

*2018/10/04 (Tue) Research Progress Workshop*

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# Joint Action in Musical Skill Transmission

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Atsuko Tominaga  
Supervisors: Natalie Sebanz  
and Günther Knoblich

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# Cultural Transmission

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- ❖ Social learning in skill transmission (Tomasello et al., 1993; Whiten, 2017)
- ❖ Cumulative cultural evolution (Dukas, 2016)
- ❖ Intensive communication between experts and novices (e.g., Lombao et al., 2017)
- ❖ Music research to investigate learning through social interaction (D'Ausilio et al., 2015)

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# Joint Action during learning

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*Do mechanisms enabling joint action  
help novices acquire expert skills?*

# Musical Joint Action (Phillips-Silver & Keller, 2012)



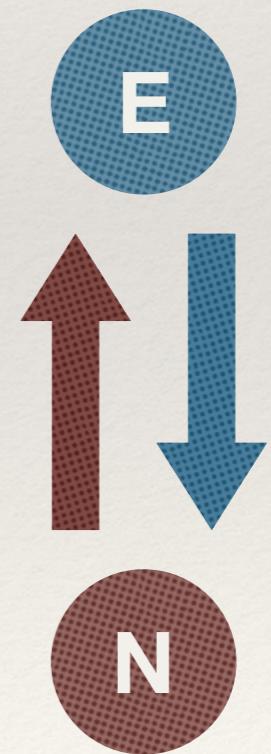
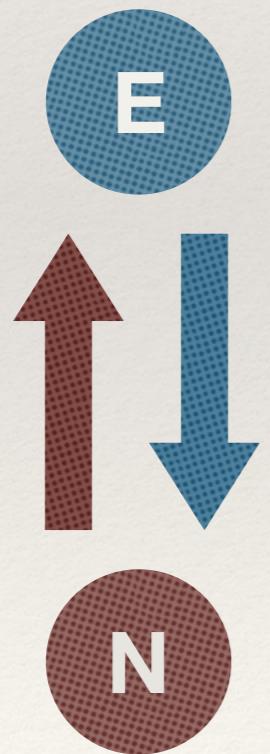
## ❖ Turn-taking

- Experts demonstrate and novices imitate (Haston, 2007)
- Intentional sound modulation
- Structural understanding of a skill

## ❖ Playing in synchrony

- Precise action coordination
- Monitoring and prediction of others (Sebanz & Knoblich, 2009; Wolpert et al., 2003)
- Temporal understanding of a skill

# Musical Joint Action (Phillips-Silver & Keller, 2012)



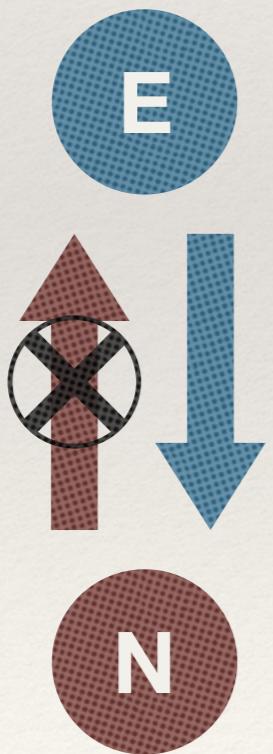
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# Joint Action during learning

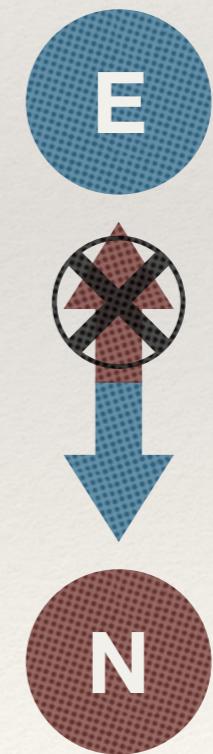
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*How does mutual coordination  
between an expert and a novice  
contribute to skill transmission?*

