

Determining the EFFECT OF SLEEP DEPRIVATION on reaction time and mood in anaesthetists

INTRODUCTION

Human beings are vulnerable to the effects of fatigue. Sleep deprivation has been implicated in poor patient care and health care worker morbidity and mortality. We compared the performance of anaesthetic registrars after sleep deprivation to normal working days.

METHODS

In this quasi-experimental study with a before-and-after design, the performance of thirty Anaesthesiology registrars at two academic hospitals were assessed before night duty, after night duty, before and after a normal working day. Assessment included cognitive processing speed (Deary-Liewald Reaction Time Task), Total Mood Disturbance (TMD) and sleepiness (Profile of Mood States – POMS, and Stanford Sleepiness Scale - SSS). Confounders such as age, sex, stimulants, number of recent night-duties and recent rest were accounted for. Paired t-tests or non-parametric alternatives were used to determine differences in mood scores and reaction times preceding and following sleep deprivation. Simple linear regression was used to determine the effect of mood and other factors on reaction time. Tests were evaluated at 5% level of significance.

RESULTS

Mean simple reaction time (measuring concentration) deteriorated from 312.85ms pre-call to 342.51ms post-call (SD 64.92), which is a 9.4% reduction ($p < 0.001$; 95% CI -42.90 to -16.42). Mean simple reaction time on working days deteriorated from 313.10ms to 323.56ms (SD 42.95). This is a 3.3% reduction ($p = 0.028$; 95% CI -19.90 to -0.99). Mean Pre-call Choice Reaction Time (measuring decision-making speed) deteriorated from 481.48ms to 511.57ms post-call (SD 87.23), resembling a 6.2% reduction ($p = 0.012$; 95% CI -53.15 to -7.01). Mean Choice Reaction Time Before a working day (496.76ms) improved to 490.27ms after the day (SD 77.17) resembling a 1.31% improvement ($p = 0.584$). Mood deteriorated after a call (POMS increase of 30.8 from pre- to post-call; $p < 0.001$) and after a working day (POMS increase of 11.9; $p = 0.01$). Sleepiness increased after a call with a SSS of 2 (1-5) pre-call and 4.73 (1-6) post-call.

CONCLUSION

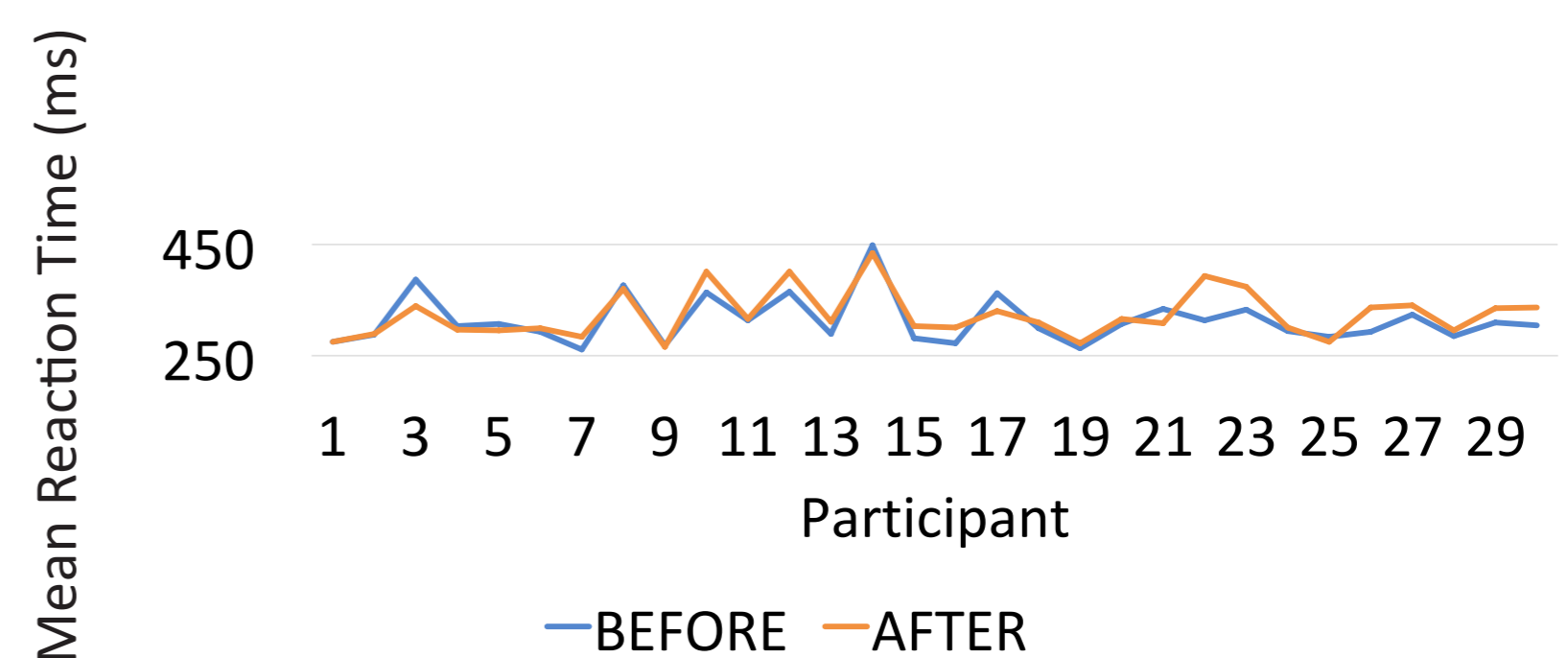
Sleep deprivation in anaesthetists leads to a statistically significant deterioration of simple and choice reaction times. Post-call processing speed equates to a blood alcohol concentration of $>0.05\%$. Sleep deprivation also results in mood disturbance. We recommend the revision of continuous overtime working hours for anaesthetists.

