

Introduction

- Auditory feedback is crucial for speech production [1]
- Studies on auditory feedback during speech production find two types of responses to unexpected feedback:
 - Compensation: short-term, online-based, corrective articulations [2]
 - Adaptation: longer-term changes in feedforward articulation [3,4]
- Whether or not people show compensation and/or adaptation might depend on the context of the unexpected feedback

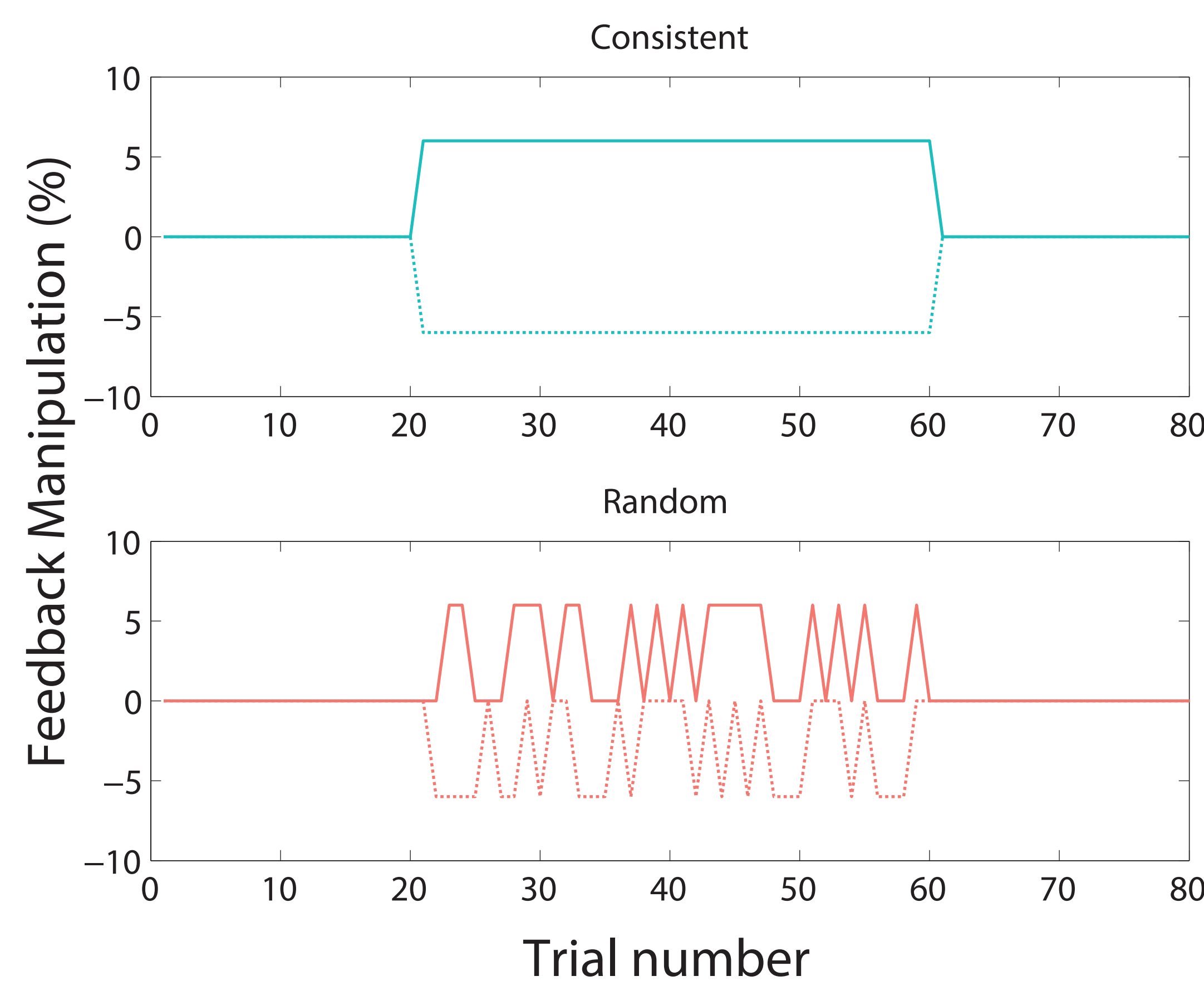
Does a consistent error in auditory feedback lead to more adaptation, compared to inconsistently altered feedback?