# Musical Joint Action (Phillips-Silver & Keller, 2012)



Bi-directional



Uni-directional

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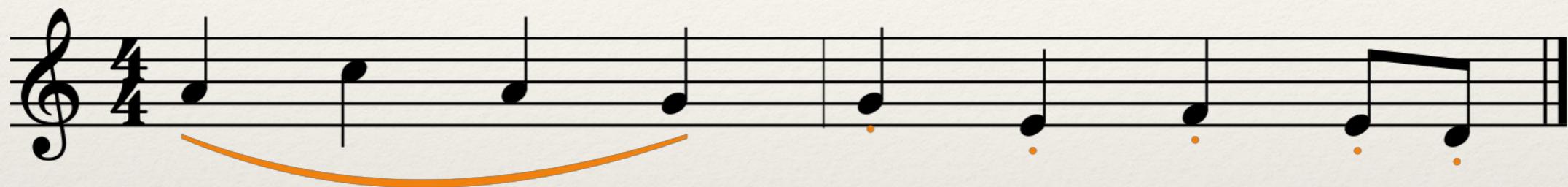
# Method

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- ❖ Participants: Pairs of an expert and a novice
- ❖ Condition: Bi-directional vs. Uni-directional
  - Whether the expert can listen to the novice's sound
- ❖ Learning: 8 sessions + 1 pre-learning
- ❖ Study 1: The expert and the novice alternate playing
- ❖ Study 2: The expert and the novice play in synchrony

# Stimuli

## ❖ Articulation



# Legato

# Staccato

## ❖ Tempo change



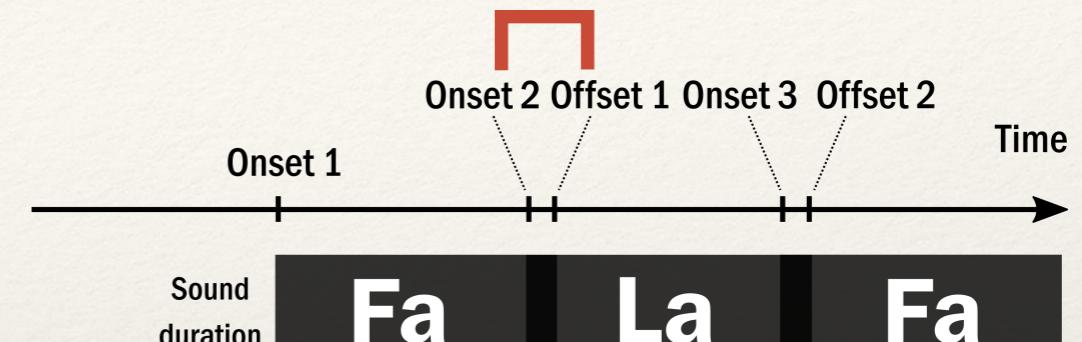
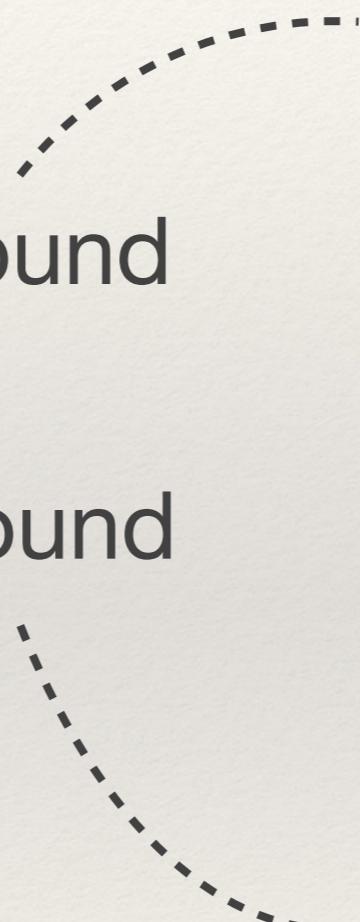
# Accelerando

