

Findings from a Randomized Controlled Trial of the Minder App: a Mental Health and Substance Use Intervention for University Students

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Introduction

- Post-secondary students have high levels of mental health and substance use concerns [1], yet many students identify barriers to treatment seeking which include wanting to deal with the problem alone or being embarrassed [2].
- E-interventions have been shown to be effective for addressing a variety of mental health and substance use issues in university students [3]; however, many digital tools fail to engage and retain users [4].
- Co-developing interventions with end-users has been previously suggested as a way to improve adherence and better meet the needs of the targeted population [3,4]. The Minder intervention has been co-developed with university students involving student-staff and volunteers as part of the research team, a Student Advisory Committee, user-testing surveys, a pilot study, and focus groups [5].

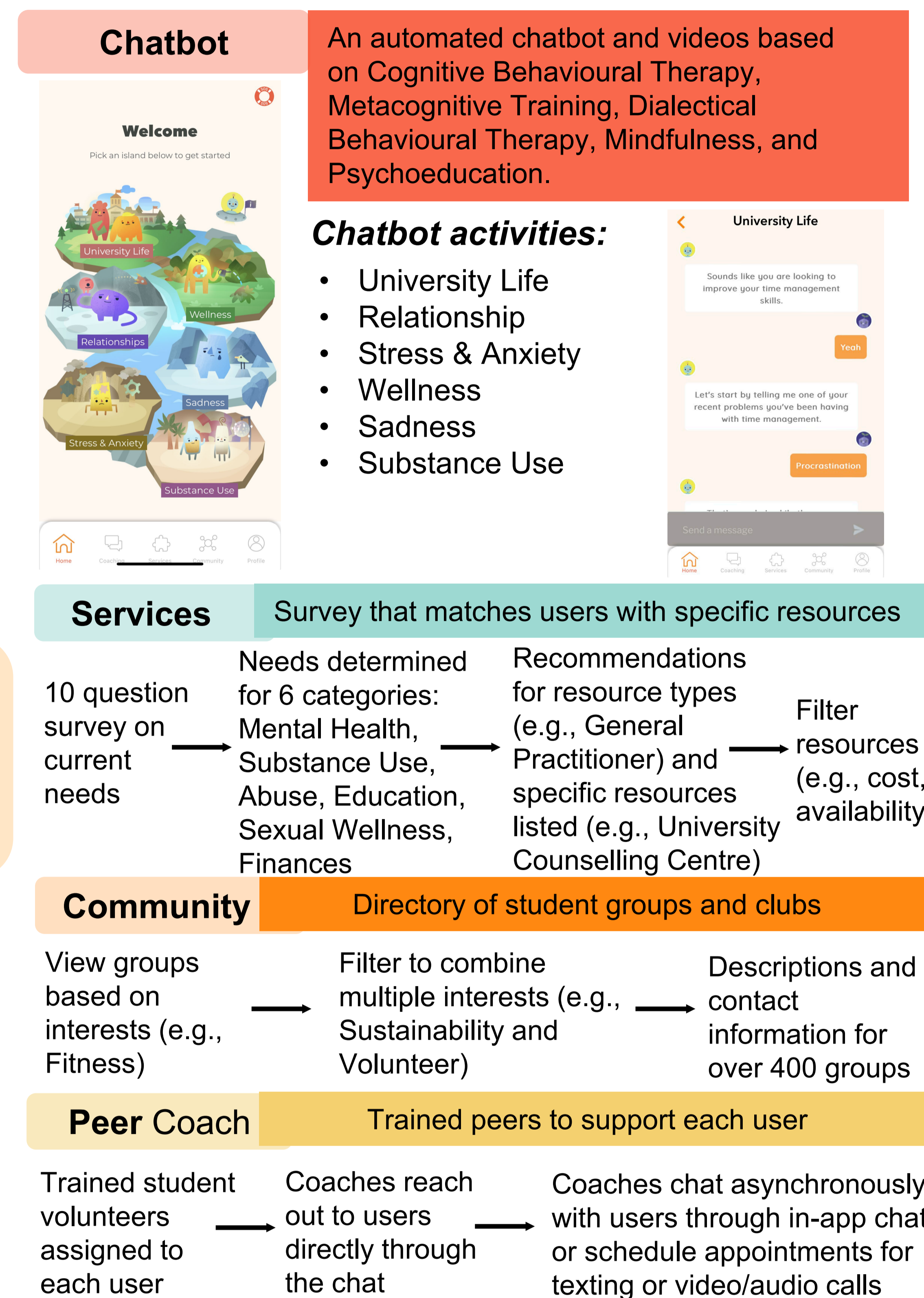
Objective

To evaluate the effectiveness of the Minder intervention in improving mental health and substance use outcomes for university students.

