

INTRODUCTION

- Performing a movement requires the planning and predicting of the sensory outcomes of the movement.
- Movement errors are detected by the CNS by comparing our predictions with incoming sensory information. Succeeding movements are made to reduce the perceived errors. This process of error reduction is called error-based learning.
- In this study, we adopted a paradigm commonly used in limb studies to examine learning in speech production.
- We hypothesized that different presentation style and ramp of perturbed auditory feedback will demonstrate different extent of adaptation. For example, participants who are given the sudden presentation of auditory feedback will have a lower extent of adaptation due to the induced awareness of the perturbation, and adaptation response is further reduced if the perturbed feedback is formant-clamped.

METHODS

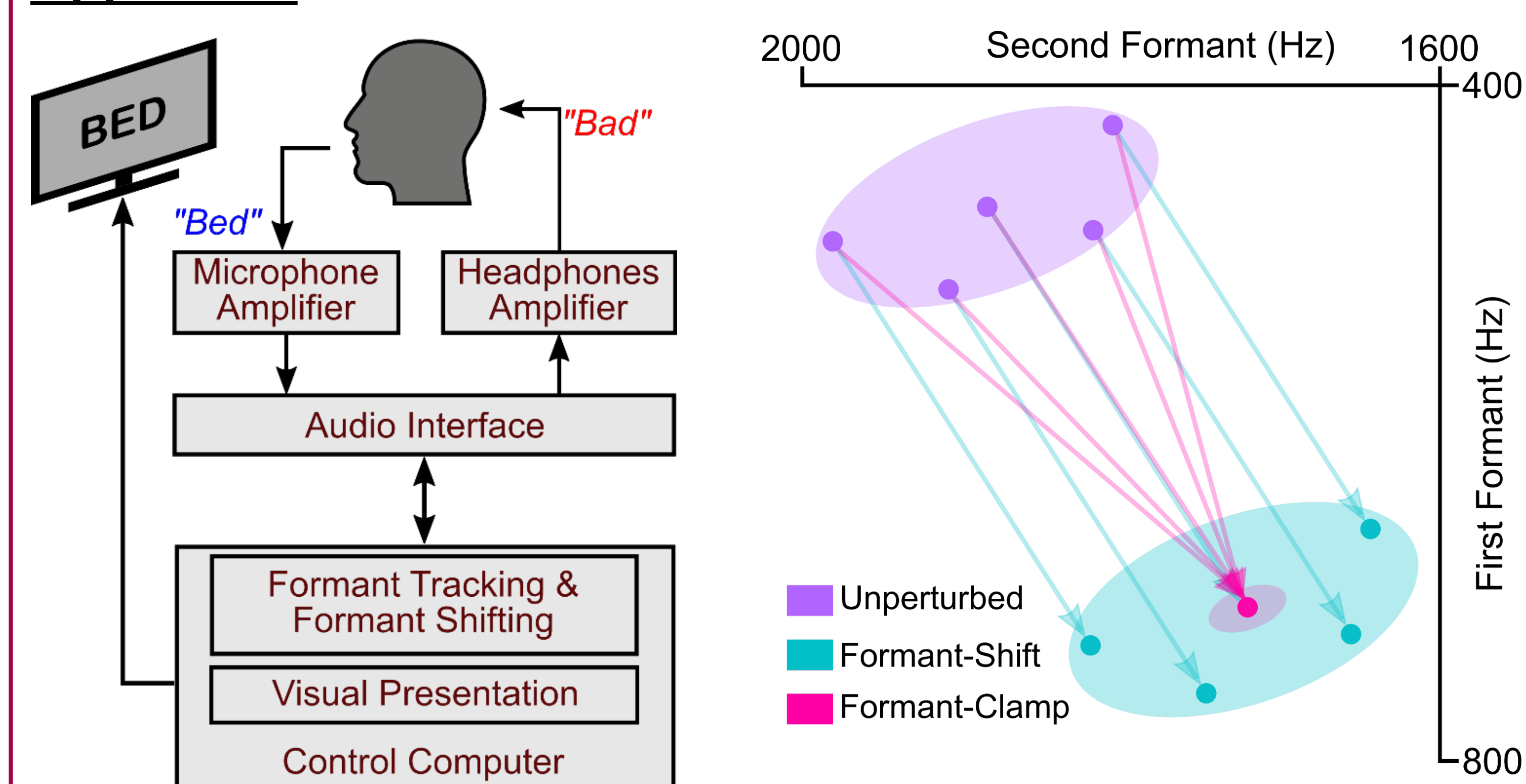
Participants

- 47 adults ($M_{age} = 23.8$ years, $SD_{age} = 6.4$).