# Ritardando

# Measurements

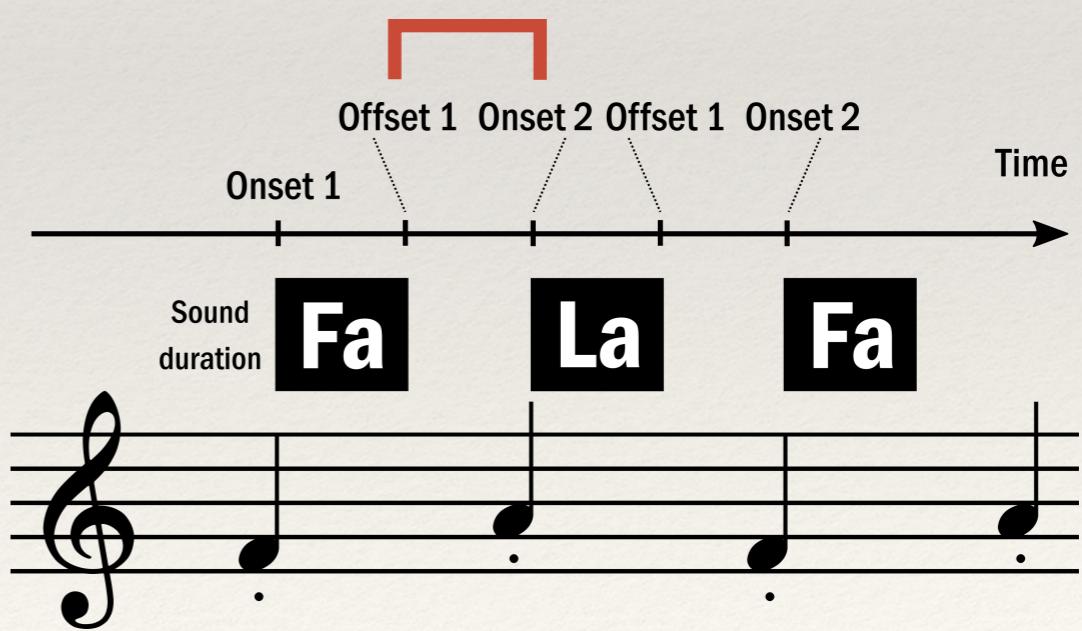
## ❖ Articulation value

- Offset1 - Onset2
- Legato (smooth sound - positive)
- Staccato (sharp sound - negative)