Methods

- The study was a 30-day 2-arm randomized controlled trial with one intervention group (full app access) and one waitlist control group (access to baseline and follow-up surveys, after completing which they got access to the full app). Participants were randomized automatically using a pre-generated list of stratified blocks based on prior drug use.
- Participants were recruited from the University of British Columbia. The eligibility criteria was being a current UBC student, at least 17 years old, having access to a smartphone, and speaking English. Students with a current suicidal plan were excluded from the study.
- No specific amount of app use was required by participants. Both groups received \$10 gift cards for completing the baseline and follow-up survey.
- The baseline and follow-up surveys contained primary outcomes assessing anxiety using the Generalized Anxiety Disorder Scale (GAD-7; score range 0-21), depression using the Patient Health Questionnaire (PHQ-9; score range 0-27), and alcohol consumption risk (USAUDIT-C). Other substance use outcomes and wellbeing (Short Warwick-Edinburgh Mental Wellbeing Scale) were assessed as secondary outcomes.
- The primary analysis was an intention-to-treat including all participants who were randomized with three primary end points. Secondary outcomes were assessed using linear mixed-effects models, mixed-effects quasi-Poisson regression models with a log link, and zero-inflated Poisson. Complier Average Causal Effects (CACE) analysis was done to look at the impact of compliance on primary outcomes. Instrumental variable techniques were used to estimate the effects with two-stage least squared regression (2SLS).