- We predict that consistently altered feedback leads to an increase in adaptation responses.

Methods and Measures

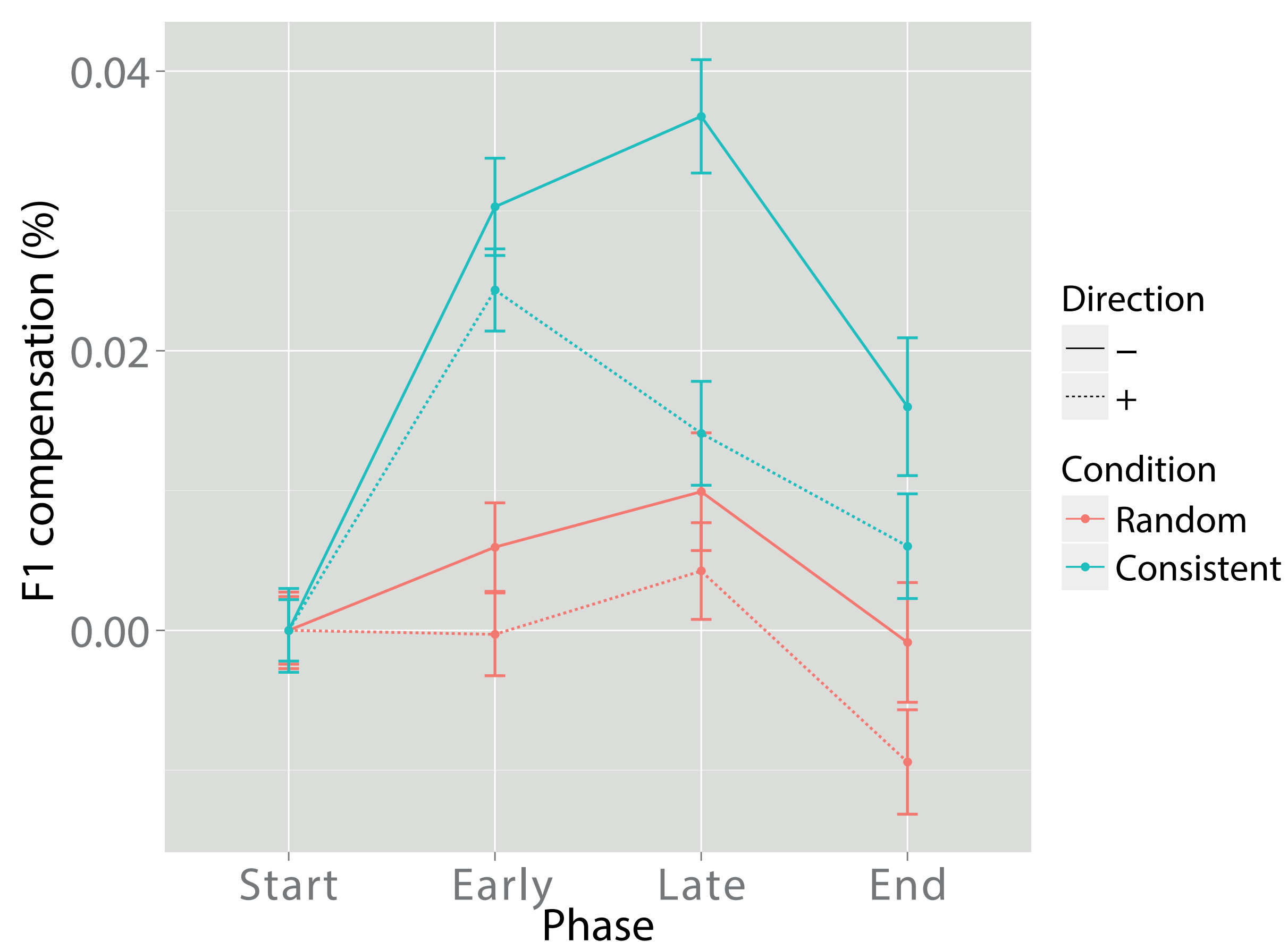


- task: produce 3s-long /e:/
- 6.6% perturbation of F1 (positive or negative)
- 4 blocks: 2 conditions * 2 directions



