What makes listeners infer teaching intentions?

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Introduction

1. Experts tend to change their behaviour specifically for teaching purposes (e.g., Brand et al., 2002, Saint-Georges et al., 2013).

2. Our previous studies revealed that expert pianists modulated their sounds to teach musical expressive techniques such as articulation and dynamics (Tominaga et al., 2021)

   In particular, pianists tended to play slower and exaggerate each technique when they had an intention to teach.

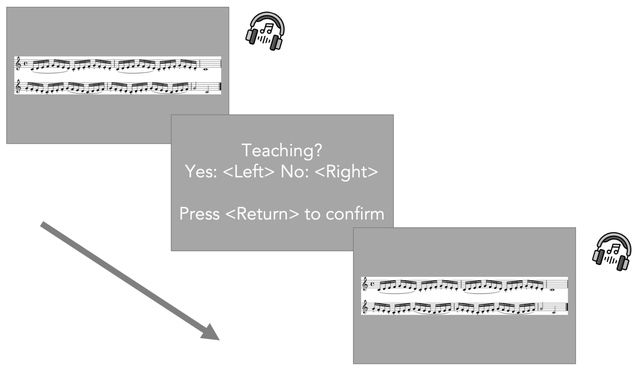
3. Here we investigated whether such modulations are also perceived by listeners as conveying pedagogical intentions.

Methods

- 20 participants (on average 11.85 years of musical training)

Task

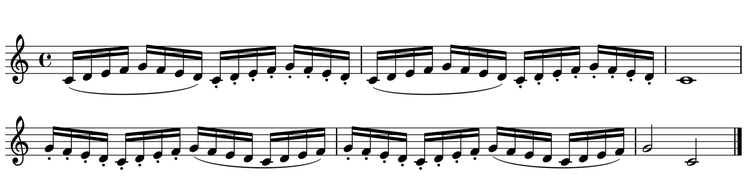
- Listen to recordings and judge whether each recording was produced for teaching purposes or not.



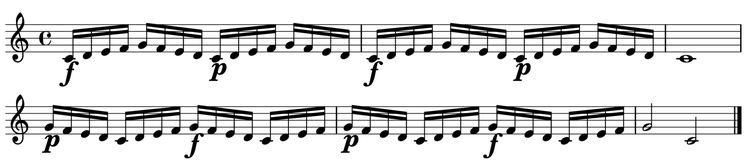
Stimuli

- We randomly sampled performances from our previous experiment (Tominaga et al., 2021, experiment 1).

1. 48 recordings from the piece with articulation



2. 48 recordings from the piece with dynamics



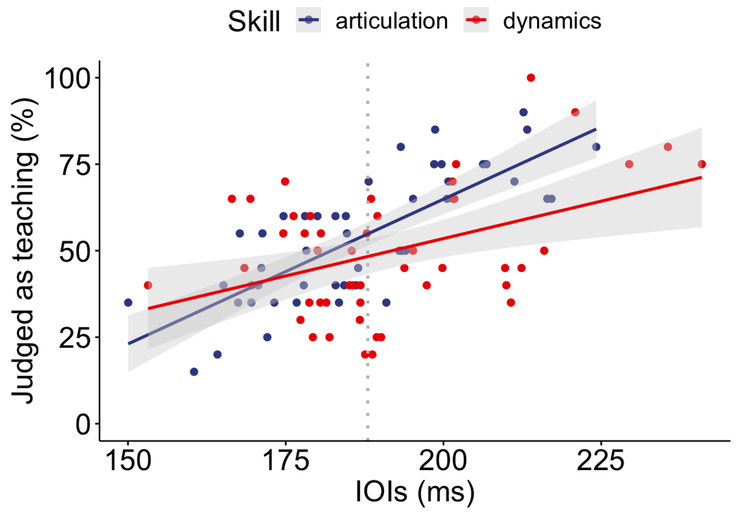
- 2 blocks (articulation, dynamics)
- Each block: 4 practice trials and 48 experimental trials.
- The order of the blocks was counterbalanced across participants. The order of the recordings was randomised across participants.

Results

What kind of performances were likely to be judged as teaching performances?

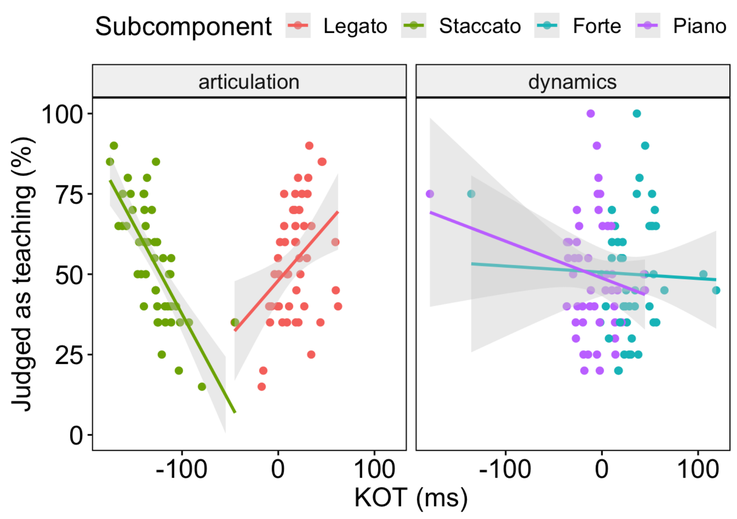
- We characterised performances in terms of:
  - Tempo (IOIs)
  - Articulation (KOT; legato/staccato)
  - Dynamics (KV; forte/piano, Velocity difference; forte to piano/piano to forte)
- Each dot represents a characteristic of each recording.