## ❖ Tone intensity

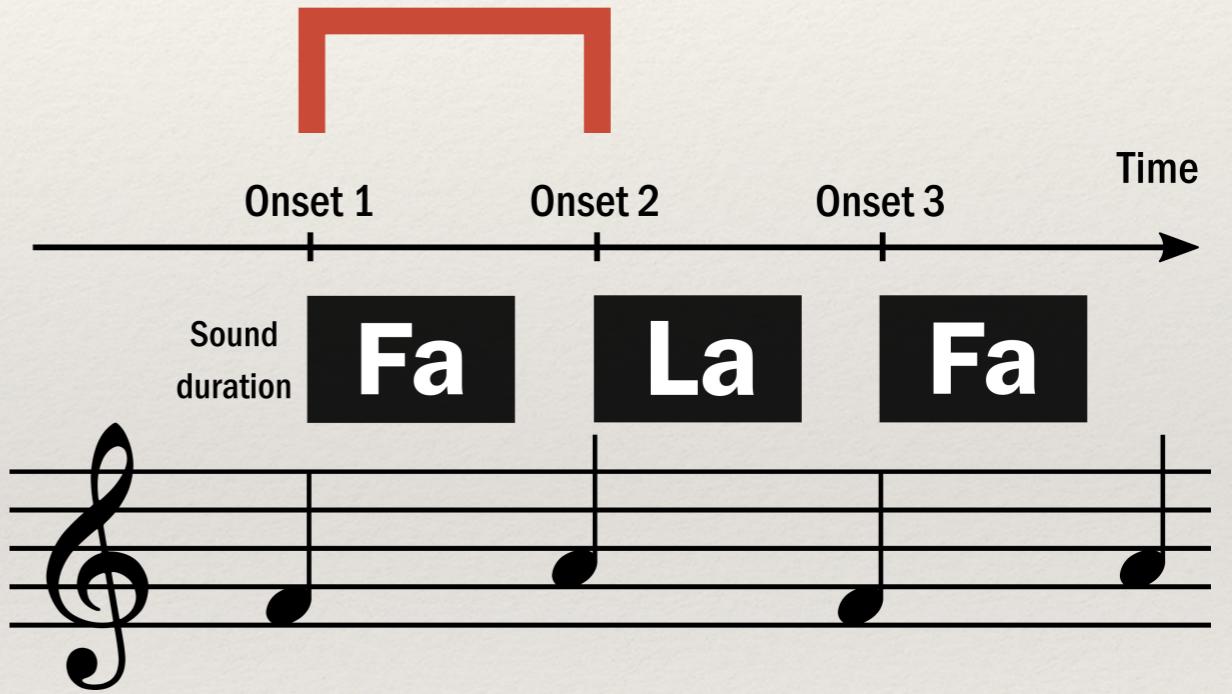
- Key velocity
- Grouping for legato



# Measurements

## ❖ Interonset intervals (IOIs)

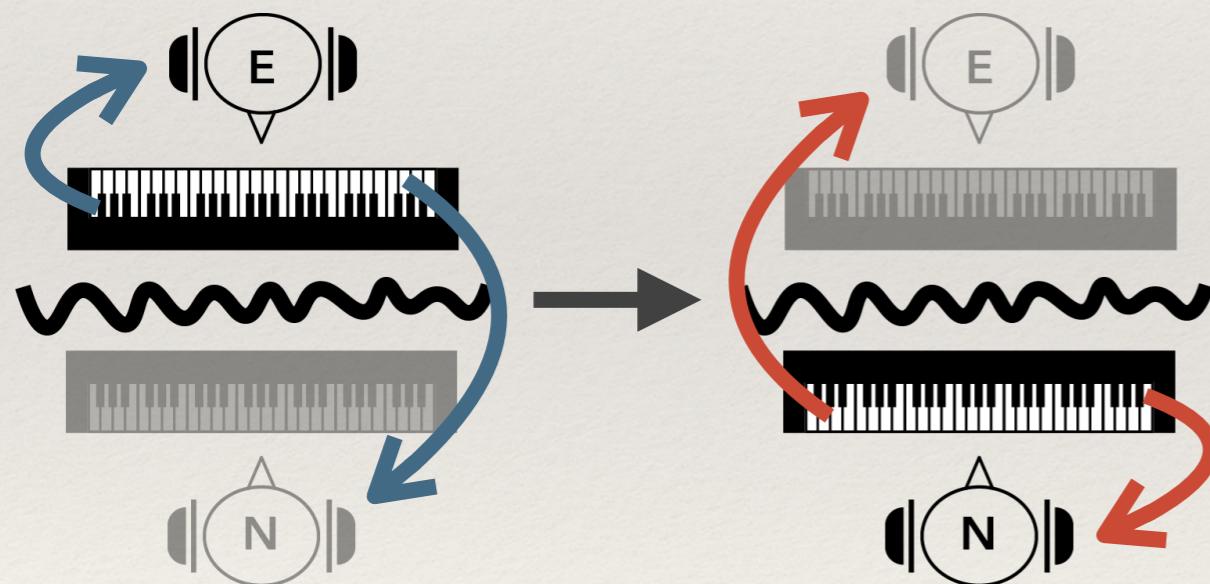
- Between each onset
- Accelerando (getting faster - short)
- Ritardando (getting slower - long)



