

Music Therapy Practice and Research



CCL
Anna Palumbo, PhD
2025

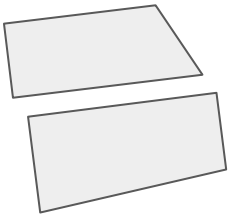
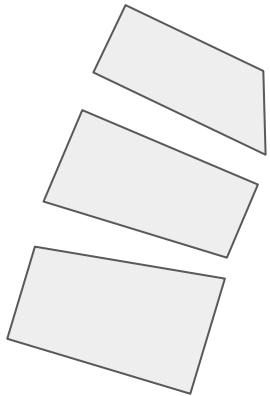


Nordoff-Robbins
Center for
Music Therapy

A path to research and practice in music therapy.....



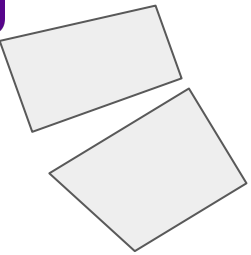
Music Marketing and
Professional Chorus Member,
Virginia Symphony Orchestra



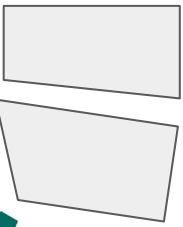
MA, MT-BC
Music Therapy



B.S. in Biology
(Double Major in Music)



CenterLight™
Healthcare
Skilled Nursing Facility



NYC
HEALTH+
HOSPITALS

LCAT, Inpatient
Psychiatry



Institute for Music and
Neurologic Function



Nordoff-Robbins
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Music Therapy



Randomized Controlled Trial
NRMT Level 1
Internship Supervisor

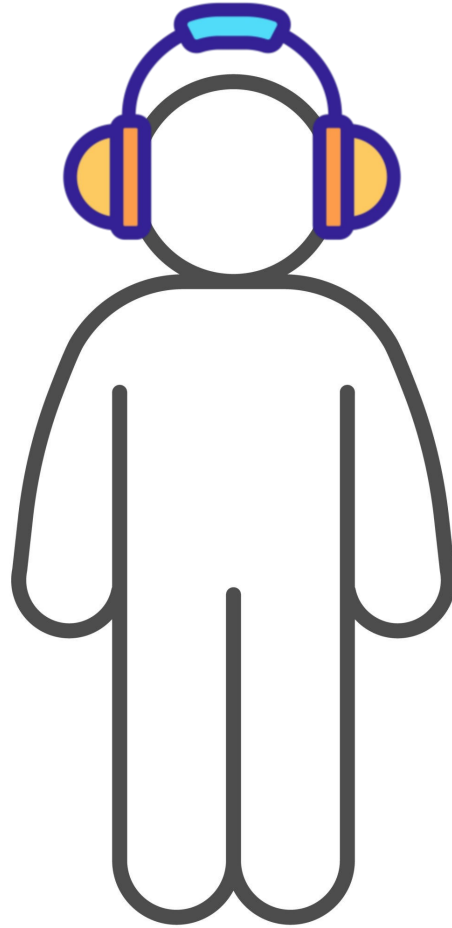


PhD Rehabilitation Sciences

Research Manager,
Nordoff Robbins Center
for Music Therapy

Adjunct Faculty, GSAS

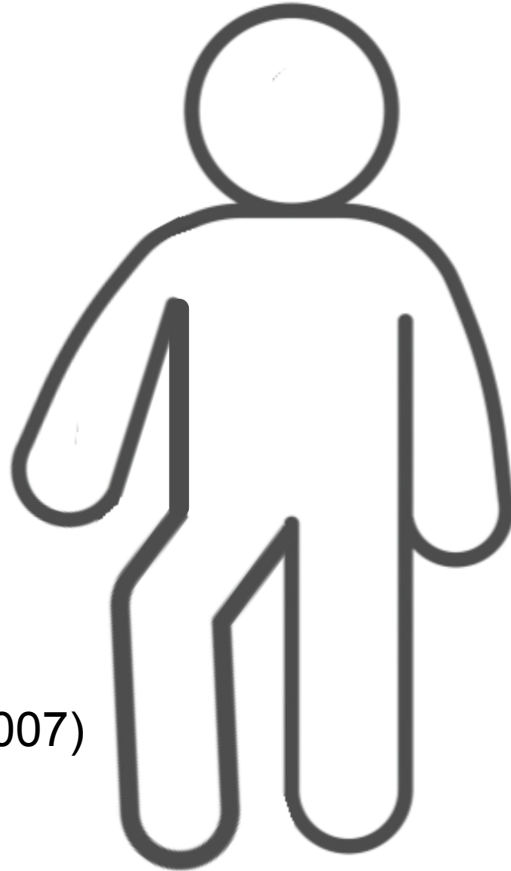
How does *music* help
in stroke rehabilitation?



Language Skills &
Neural Connectivity
(Sihvonen, 2020, 2021, 2022)



↑ Gait Performance
(Awad, 2024; Thaut, 2007)

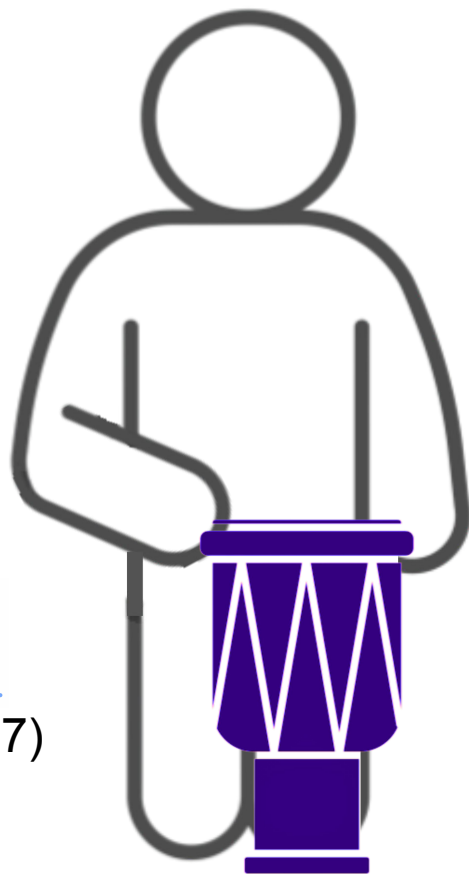


Language Skills &
Neural Connectivity
(Sihvonen, 2020, 2021, 2022)





