

A “Growth Mindset of Mental Health” Online Intervention Increases Self-Help Engagement On A Mental Health App

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A “Growth Mindset of Mental Health” Online Intervention Increases Self-Help Engagement

On A Mental Health App

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Abstract

Background: Mental health applications have the potential to improve access to treatment among people with mental health needs through empirically supported self-help features. However, engagement with these features remains low, with up to 80% of users logging into the app only once and failing to return. A potential psychological barrier to engagement may be a fixed mindset of mental health, the belief that mental health cannot be meaningfully improved.

Addressing this maladaptive belief may, therefore, motivate sustained self-help engagement.

Objective: This randomized controlled trial (RCT) examines whether a brief growth-mindset-of-mental-health intervention—portraying mental health as improvable, not fixed—can increase self-help engagement within an evidence-based mental health app among employees with mental health needs.

Method: A total of 252 full-time employees across 83 companies were randomly assigned to either the growth-mindset-of-mental-health or active control condition. Baseline measures included demographics and indicators of well-being (i.e., perceived stress, anxiety, depression, and positive mental well-being). The primary outcome was a binary variable assessing whether users repeatedly engaged with the mental health application (i.e., accessed a second self-help feature) over the subsequent three months. Secondary outcomes were binary variables assessing repeated engagement with self-help features of varying dosage, categorized by the increasing time and effort to complete: “low-intensity” features, “moderate-intensity” features, and “high-intensity” features.

Results: The sample ($N = 252$) was predominantly male, single, with at least a bachelor’s degree, and an average age of 32 ($SD = 7.80$). Primary analyses revealed that participants in the growth-mindset condition (vs. control) with poorer mental well-being at baseline (i.e., higher stress,

anxiety, depressive symptoms, and lower positive mental well-being) were more likely to repeatedly engage with self-help features overall. Specifically, secondary analyses showed that those with higher anxiety and depressive symptoms repeatedly engaged with moderate-intensity features, while those experiencing higher stress and lower positive mental health were more likely to repeatedly engage with both low- and moderate-intensity features.

Conclusion: By removing a psychological barrier, the growth-mindset intervention (vs. active control) increased the pursuit of self-care among people with poorer well-being at baseline. We discuss implications for treatment-seeking and targeted approaches to mental health engagement.

Clinical Trial Registration Number: NCT07071311.

Keywords: app, engagement, behavior change, growth mindset, digital intervention, mental health, mhealth, self-help

1. Introduction

Many people with mental health problems do not seek, access, or sustain professional treatment. The treatment gap, defined as the discrepancy between individuals in need of care and those who receive effective treatment, remains alarmingly wide, with estimates ranging from 40% in high-income countries to as high as 85% in low- and middle-income countries (Ndeti et al., 2023; World Health Organization, 2016). While mental health applications (MHAs) have emerged as promising and scalable tools to bridge this gap (Goldberg et al., 2022; Marshall et al., 2020; Yin et al., 2020), continuous engagement with these apps remains strikingly low. Most users discontinue their use after minimal interaction (Baumel et al., 2019; Linardon & Fuller-Tyszkiewicz, 2020; Saleem et al., 2021; Szinay et al., 2020; Torous et al., 2018), which limits the potential benefits of these features.

Given this challenge, we asked: Can an intervention that helps people develop the belief that mental health is improvable and not fixed—a *growth-mindset-of-mental-health intervention*—promote sustained engagement (defined as using self-help features repeatedly over the following 3

months) with MHAs? Using a two-armed randomized controlled trial (RCT), participants with access to the MHA through their work organizations were randomly assigned to complete either the growth-mindset-of-mental-health intervention or an active control condition. In the following 3 months, we tracked participants' engagement with the app's self-help features. We hypothesized that among participants with poorer mental health at baseline—that is, those most in need of treatment—the growth-mindset-of-mental-health intervention (compared to the active control condition) will increase the likelihood of repeatedly engaging with the app's self-help features.

