

INCREASED INTER-NETWORK CONNECTIVITY IN THE TRIPLE NETWORKS AFTER SHORT-TERM MINDFULNESS MEDITATION TRAINING

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INTRODUCTION

- Meditation training has shown to reorganize functional networks
- the triple networks has received interests in meditation, due to its inherent function in attention-related processes
- Previous research suggests a dynamic interaction between the triple networks and trait-mindfulness
- However, limited studies have dwell into the inter-network connectivity of the triple networks in meditation training

Current Study

- Investigate the functional connectivity of the triple networks of attention after short-term mindfulness meditation training
- Hypothesis: Increased inter-network connectivity after meditation

METHODS

PARTICIPANTS & SHORT-TERM INTEGRATED BODY-MIND TRAINING

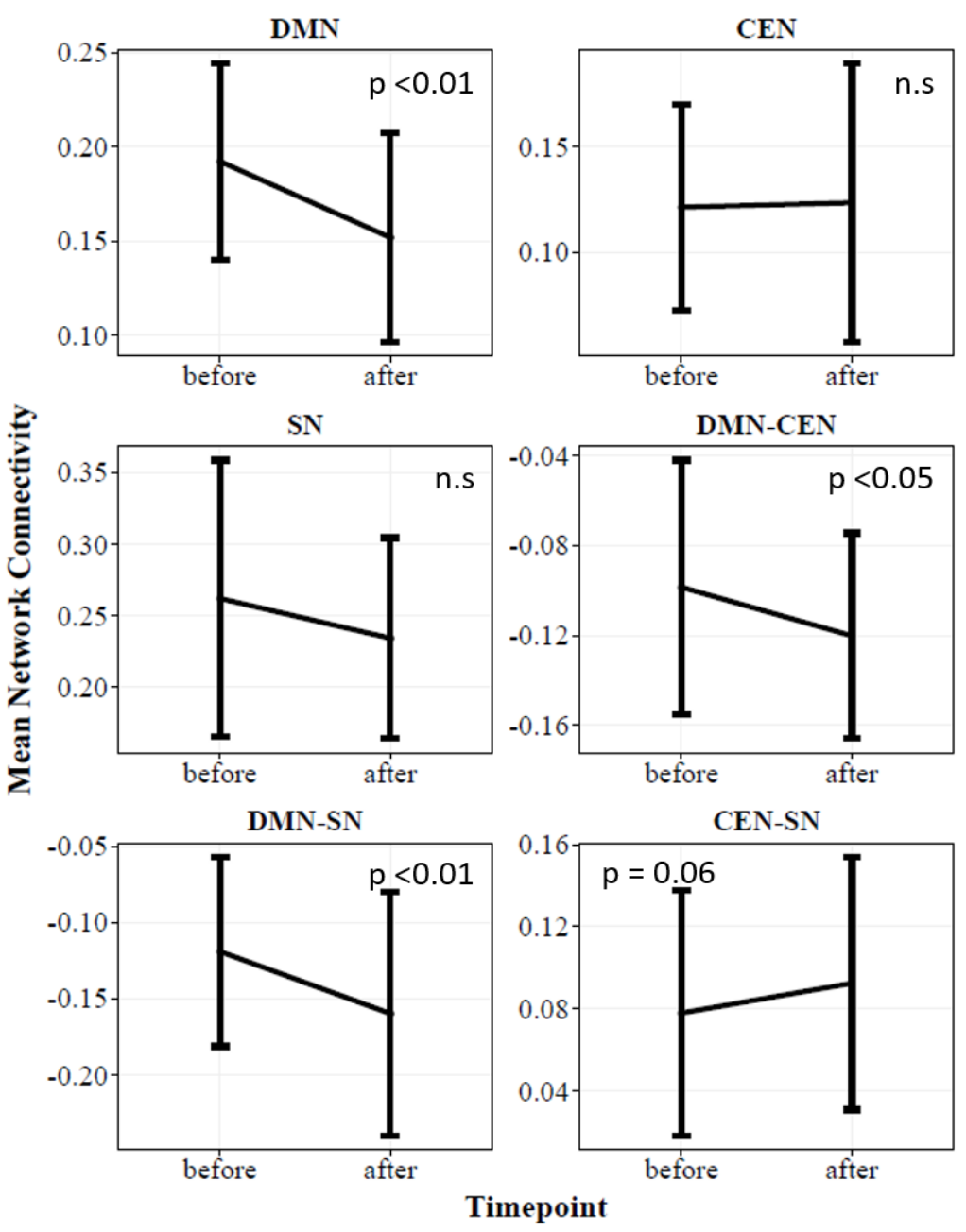
- 21 healthy undergraduate students completed four weeks (10 hours) of Integrated Body-Mind Training (IBMT), with each session lasting 30 minutes.
- IBMT involves several body-mind techniques, including (1) body relaxation, (2) breath adjustment, (3) mental imagery, (4) mindfulness training, accompanied by a selected background music