Gait Performance
(Awad, 2024; Thaut, 2007)



Motor Function & Neural
Plasticity (Ripollés, 2016;
Raghavan, 2016)



Language Skills &
Neural Connectivity
(Sihvonen, 2020, 2021, 2022)

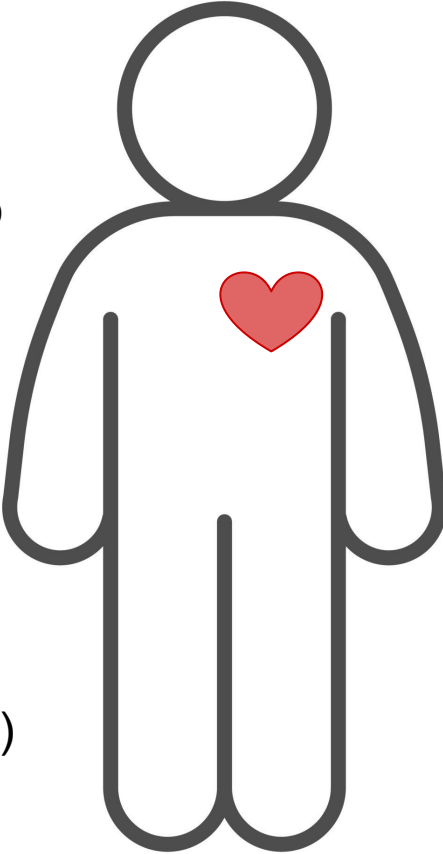




Emotional Well-being
(Palumbo, 2022; Palumbo
2025; Sarkamo, 2008)



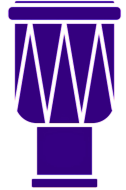
Gait Performance
(Awad, 2024; Thaut, 2007)



Language Skills &
Neural Connectivity
(Sihvonen, 2020, 2021, 2022)

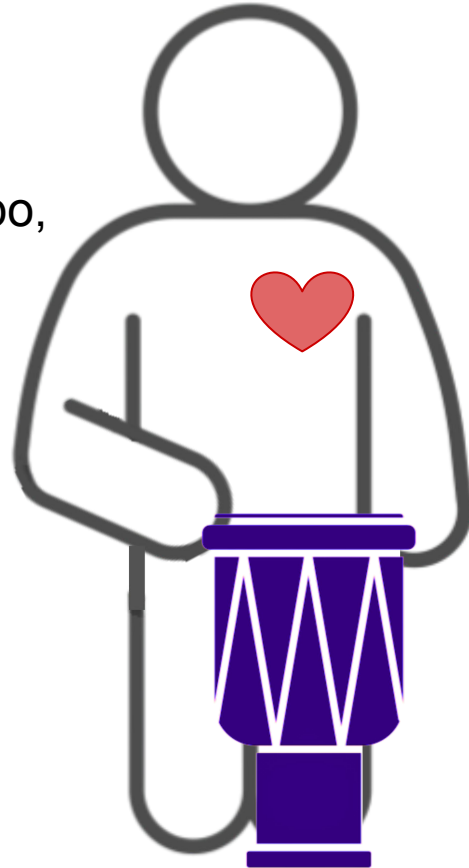


Motor Function & Neural
Plasticity (Ripollés, 2016;
Raghavan, 2016)





Emotional Well-being
(Palumbo, 2022; Palumbo,
2025; Sarkamo, 2008)



Motor Function & Neural
Plasticity (Ripollés, 2016;
Raghavan, 2016)

Case Study

Background

- 58 year old female with unilateral hemiparesis, nonfluent aphasia, and moderately severe depression (PHQ-9 = 17)

Context

- Arrived to music therapy group withdrawn: slouched in chair, looking down, declined help to play instruments, and not attempting to talk

How Music Helps

- Incorporate her meaning into the music: “I like to talk!”
- Allow *feasible* and *meaningful* participation with room for *growth*

Transformation

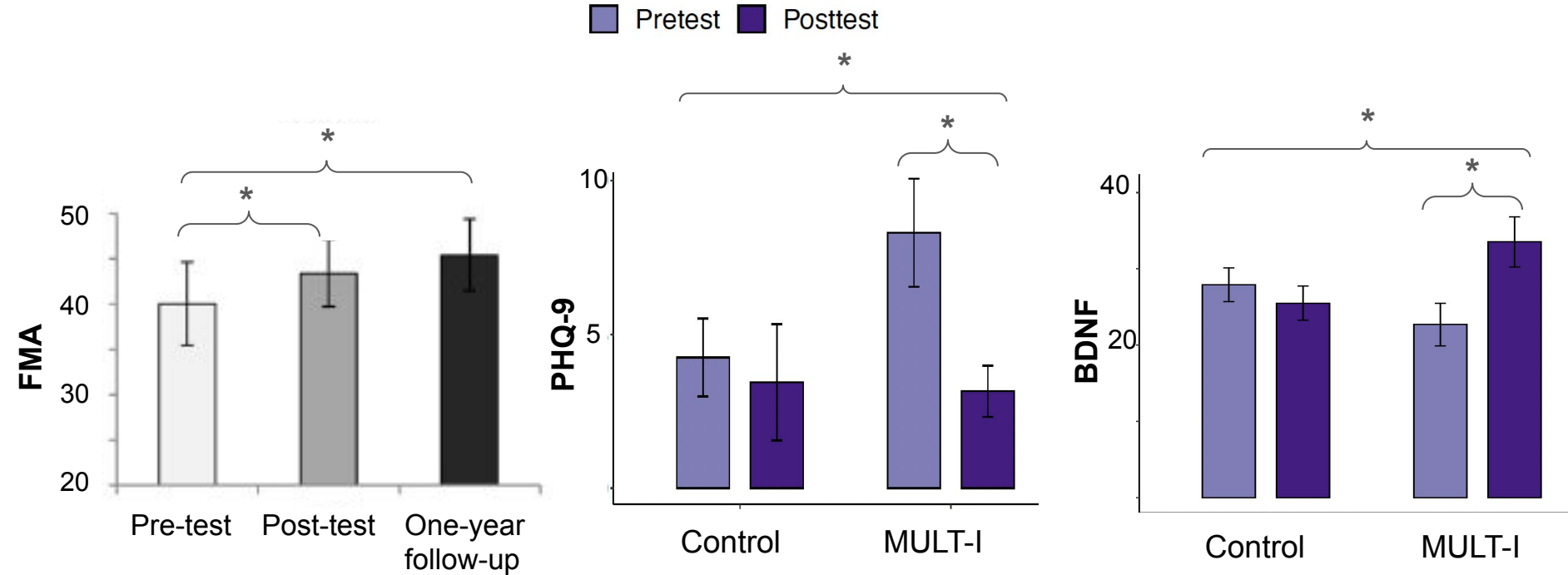
- She became a leader for the group who inspired others
- Depression reduced (PHQ-9 = 10) along with improved self-efficacy, quality of life, and self-perceived communication, participation, strength, and recovery