1.1 The Potential of Mental Health Apps

Despite the availability of effective treatments today, mental health problems remain prevalent and largely untreated (Nochaiwong et al., 2021). Multiple factors contribute to this treatment gap, including stigma, financial constraints, and poor mental health literacy in high-income countries (Mojtabai et al., 2011), with low- and middle-income countries also facing shortages of mental health professionals and treatment facilities (Bruckner et al., 2011). MHAs offer a promising solution by expanding access to reliable mental health support. Many of the MHAs today are either free or low-cost, widely available to anyone with a smartphone, and can be used privately and on-the-go (Anthes, 2016). Recent systematic reviews indicate a growing number of MHAs incorporating evidence-based strategies, such as cognitive behavioral therapy (CBT) and mindfulness, which have been shown to effectively reduce the severity of common mental health problems (e.g., stress, anxiety, and depression) (Linardon et al., 2019; Linardon et al., 2024). These apps have demonstrated efficacy in RCTs and across various age groups, showing that they can equip individuals struggling with poor mental well-being with skills to manage their mental health effectively. Taken together, evidence-based MHAs represent a scalable and practical avenue to delivering good mental health support beyond traditional clinical settings.

1.2 Poor Engagement with Mental Health Apps

Despite their potential, repeated engagement with MHAs remains a longstanding challenge

(Boucher & Raiker, 2024; Valentine et al., 2025). A systematic review by Fleming et al. (2018) examining real-world uptake of digital mental health treatments found that up to 80% of users logged in only once after downloading the mobile app and did not return to complete another activity. These findings were supported by an earlier review assessing the engagement rates of 12 publicly available MHAs, where the most common pattern of use was launching the app only once (Lattie et al., 2016).

These trends are evident even among widely used and empirically supported apps. For instance, in Australia's most widely adopted CBT-based mental health app (MoodGYM), which has demonstrated efficacy across RCTs in reducing mental health symptoms, only 7.0% to 16.0% of users returned for further engagement (Batterham et al., 2008; Christensen et al., 2002; Christensen et al., 2004; Christensen et al., 2006; Neil et al., 2009). Similarly, in apps that have promoted positive well-being, such as Happify Health, only 20.6% of users voluntarily returned to complete a second activity after their initial interaction (Carpenter et al., 2016). Although recent research has identified several technical features that may support user retention, such as improving user-friendliness, personalizing feedback, customizing self-help activities, and implementing features that boost social connection (Alqahtani & Orji, 2020; Borghouts et al., 2021), MHAs that have incorporated these improvements have not consistently demonstrated higher user engagement (Valentine et al., 2025; Wu et al., 2021). Collectively, these findings suggest that MHAs are still often used only briefly, even when they are evidence-based and thoughtfully designed (Ng et al., 2019). This is particularly concerning for people struggling with their mental health as they could benefit more from these empirically supported mobile apps.

1.3 The Role of Mindsets in Shaping Beneficial Behaviors

Psychological or attitudinal factors have been shown to significantly influence whether individuals pursue mental health support for themselves, yet these factors remain largely understudied in the context of MHA engagement (Biffu et al., 2025). One such factor is an individual's mindset, which can shape behavior in meaningful ways. Decades of research on fixed

and growth mindsets demonstrates that one's beliefs about the malleability of personal attributes can profoundly influence a wide array of behaviors (Dweck et al., 1995; O'Keefe, 2013; Yeager & Dweck, 2012; Yeager et al., 2019). A *fixed mindset* is the belief that a particular attribute (e.g., intelligence, personality, interest, opportunities) is largely unchangeable. In contrast, a *growth mindset* reflects the belief that an attribute is malleable and, therefore, can be developed and improved (Crum et al., 2013; Dweck, 2006; Dweck & Yeager, 2019). For instance, middle school students with a growth mindset of intelligence—the belief that intelligence is malleable—showed significant academic gains over the following two years compared to those with a fixed mindset (e.g., Blackwell et al., 2007; Dweck & Yeager, 2020; see Dweck, 2006). As another example, adults who viewed their shyness as a changeable trait were more likely to actively engage in social interactions, and adopt behaviors that mitigated the negative consequences of their shyness, relative to those who believed their shyness was unchangeable (Beer et al., 2002).