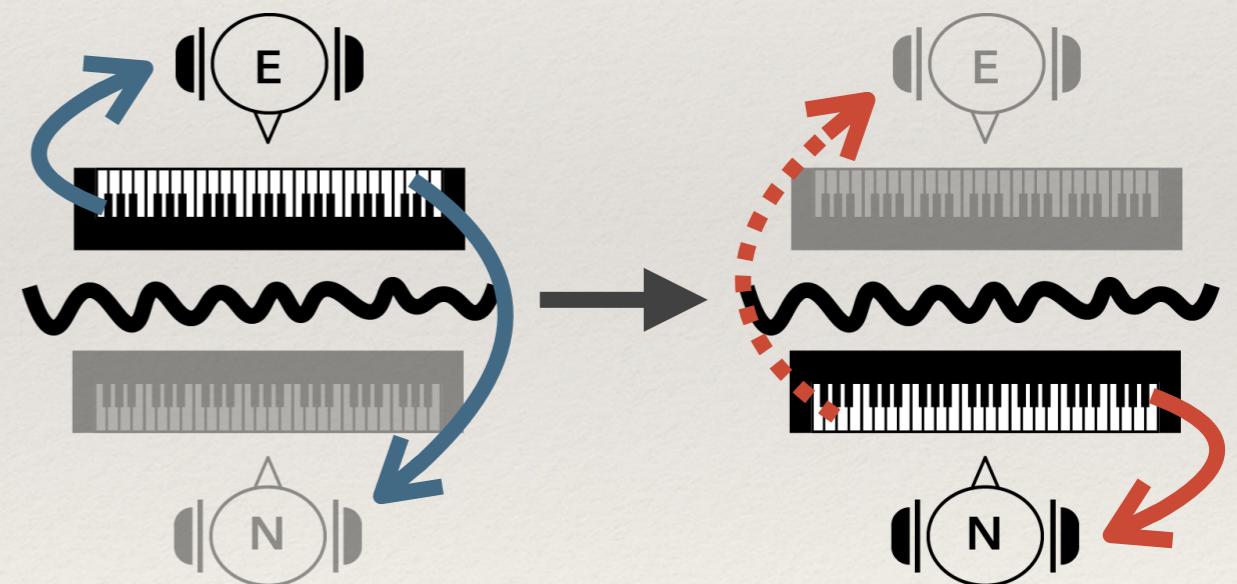
# Procedure (Study 1)

