Listeners Converge to Fundamental Frequency (F0) in Synchronous Speech

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📚 Background

- In conversation, interlocutors' speech tends to become increasingly similar
- This "convergence" can be difficult to measure, particularly in lab settings [1]
- Still, recent studies involving fundamental frequency (F0; pitch height) have yielded promising results [2]
- We aimed to replicate these as a stepping stone towards future experiments

RQ: Do listeners converge to F0 when only instructed to converge to speech rate?

Participants

32 healthy female Dutch native speakers

Assigned to one of two groups (N = 16):
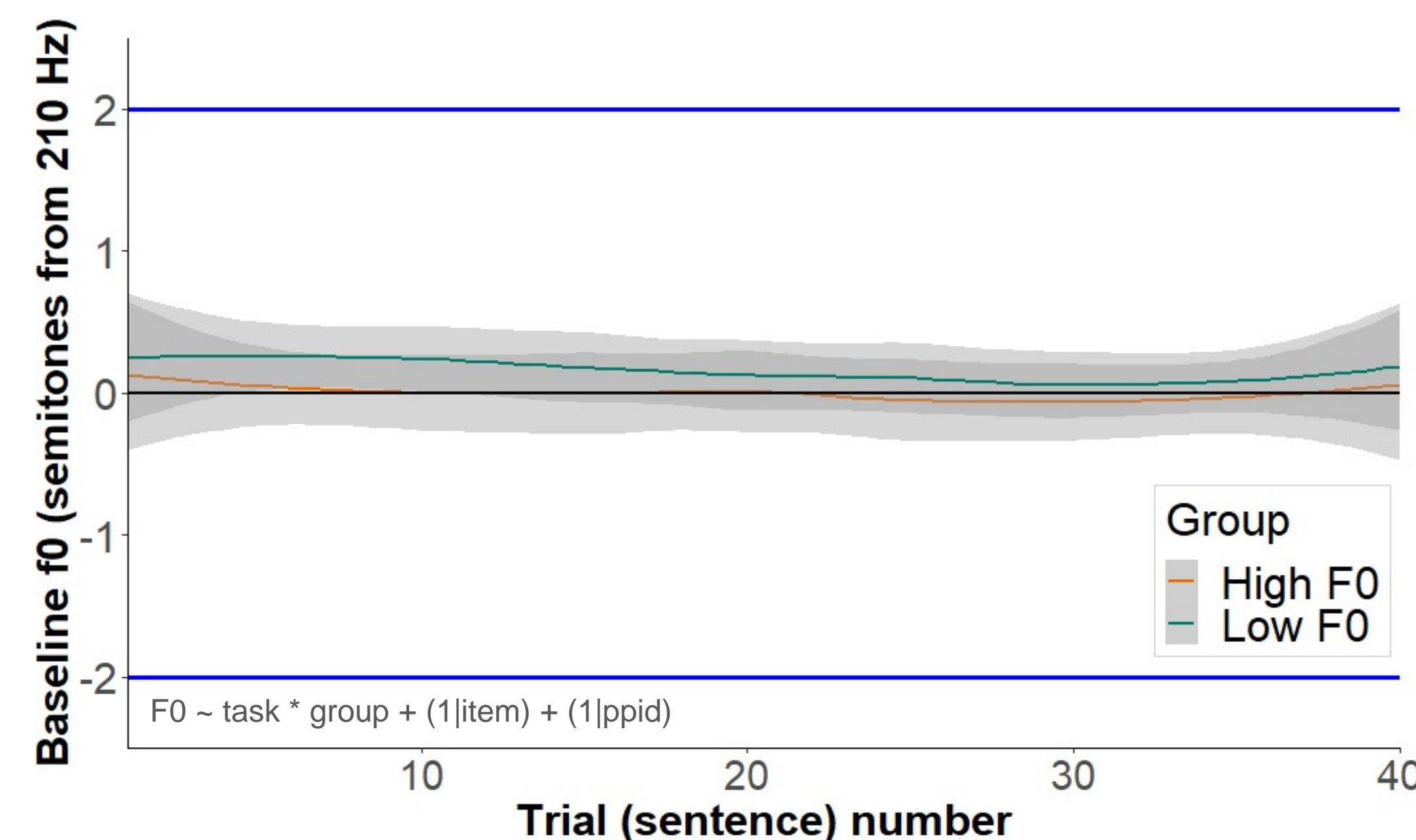
➢ High F0 (pitch)
➢ Low F0 (pitch)

Stimuli

85 Dutch sentences in 3 sets. Sets A & B had 40 sentences each, and set C had 5 sentences.

Manipulation

Model talker recordings

High F0 Stimuli
Shifted to 236 Hz
(210 + 2st)

**Low F0 Stimuli**
Shifted to 187 Hz
(210 - 2st)

Reading Task

Participants read 40 sentences (Set A or B) at their natural F0

Participants read at their own pace after a 3-second countdown (sentence visible during countdown).

