

PSYCHOLOGICAL RESPONSES OF SUBMARINERS IN A SIMULATED DISSUB ENVIRONMENT

CPT Jason Ng

Field Psychologist

Applied Behavioural Sciences Department





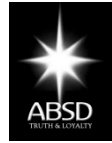
Scope

- Introduction
- Study Model
- Methodology
- Findings
- Implications
- Way Ahead

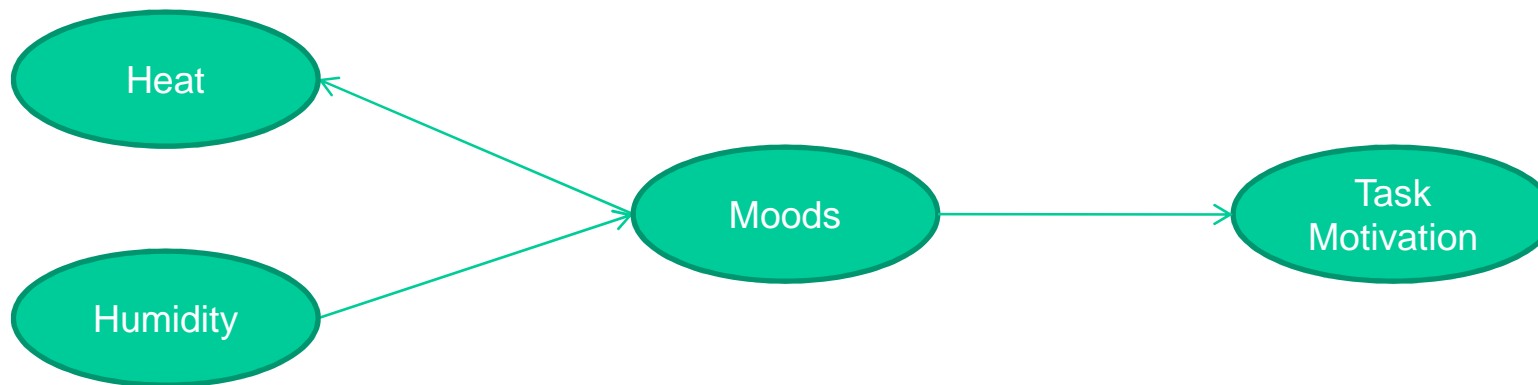


Introduction

- DISSUB – DIStressed SUBmarine
- Wait for rescue or escape opportunity under harsh survival conditions
- Past studies
 - Temperate climates
 - Effects of low temperatures
 - DISSUB 04



Study Model



Adapted from Psychological Model of Combat Stress,
Pavlina et al





Methodology

- 33 Subjects, 3 subjects dropped eventually due to missing data
- Enclosed environment with light and ventilation shut off
- Increasing ambient temperature at about 1 ° every 4 hours
- Humidity dropped in the first 6 hours, before increasing gradually to 100%
- Each participant to complete an 81 Item Questionnaire at regular 12 hours intervals