Music Upper Limb Therapy-Integrated (MULT-I)



Guerrero, *Music & Medicine*, 2014; Raghavan...**Palumbo**, Turry, *Front Hum Neurosci*, 2016;
Palumbo et al., *AJPMR*, 2022; **Palumbo** et al., *Disabil Rehabil*, 2025

MULT-I Improves Motor Function, Emotional Well-being and Neural Environment for Recovery



BREAK

(10 min)



**Pablo
Ripollés**



**Karleigh
Groves**



**Eva Luna
Muñoz Vidal**



**Lucía
Vaquero**



**Alan
Turry**



**Preeti
Raghavan**



**Heidi
Schambra**



**Gerald
Voelbel**



**Richa
Namballa**



**Stephanie
Yandun**



This research is supported in part by the **National Institute of Neurological Disorders and Stroke (NINDS)** and the **Music and Audio Research Lab**



**Robert
Codio**



**Renate
Rohlfing**



What are the effects of music
improvisation and **live
accompaniment** on motor,
autonomic, affective, and
neural response to music
playing?

What are the effects of music improvisation and live accompaniment on **motor**, autonomic, affective, and neural response to music playing?

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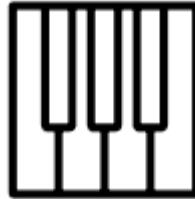
What are the effects of music improvisation and live accompaniment on motor, autonomic, affective, and **neural response** to music playing?

Comparing effects of improvisation and live accompaniment in music playing



drum
playing

+



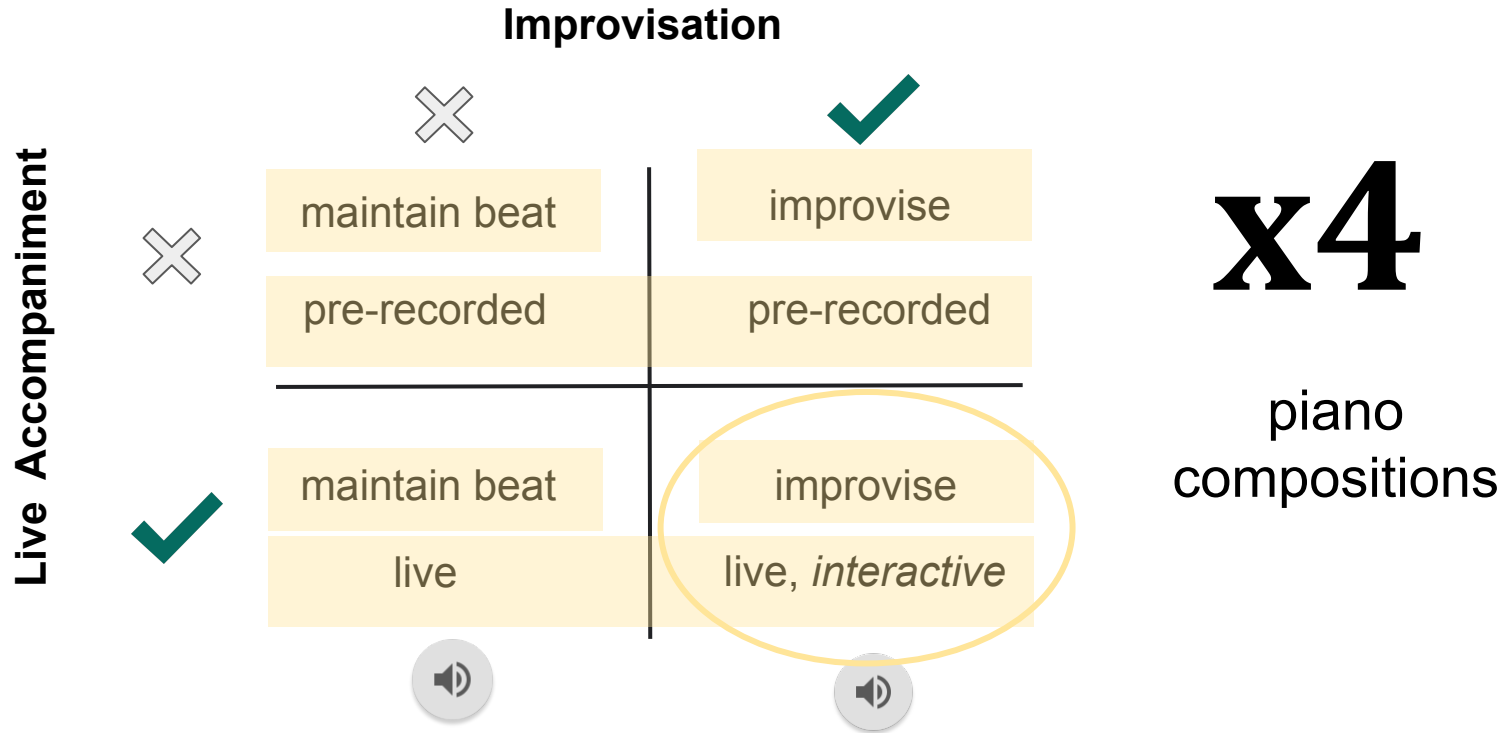
piano
accompaniment

x4

piano
compositions

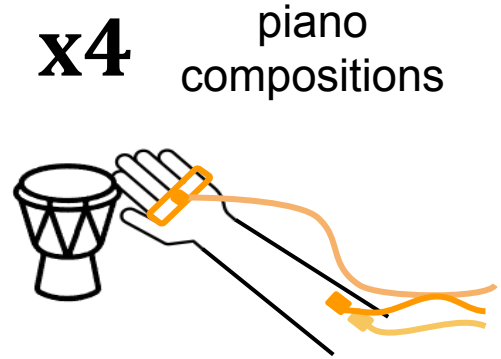
With or without improvisation and live accompaniment