Critically, this perspective has been extended to beliefs about the growth versus fixed nature of mental health attributes. People who endorsed a growth mindset of emotion—believing that emotions are malleable and can be regulated and improved—were more likely to adopt adaptive coping strategies, such as actively reappraising negative thoughts (Skymba et al., 2022). These strategies have been linked to positive outcomes, including greater subjective well-being and improved satisfaction in general interpersonal relationships (Van Tongeren & Burnette, 2018). On the other hand, those with a fixed mindset of emotion relied more on avoidance-based strategies, such as suppression, substance use, distraction, or disengagement, all of which have been linked to greater psychological distress (Schroder et al., 2015, 2016; Schroder, 2021). Additionally, Schroder et al. (2015) found that undergraduate students with a growth mindset about anxiety preferred seeking psychotherapy as their primary treatment, whereas those with a fixed mindset of anxiety favored medication-based treatments, attributing their mental health difficulties to uncontrollable genetic factors and feelings of helplessness. Participants with higher levels of positive mental well-being also tended to endorse a stronger growth mindset about

mental well-being at baseline (e.g., greater happiness, more satisfying interpersonal relationships) (Van Tongeren & Burnette, 2018), positive affect and overall flourishing (Howell et al., 2016; Passmore et al., 2018) were positively correlated with growth mindset of well-being measures ($r = .20$ to $.52$). In contrast, those who reported more severe mental health symptoms, including psychological distress (Schroder et al., 2019), depression and anxiety ($r = -.37$ to $-.49$; Schroder et al., 2017; Schroder et al., 2019), were more likely to hold fixed beliefs about mental well-being. That is, a fixed mindset may serve as a psychological barrier to engaging in proactive care.

Research has also shown that well-being mindsets can be induced to produce positive outcomes. Howell et al. (2016) experimentally induced a growth mindset of well-being by presenting university students with information about (a) the effectiveness of well-being interventions, (b) the role of attitudes in supporting overall health, and (c) testimonials from older adults who had improved their health. Following the experimental tasks, students reported greater openness to adopting positive lifestyle changes, such as increasing their exercise levels, participating in recreational activities, and engaging with nature. These studies point to the potential of growth mindsets in encouraging health-promoting behaviors. This work further implies that interventions aimed at fostering a growth mindset about mental health could help increase individuals' willingness and propensity to engage with self-help treatments and manage their own mental health.

Indeed, growth-mindset interventions have successfully promoted adaptive behaviors. For example, in the academic domain, O'Keefe et al. (2023a) developed a growth-mindset intervention that helped first-year undergraduate students understand that new academic interests can be cultivated. Among arts students who initially lacked an affinity for math and science, this intervention boosted subsequent interest and achievement in their required math and science courses, compared to an active control condition (for other examples, see O'Keefe et al., 2025; Paunesku et al., 2015; Yeager et al., 2019).

1.4 Overview of the Present Research

Our primary goal was to test whether a growth-mindset-of-mental-health intervention (vs. active control) could cause meaningful improvements in MHA engagement among employees with mental health needs. To examine this, we conducted a two-armed RCT with working adults who had access to an evidence-based MHA, *Intellect*, through their organizations. Intellect is a digital mental health platform that serves as the official mental healthcare provider for various government agencies, insurance companies, healthcare organizations, hospitals, and corporations across Singapore and the Asia-Pacific region. The platform offers a broad range of self-guided mental health activities rooted in evidence-based practices, such as Cognitive Behavioral Therapy (CBT), Mindfulness, Acceptance and Commitment Therapy (ACT), and Positive Psychology, and some of these features have demonstrated efficacy in previous RCTs (Kosasih et al., 2023; Li et al., 2024; Ong & Sündermann, 2022; Toh et al., 2022; Toh et al., 2023; Yang Toh et al., 2023; Yokomitsu et al., 2025).