Du Toit PR
Spijkerman S

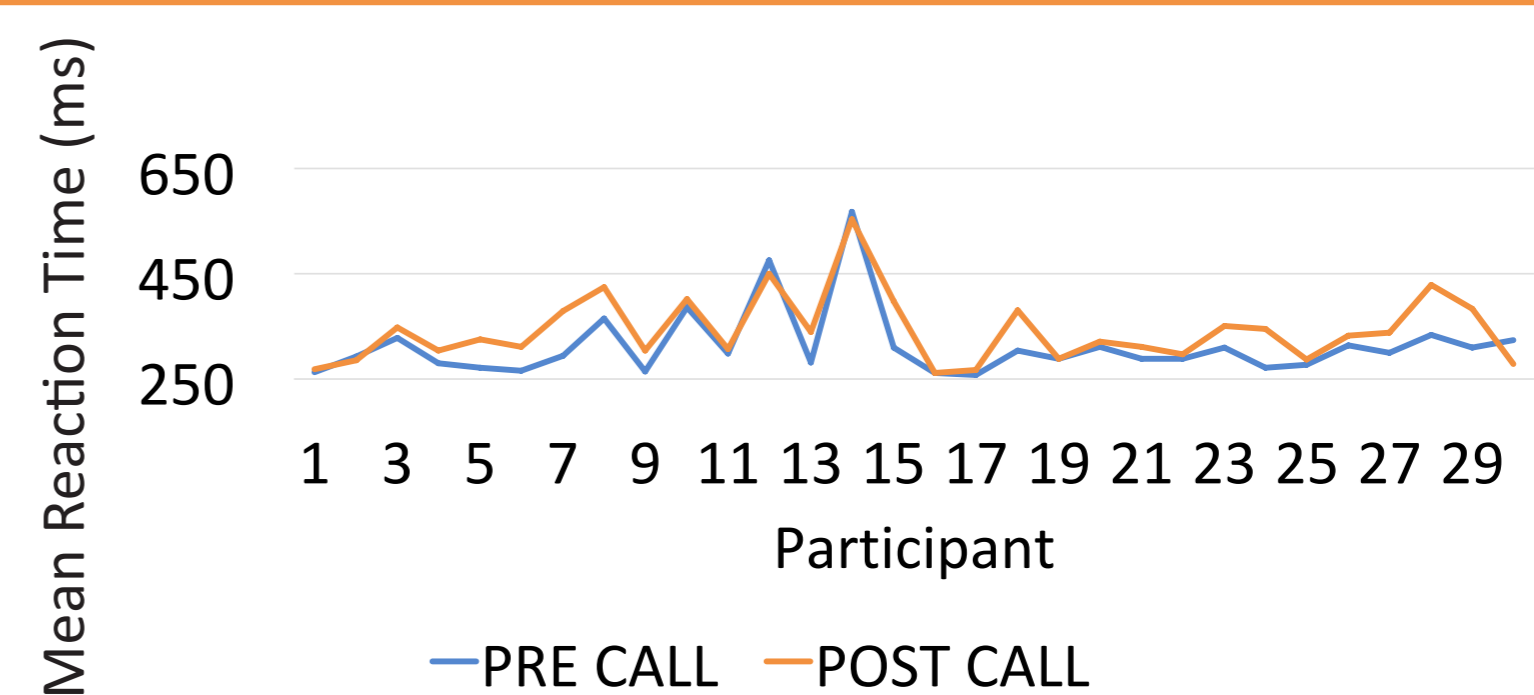
Department of Anaesthesiology
Faculty of Health Sciences
University of Pretoria



