

Murdoch Sleep Study Closing Report

Project title (No.): Effects of Sleep Loss and Sleep Recovery on Mood and Mood Regulation (2015/019)

PhD candidate: Greyson Kim

Supervisors: Dr. Helen Davis & Dr. Suzanne Dziurawiec

Introduction

Pulling an all-nighter is known to impact the way we feel and impair many aspects of our thinking processes. However, an area that has yet to be sufficiently researched is the concept of mood regulation, a domain that overlaps with emotions and thinking. Mood regulation is the ability to evaluate our feelings, then determine the right strategy to adjust our feelings back to normal. In general, a low mood requires mood repair, an overly-excited mood requires mood dampening, and an adequate mood requires mood maintenance. However, a person who is unable to emotionally regulate after sleep deprivation might experience the poorer mood state for a longer time. So, even though sleep-deprived, we would expect that participants would demonstrate increase mood repair, given the poorer mood after sleep deprivation, sleep deprivation could also impair this process.

In addition to extending research into mood regulation, this research project investigated the recovery patterns of mood and mood regulation in the days following sleep deprivation.

Design

This study recruited 63 undergraduate university students. Firstly, the participants went through three days of normal sleep to track their normal mood and mood regulation levels. Secondly, the participants were divided into two groups: intervention and control. The intervention group underwent sleep deprivation by not sleeping for 24 hours, whereas the control group slept as usual. This design allowed us to compare the effect of sleep deprivation to the control condition. Subsequently, the control group also underwent sleep deprivation, allowing us to verify the effects of sleep deprivation with an increased sample size. Lastly, we tracked how everyone recovered from the sleep deprivation in terms of mood and mood regulation for the next three days. The changes across time for mood are summarised in Figure 1, and for mood regulation in Figure 2.

Results

Impact of sleep deprivation. Our study found that after sleep deprivation, participants felt significantly worse than normal, in the following mood facets starting with the most affected facet to the least: vigour, fatigue, happiness, calmness, confusion, depression and anger. Tension did not change. In response to these mood changes, the participants evaluated their overall mood as significantly less acceptable and typical, and more influential than at baseline. Subsequently, the participants demonstrated markedly less mood maintenance and somewhat greater mood repair efforts than at baseline. By contrast, the control group did not demonstrate any major change in their mood and mood regulation on their usual sleep day. This study shows that despite the pervasive impact of sleep deprivation, participants were

able to emotionally regulate, as seen from the rise in repair efforts when their moods were negatively affected. Hence, the emotional impact of sleep deprivation remained only at mood level, and did not impair regulation ability.

Recovery from sleep deprivation. After sleep deprivation, different patterns of recovery were observed for the various mood facets. Firstly, positive affect facets (e.g., happiness, calmness), which were strongly impacted by sleep deprivation, took a longer time to recover back to baseline than negative affect facets (e.g., confusion, depression). After three recovery days, happiness and calmness remained consistently below baseline. Although vigour showed immediate improvement to baseline on the first recovery day, vigour scores deteriorated on the next two days. Secondly, the deteriorated negative mood facets (i.e., anger, depression, fatigue and confusion) fully recovered to baseline by the first day of recovery and the recovery was sustained in the following days.

Following alongside the recovery of most mood facets, mood evaluation and regulation facets of acceptability, typicality, influence, maintenance and repair recovered to baseline on the first recovery day; but dampening remained consistently below baseline through the three recovery days. The lack of recovery for dampening could be explained by the low scores in happiness and calmness through the three recovery days – basically there was little positive affect to be dampened. Maintenance showed a partial recovery on the first recovery day, followed by a delayed decline on the third recovery day, which might be explained by the parallel decline in vigour around the same period.