We randomly assigned participants to complete either the growth-mindset-of-mental-health intervention or the active control materials, after which their engagement with the app's self-help features was tracked over a 3-month period. If the growth-mindset-of-mental-health intervention leads to a higher likelihood of repeated MHA engagement, it would demonstrate the crucial role of mindsets in help-seeking and engagement with digital mental health tools. Specifically, it would suggest that viewing mental well-being as malleable and improvable motivates people to actively engage with mental health resources, thereby maximizing the benefits of MHAs.

We hypothesized that the benefits of the intervention would be particularly effective for employees with poorer baseline mental well-being. These employees are not only more likely to view engagement with the MHA as personally relevant, but earlier studies also suggest they are more likely to hold fixed beliefs about mental well-being (Schreiber & Schotanus-Dijkstra, 2024). As such, they may stand to benefit more from an intervention that instills a growth mindset of mental health. Consequently, we sought to evaluate if fostering a growth mindset of mental health

would increase their likelihood of taking more proactive steps to support their mental well-being. Specifically, our central hypothesis is that, among people with lower (but not higher) baseline mental well-being, the growth-mindset-of-mental-health intervention (vs. control) will increase the likelihood of repeated engagement with the app's self-help features following the intervention.

Additionally, in secondary analyses we examined whether, among individuals with lower (but not higher) baseline mental well-being, the growth-mindset-of-mental-health intervention (vs. control) would increase the likelihood of repeated engagement with app features of varying intensities—low, moderate, and high—categorized by the increasing effort and time required to complete them. These served as tests of employees' propensity to take proactive steps to support their mental well-being.

2. Method

2.1. Transparency and Openness

We report how we determined our sample size, the statistical software used, the analyses conducted, the statistical findings, and all measures included in this study. We follow standards for reporting psychological research in scientific journals (Appelbaum et al., 2018). These research materials are available at the study's Open Science Framework repository (https://osf.io/nsw2t/?view_only=7ffdc129fb4b400ebe036be4ff843837).

2.2. Study Design

This study received ethical approval from the Institutional Review Board of National University of Singapore (ID: NUS-IRB-2022-253). We registered the study protocol at [ClinicalTrials.gov](https://clinicaltrials.gov) (Identifier: NCT07071311). The trial was conducted in full compliance with ethical standards, including the Declaration of Helsinki. All participants provided informed consent prior to their involvement in the study. We conducted a randomized controlled trial (RCT) to test the effectiveness of a brief intervention promoting a growth mindset of mental health as compared to an active control condition in promoting the benefits of digital technology in the workplace. We tested whether the intervention would lead participants with lower baseline well-

being—characterized by higher stress, anxiety and depression, or lower positive mental well-being—to repeatedly engage with self-help features on *Intellect*.

2.3. Procedure

Recruitment took place from March–September 2023. Employees from 83 organizations received an email newsletter coordinated by Intellect’s client relations teams in collaboration with the human resource managers from their respective organizations. This email provided a brief overview of our research study, along with instructions on how to download and register for an account on the Intellect app (see Supplementary Material A for materials). The final section of the newsletter included a link to a Qualtrics survey, where employees could access the Participant Information Sheet (PIS) to learn about the study details and provide their informed consent to participate. According to Intellect’s internal data, 9,698 employees opened the newsletter. Of those, 2,619 clicked on the survey link and reviewed the Participant Information Sheet on Qualtrics, which outlined the study’s aims, eligibility criteria, data protection measures, investigator contact details, and study incentives. The aims of our study were partially concealed, as employees were told that the purpose of the study was solely to examine the use of a mobile health application (“Intellect”) in the workplace. This partial concealment was necessary to avoid the Pygmalion effect, where expectations of a desired behavior can lead to improvements in that behavior (Good et al., 2018). A total of 307 employees provided informed online consent to participate. After providing consent, employees completed pre-screening measures. Inclusion required participants to report (a) being able to read and understand English, (b) being 18 years or older, (c) being employed, and (d) not using other mental health mobile applications or services concurrently. Thirty-five participants were excluded for failing to meet any one of these eligibility criteria (see Figure 1).

