What makes musicians infer teaching intentions?

Atsuko Tominaga, Günther Knoblich & Natalie Sebanz
Department of Cognitive Science, Central European University (Austria)
Email: tominaga_atsuko@phd.ceu.edu

Introduction

- Perceiving pedagogical intentions is vital when learning skills from others.
- Experts modulate their behaviours for teaching (e.g., motherese, motionese; Saint-Georges et al., 2013; Brand et al., 2002).
- Our previous study showed that expert pianists exaggerated relevant aspects of musical expressive techniques to be taught (Tominaga et al., in revision).

Aims

- We investigated whether such sound modulations for teaching were perceived by listeners as conveying pedagogical intentions.

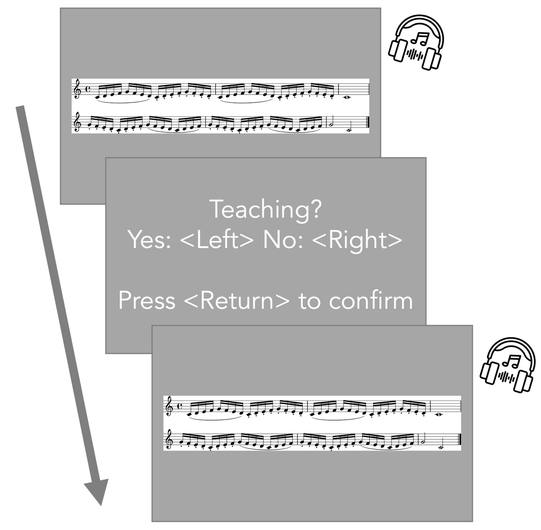
Participants

- Experiment 1
  - 20 musicians (13 female)
  - average training years: 11.84 (SD = 5.62)
- Experiment 2
  - 20 musicians (10 female)
  - average training years: 12.65 (SD = 5.40)

Task/Procedure

- Participants listened to a number of recordings and were asked to judge if each recording was produced for teaching.
- In each block, participants listened to piano recordings of a piece with articulation (articulation recordings) or with dynamics (dynamics recordings).
  - Experiment 1: Stimuli (1) and (2)
  - Experiment 2: Stimuli (3) and (4)

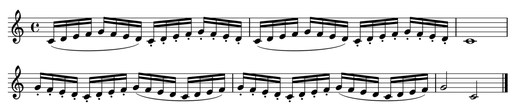
- In Experiment 1, 48 articulation recordings, 48 dynamics recordings
- In Experiment 2, 36 articulation recordings, 36 dynamics recordings



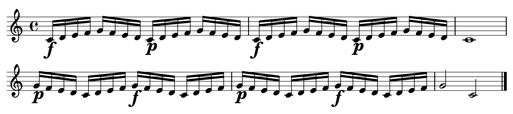
Stimuli

Recordings were randomly sampled from our previous experiments (Tominaga et al, in revision).