- ❖ The expert and the novice alternate playing

1) Bi-directional feedback



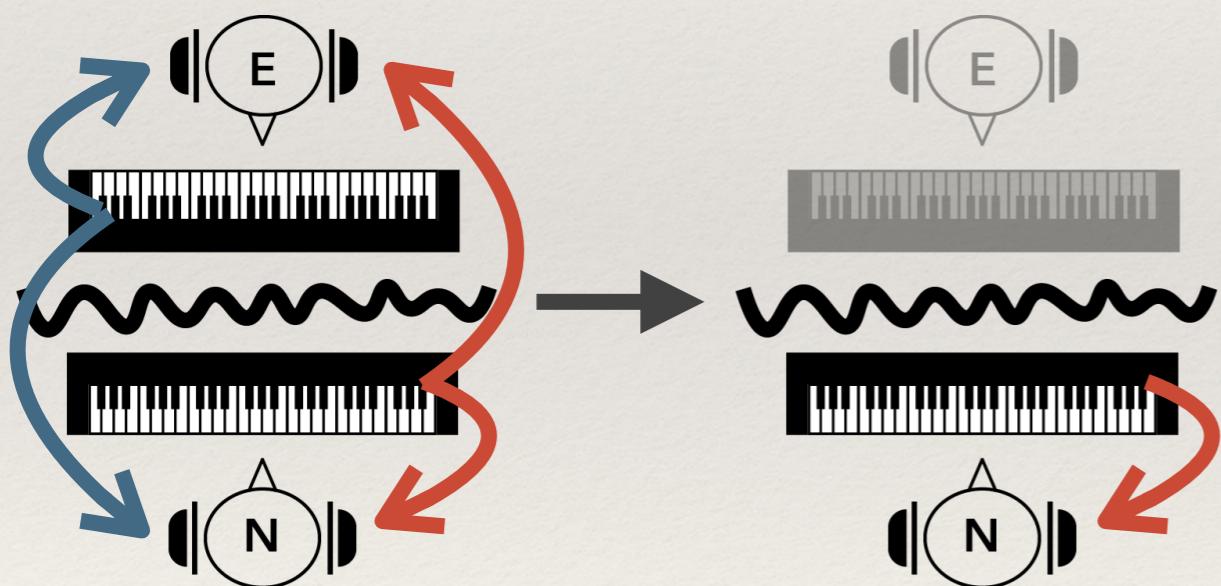
2) Uni-directional feedback



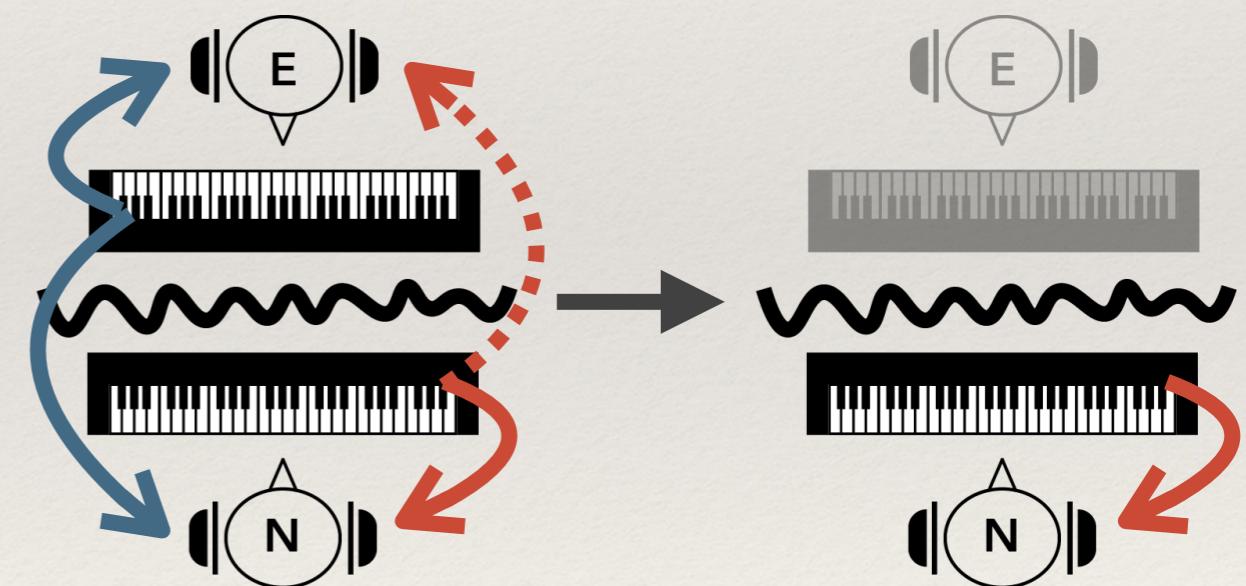
# Procedure (Study 2)

- ❖ The expert and the novice play in synchrony

1) Bi-directional feedback



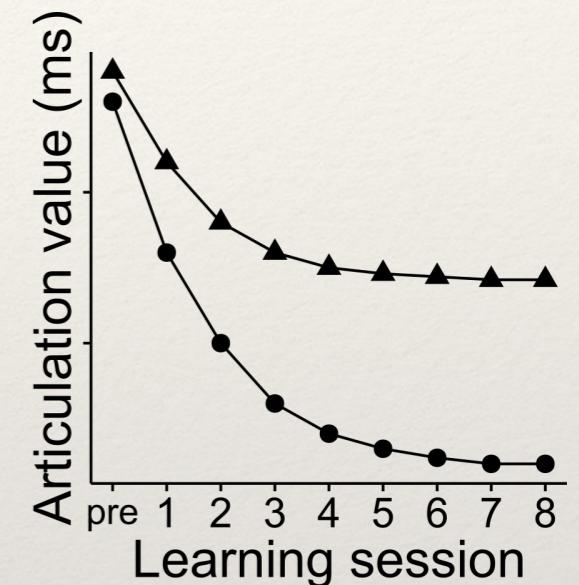
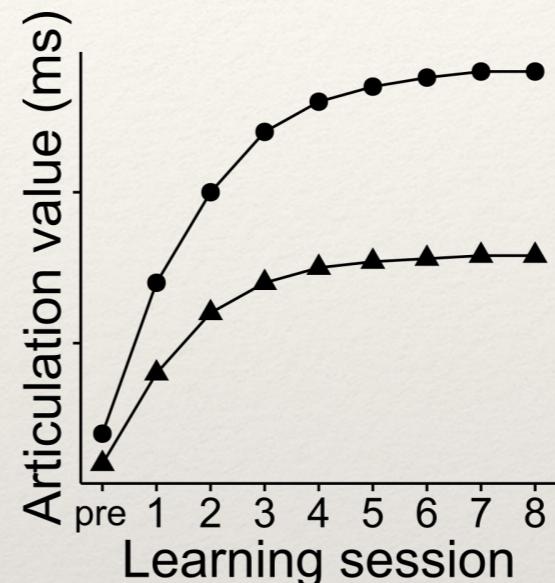
2) Uni-directional feedback