The remaining 272 participants proceeded to complete a demographic questionnaire and three baseline mental well-being assessments: (a) anxiety and depressive symptoms, (b) perceived stress, and (c) positive mental well-being. Additional measures unrelated to the state of

participants' mental health (e.g., self-stigma of seeking professional help, social support, marital status) were also collected and are detailed in Supplementary Material A. Participants were then randomly assigned by Qualtrics to one of two conditions (i.e., growth-mindset intervention or active control). After completing the treatment materials, participants either created a new Intellect account ($N = 149$, 59.1%) or signed into a dormant account they created at an earlier time ($N = 103$, 40.9%). Those who participated were given a SGD \$10 Amazon or Grab online gift card.

All responses to the treatment materials were reviewed for quality in four ways, which resulted in several exclusions (see Figure 1). First, we excluded responses identified as likely bots by Qualtrics' reCaptcha scores (i.e., scores under .50)¹. Second, we removed duplicate responses based on repeated email addresses. Third, survey completion times were reviewed. Based on our pilot testing, which showed an average treatment completion time of 10 minutes, and recommendations to exclude responses completed in less than 40% of the average completion time (Cobanoglu et al., 2014), any responses submitted in under 4 minutes were excluded. Finally, participants who left all three writing activities in the treatment materials entirely blank or provided nonsensical or non-response answers (e.g., blank, "NA," "Yes," "Don't know") were excluded, as this was evidence of inattention. The final sample consisted of 252 participants across conditions. Figure 1 illustrates the recruitment procedures and participant flowchart.

¹ www.qualtrics.com/support/survey-platform/survey-module/survey-checker/fraud-detection