Conclusions

Taken together, this study found that, although sleep deprivation impacts our emotions, sleep-deprived participants responded with relevant emotional regulation strategies to mitigate these impacts. While the emotional state of sleep-deprived individuals returned to baseline to a large degree after one day of recovery, delayed fluctuations were evident, suggesting that the acute sleep deprivation protocol continued to impact emotional recovery on the subsequent days. It is likely that full emotional recovery back to baseline may require more than three recovery days following sleep deprivation. It appears that mood regulation is not as strongly impacted by sleep deprivation as mood. Mood regulation seems to adapt flexibly after sleep deprivation and normalises during sleep recovery, demonstrating that individuals retain aspects of their emotional resilience even after pulling an all-nighter.

Figure 1: Mood Change Across Time

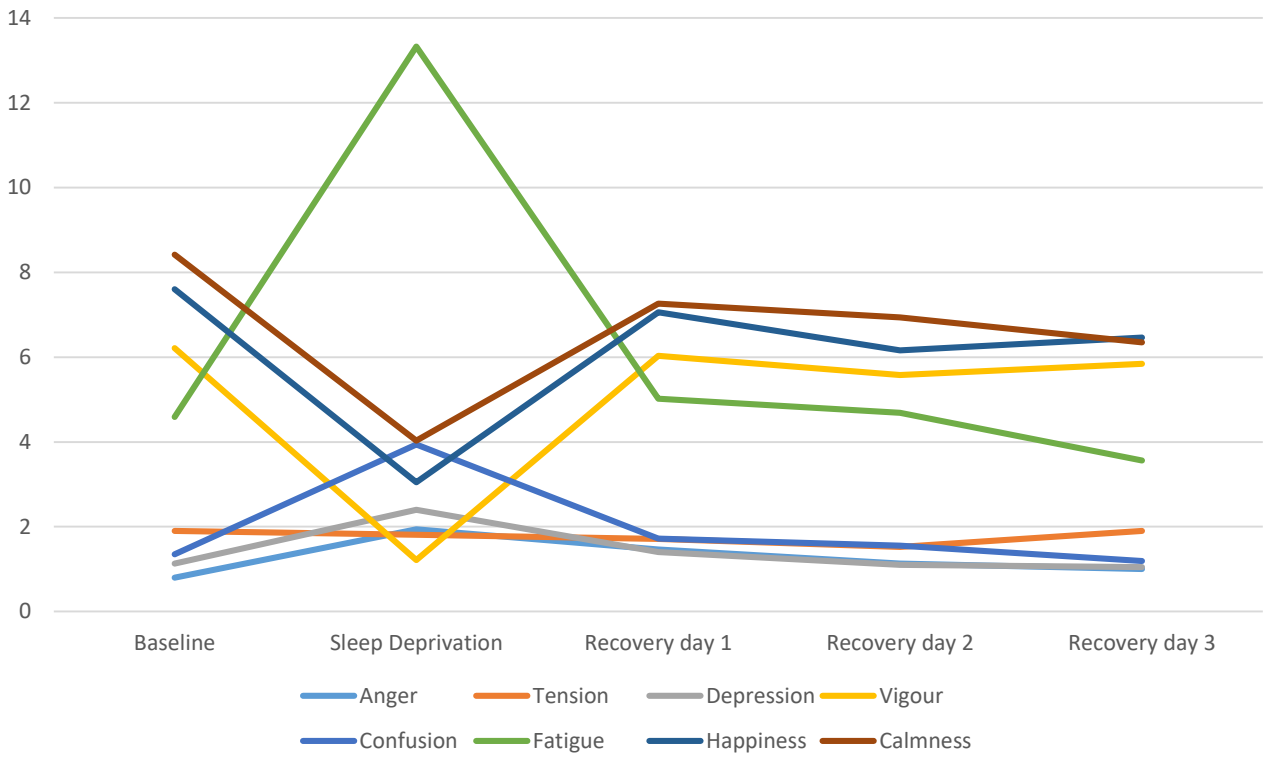


Figure 2: Mood Regulation Change Across Time