Comparing effects of improvisation and live accompaniment in music playing



Comparing effects of improvisation and live accompaniment in music playing

		Improvisation	
		✗	✓
Live Accompaniment	✗	maintain beat pre-recorded	improvise pre-recorded
	✓	maintain beat live	improvise live, <i>interactive</i>

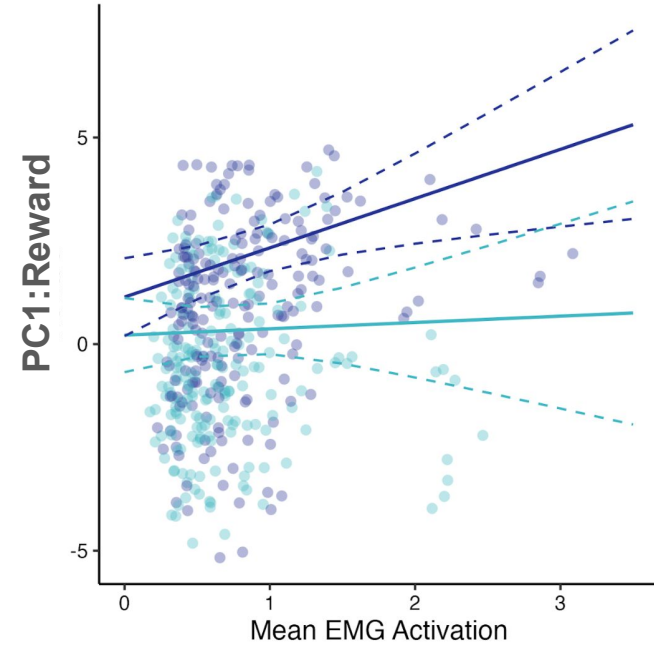
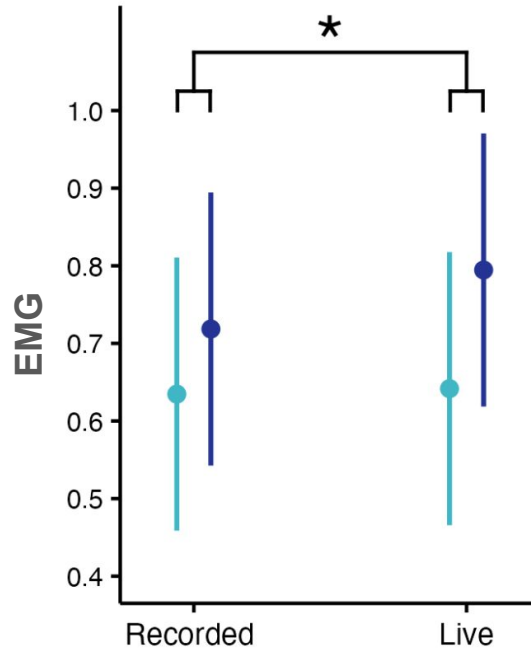
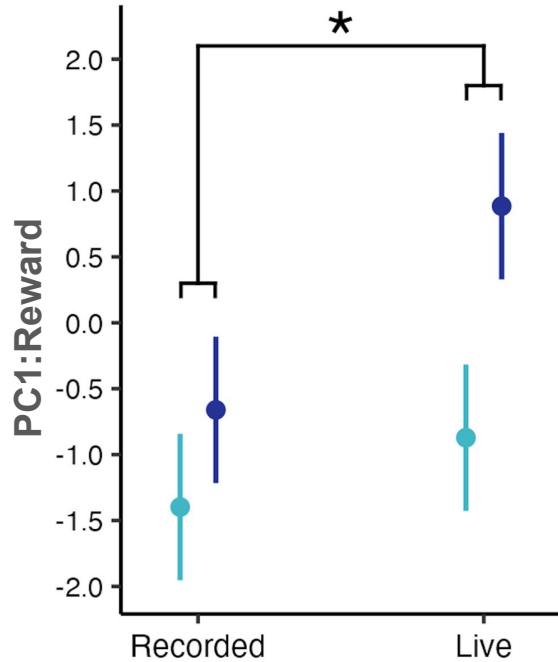


Accelerometry
EMG

12-item scale:
Reward

Greater reward and motor response with the combination of improvisation and live accompaniment.

● Beat ● Improve



How do improvisation and
live accompaniment impact
responses among survivors
of stroke?