Practice Task

Participants read 5 sentences (Set C) in synchrony with a model talker with high or low F0

Participants read in synchrony with the model talker after a 3-second countdown (sentence visible during countdown).

Sync Speech Task

Participants read 80 sentences (Sets A + B) in synchrony with a model talker with high or low F0

Participants read in synchrony with the model talker after a 3-second countdown (sentence visible during countdown).

Reading Results

The observed mean F0 baseline was 210.17 Hz.

No significant difference between groups in F0 baselines

$F0 \sim task * group + (1|item) + (1|ppid)$

Sync Speech Results

High F0 group: +6 Hz
Low F0 group: -4 Hz

Both groups converged
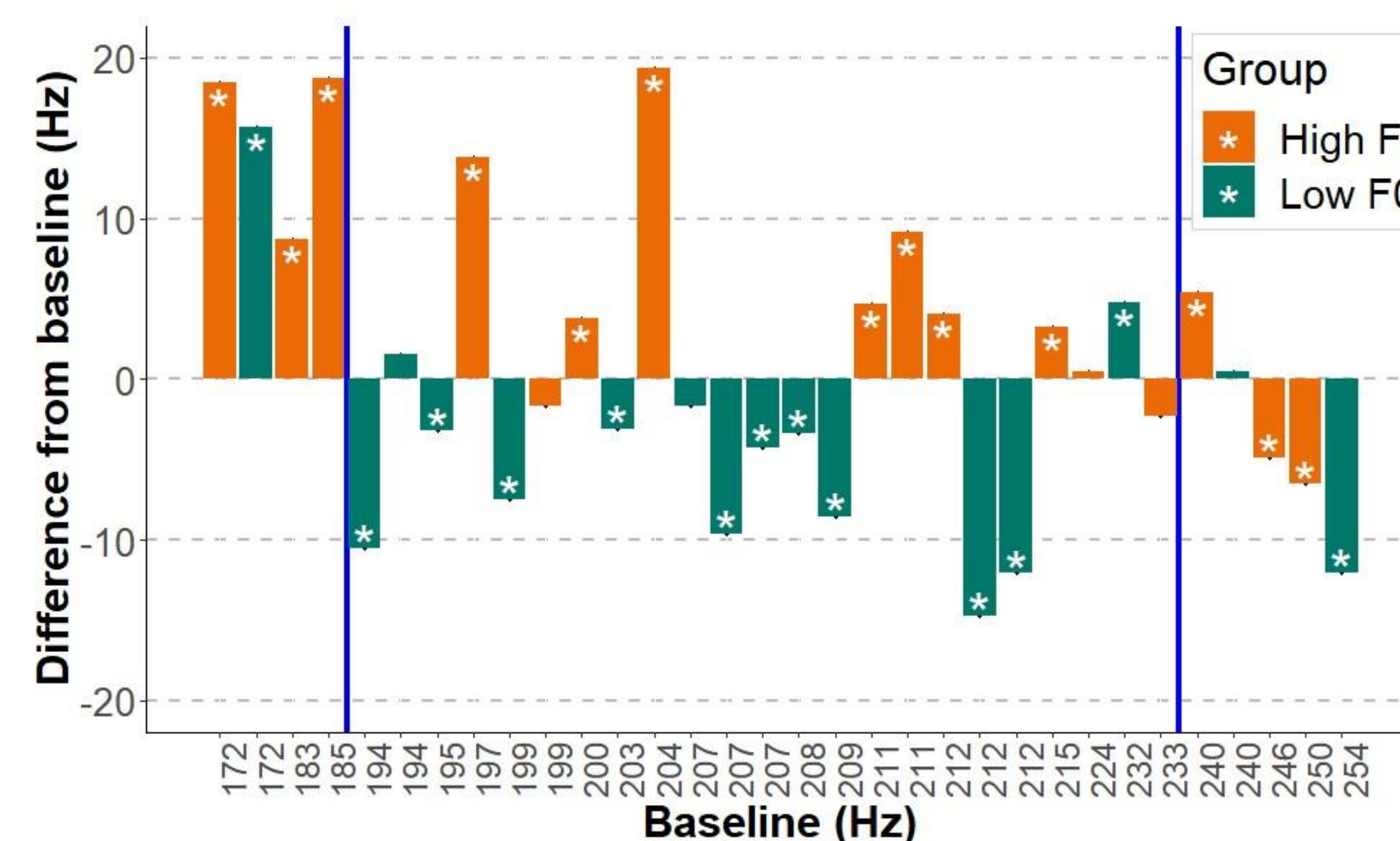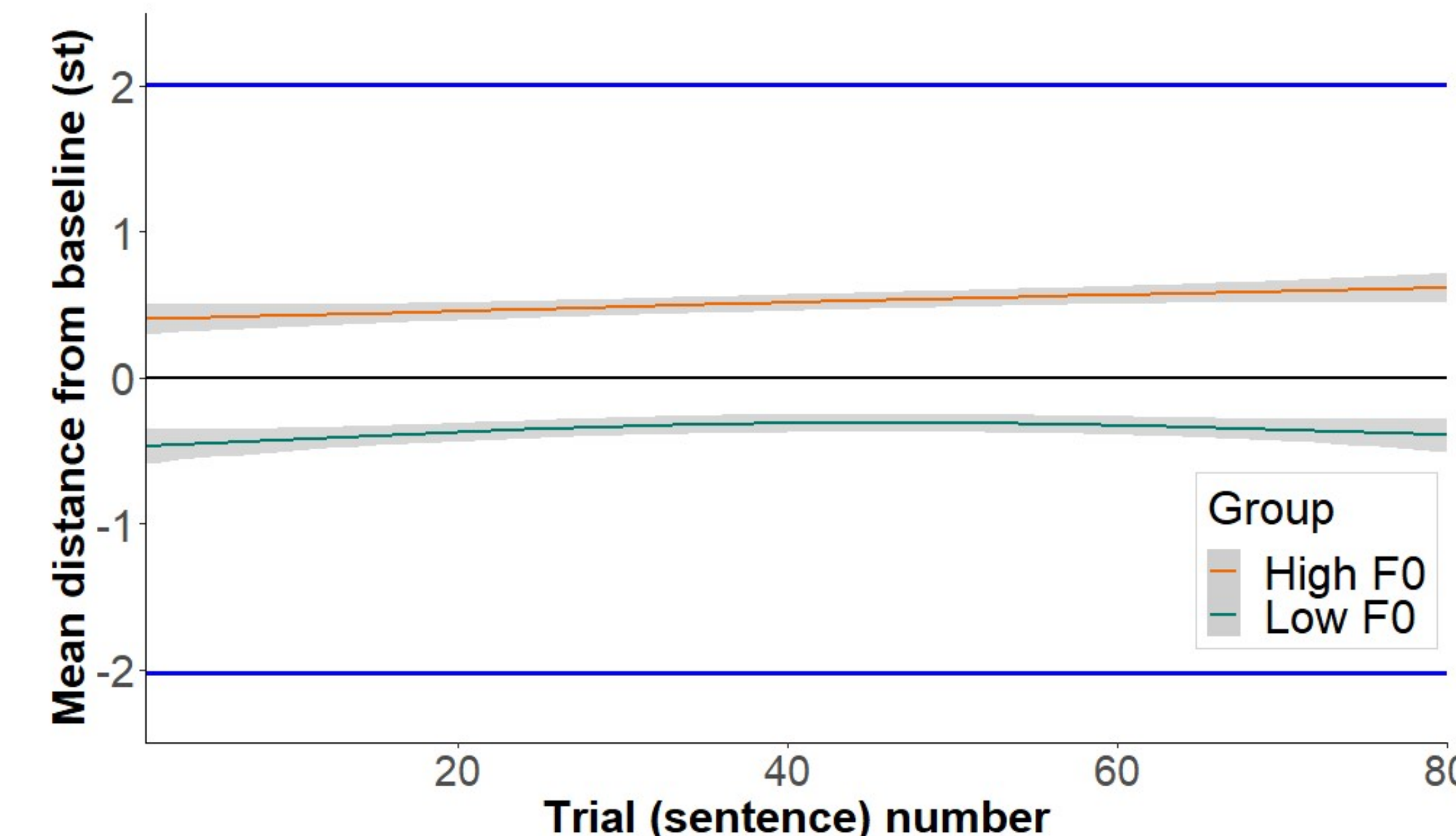
Per-Participant Results

24 out of 32 participants converged, 2 diverged, and 6 did not significantly change their mean F0 between tasks

Conclusion

- Without explicit instruction to do so, **participants in both F0 groups converged to the model talker's manipulated F0**
- We replicated the findings of [2] with various stimulus optimizations, which likely led to a higher proportion of convergers

Save for later!

💬 Contact

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💡 Future Work

Investigating the role of talker information in convergence to F0 in synchronous speech.

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References
[1] Pardo, J. S., Urmanche, A., Wilman, S., & Wiener, J. (2017). Phonetic convergence across multiple measures and model talkers. *Attention, Perception, & Psychophysics, 79*, 637-659.
[2] Bradshaw, A. R., & McGettigan, C. (2021). Convergence in voice fundamental frequency during synchronous speech. *PloS one, 16*(10), e0258747.