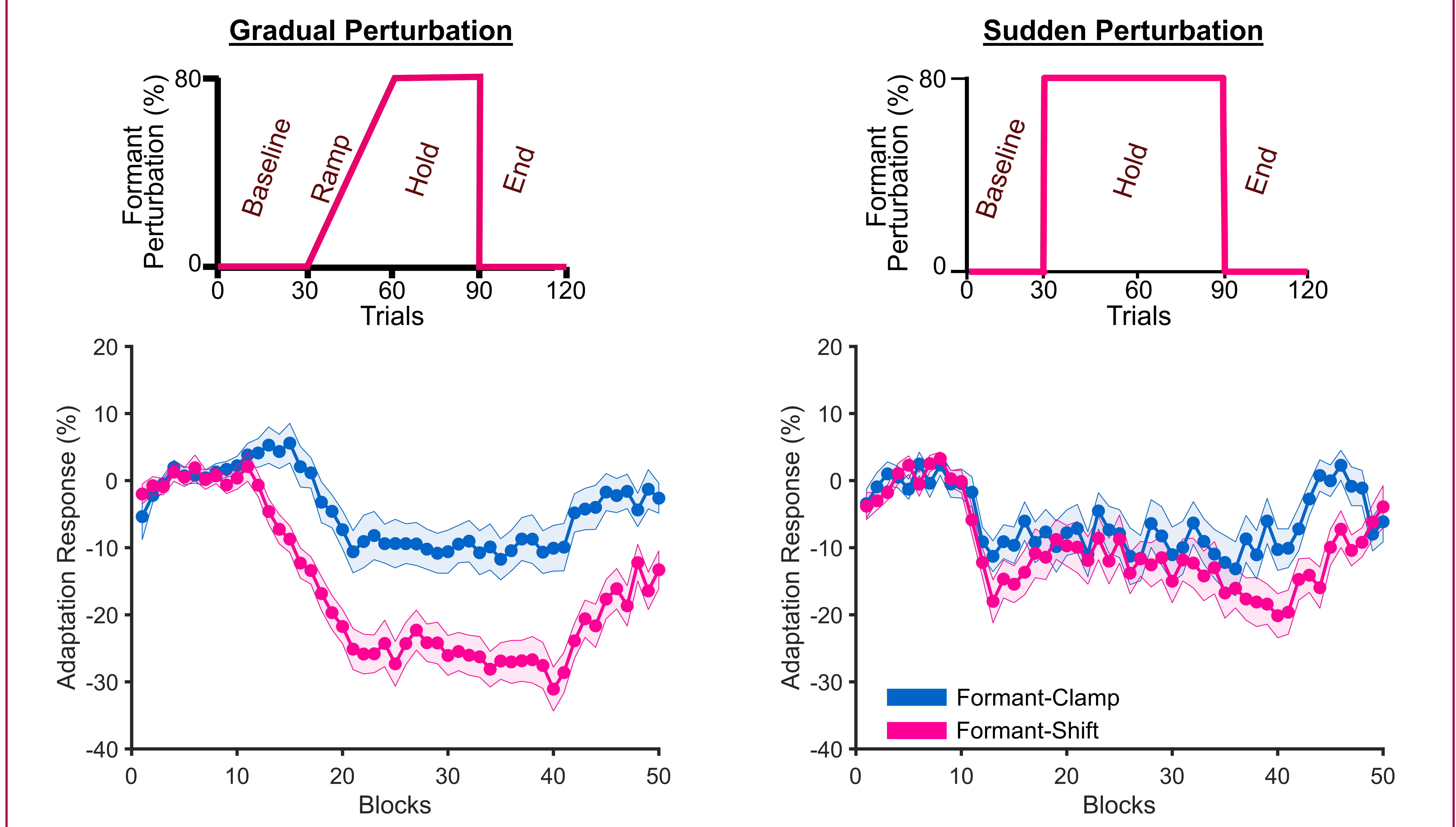
Tasks

- Practice task: familiarizes participants to the experiment set-up.
- Pre-test task: obtains the participant-specific F1 and F2 trajectories and finds the middle production of the main vowel used in this study, /ε/.
- Adaptation task: auditory perturbation is applied to participants' auditory feedback. Two types:
 - Formant-clamp and formant-shift