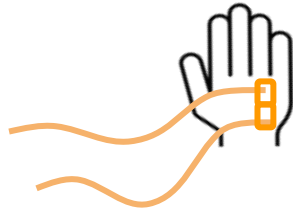
Methods

Autonomic Response

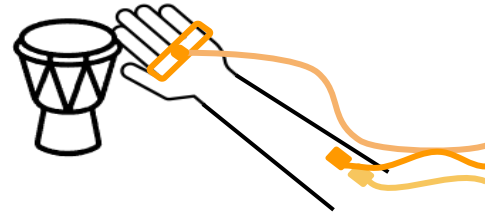
Motor Response

Neural Response

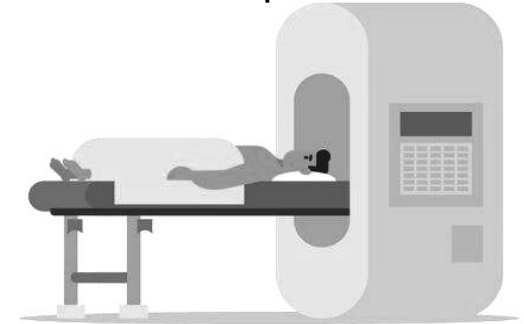
Outcomes



EDA



Accelerometry
EMG

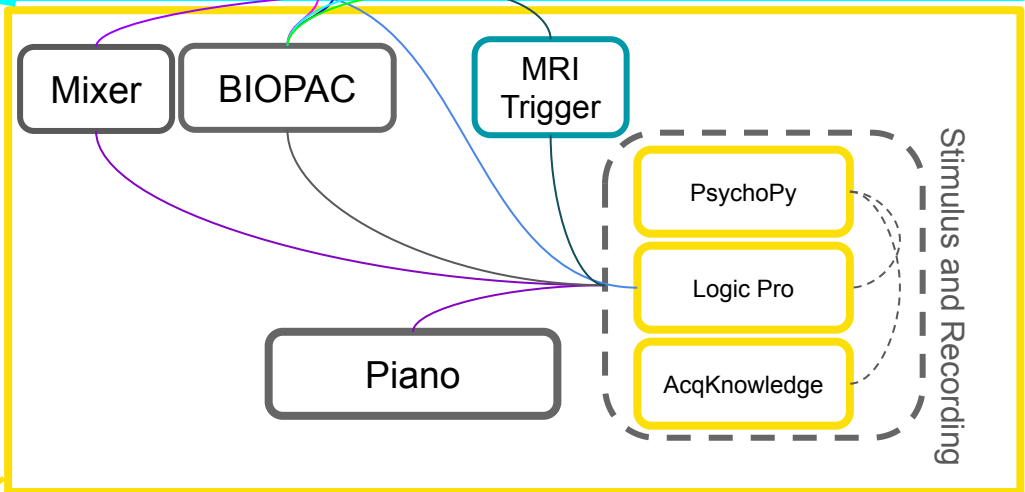
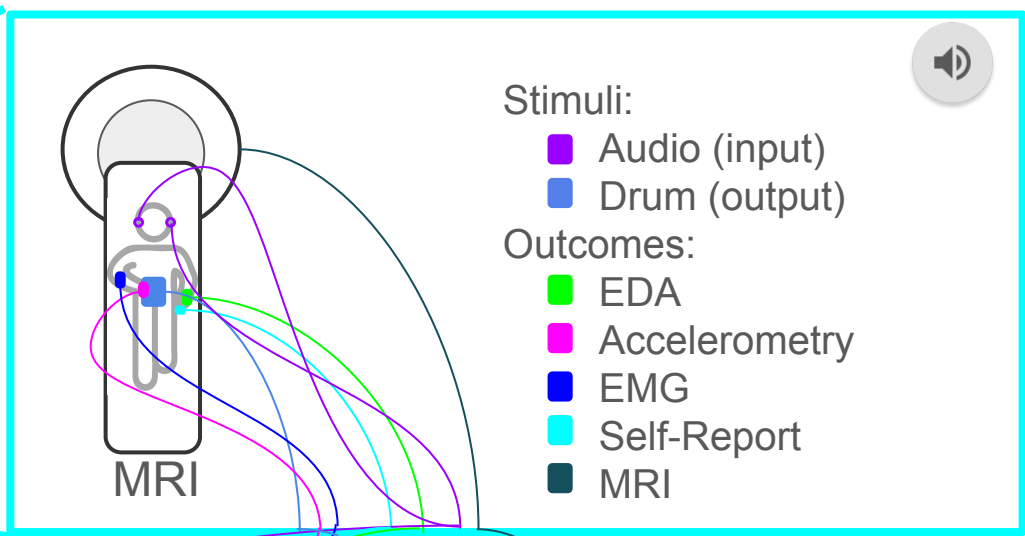


fMRI

Self Report: Pleasure, Physical Effort, Cognitive Challenge

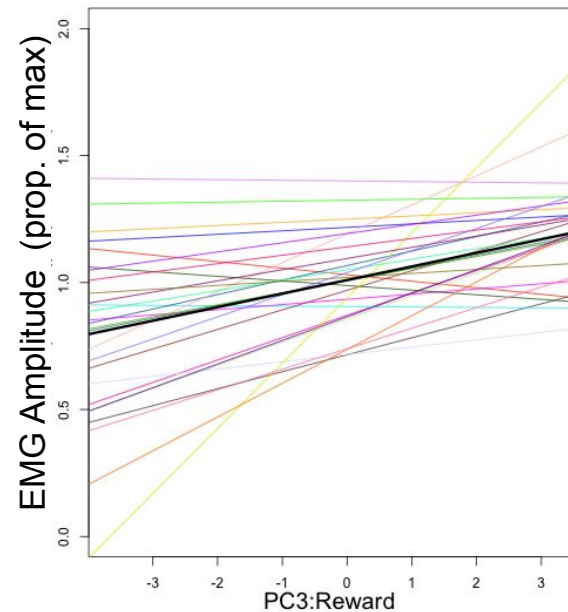
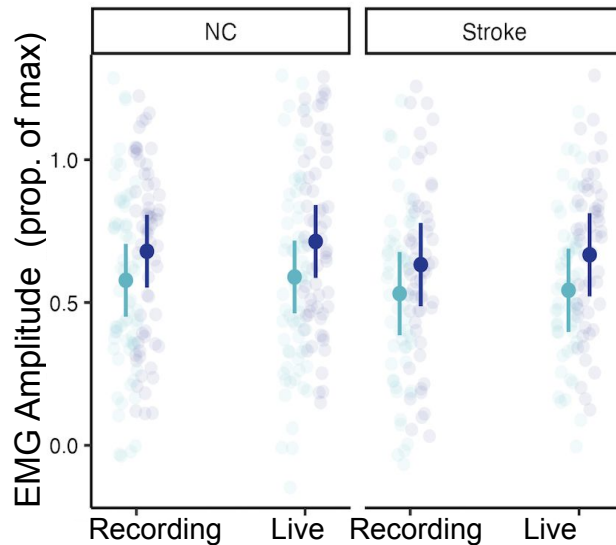
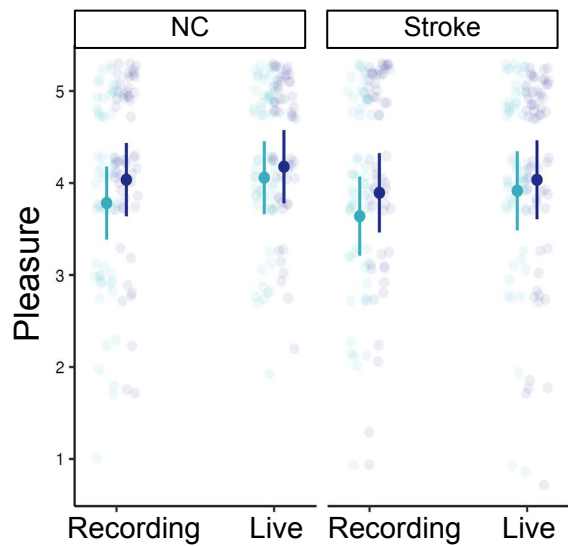
x4 piano compositions