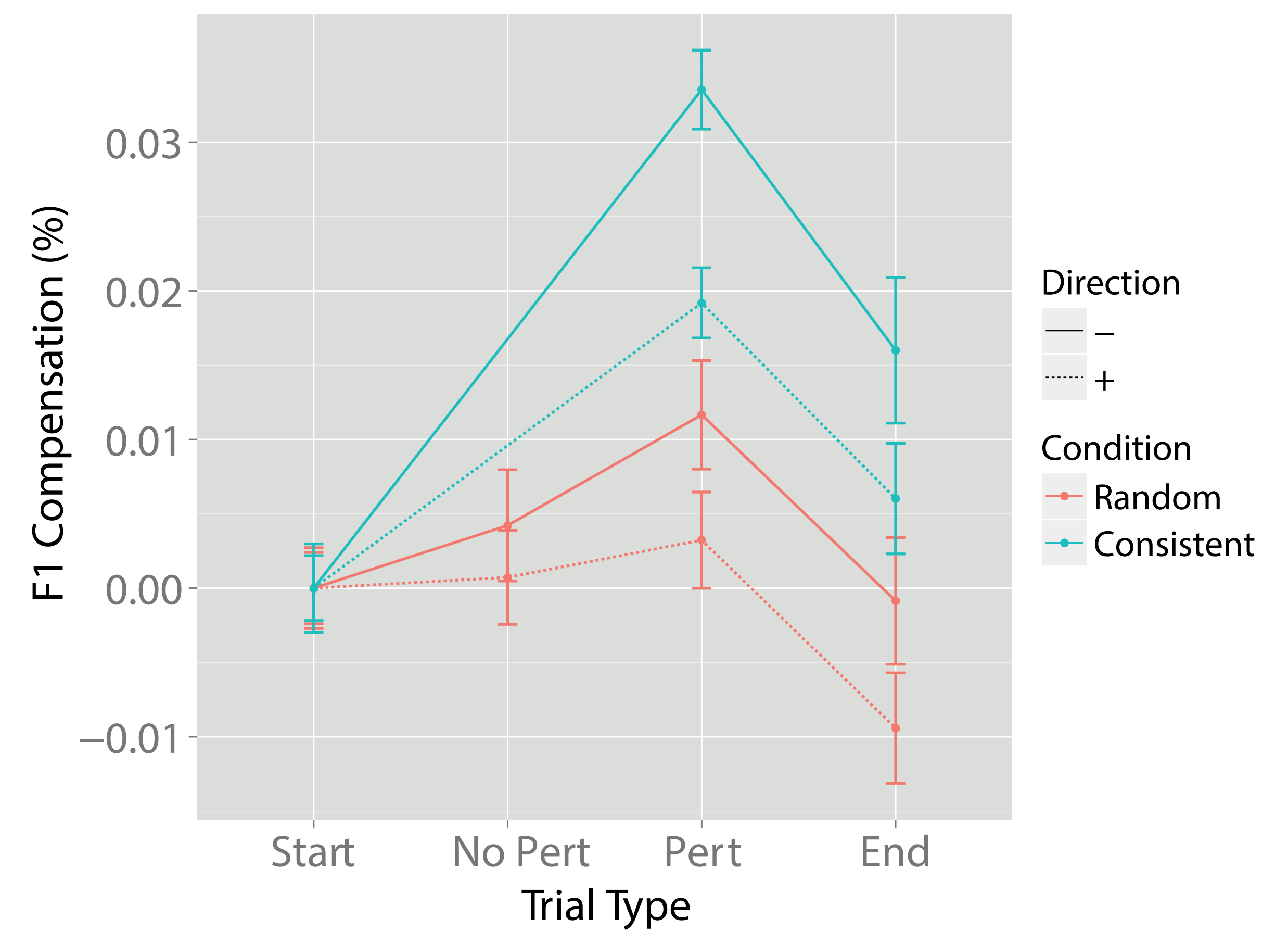
- 4 phases of 20 trials: start, early perturbation, late perturbation, end
- F1 compensation: change in F1 relative to baseline, opposite to perturbation direction
- Adaptation Rate: slope of F1 compensation over trials in experimental phases 2 and 3