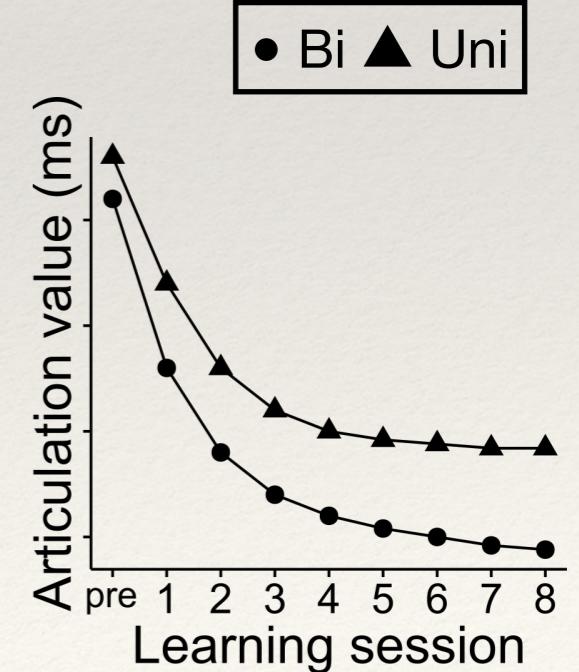
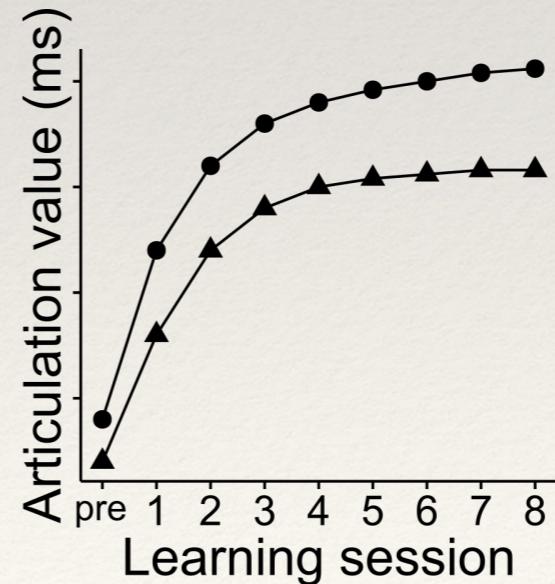
# Prediction (Articulation)

- ❖ Adjustments will help novices acquire articulation skills.
- ❖ Turn-taking will be more beneficial for articulation than playing in synchrony.

