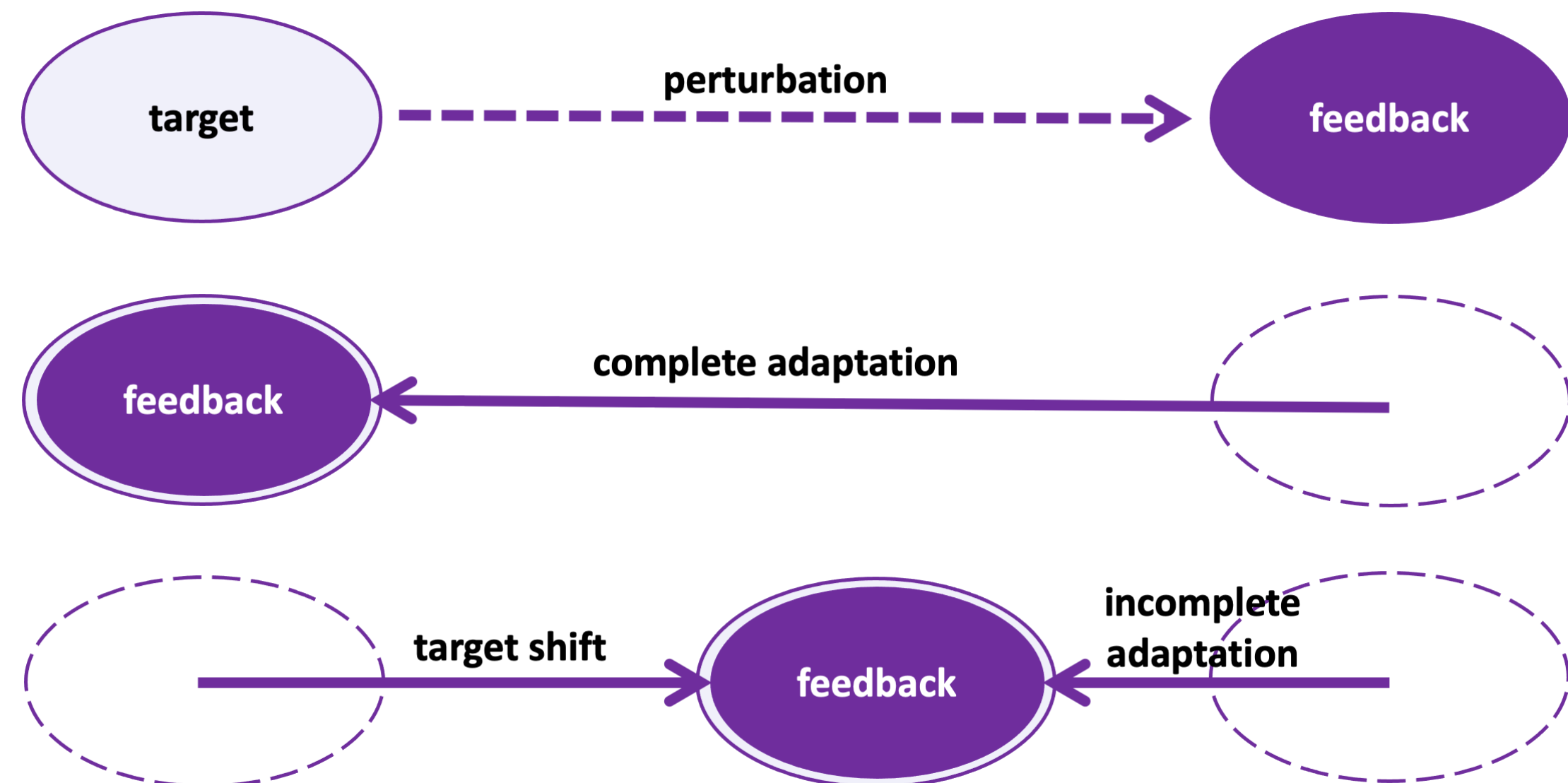


Toward understanding the limiting factors in speech auditory-motor adaptation: A new look at perceptual targets