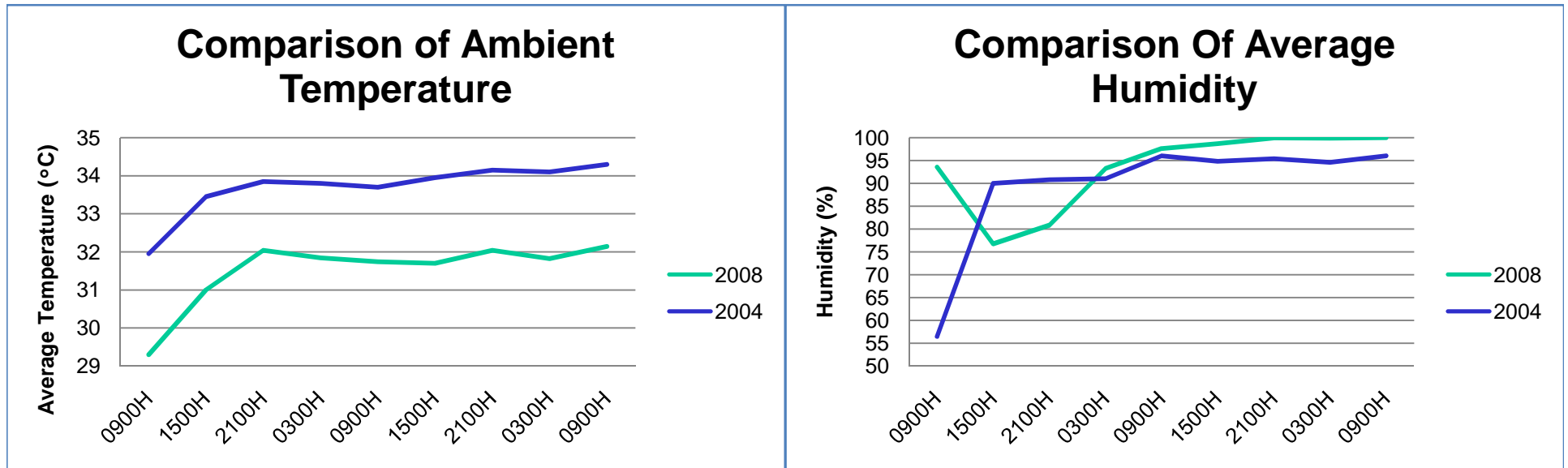


Methodology

- Measurements Taken
 - Happiness Sub Scale (Ryman et al, 1974)
 - Profile of Mood States (McNair et al, 1981)
 - Depression
 - Anger
 - Tension
 - Fatigue
 - Vigor
 - Task Motivation



Environmental Parameters



- Differences in ambient temperature from DISSUB 04 due to study being conducted in open air conditions while the current study is conducted under shaded conditions
- Drop in humidity in 1st 6 hours due to absorption of moisture by the LiOH compound when combining with CO₂





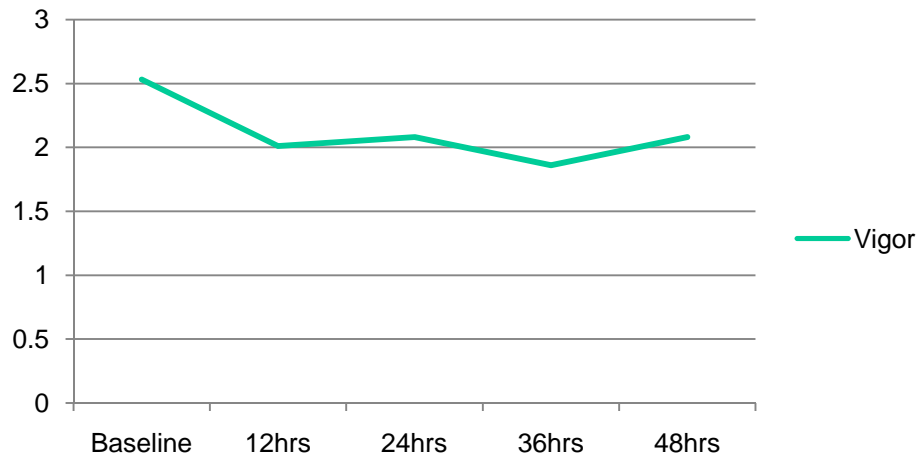
Quantitative Findings

- Overall decrease in positive mood states and increase in negative mood states
- Upsurge in positive mood states and decrease in negative mood states at 48hr time point reflects participants' anticipation of end of trial
- Decrease was most significant at the 12Hr mark and 36Hr mark, reflective of initial adjustment period and also the $\frac{3}{4}$ barrier typical of endurance activities
- Further analysis showed that the change in Happiness correlated most strongly with the change in task motivation in the 1st 12Hrs

