

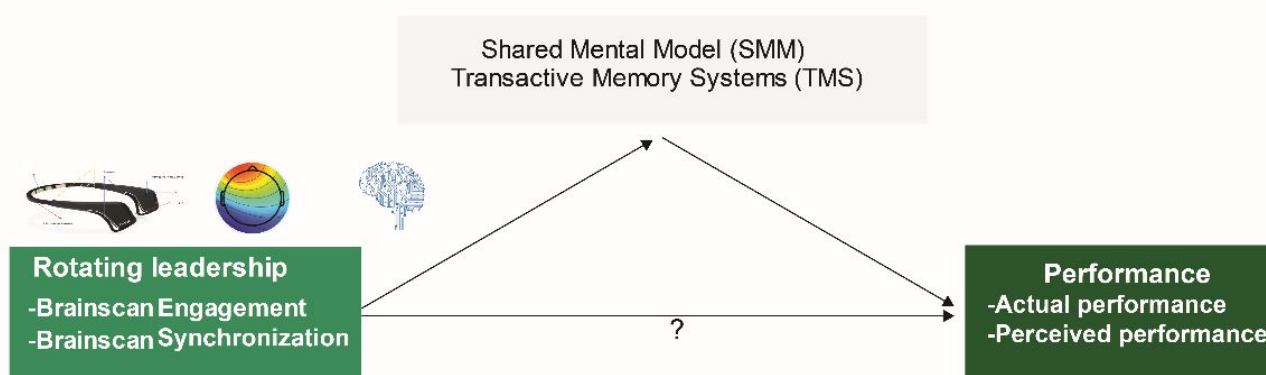
# Psychological and neural mechanisms of rotating leadership in teams: the impact of engagement and shared mental model

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## 1 Introduction and aim

Rotating leadership, the changing of complimentary roles matter for team development and performance [1] as does the related construct of shared leadership [2], and the cognitive shared mental model (SMM) [3] and transactive memory system (TMS) variables [4]. Neuro methods have been applied to understand the dynamics of teamwork [5]. The aim of current study is to hypothesize the relationship of the above emergent properties of teams with perceived and actual performance in real-world settings by using organizational psychometric surveys jointly with electroencephalogram (EEG) measures.



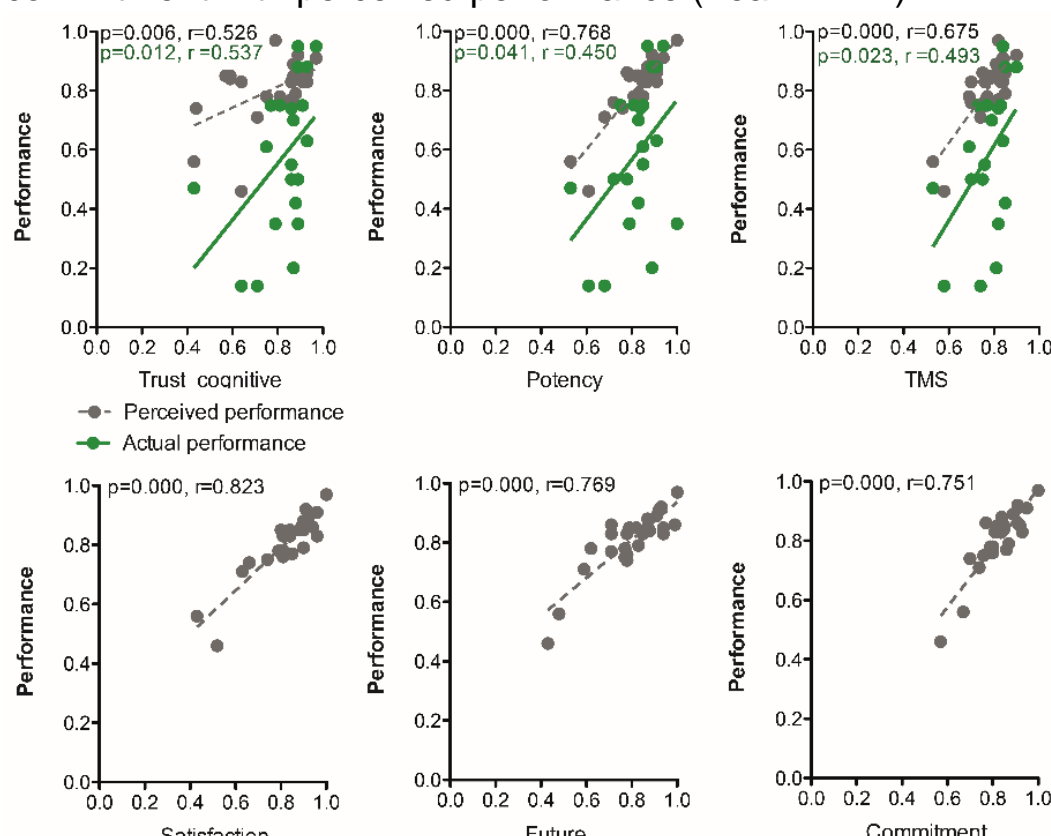
## 2 Methods

Twenty-one teams (Master students aged 22-30, n=89, F/M) tasked with developing an innovative and disruptive venture/project were included. Organizational psychometric survey (7-point scale) assessed affective and cognitive parameters including trust, cohesion, team efficacy, SMM or TMS. EEG signals were recorded simultaneously from the brains of 8 team (27 members) during team discussions (6x10 minutes) using mobile dry-electrode EEG headsets in a quiet room. Individual level of engagement was calculated by the amplitude of beta-wave in the frontal lobe (AF7, AF8); Synchronization by wavelet coherence analysis of the beta-wave dynamics between two team members [6] (MATLAB).

