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## Study Aim

**This study aims to investigate how cognitive interpretation biases could be trained and modified and used along side moderate exercise, to alleviate the symptoms of anxiety, depression, and stress related disorders.**

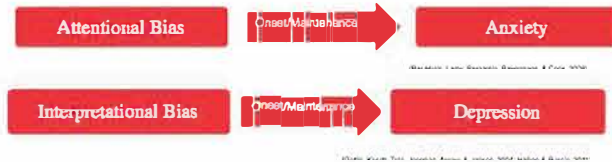
**Hypothesis one** Participants in the CBM & Exercise condition will have a greater decrease in symptoms of anxiety, depression and stress from session one to session two than the exercise condition or CBM condition alone. There will be no difference from session one to session two in the control condition.

**Hypothesis two** Participants in the CBM conditions will have a greater decrease in SST cognitively loaded scores between sessions one and two, relative to the non-CBM conditions and non-loaded condition.

## Background

Cognitive biases are rooted in cognitive functions, in clinical populations; suggesting that anxiety and stress-related symptoms could be considerably reduced<sup>1, 9</sup>.

Moderate exercise is advocated to reduce emotional problems and maladaptive mood<sup>2</sup>, however exercise is only mood enhancing when performed at a manageable level<sup>9</sup>.



## Methods

Condition 1: CBM training program (N=20),  
 Condition 2: Moderate Exercise protocol (N=20),  
 Condition 3: CBM training program & Exercise protocol (N=20),  
 Condition 4: Control (N=20).

DV's; Anxiety; STAI, Depression; BDI-II, Stress; PSS, Cognitive interpretation biases; SST.

CBM training program developed using 5 sets of 10 ambiguous scenarios, that are trained to be interpreted positively. In each set of 10; 6 focused on exercise anxiety, 2 on social anxiety and 2 on physical anxiety.

Moderate exercise protocol in accordance with previous research<sup>3</sup> and conducted in the University of Essex Sports labs.

## Results

### Findings

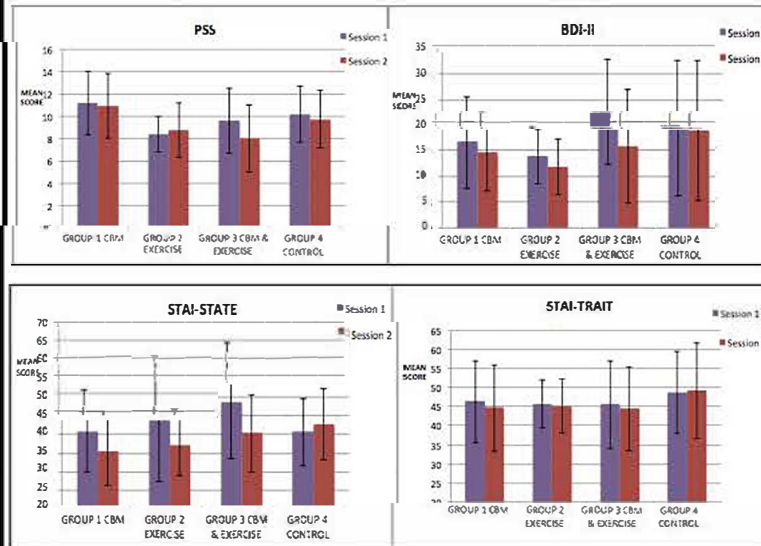


Figure 1 results by experimental condition, for Stress (PSS), State anxiety (STAI-state), Trait anxiety (STAI-trait), Depression (BDI-II).

CBM condition; significant decrease in depressive symptoms, state anxiety and perceived stress, but not trait anxiety.

Exercise condition; significant decrease in depressive symptoms, but not state or trait anxiety, or perceived psychological stress.

CBM & Exercise condition; significant decrease in depressive symptoms and psychological stress. However no significant decrease in state or trait anxiety.

Control condition; no significant decrease in symptoms of anxiety, depression, however there was significant decrease in perceived stress.

There was no significant effect of experimental condition on negative interpretation bias scores (SST).

## Discussion

When exercise is used alongside treatments for anxiety and depression; such as CBM and CBT, effectiveness of these treatments is greatly increased.

Previous research found that regular exercise acts as a prevention of developing anxiety and depression<sup>6</sup>.

Therefore individuals with maladaptive mood, could benefit from the mood-elevating effect of moderate exercise, suggesting that anxiety and stress-related symptoms could be considerably reduced in vulnerable populations<sup>5, 9</sup>.

## Conclusions

Findings from the current study suggest that exercise and CBM training have an accumulative effect on reducing anxiety, depression and stress. Furthermore the current study is progressing research into modifying and training of cognitive interpretation biases.

Once the paradigm of both attentional and interpretational cognitive biases are formed there are vast implications for how CBM could be used within non-clinical and clinical treatments for depression, anxiety and stress related disorders; especially milder cases.

Future research will investigate cognitive bias modification training over a series of treatment sessions to increase effectiveness.

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