1. Performances with slower tempo.



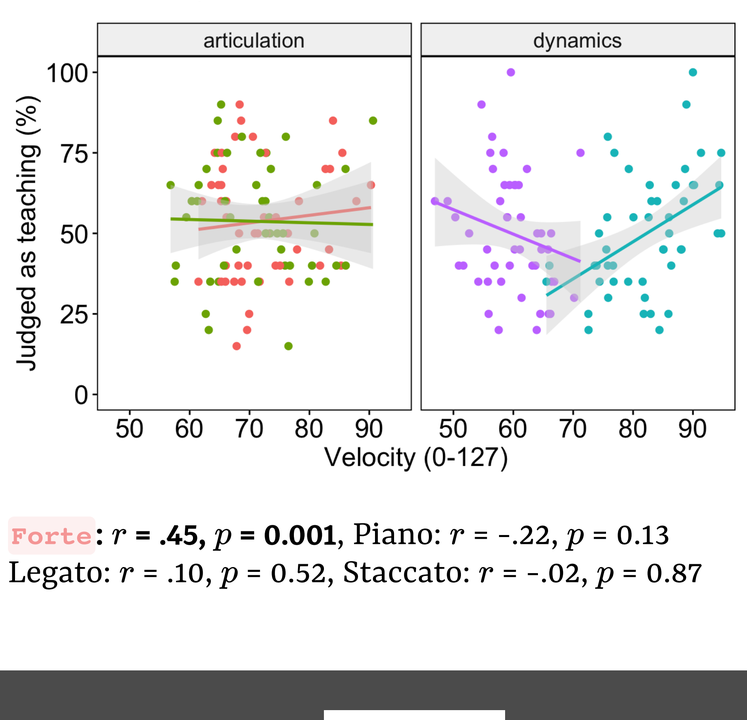
`Articulation`: r = .77, p < 0.001
`Dynamics`: r = .42, p = 0.003

2. Performances with longer legato and shorter staccato.



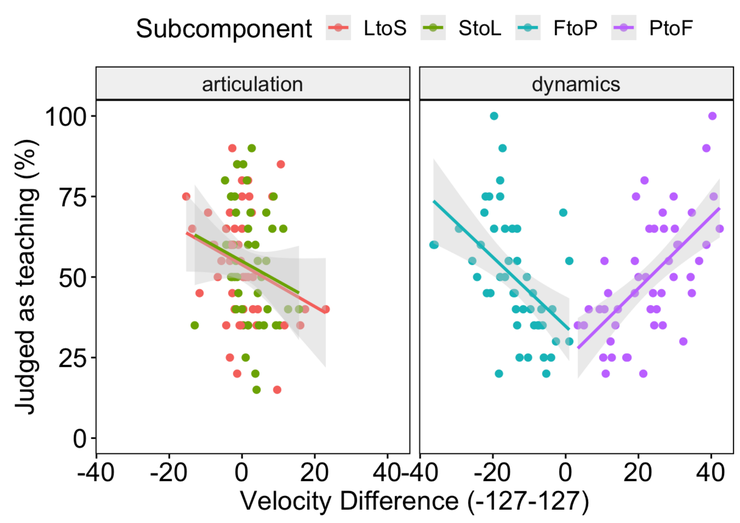
`Legato`: r = .40, p = 0.005, `Staccato`: r = -.73, p < 0.001
Forte: r = -.04, p = 0.81, Piano: r = -.19, p = 0.19

3. Performances with louder forte (but not softer piano).



`Forte`: r = .45, p = 0.001, Piano: r = -.22, p = 0.13
Legato: r = .10, p = 0.52, Staccato: r = -.02, p = 0.87

4. Performances with larger contrast between forte and piano.



`Forte to Piano`: r = -.50, p < 0.001
`Piano to Forte`: r = .62, p < 0.001
Legato to Staccato: r = -.26, p = 0.071, Staccato to Legato: r = -.19, p = 0.21

Which feature of performance contributes the most to participants' judgments as teaching performances?

- 4 regression models for each musical expressive techniques (i.e., legato, staccato, forte, piano)
  - Predictor variables: IOIs, KOT, KV, Velocity difference

1. Overall, tempo (IOIs) is a significant predictor for all models, which suggests performances with slower tempo are likely to be judged as teaching performances, regardless of the techniques.

2. In addition to tempo, a relevant predictor for each model (KOT, KV, Velocity difference) contributes to participants' judgements as teaching, which suggests performances with particular exaggeration of expressive techniques (e.g, exaggerating dynamics contrast when playing the piece with dynamics) are likely to be judged as teaching performances.

Discussion

1. Our findings suggest that musicians infer teaching intentions by relying on specific performance features.

2. Future studies should investigate whether and how perceiving pedagogical intentions is beneficial for learning (e.g., attention, memory, imitation).

References

Brand, R. J., Baldwin, D. A., & Ashburn, L. A. (2002). Evidence for 'motionese': modifications in mothers' infant–directed action. *Developmental science, 5*(1), 72-83.

Saint-Georges, C., Chetouani, M., Cassel, R., Apicella, F., Mahdhaoui, A., Muratori, F., ... & Cohen, D. (2013). Motherese in interaction: at the cross-road of emotion and cognition?(A systematic review). *PloS one, 8*(10), e78103.

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