Minder Intervention

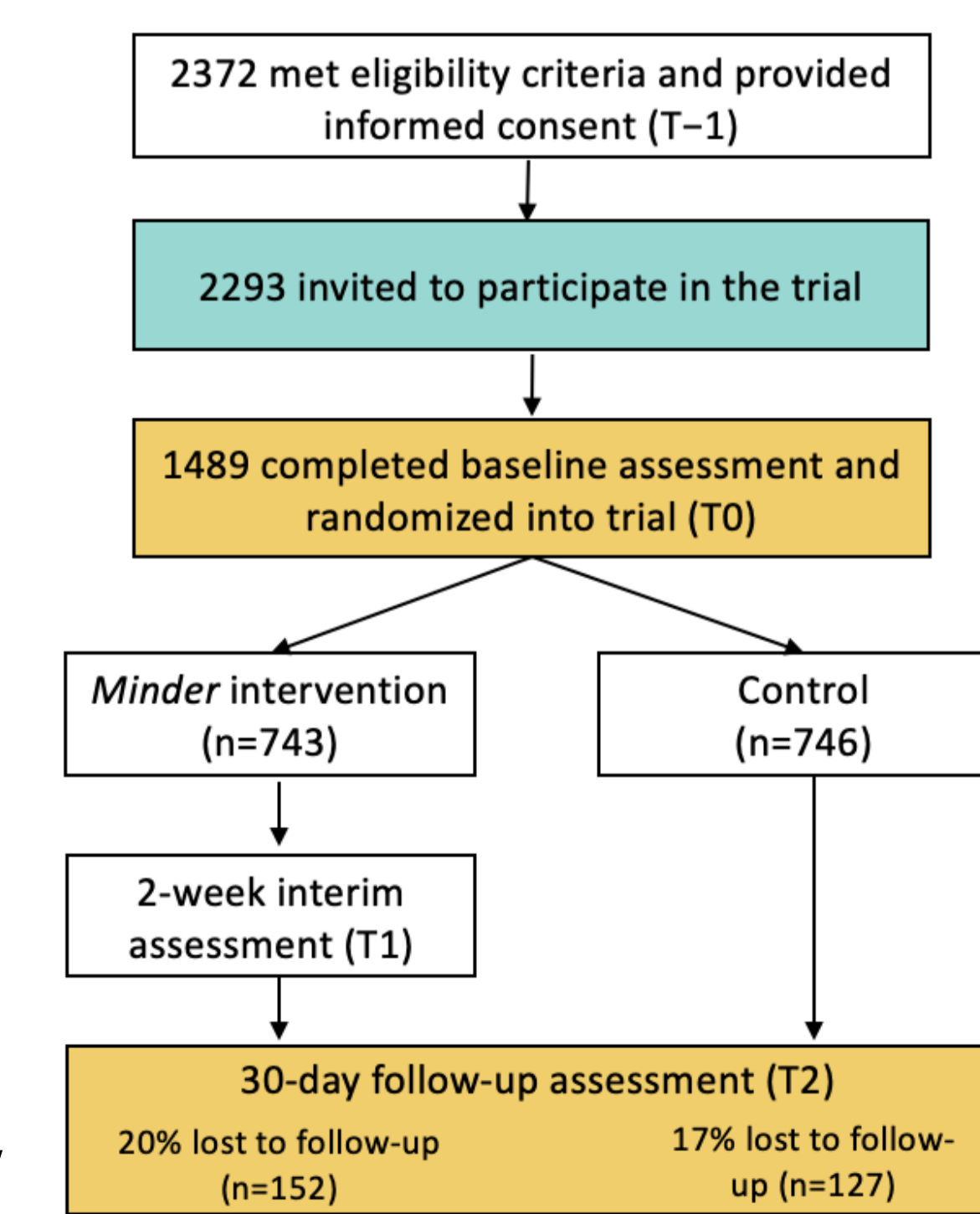


Results

Participant Characteristics:

- The median age was 20 years
- 70.3% identified as women
- 82% were undergraduate students
- 39% had moderate or greater anxiety symptoms (≥ 10 on GAD-7) and 44% had moderate or greater levels of depression symptoms (≥ 10 on PHQ-9)
- The intervention group had higher baseline scores on the GAD-7 and PHQ-9

Figure 1. CONSORT flow diagram



Self-Reported User Experience:

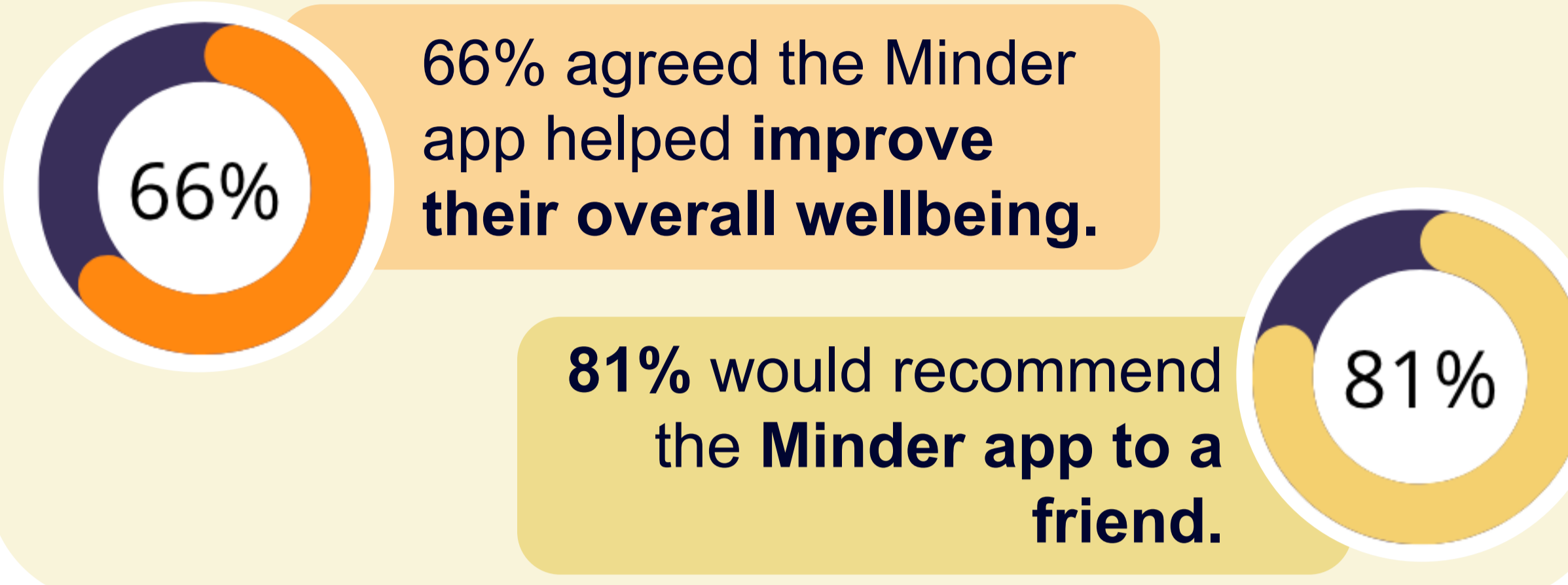
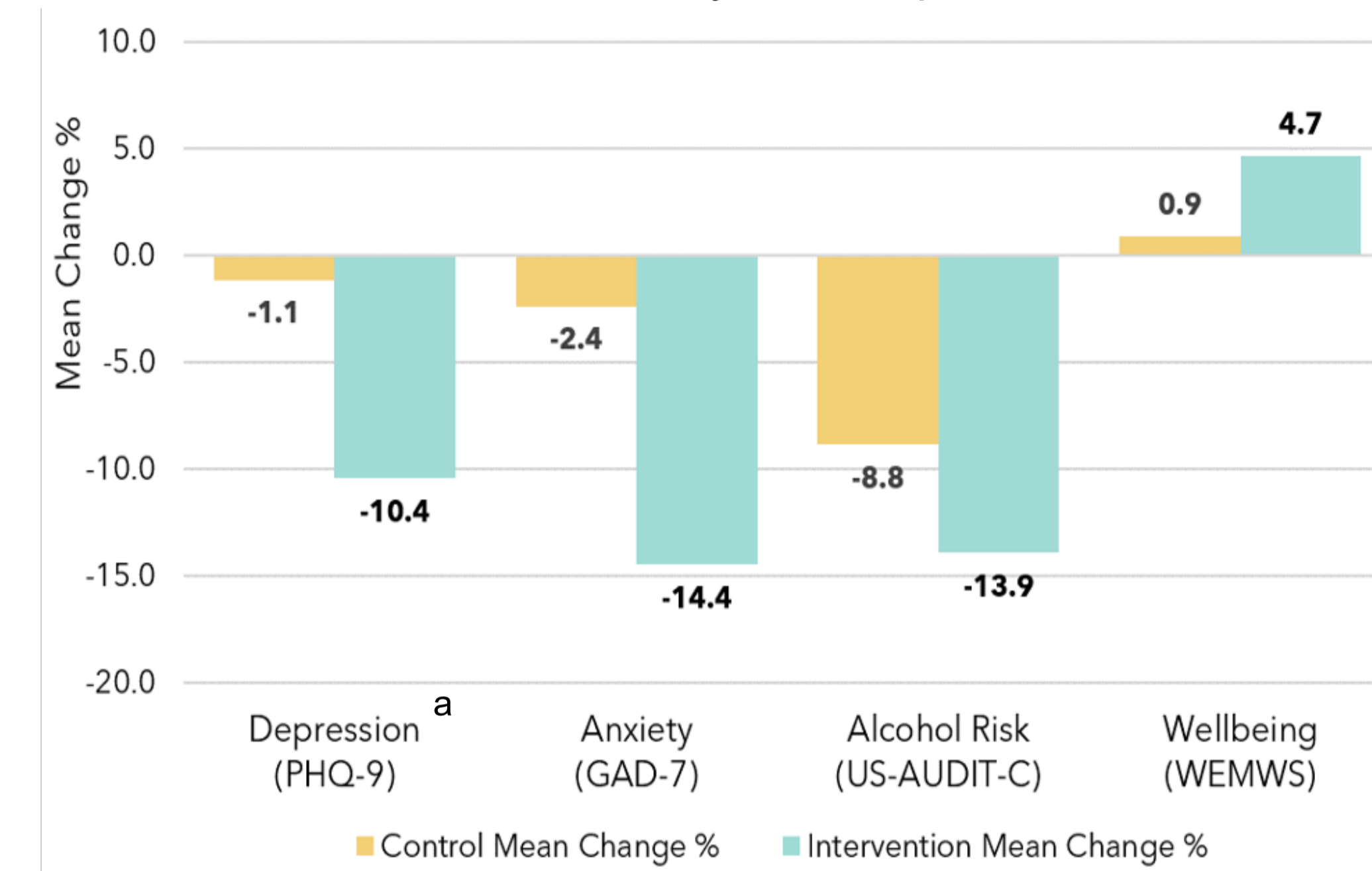


Table 1. Percentage mean change in primary^a and select secondary^b outcomes from baseline to 30-day follow up.



^aPrimary outcomes are depression, anxiety and alcohol risk.
^bSecondary outcomes are wellbeing.

Participants in the intervention group had **significantly greater reductions in symptoms of anxiety** (adjusted group mean difference = -0.85, (95% Confidence Interval (CI): -1.27, -0.42)) **and depression** (adjusted group mean difference = -0.63 (95% CI: -1.08, -0.17)).