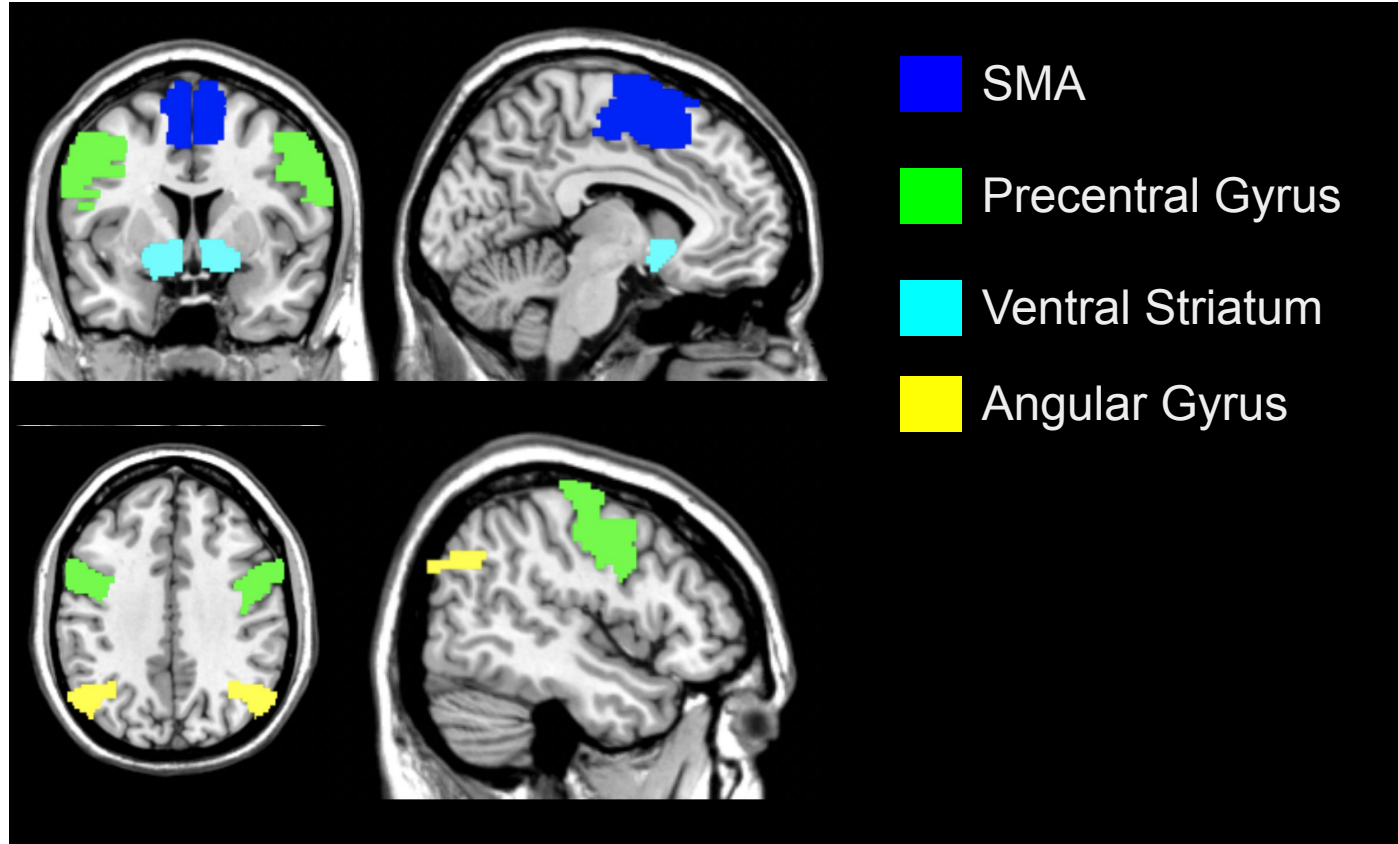


Greater Reward and Motor Response with Improvisation

● Beat ● Improvise



Regions of Interest

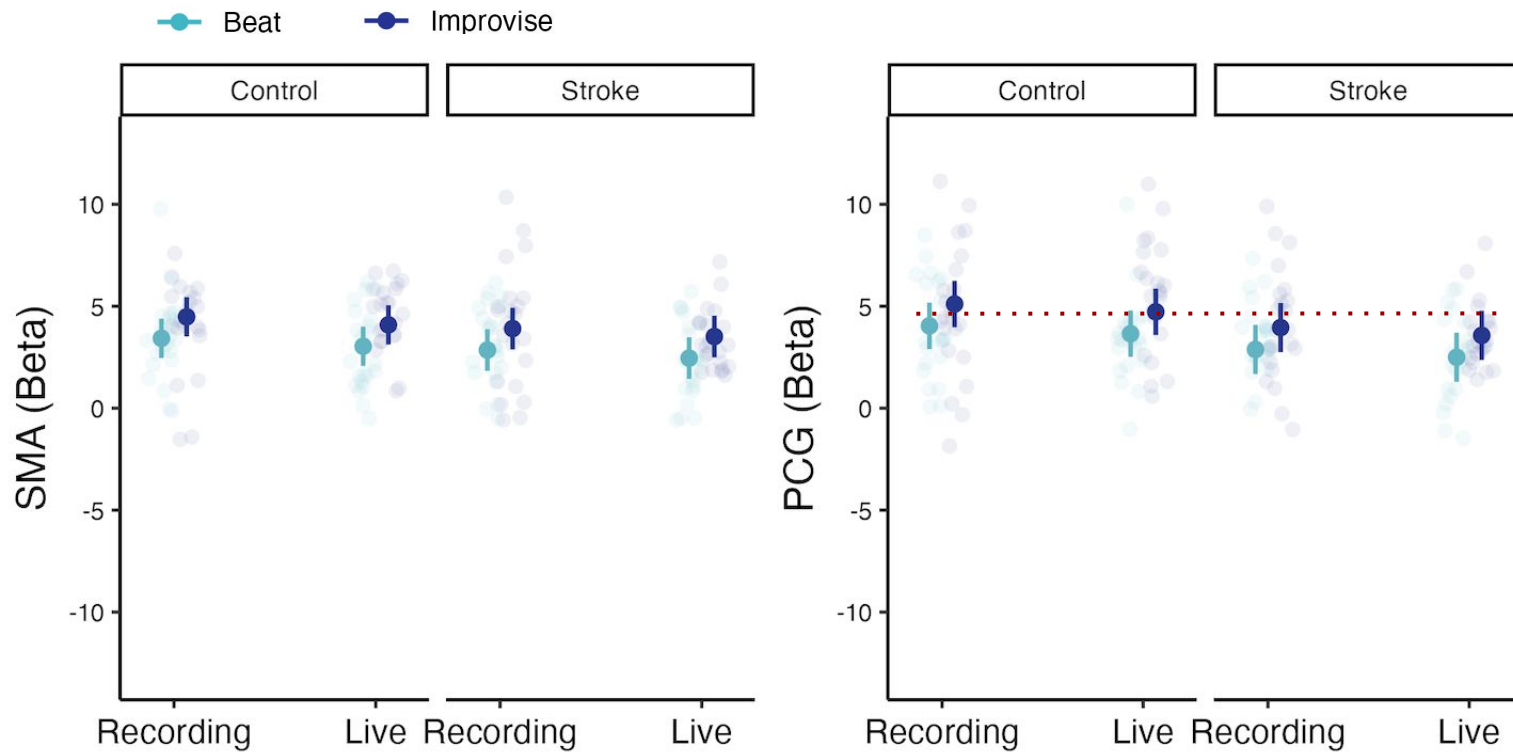


Beaty, *Neurosci Biobehav Rev*, 2015; Nachev, Kennard & Hussain, *Nat Rev Neurosci*, 2008; Yousry, *Brain*, 1997; Shepherd & Yamawaki, *Nat Rev Neurosci*, 2022; Tomas, *Neuroimage*, 2020; Martínez-Molina, *PNAS*, 2016;

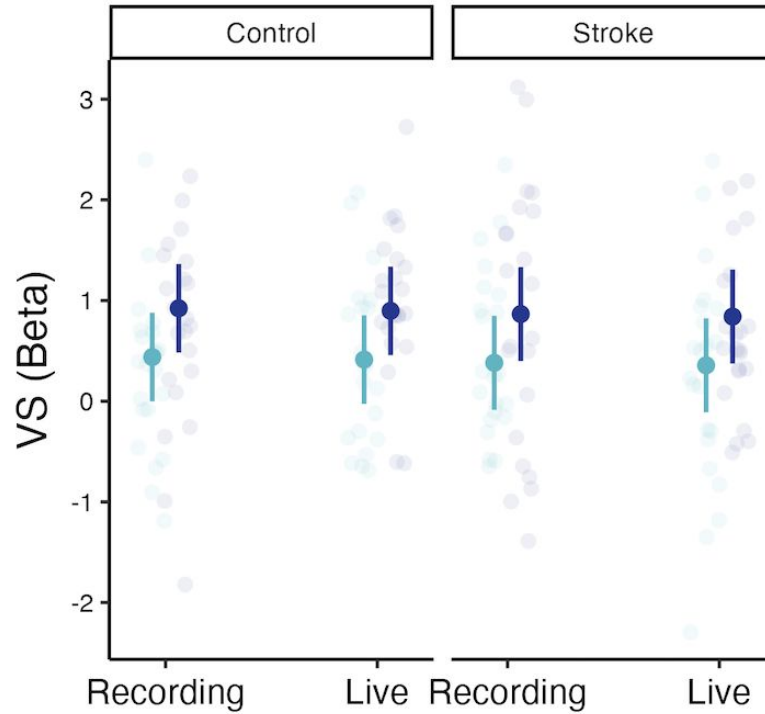
No change in activation of Angular Gyrus