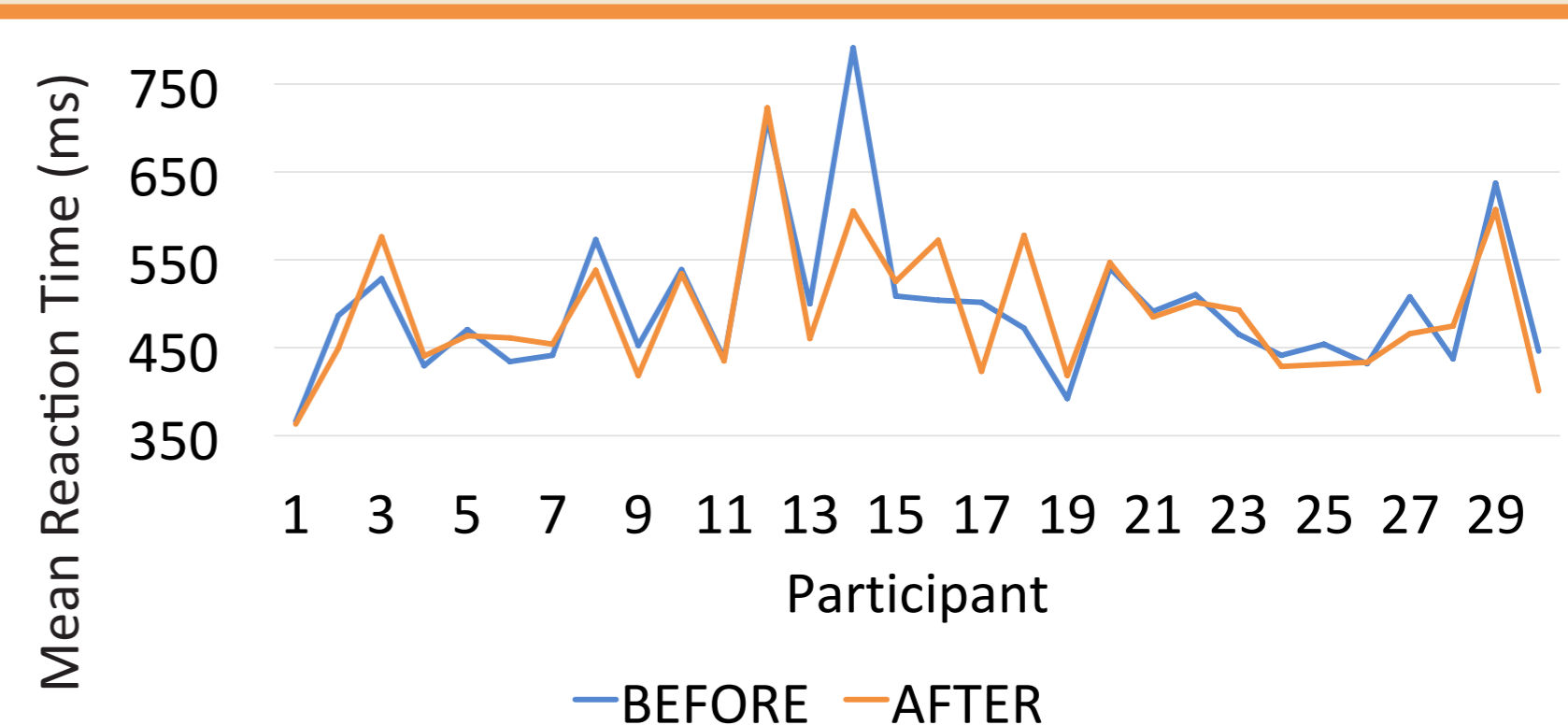
Simple Reaction Time - Normal Day



Simple Reaction Time - Night on Call



Choice Reaction Time - Normal Day



Choice Reaction Time - Night on Call