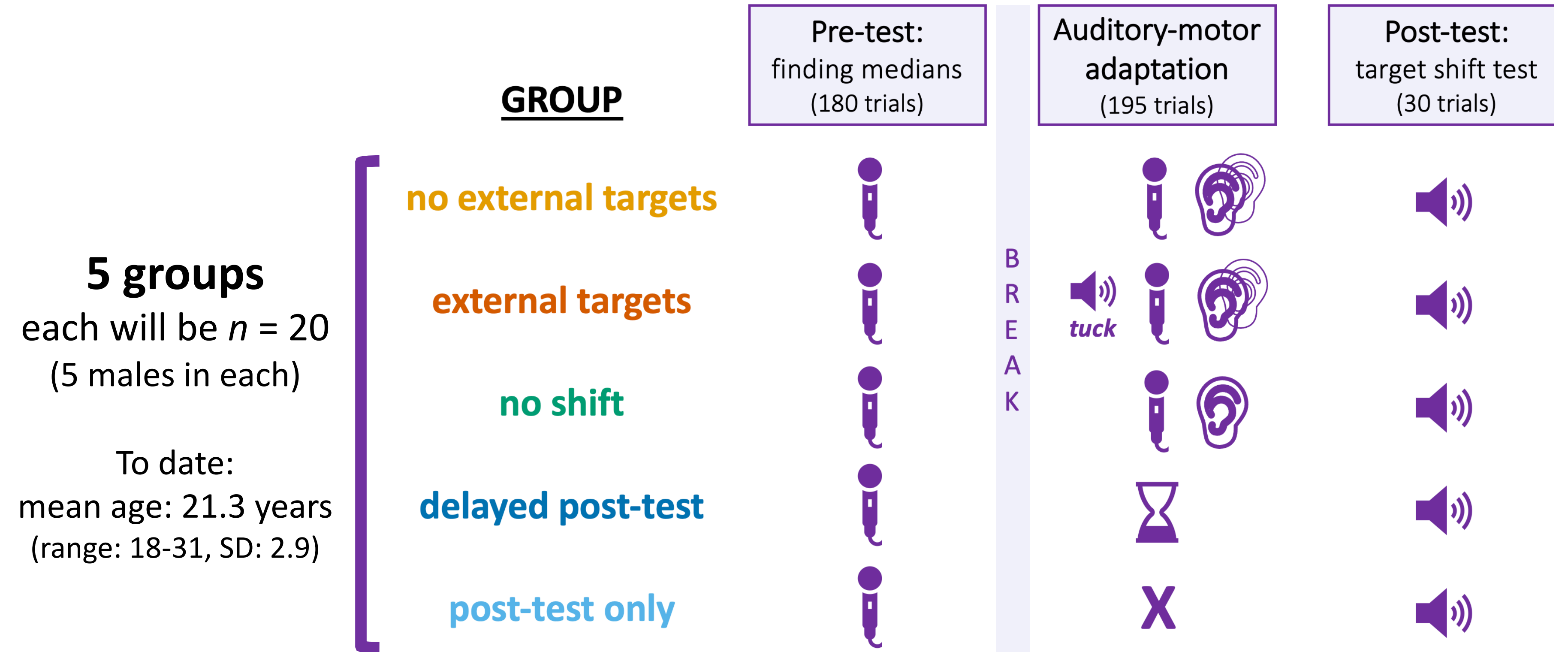


Introduction and Methods

- Typical speakers monitor their acoustic speech output and gradually adapt to compensate for altered auditory feedback.
- It remains unclear why speakers only partially compensate for such auditory perturbations.
- Altered feedback may change the speaker's intended perceptual targets. Shifts in perceptual boundaries between speech sounds have been shown to occur in parallel with motor adaptation.^{1,2}

