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# Vibe Up

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## Research aims

The Vibe Up trial uses a smartphone app to deliver mindfulness, physical activity and sleep interventions designed to ease psychological distress. Researchers trialed these brief interventions with 1,282 Australian tertiary education students in an effort to identify the most effective intervention for reducing psychological distress as quickly as possible, and to determine which intervention works best for individuals depending on their severity of distress.

### AI-driven response adaptive randomisation

Vibe Up is the first Australian mental health trial to use AI-driven response adaptive methodology, in place of a traditional Randomised Controlled Trial (RCT). The research team wanted to understand:

- whether the AI could identify the most effective intervention;
- whether it could do so for individuals with mild, moderate and severe distress symptoms; and
- the efficiency of this trial methodology compared to a traditional RCT.

## Overview

The 'gold standard' method for assessing new clinical interventions or comparing existing interventions is a RCT. However, these trials are often expensive to run, require large numbers of participants and can take months or years to produce results. Integrating AI into the clinical trials landscape offers exciting potential to deliver faster results at lower costs, and using smaller participant samples.

Vibe Up, a part of the three-year, multi-institutional Optimise Project, presents a novel opportunity to explore the utility of AI-driven response adaptive randomisation in a mental health context. In an AI-adaptive trial, we perform a series of 'mini-trials' where the results of each mini-trial feed into the next. A live mathematical model of how well the interventions work is updated after each mini-trial. As the mini-trials continue, the proportion of participants allocated to an intervention changes relative to its effectiveness, with progressively fewer participants allocated to the less effective interventions.



The Vibe Up trial focused on addressing psychological distress among tertiary education students. Among this cohort, such distress can potentially lead to poor academic outcomes and relationship/family problems. Previous research suggests that targeting mindfulness, physical activity and sleep hygiene through the use of psychological interventions can be effective in reducing distress.

## Research activity

### Phase 1: App development and lived experience input

The Vibe Up mobile app was conceived and designed by a multidisciplinary team consisting of clinical psychologists, software engineers, computer scientists and user experience experts.

33 lived experience advisors (tertiary education students who scored highly on the Kessler Psychological Distress Scale) were consulted on app design and development. These students provided a range of insights throughout the development process, including guidance around appropriate and effective language to communicate with the target cohort and advice on how to keep trial participants engaged with the research over the trial period (29 days).


Once the development phase was completed, the researchers recruited three lived experience advisors from the Black Dog Institute Lived Experience Network, along with representatives from the UNSW Psychology Society, UNSW Student Minds and Deakin University Student Counselling Services, to test the intervention content and provide further feedback before finalizing the mobile app.

### Phase 2: Vibe Up trials

After initial pilot testing, tertiary education students from across Australia were recruited into 12 Vibe Up mini-trials to determine which of the three interventions (Mindfulness, Physical Activity, and Sleep Hygiene) and a control (Ecological Momentary Assessment; EMA) was

 **4917** Students screened for the study

 **1669** Students met eligibility criteria


 **1282** Participated in the mini trials

most effective in reducing psychological distress. Each trial ran for four weeks (two weeks baseline, two weeks intervention).


During the first mini-trial, participants were allocated evenly to the three interventions and the control group. Results from the trial were used to inform the allocation of participants in subsequent mini-trials, with greater numbers allocated to the more effective interventions as the mini-trials went on.

A new mini-trial began every three weeks until all 12 mini-trials had been completed.

### Participant demographics

 **74%**  
Women

 **78%**  
Undergraduate

 **2%**  
Aboriginal or Torres Strait Islander

 **6%**  
International

### Outcomes

Results showed that the effectiveness of each intervention was dependent on the participant's pre-treatment distress severity. Physical Activity and Sleep Hygiene were the most effective interventions for participants with mild distress, followed by Mindfulness and EMA. For those experiencing moderate distress, the interventions were ranked as follows: Mindfulness, Physical Activity, Sleep Hygiene, and EMA. For severe

distress, Physical Activity and Mindfulness were the most effective, followed by Sleep Hygiene and EMA.

## Impact

Vibe Up is an exciting exploration of the utility of AI-adaptive trials in mental health and their potential to identify personalised interventions based on an individual's symptom severity. The results demonstrate the feasibility of conducting AI-adaptive trials to compare mental health interventions. This approach offers a viable alternative to traditional RCTs and could also deliver enhanced and rapid clinical decision support for mental health practitioners. The next step will be to test this methodology with a cohort of people receiving clinical treatment for depression, anxiety and stress.

## Research team

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### External Partners

- Applied Artificial Intelligence Institute (A<sup>2</sup>I<sup>2</sup>), Deakin University
- Australian Medical Association
- Australian Psychological Society
- Garvan Institute's Kinghorn Centre for Clinical Genomics
- Macquarie University Centre for the Health Economy (MUCHE)
- QIMR Berghofer Medical Research Institute
- Royal Australia and New Zealand College of Psychiatrists

## Publication

Huckvale, K. et al. (2023). Protocol for a bandit-based response adaptive trial to evaluate the effectiveness of brief self-guided digital interventions for reducing psychological distress in university students: The Vibe Up Study. *BMJ Open*, 13(4). doi: <https://doi.org/10.1136/bmjopen-2022-066249>

Shvetcov, A. et al. (2023). Machine learning identifies a COVID-19-specific phenotype in university students using a mental health app. *Internet Interventions*. 34. doi: <https://doi.org/10.1016/j.invent.2023.100666>

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