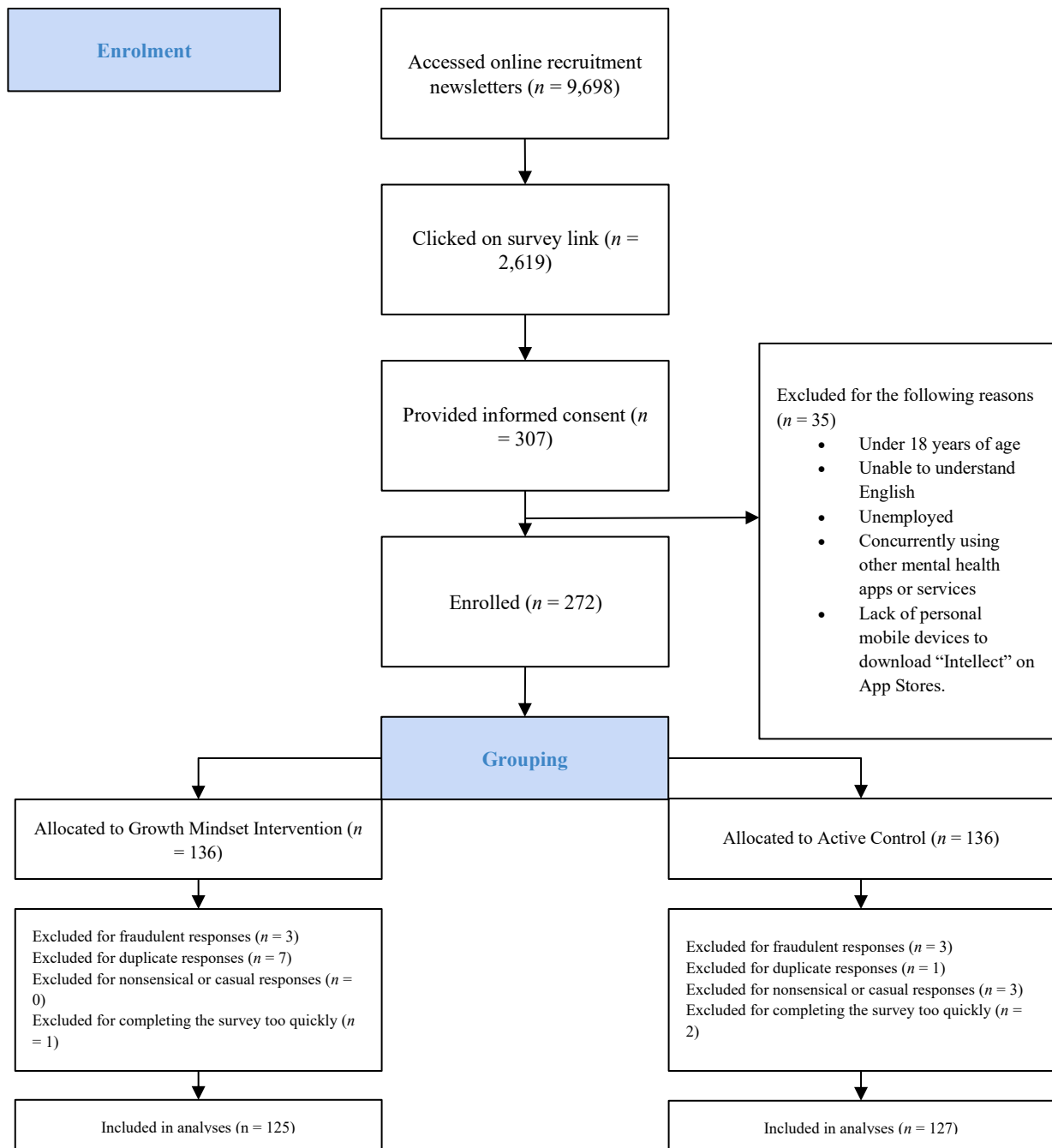


Figure 1. Participant CONSORT

2.4 Treatment Materials

2.4.1 Growth-Mindset Intervention Condition

This single-session growth-mindset intervention was developed using methods from the family of “Wise Interventions” (Walton, 2014; Walton & Wilson, 2018; Walton & Crum, 2020). It involved reading and reflective writing activities that portrayed mental health as improvable

rather than fixed. To avoid eliciting demand, reactance, or stigmatization, the materials were not presented as an intervention or as addressing a deficit in employees. Instead, they were framed as part of an effort to gather insights to better support employees as a whole and improve their mental health. Participating employees were thus positioned as experts and co-creators of an intervention for other employees (e.g., O’Keefe et al., 2021; Walton & Cohen, 2011).

Participants first read stories of three employees who shared their experiences overcoming mental health challenges in the workplace. Each described their struggles with workplace issues and their journey toward understanding that mental health is changeable, which includes taking proactive steps to improve it (e.g., deliberate self-care, or seeing a therapist). The stories represented diverse industries and professional roles, allowing participants to connect with a range of experiences. Since employees are likely to perceive their peers as credible and important sources of information, reading about how those peers proactively managed their mental health in response to workplace challenges may be particularly persuasive. This aspect of the material leverages informational social influence (Cialdini & Goldstein, 2004), as individuals tend to look to their peers for guidance when forming beliefs and making decisions about their well-being. For example, one story illustrated how a director at a technology company suffering from anxiety attacks came to understand that his mental health was improvable and learned techniques to manage the anxiety after attending sessions with a clinician.

Next, participants wrote a brief essay reflecting on a time they successfully took action to improve their mental health while facing workplace challenges. They responded to the following prompt: *“Take a moment and recall a time in your life when your mental health was poor but you took actions to improve your mental health. What did you do? In what ways did it improve your mental health and well-being?”* They were informed that their essays would be used to support future employees in coping with mental health challenges at work. This activity leveraged the “saying-is-believing” effect, a technique whereby people advocate for a position to a relevant audience (i.e., other employees, in the present case), which strengthens their own endorsement of

that belief (Aronson, 1999). By articulating that mental health is malleable and linking this idea to their own experiences, participants can come to endorse the belief more strongly for themselves (see Supplementary Material A for more sample responses). As a representative example, one participant wrote:

People who believe that mental health can improve are more likely to take proactive steps toward improving it. Without the belief that change is possible, there's little motivation to take action. This is why adopting the right mindset is essential.

