02. Mind-Wandering and Attentional Control as Behavioural Markers of Fronto-Parietal Network Inefficiency: A Questionnaire Based Study Among Medical Trainees

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Background: Efficient cognitive performance requires dynamic regulation between the default mode network and the fronto-parietal attentional control network. Mind-wandering reflects internally directed cognition, while attentional control represents top-down regulatory capacity. Although these processes are central to cognitive neuroscience, their interaction in medical trainees, a population exposed to immense cognitive load and multitasking, remains poorly explored. **Methods:** A Cross-sectional, questionnaire-based study was conducted among medical trainees, where they completed the Mind-Wandering Questionnaire (MWQ), Attentional Control Scale (ACS), and Cognitive Failures Questionnaire (CFQ). Descriptive statistics, correlation analysis, multiple linear regression, mediation, and moderation analyses were performed. **Results:** A sample of 200 students was analysed. Mean scores of MWQ 18.3 ± 4.36, ACS 50.26 ± 4.11, and CFQ 34.68 ± 7.34 were observed. Mind-wandering demonstrated a significant positive association with cognitive failures and independently predicted CFQ scores on regression analysis ($p < 0.001$). Mediation analysis further confirmed that attentional control significantly mediated the association between mind-wandering and cognitive failure, with evidence of partial mediation. Although attentional control accounted for a substantial portion of this relationship, the direct effect of mind-wandering on cognitive failure remained more significant. Female trainees reported higher mind-wandering scores, whereas males demonstrated higher cognitive failure scores. **Conclusion:** Mind-wandering increased significantly across the years of study and was higher in females, while attentional control showed a declining trend, and cognitive failure increased with academic progression. Furthermore, attentional control partially mediated the relationship between mind-wandering and cognitive failure, indicating that reduced attentional control may be a key mechanism through which mind-wandering contributes to cognitive failures.

Key Words: Mind-wandering, Attention control, Cognitive failures, Medical trainees

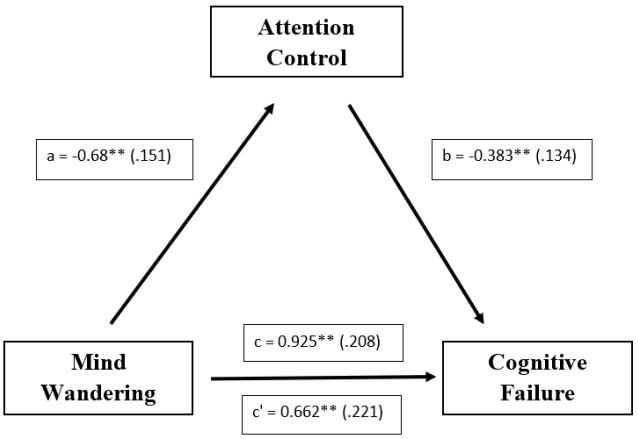

Figure: Simple mediation diagram: a, b, c and c' are path coefficients representing unstandardized regression weights and standard errors (in parentheses). The c path coefficient represents total effect of MW on CF. The c' prime path coefficient represents direct effect MW on CF after including AC as mediator. All analyzed path significant,**p <0.01

ISSN 2076-6327

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