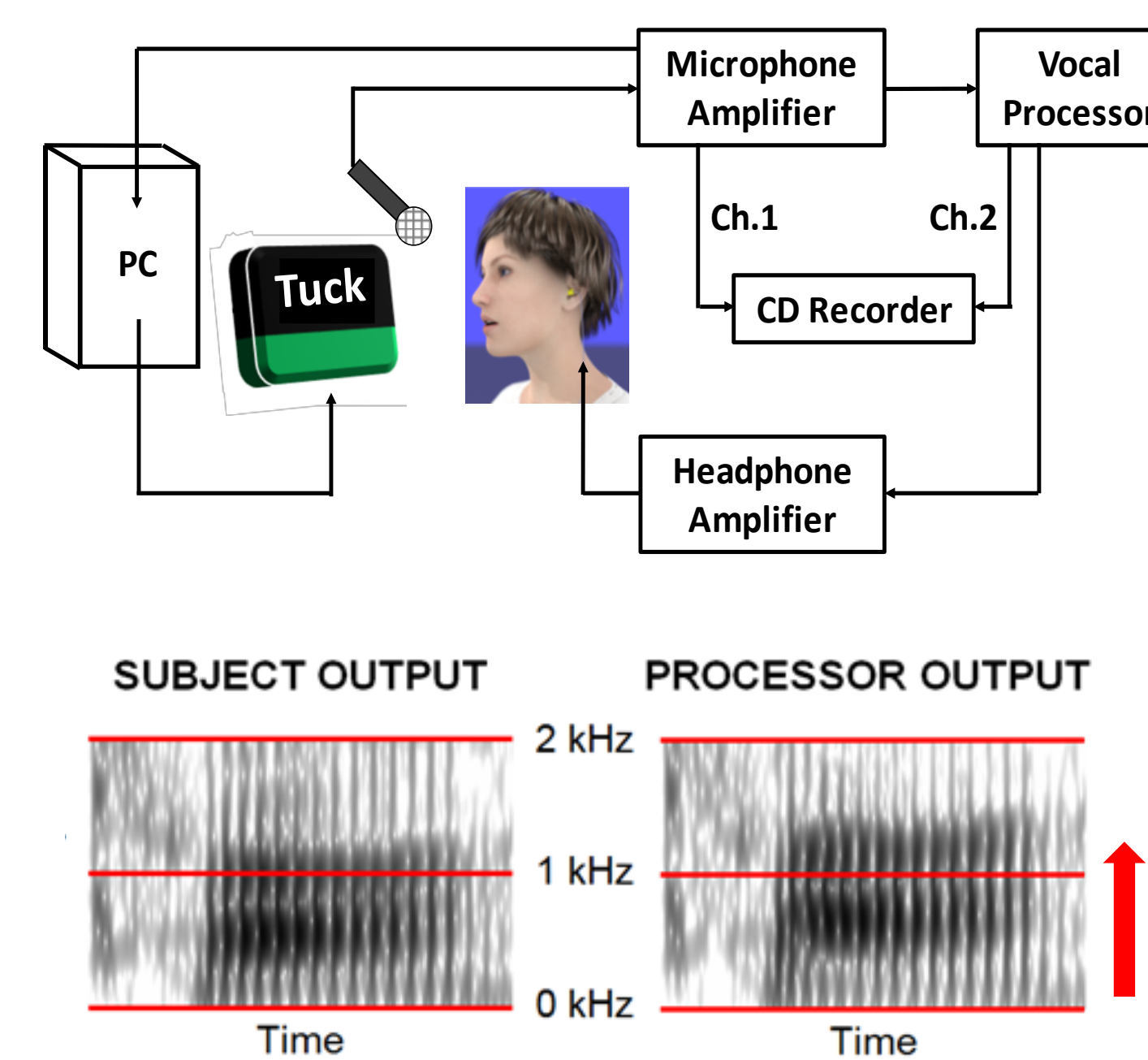


- We therefore investigated:
 - (a) whether perceptual targets change during adaptation,
 - (b) whether auditory presentation of the speaker's own baseline production "anchors" the real-world targets, and
 - (c) whether the amount of adaptation increases with auditory anchoring.