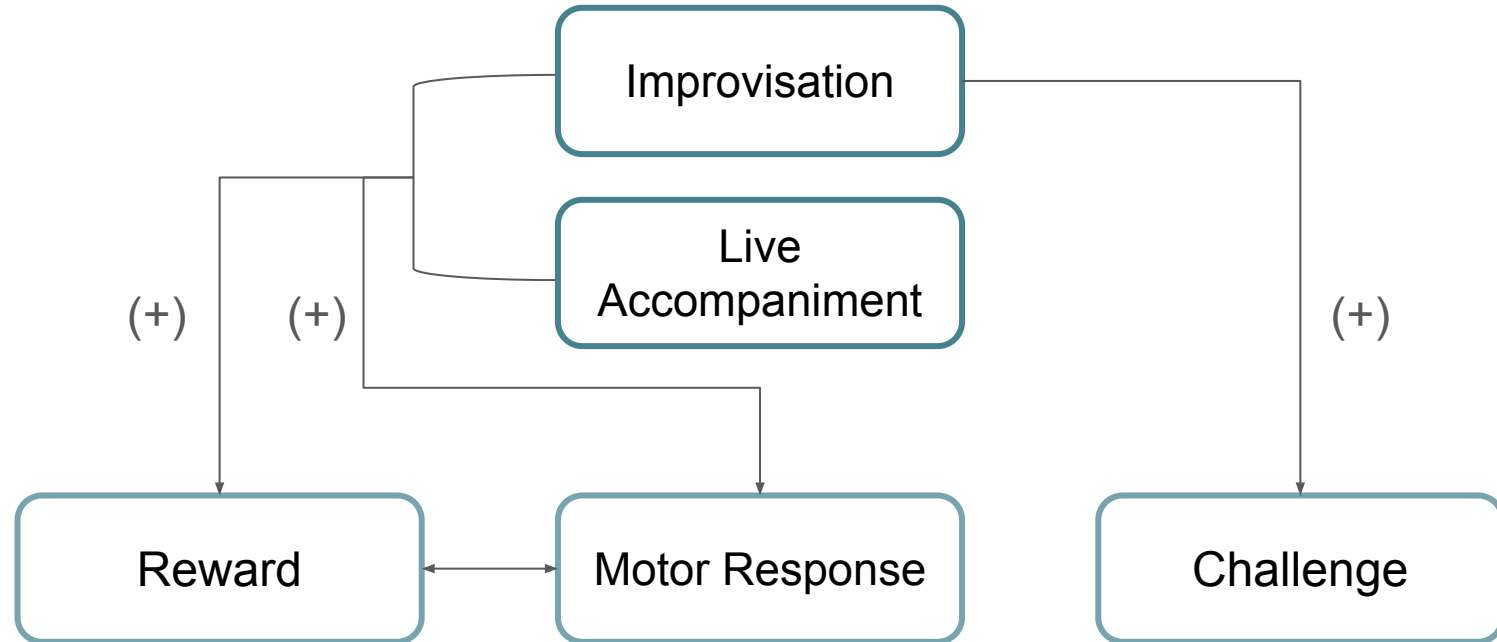
Improvisation Increased Activation in Motor-Related Brain Regions



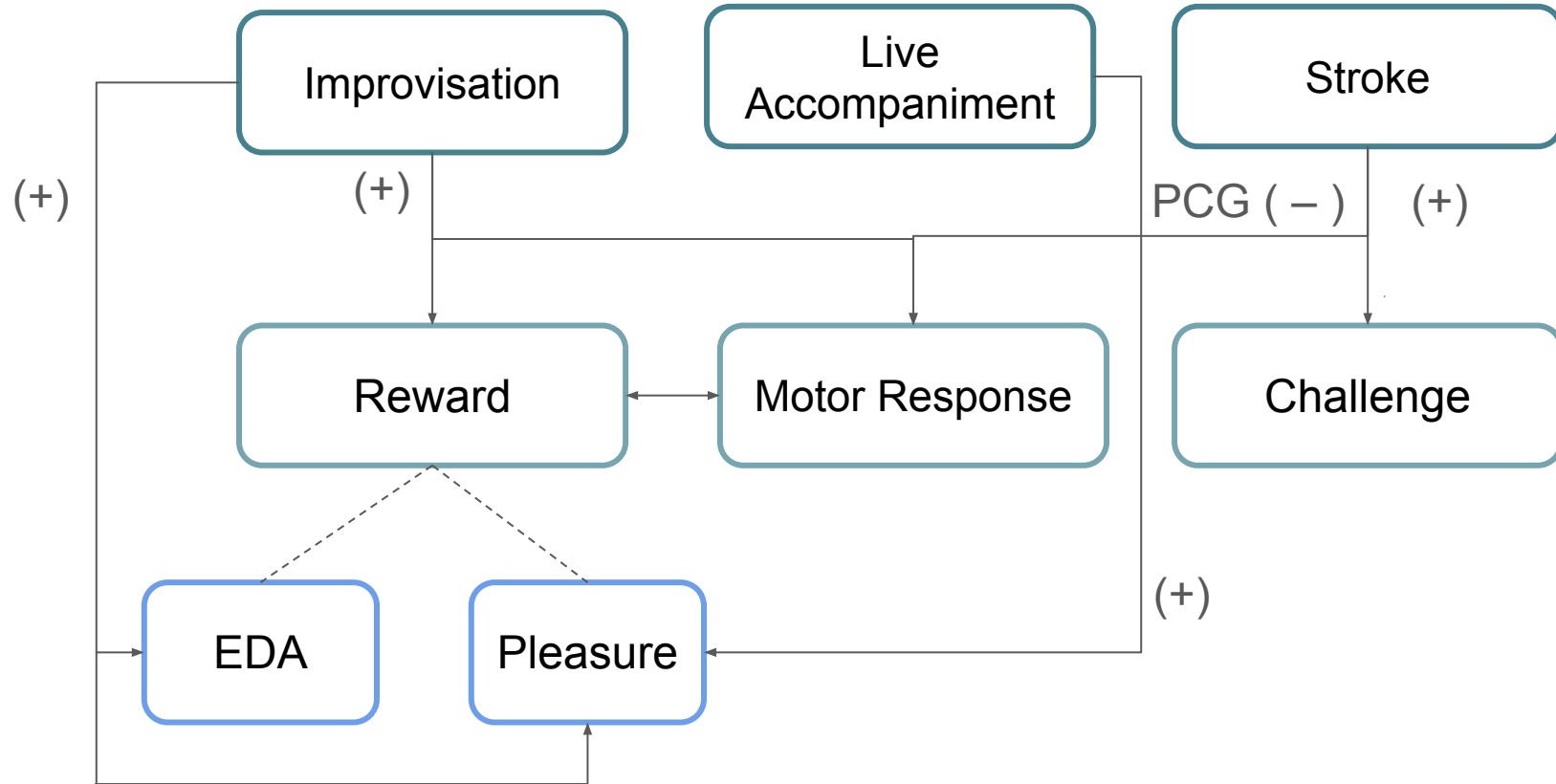
Improvisation Increased Activation in Ventral Striatum



Conclusions



Conclusions



Questions?