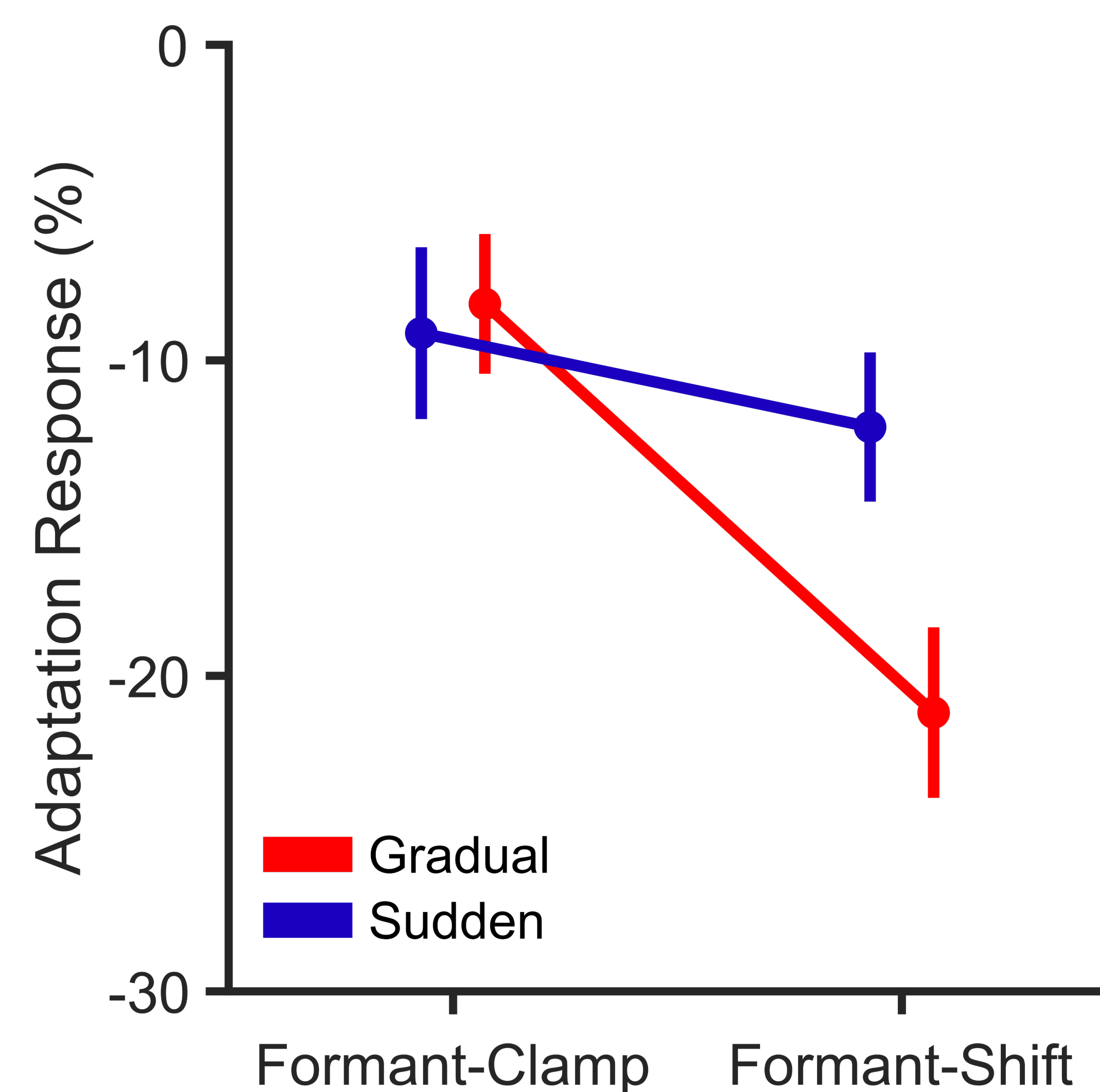
Apparatus



RESULTS



Average Adaptation Responses in the Hold Phase



CONCLUSIONS

- Preliminary results show:
 - 1) Greater extent of adaptation for the formant-shift condition with the gradual ramp style in comparison to the formant-clamp condition with the gradual ramp style.
 - 2) No difference between the formant-clamp and formant-shift conditions when perturbations are presented using the sudden ramp style.
- In conclusion, the CNS potentially evaluates errors based on whether the errors are:
 - 1) recognized by the speaker, and
 - 2) self-induced and can be adjusted by the speaker

References:

Daliri, A., & Dittman, J. (2019). Successful auditory motor adaptation requires task-relevant auditory errors. *Journal of neurophysiology*, 122(2), 552-562.
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