NEUROIMAGING PROCEDURE AND ANALYSIS

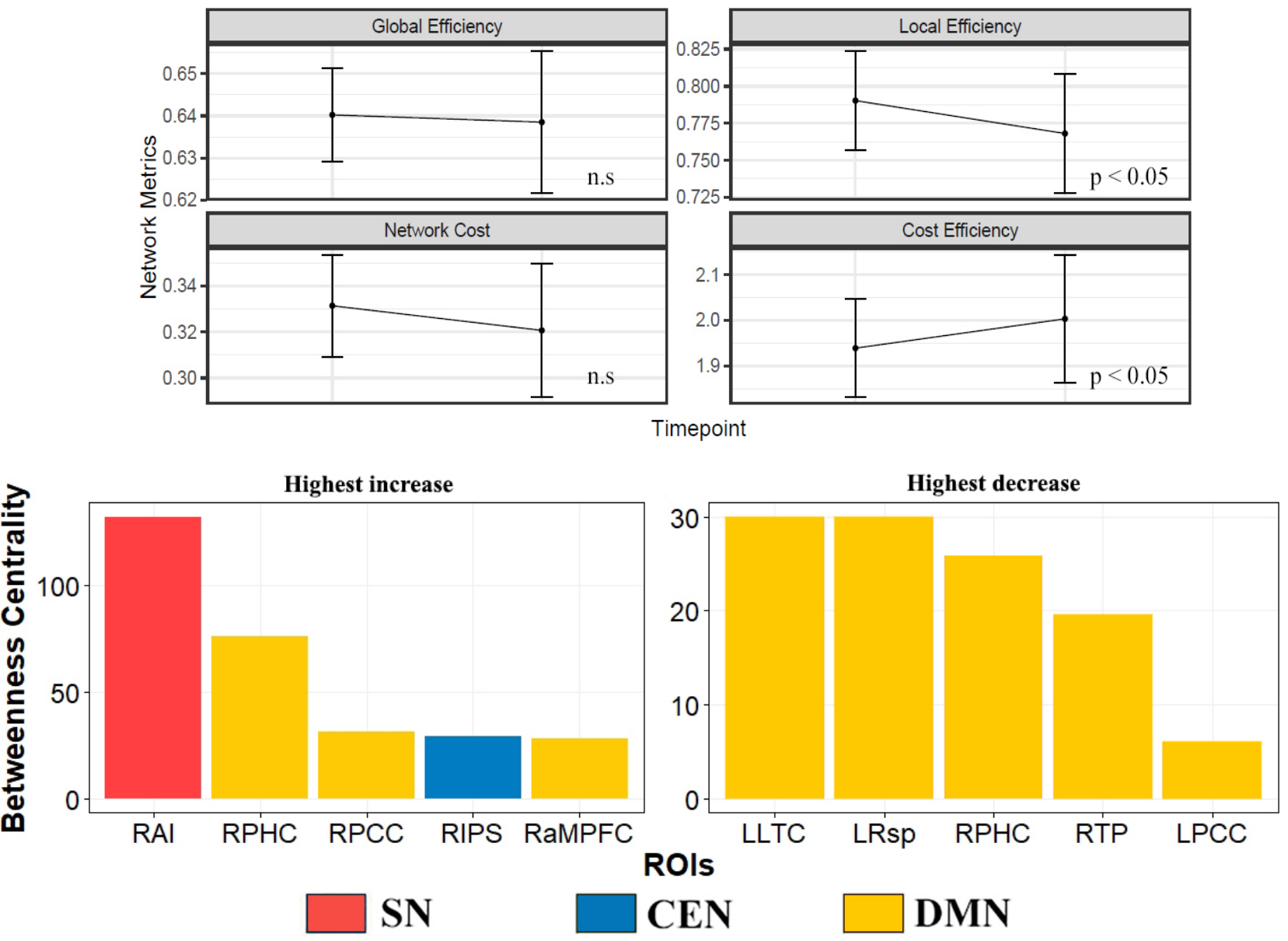
- Participants underwent resting-state fMRI scans one week before and after the training
- Average static functional connectivity within and between networks were calculated using pre-selected ROIs of the triple networks.
- Graph theory metrics such as betweenness centrality, global efficiency, and cost efficiency were calculated
- NBS was used to calculate group-level differences in functional connectivity in the triple networks