Analysis of secondary outcomes found significant reductions in **frequency of cannabis use** and **typical number of drinks consumed when drinking**, and greater improvements in **mental well-being**.

Minder App Utilization of the Intervention Group:

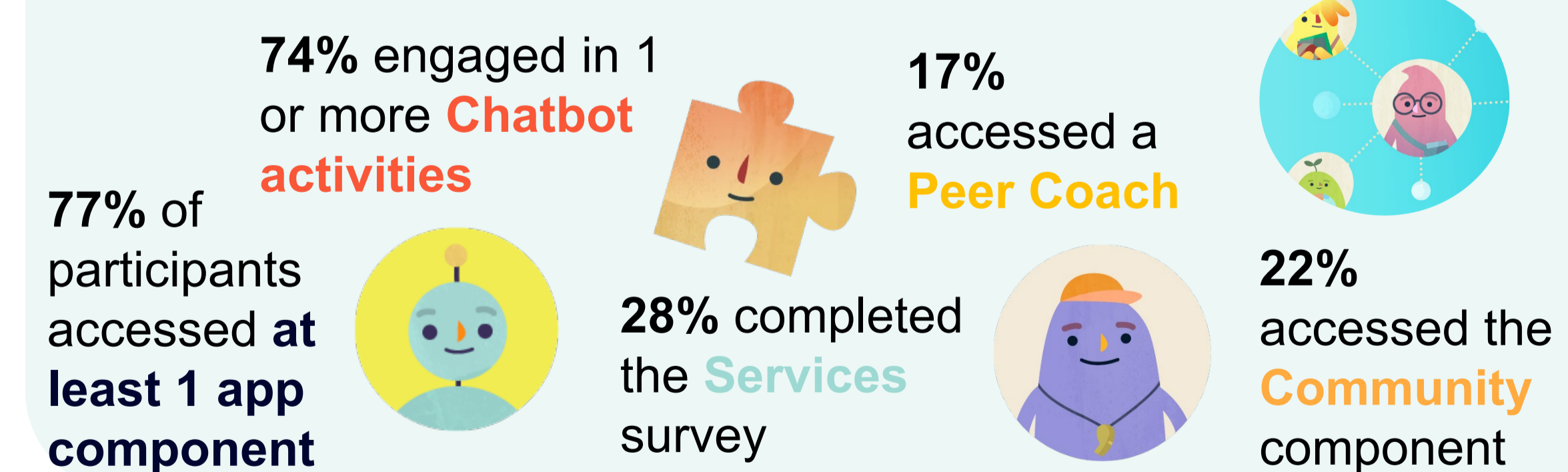


Table 2. CACE analysis of treatment difference on primary outcomes.

CACE model	GAD-7			PHQ-9			AUDIT C		
	Coef.	95% CI	P-value	Coef.	95% CI	P-value	Coef.	95% CI	P-value
Used Minder App (yes/no)	-1.09	(-1.60; -0.57)	< 0.001	-0.84	(-1.41; -0.27)	0.004	-0.16	(-0.40; 0.07)	0.176
Unique days used (0-12)	-0.41	(-0.61; -0.214)	< 0.001	-0.32	(-0.53; -0.10)	0.004	-0.06	(-0.15; 0.03)	0.175

Discussion

- The Minder intervention was effective in reducing mental health symptoms and improving several measures of substances use in a general sample of university students; however, the effects were small. The app also seems to be acceptable to students, with over 80% indicating they would recommend the app to a friend and of 75% of students using some part of the app during the study.
- Participants who used the Minder intervention (i.e., compliers) had greater reductions in anxiety and depression symptoms. Additionally, those who used the intervention for more unique days had greater effects (e.g., using the app 5 different days would result in a 2.05 decrease in GAD-7 score). Increasing engagement with the intervention will be important for future versions of the app, a challenge faced by many digital interventions [4]. Already, several features were added to increase engagement, including automated reminders, gamification of activities, and personalization of avatars; however, additional features related to Persuasive System Design frameworks [6] may be helpful, such as tailoring recommendations of content based on needs.

Future Directions

- Future research on the Minder app can explore ways to improve the effectiveness and adherence to the Minder intervention. Notably, determining which participants do not use the app identifying any potential barriers they may face to using digital interventions.
- The app is also being adapted for other populations, including other Canadian universities and secondary school students.

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