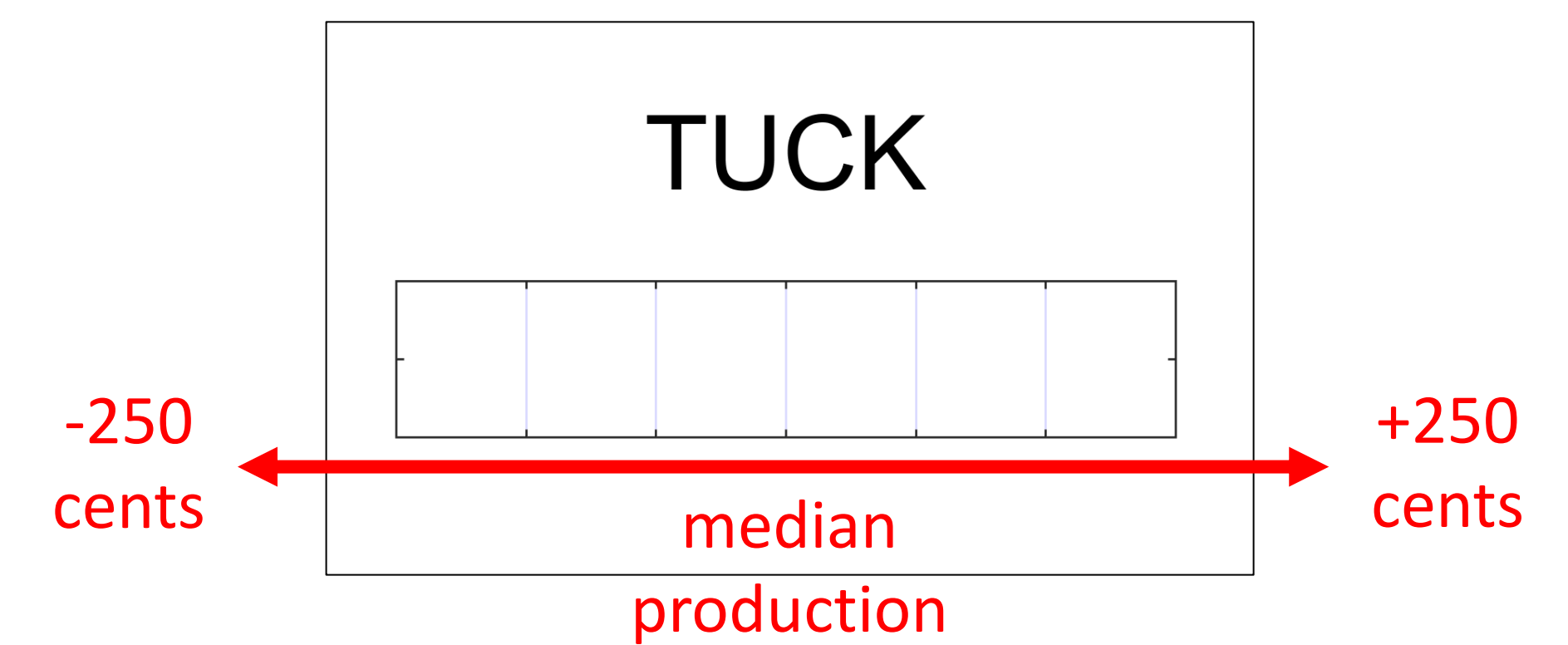
Speech auditory-motor adaptation

ramped formant shift; 250 cents up



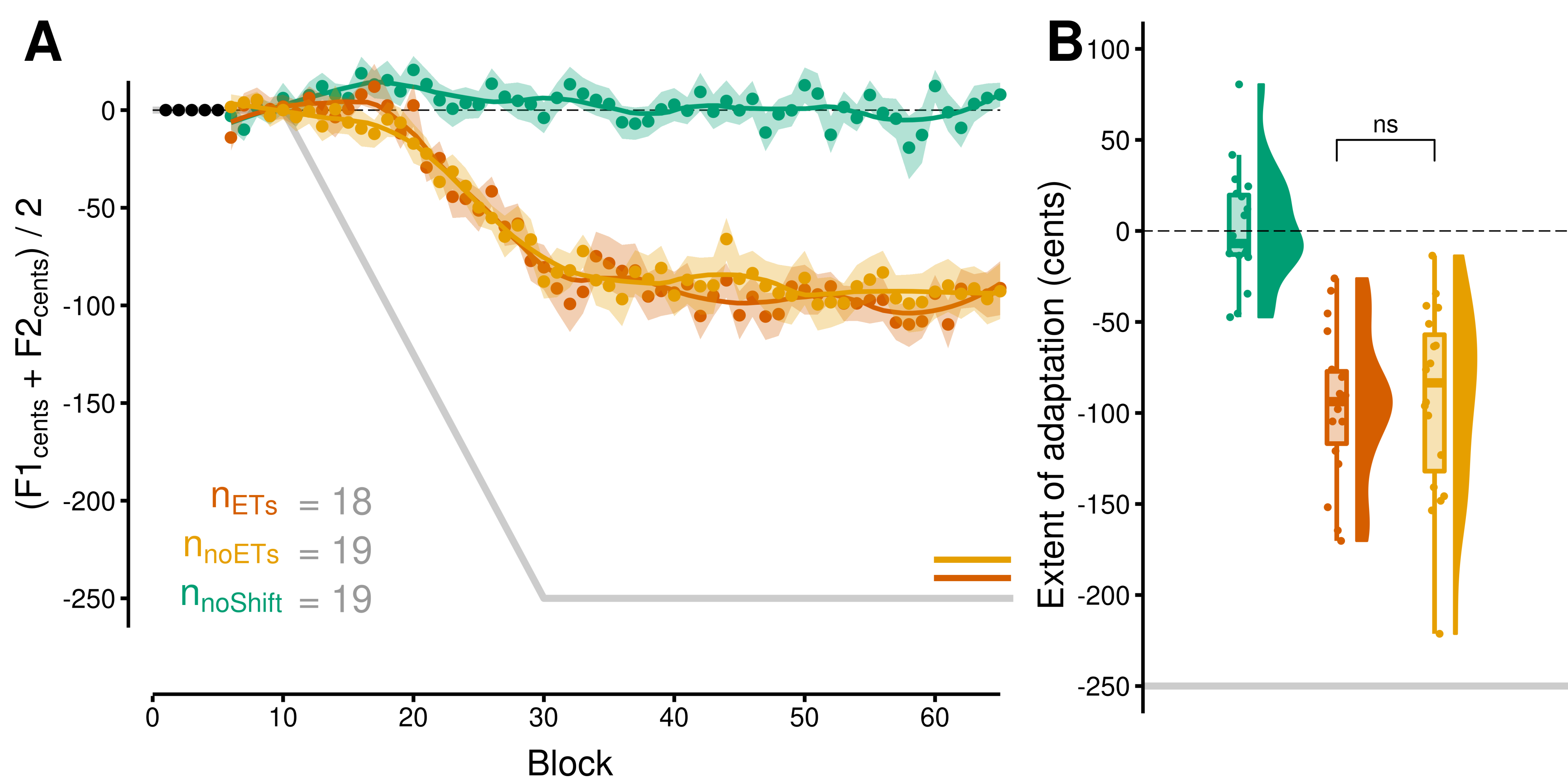
Perceptual post-test

judging auditory targets



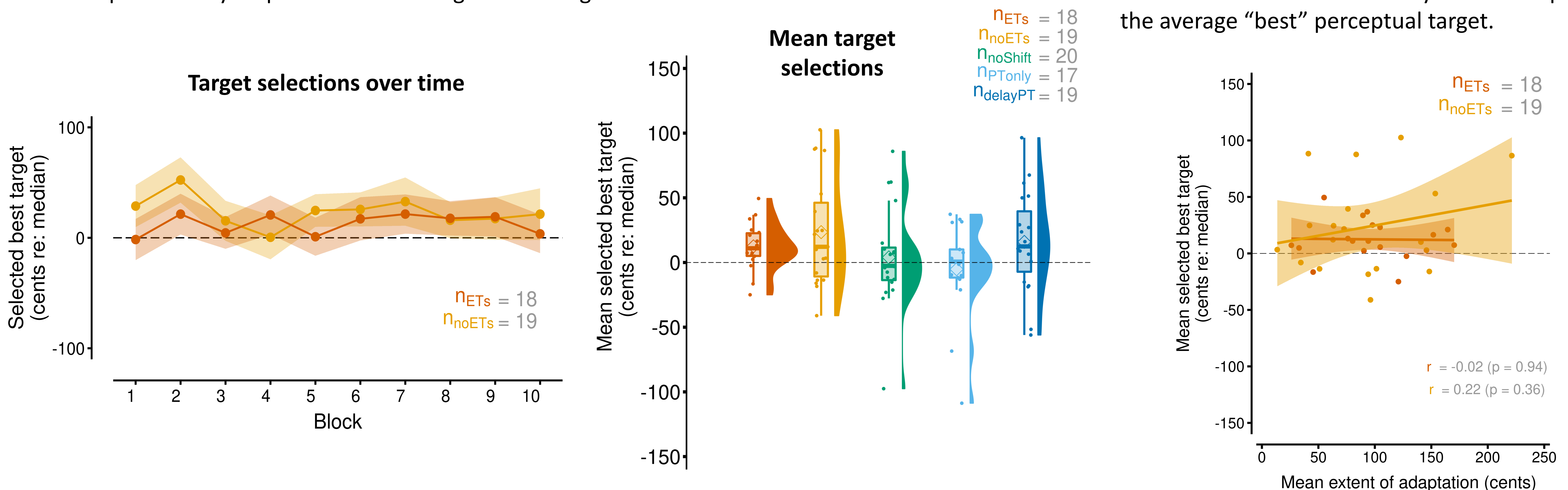
Results and Discussion

Auditory-motor adaptation task: Participants who heard their own typical production before each trial showed no improvement in adaptation.



Post-adaptation perceptual task: A small perceptual shift immediately following speech auditory-motor adaptation may be prevented with target anchoring.

Results also show that there is no correlation between the overall extent of auditory-motor adaptation and the average "best" perceptual target.



Conclusions

- Target anchoring did not substantially increase auditory-motor adaptation.
- Post adaptation, participants preferred their own productions with a small formant upshift (~25 cents).
- When considering only the first post-adaptation judgment, small perceptual shifts in the direction of the applied perturbation were prevented by target anchoring.
- In sum, perceptual shifts during speech auditory-motor adaptation are small, and anchoring may cancel this effect. However, the large amount of uncompensated shift during adaptation cannot be explained by perceptual target shift.

Acknowledgements and References



¹ Shiller, D., Sato, M., Gracco, V., and Baum, S. (2009). Perceptual recalibration of speech sounds following speech motor learning. *J Acoust Soc Amer* 125(2): 1103-1113.
² Lametti, D., Rochet-Capellan, A., Neufeld, E., Shiller, D., and Ostry, D. (2014). Plasticity in the human speech motor system drives changes in speech perception. *J Neurosci* 34(31): 10339-10346.