BRAIN CONNECTIVITY DURING NATURALISTIC AND UNINTERRUPTED ENSEMBLE MUSIC PERFORMANCE: AN EXPLORATORY FNIRS STUDY

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INTRODUCTION

Advances in neuroimaging technology have enabled a better understanding of the brain underpinnings of joint music making in ecological settings.

Techniques such as functional near infrared spectroscopy (fNIRS) have made possible the study of brain function in freely-moving participants.

Yet, one of the challenges in neuroimaging research is capturing brain states during dynamic and uninterrupted real-world experiences.

STUDY GOAL

In this proof-of-concept study, we investigated inter-brain connectivity during naturalistic and uninterrupted violin duet performance.

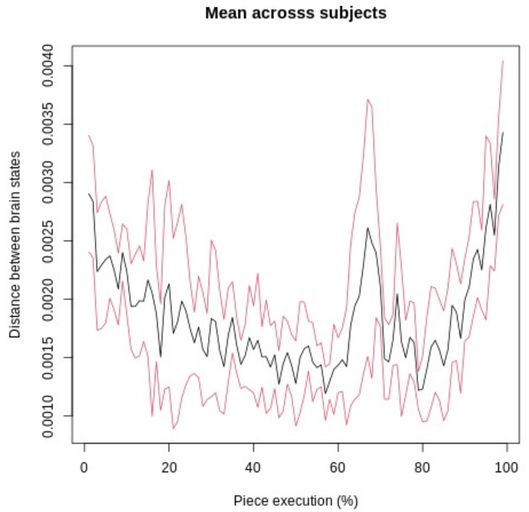
METHOD

- 07 violin duos performed the Duo n. 37 (Prelude and Canon) by Béla Bartók.
- Hemodynamic response correlates were recorded from both musicians with simultaneous fNIRS acquisition during the performance of the entire music piece.
- 23 channels covered fronto-dorsal, sensorimotor, and temporo-parietal regions of the right hemisphere.

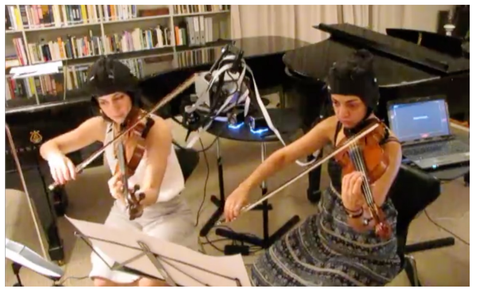
DATA ANALYSIS

- The distance between the hemodynamic response distribution for both musicians was calculated for every second of the music performance and averaged across duos.
- A small distance in brain hemodynamic distribution indicates a more similar brain activation pattern between Violin 1 and Violin 2.

RESULT



The graph displays the average (black line) and standard deviation (red lines) of the distance in brain hemodynamic distribution between duet musicians throughout the entire music performance.



DISCUSSION

The analysis revealed that moments where musicians are focused on distinct aspects of the performance (65% of execution) and during the execution of technically complex musical passages (80% of the performance onward) are reflected in an increase in the distance between brain states.

Thus, inter-brain connectivity during violin duet performance is dynamic and may reflect different levels of interaction required throughout a naturalistic music performance.

Monitoring patterns of brain activity during dynamic and real-world experiences, such as music performance, can reveal important information about brain mechanisms underlying social interaction and interpersonal coordination during joint actions.

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