- Study 1: Left - Legato, Right - Staccato



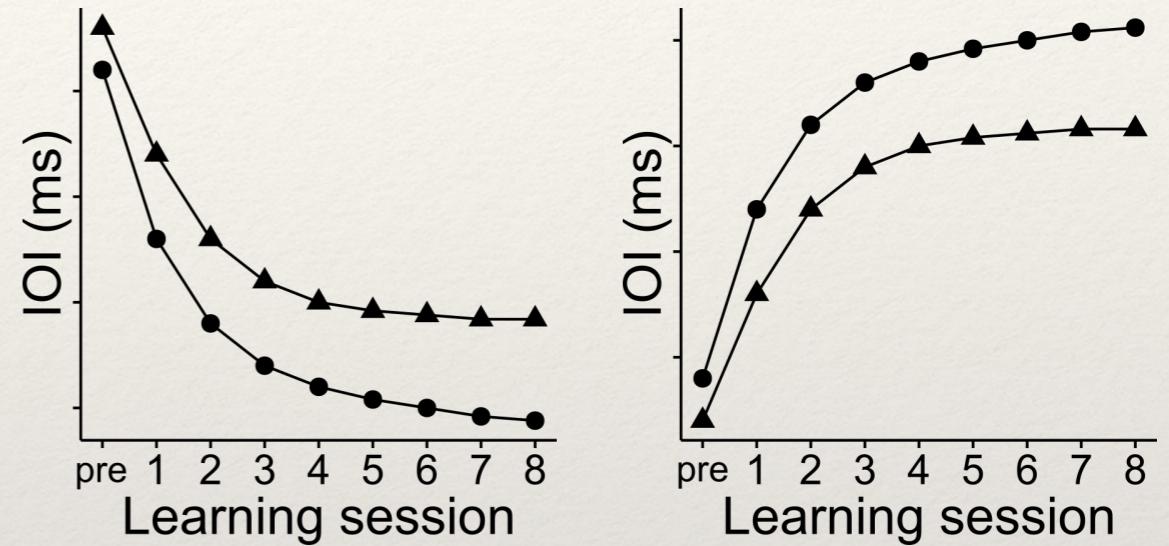
- Study 2



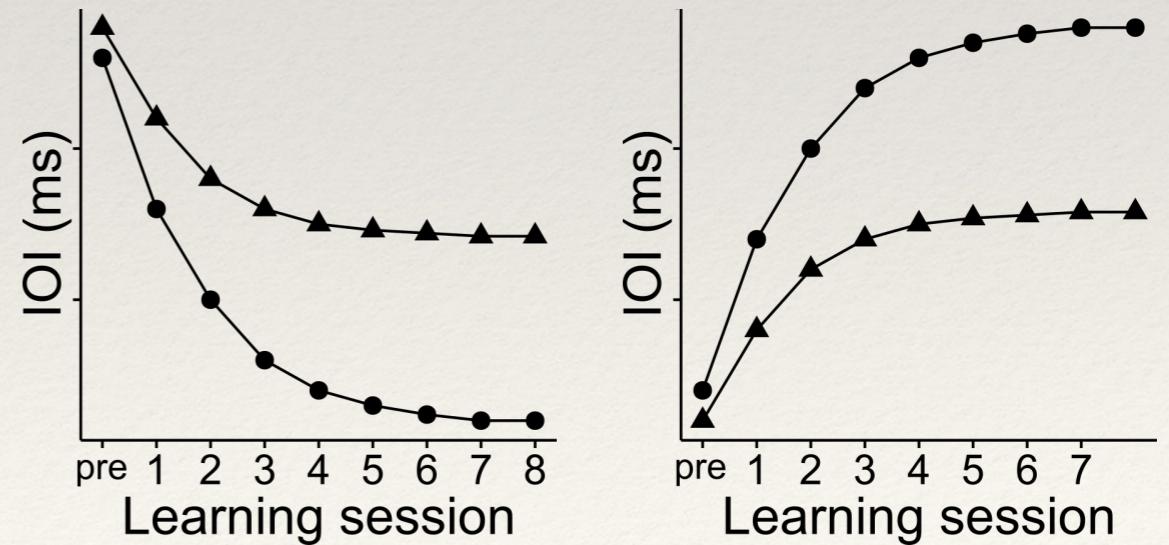
# Prediction (Tempo change)

- ❖ Adjustments will help novices acquire tempo change skills
- ❖ Playing in synchrony will be more beneficial for tempo change than turn-taking.

- Study 1: Left - Accel, Right - Rit



- Study 2



• Bi ▲ Uni

Thank you for listening!

# Predictions for didactics

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- ❖ Experts often modulate their behaviour for teaching purposes (e.g., Fernald, 1985; Brand et al., 2002)
  - Exaggeration of sounds (e.g., Kuhn, 2004; McEllin et al., 2017)
- ❖ Experts' didactic behaviour in music
  - High variability in the bi-unidirectional condition?
  - Low variability in the uni-directional condition?
  - Recognition and memory

# Similarity - imitation