RESULTS

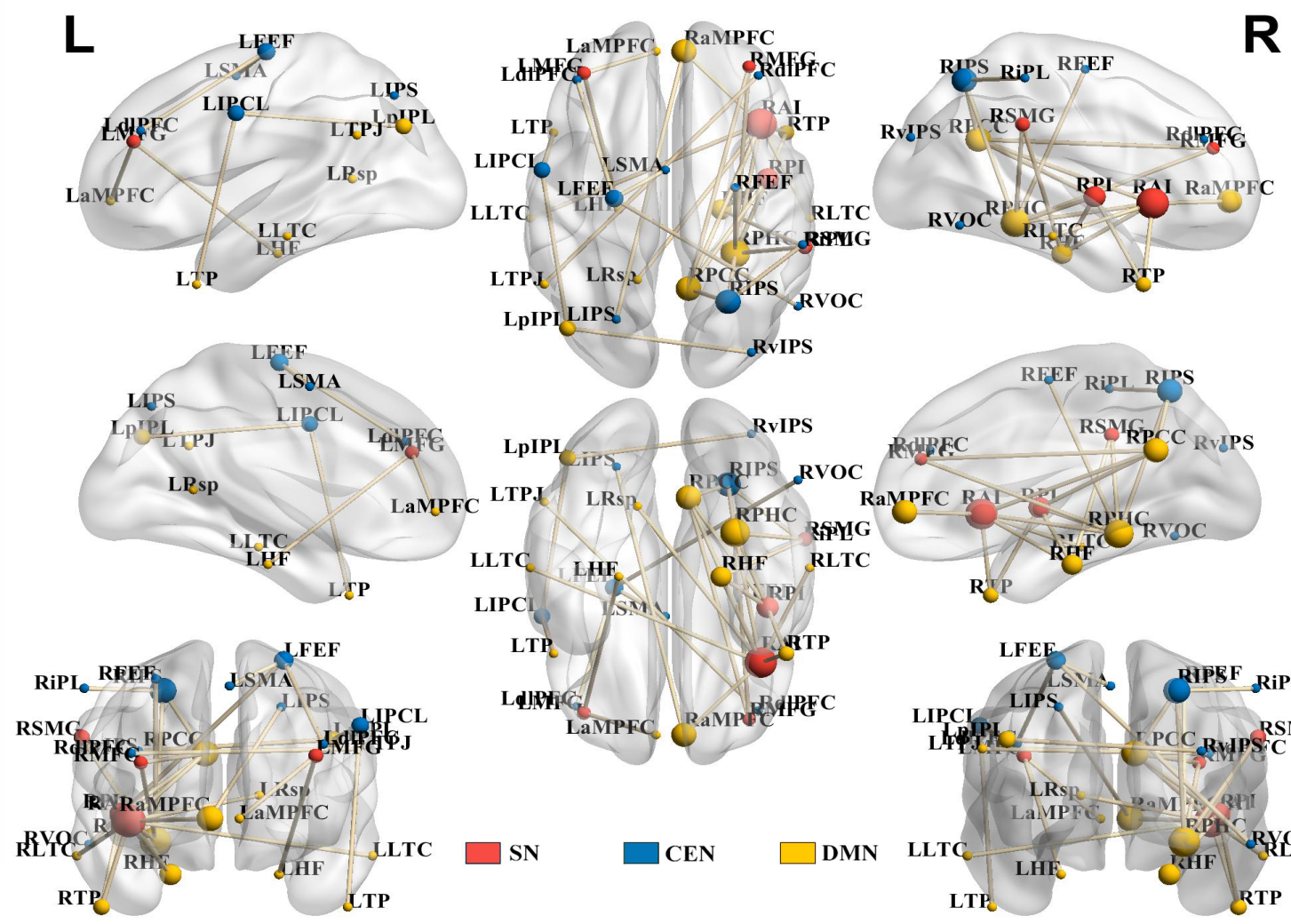
Mean connectivity



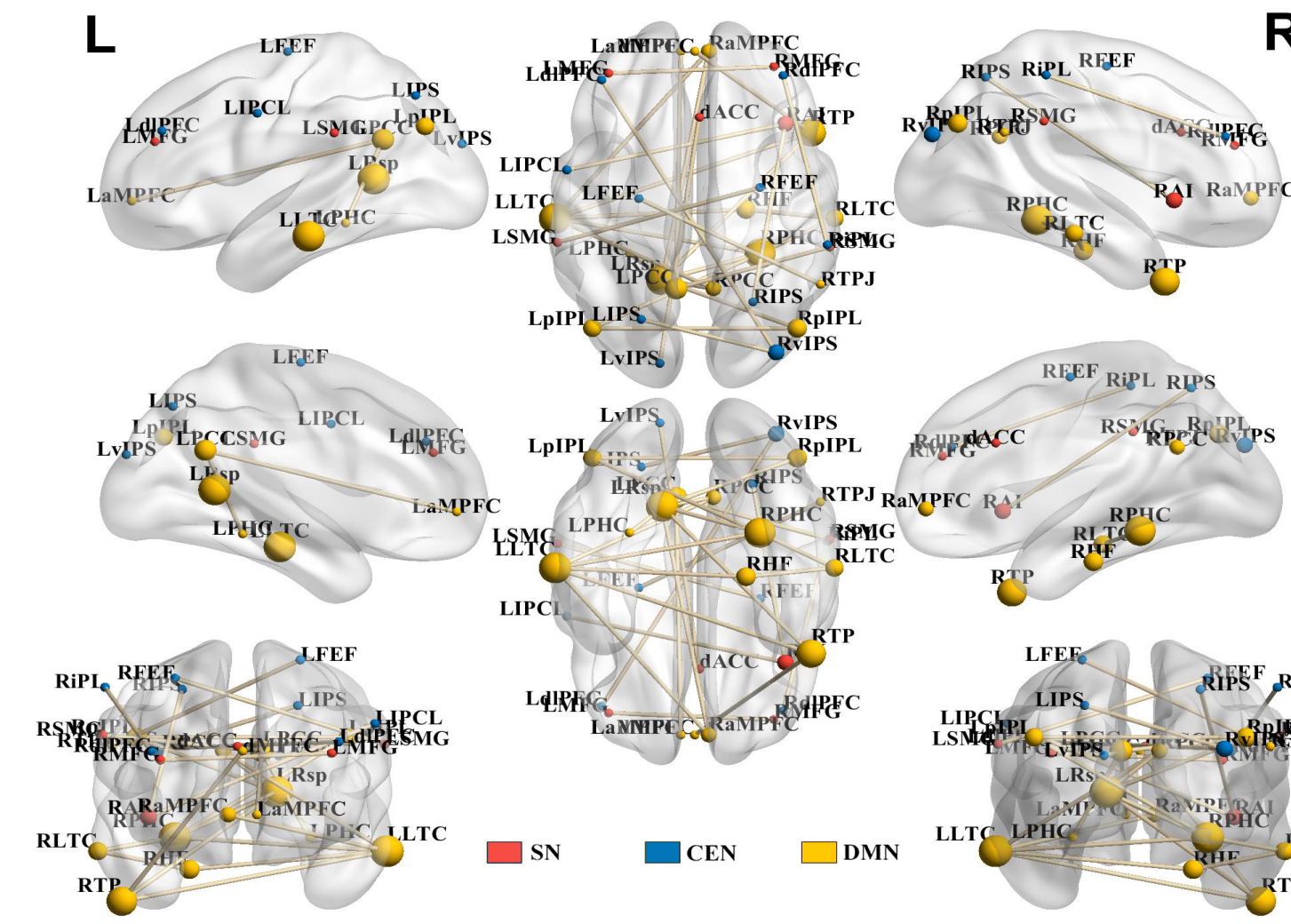
Graph Metrics



Increased connectivity



Decreased connectivity



DISCUSSION

Inter-network connectivity

- Findings likely reflect changes in cognitive processes, such as self-detachment, and more effortless attention with meditation practices
- Individuals were more “on-task” than “off-task, and resilient towards distractions

Importance of the right anterior insula

- Right AI initiates interaction between the three networks
- May help individuals direct their attention away from automatic and maladaptive internal processing, and move towards adaptive processing

Importance of the DMN in meditation

- Meditation helps the individual to move away from the ego “self”, and build adaptive character
- The posterior DMN aids in diminishing ego borders which may be vital for human flourishing traits, such as empathy, and compassion

Implications for brain health and behavior

- Contemplative practices such as meditation may be a vital intervention for some psychopathologies such as depression
- Individuals who lack awareness of their present situation are more likely to direct their attention towards internal thoughts, thus engaging in automatic processing and negative mood
- Many psychopathologies have disrupted functional connectivity in the triple networks. Contemplative practices such as meditation may be an important intervention for some of these psychopathologies

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