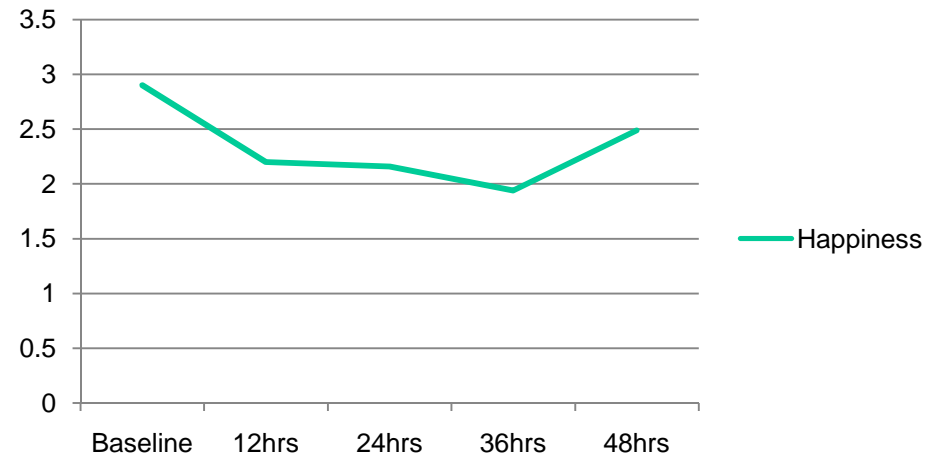


Decrease in Positive Mood States

Vigor



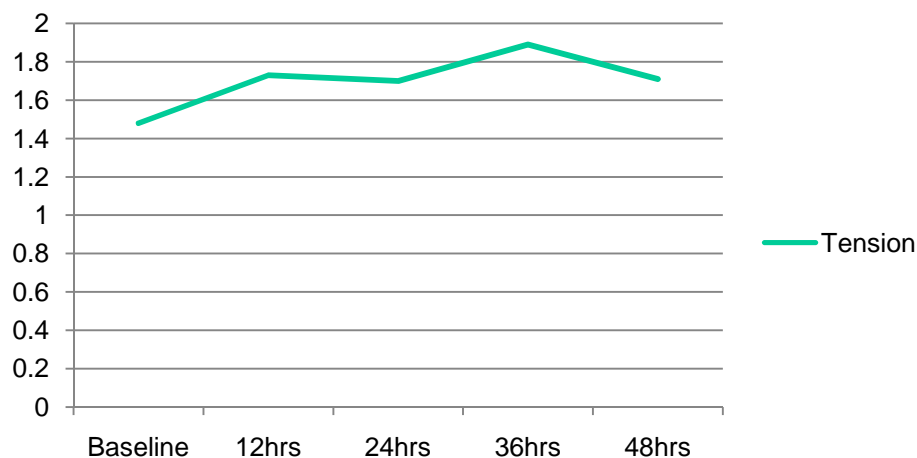
Happiness



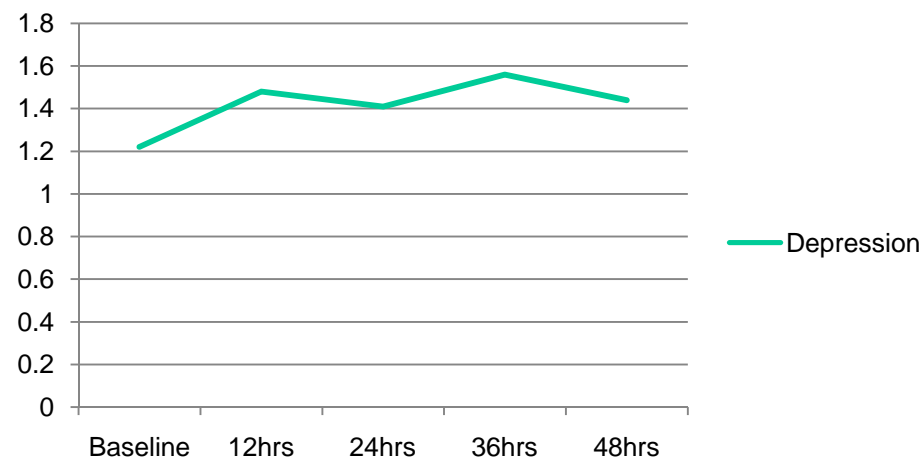


Increase in Negative Mood States

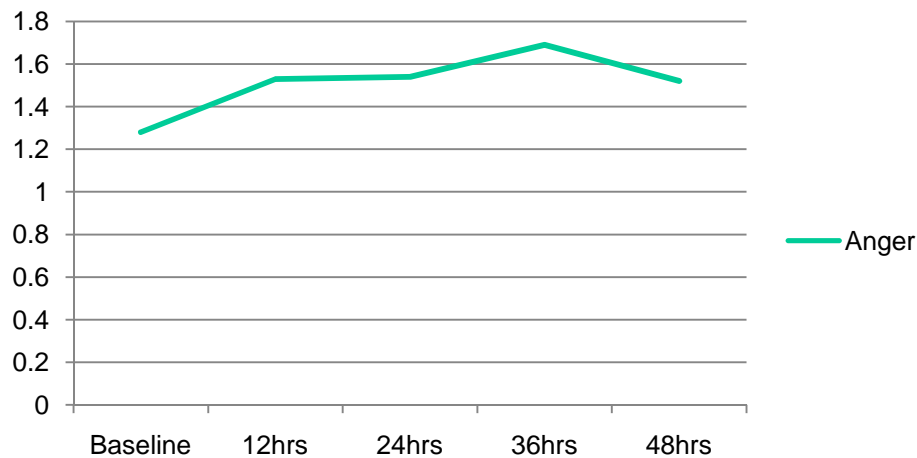
Tension



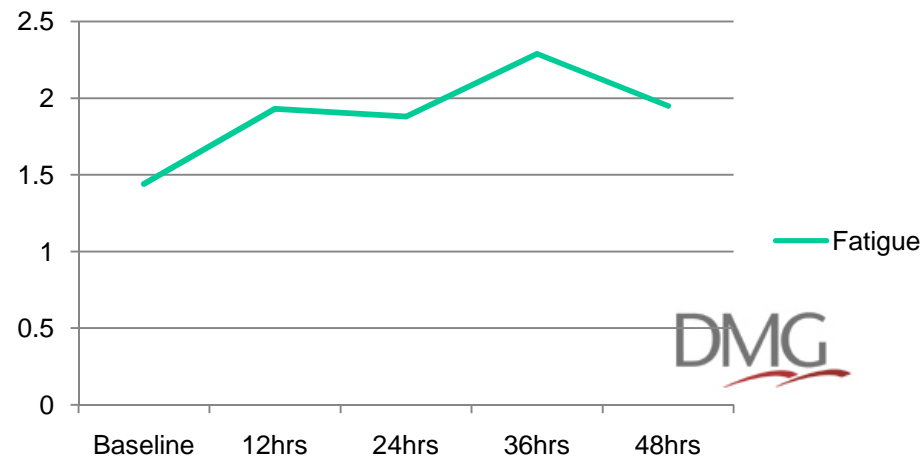
Depression



Anger



Fatigue



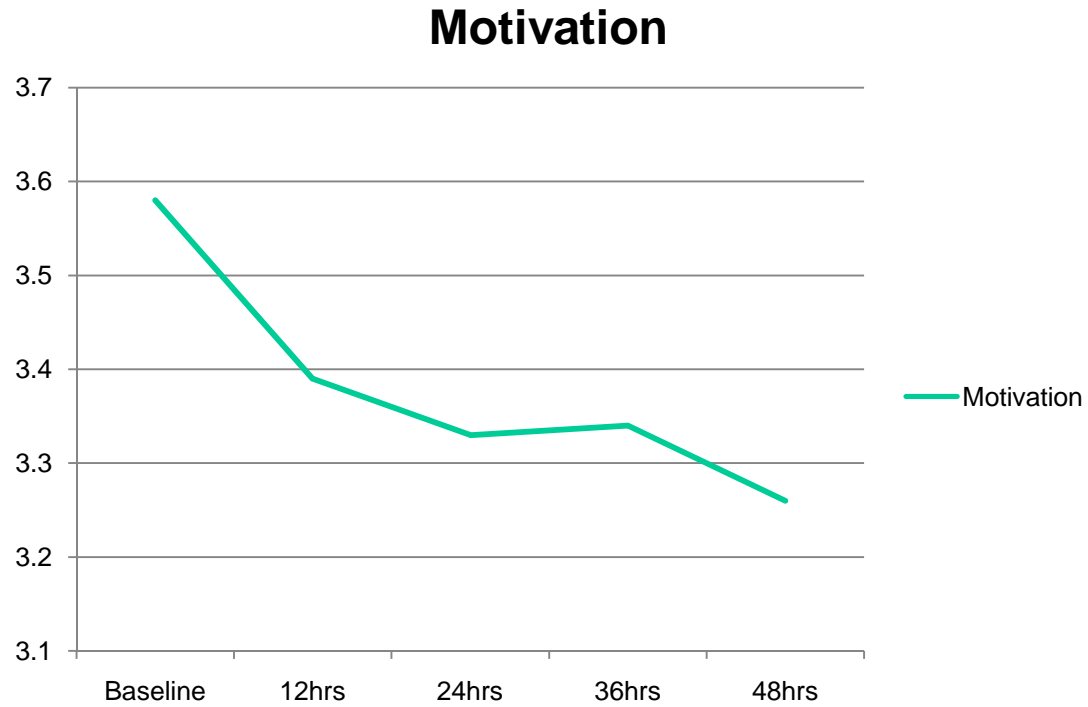


Quantitative Findings

- No significant decrease in Individual Task Motivation
- There is no anticipatory effect at 48hr. Instead, Task Motivation continued to decrease
- Temperature had a strong correlation with the changes in mood states, but humidity did not correlate well



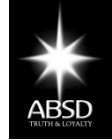
Task Motivation





Qualitative Findings

- Compared to DISSUB 04, there were fewer numbers of qualitative feedback on negative behaviours
 - Fewer cases of physical discomfort
 - Lower ambient temperature
- Typical examples of negative behaviours which discouraged the submariners
 - Incessant complaining by others about the heat
 - Shining torches at each other
 - Being irritable



Qualitative Findings

- As for encouraging behaviours, some felt better talking to each other while others preferred to be left alone
 - Individual stress coping mechanisms
 - Personal space
- By maintaining a positive outlook, submariners were able to distract themselves from the heat and humidity



Implications

- Critical first 12 hours
 - Biggest decrease in positive moods and increase in negative moods
 - Acclimatisation phase where specific interventions to increase positive moods may be administered to moderate the psychological state, eg
 - Better emergency rations for the 1st 12 hours,
 - Making effort to show more consideration to others with regard to stress coping
 - Introduce demarcated areas for resting and for interaction
 - Keeping submariners “Happy” may be the key



Way Ahead

- Due to differences in the temperature and humidity between DISSUB 04 and DISSUB 08, direct comparisons may not be equitable
- Future studies should not have an “exercise end time” to prevent any anticipatory effects on mood



Way Ahead

- Applications in training
 - Stress inoculation workshops to prepare submariners psychologically
 - Crisis management tools for commanders to moderate negative behaviours and promote positive behaviours in a team during crisis situations