## 3 Results

### Psychometric variables positively correlate with team actual and perceived performance

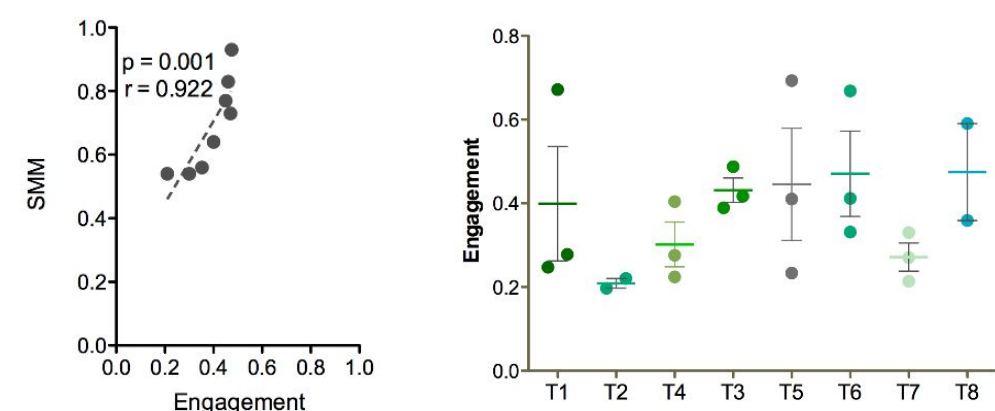
Non-parametric Spearman rank analysis of survey results indicate positive correlations of potency, trust\_cognitive, and TMS with team actual and perceived performance; satisfaction, future and commitment with perceived performance (Team n=21).



## 3 Results and discussion

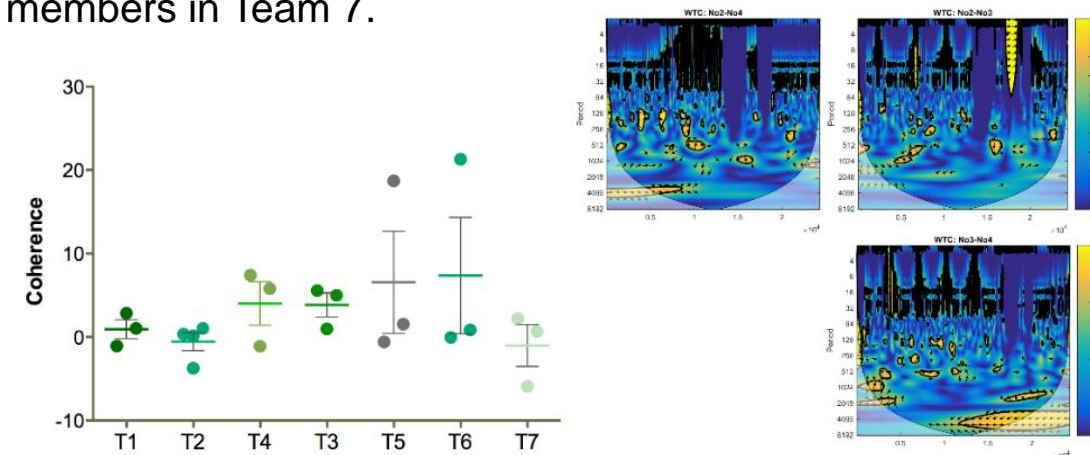
### Psychometric and EEG measures relationship

Non-parametric analysis indicated a positive correlation between mean engagement with psychometric parameter SMM of the teams.



### Wavelet coherence analysis of synchronization between team members

Wavelet coherence analysis were performed using paired 90s beta-wave time series of two team members. Coherence score indicate positive/negative synchronization between members. WTC Figure illustrates the coherence of three members in Team 7.



## 4 Conclusions

- Assessing emergent properties of teams by neurometric methods has the potential to complement, both empirically and theoretically, the traditional psychometric approaches to understand team processes and performance.
- Positive correlations found between TMS, trust\_cognitive and potency with actual and perceived performance. Strong correlation between Engagement and SMM suggests link between psychological and neural measures.
- Implications of results for literature inconclusive, even as intriguing directions are suggested. Perceived performance as a cognitive bias, or the potential moderating, mediating roles of SMM, TMS.
- Further studies will further refine the research design, variables and falsifiable hypotheses to investigate the relevance of EEG derived parameter such as entropy [7].

## 5 References

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