F1 as a function of Experiment Phase



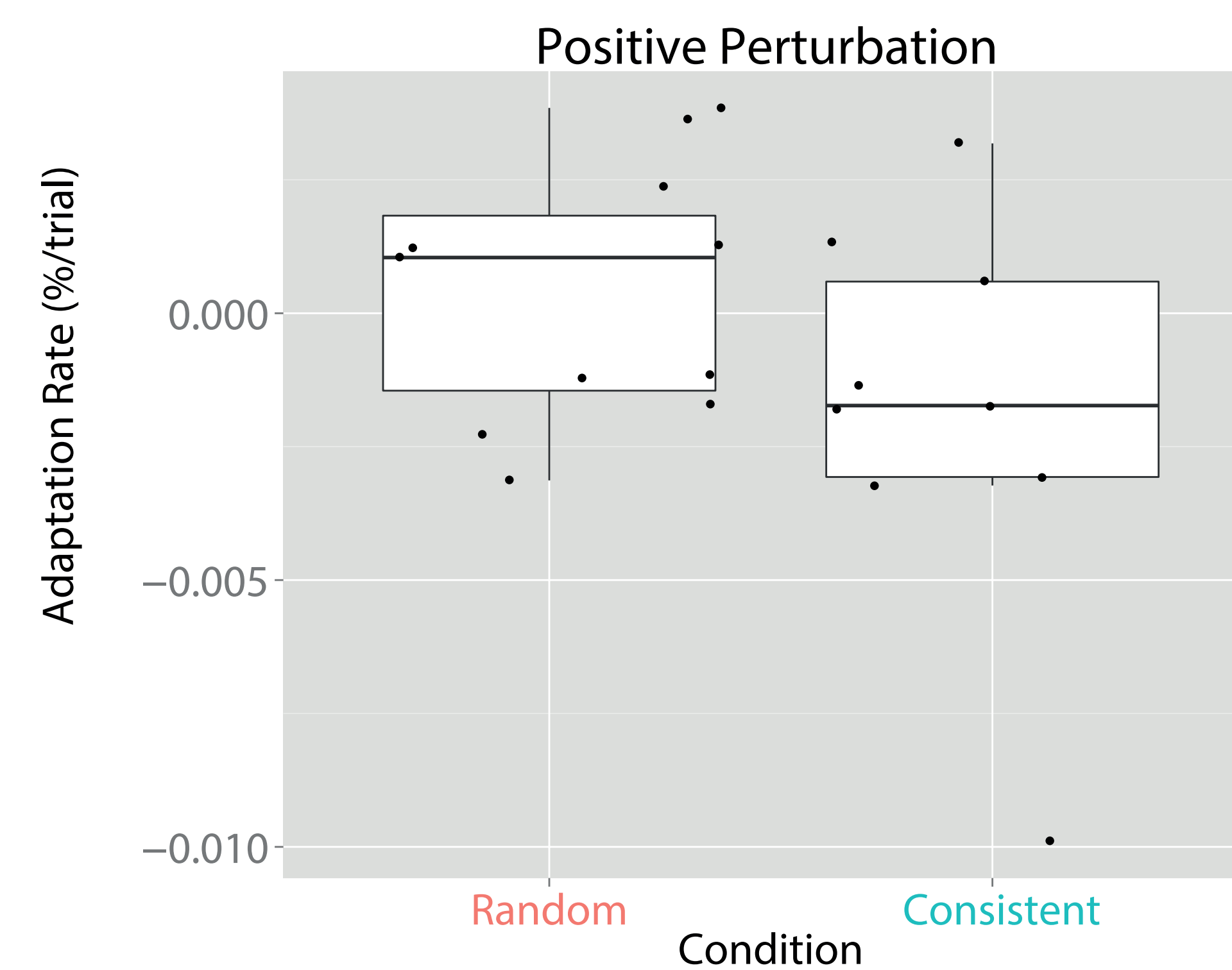
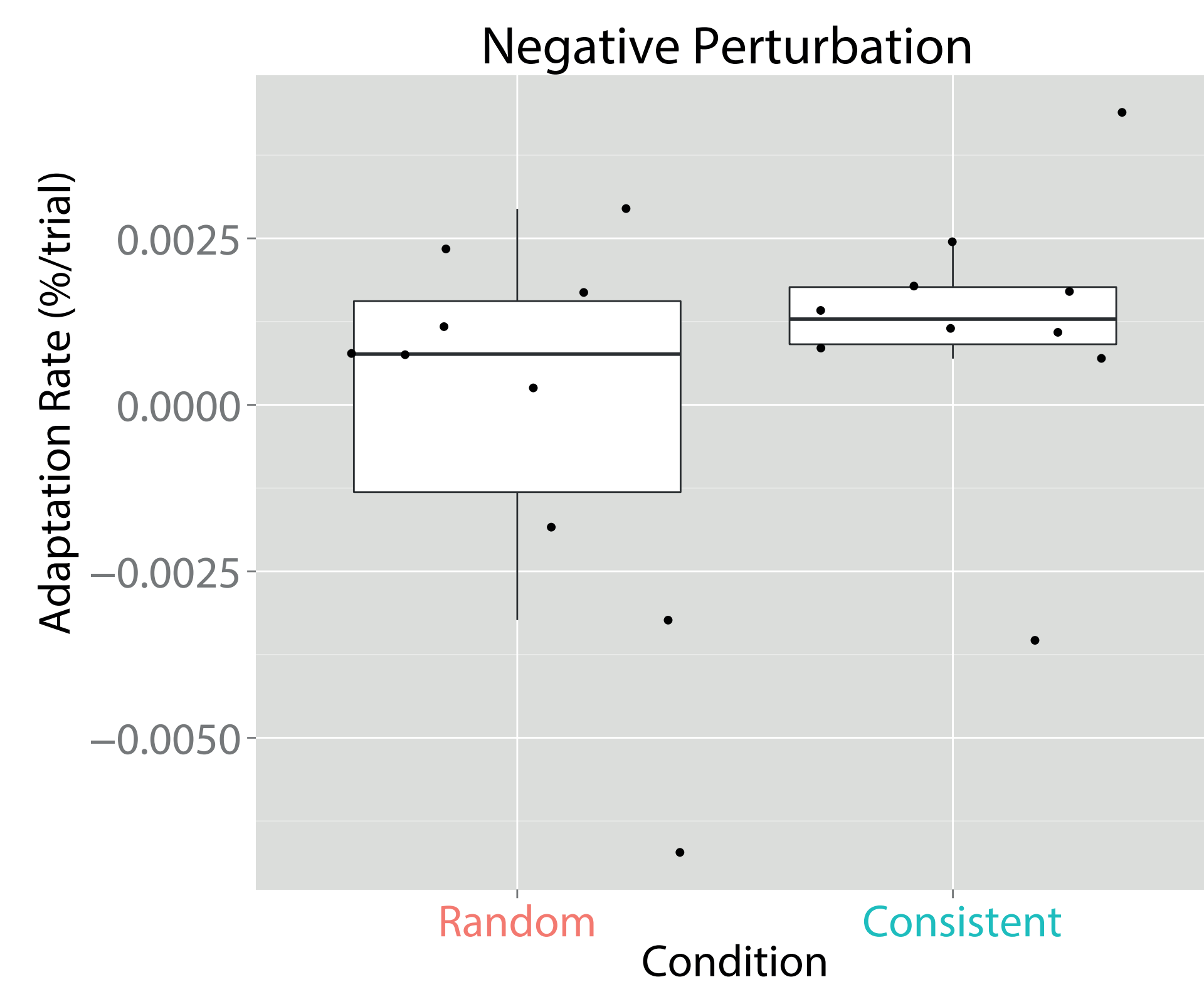
F1 compensation in perturbation phases for consistent but not for random condition

F1 as a function of Trial Type



F1 compensation in perturbation trials for consistent, but not for random condition

Adaptation Rate



Consistent condition shows increased F1 compensation compared to random condition at the group level, suggesting an adaptation effect.

For negative perturbation, same number of subjects show adaptation for both conditions, but more followers for random condition.

Feedback consistency affects adaptation effects, though with large interindividual variability.

References

- [1] Guenther, F. H., Ghosh, S. S., & Tourville, J. A. (2006). Neural modeling and imaging of the cortical interactions underlying syllable production. *Brain and Language*, 96(3), 280-301.
- [2] Burnett, T. A., Freedland, M. B., Larson, C. R., & Hain, T. C. (1998). Voice F0 responses to manipulations in pitch feedback. *The Journal of the Acoustical Society of America*, 103(6), 3153-3161.
- [3] Purcell, D. W. and K. G. Munhall (2006). "Adaptive control of vowel formant frequency: Evidence from real-time formant manipulation." *Journal of the Acoustical Society of America* 120(2): 966-977.
- [4] Houde, J. F. and M. I. Jordan (1998). "Sensorimotor adaptation in speech production." *Science* 279(5354): 1213-1216.

m.franken@donders.ru.nl
neurobiologyoflanguage.com