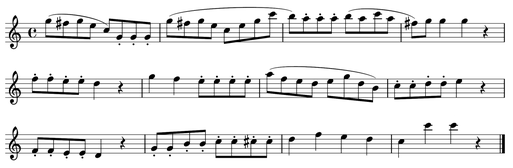
(1) Articulation recordings – Exp 1



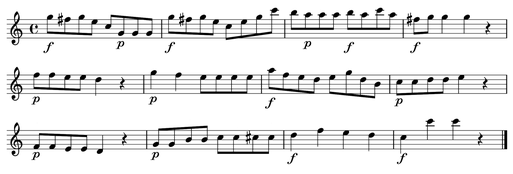
(2) Dynamics recordings – Exp 1



(3) Articulation recordings – Exp 2



(4) Dynamics recordings – Exp 2



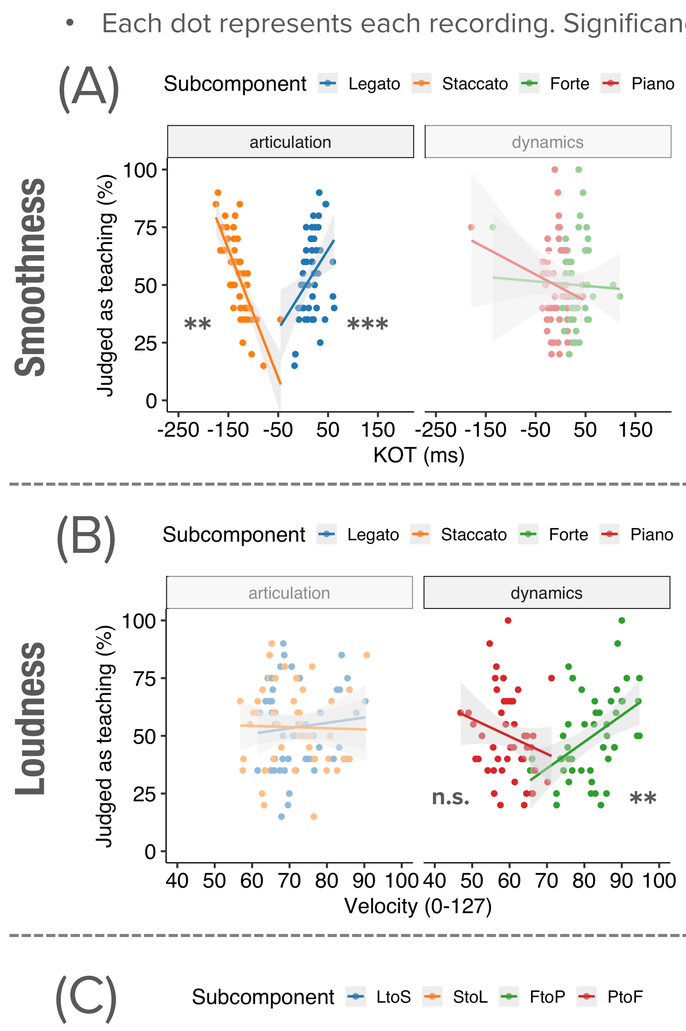
Data analysis

We quantified recordings in terms of:

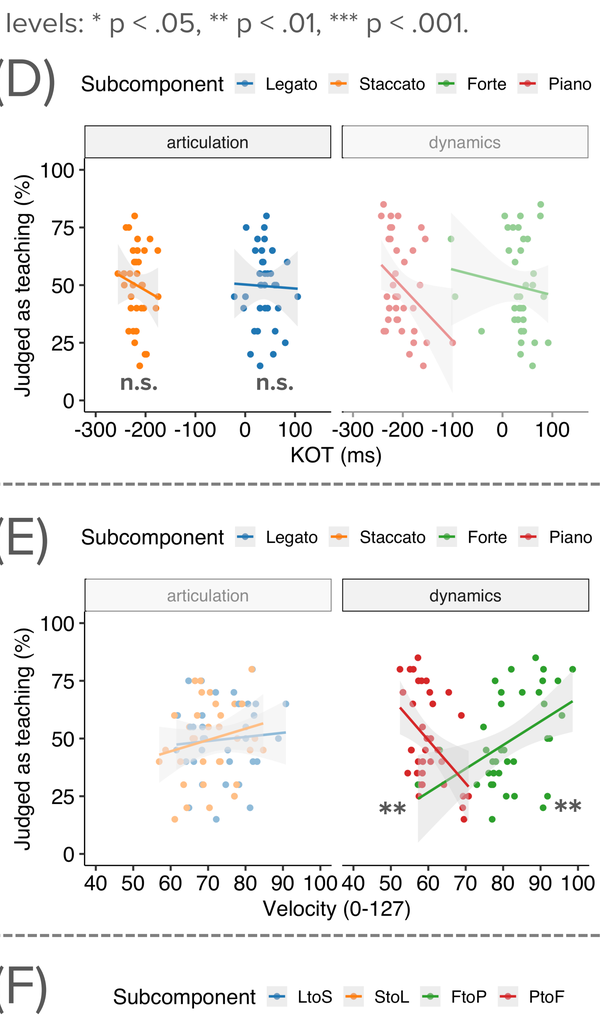
- Tempo (InterOnset Intervals)
- Smoothness (Key-Overlap Time)
- Loudness (Key Velocity)
- Dynamics contrast (Velocity Difference between forte and piano at transition points)

Experiment 1

- Each dot represents each recording. Significance levels: * p < .05, ** p < .01, *** p < .001.



Experiment 2



- Generally, performances with slower tempo were likely to be considered for teaching.
  - Articulation; $r(46) = .77$, $p < .001$, Dynamics; $r(46) = .42$, $p = .003$ (Experiment 1)
  - Articulation; $r(34) = .25$, $p = .15$, Dynamics; $r(34) = .39$, $p = .02$ (Experiment 2)
- In Experiment 1 (left), exaggerated performances (i.e., longer legato, shorter staccato, louder forte and larger contrast between forte and piano) were judged as teaching performances.
  - Legato: $r(46) = .40$, $p = .005$, Staccato: $r(46) = -.73$, $p < .001$ (*Fig. A*)
  - Forte: $r(46) = .45$, $p = .001$, Piano: $r(46) = -.22$, $p = .13$ (*Fig. B*)
  - From Forte to Piano; $r(34) = -.75$, $p < .001$, From Piano to Forte; $r(34) = .59$, $p < .001$ (*Fig. C*)
- In Experiment 2 (right), we replicated the findings for dynamics (loudness, dynamics contrast) only.
  - Legato; $r(34) = -.03$, $p = .88$, Staccato; $r(34) = -.15$, $p = .39$ (*Fig. D*)
  - Forte: $r(34) = .45$, $p = .007$; Piano: $r(34) = -.45$, $p = .006$. (*Fig. E*)
  - From Forte to Piano; $r(34) = -.75$, $p < .001$, From Piano to Forte; $r(34) = .59$, $p < .001$ (*Fig. F*)

Discussion

- Our findings suggest that musicians infer teaching intentions by relying on specific performance features (e.g., tempo, exaggeration).
- The complexity of a musical piece may affect listeners' perception of teaching intentions.
- Future studies should investigate whether and how perceiving pedagogical intentions is beneficial for learning (e.g., attention, memory, imitation).

CEU CENTRAL EUROPEAN UNIVERSITY