Next, employees completed two additional brief essays, which again leveraged the saying-is-believing effect (See Supplementary Material A for essay examples). In these essays, they offered advice to help other employees manage their mental health in response to the following prompts: “*How might this understanding that mental health can improve help people with their own mental wellbeing, especially when work becomes stressful?*” and “*What can people do to improve their mental health when experiencing difficulties at work?*” While writing, participants were also encouraged to draw on both the stories of other employees and their own experiences. By positioning participants as experts, helping to advise other employees at their company, the activity aimed to further strengthen their personal endorsement of a growth mindset (see Walton & Cohen, 2011).

2.4.2 Active Control Condition

This control exercise was identical in approach and structure but instead promoted the use of technology in the workplace (e.g., Okonofua et al., 2021). Unlike the intervention, the control exercise did not address mental health or its potential for development. Similar to the intervention, the control materials positioned employees as experts offering guidance to other employees, rather than as recipients of an intervention who were in need of help. These materials also emphasized a growth-oriented process, specifically focusing on the development of expertise in workplace technology as a crucial skill for overcoming challenges in the workplace. Therefore, these materials provided a rigorous comparison to test the effects of the intervention condition.

Participants first read stories about employees' experiences managing their workload using workplace technology. Each described their challenges with learning and adapting to digital tools but ultimately came to see the value in technology use at work. This included viewing learning digital tools as manageable, and taking proactive steps, such as consulting with colleagues or making time to practice and improve. Different industries and roles were represented to resonate with participants' own experiences at work.

Next, control participants wrote a brief essay about their personal experiences using digital tools to enhance their efficiency at work (see Supplementary Material A for more sample responses). In response to the prompt "*Take time to think about the digital technology you love most at work. What is the digital technology you use, and how does it help you?*", one participant wrote:

The growing adoption of online collaboration tools, such as Microsoft Teams and Microsoft Sharepoint, has greatly enhanced flexibility and efficiency. These tools allow us to communicate and collaborate on documents virtually at our convenience, enabling contributions to work without sacrificing personal time—This is an especially valuable benefit when working in a global organization. This aspect of digital technology is something I truly appreciate, as it has significantly supported me in my work.

After this reflection, participants completed two additional essays, for which they were asked to offer advice to others on how to effectively use new technologies in the workplace. Their responses were guided by the following prompts: "*Next, how do employees typically discover digital technologies at work?*" and "*How do employees apply those newly-discovered technologies at work?*" Similar to the intervention materials, control participants were encouraged to draw from the employee stories they read and their own experiences with workplace technology.

2.5. Measures

2.5.1 Demographic Variables

Following past mindset intervention research, we collected participants' age and gender

for use as covariates (e.g., O’Keefe et al., 2023a; O’Keefe et al., 2025; see Supplemental Material A for details about remaining demographic variables not used in present analyses: employment status, highest level of education attained, marital status, occupational position, and length of time in their current employment role). Controlling for these additional factors did not change any of our findings.

2.5.2 Anxiety and Depressive Symptoms

Participants’ baseline anxiety and depressive symptoms were assessed with the widely used 4-item Patient Health Questionnaire (PHQ-4; Kroenke et al., 2009), which has demonstrated excellent internal consistency and convergent validity (Staples et al., 2019). Two items assessed depressive symptoms over the past 2 weeks (e.g., “Over the past 2 weeks, how often have you been feeling down or hopeless?”), and the other two assessed anxiety levels (e.g., “Over the past 2 weeks, how often have you felt nervous, anxious or on edge?”). Each item was rated 0 = *Not at all* to 3 = *Nearly every day*. Higher PHQ-4 scores indicate more severe anxiety and depressive symptoms. The cutoffs for mild, moderate, and severe depression were 3, 6, and 9 respectively. The Cronbach’s alpha for PHQ-4 in our current sample was high ($\alpha = .799$).

2.5.3 Perceived Stress

Participants’ baseline stress levels over the last month were assessed using the 4-item Perceived Stress Scale (PSS-4; Warttig et al., 2013), which has good convergent validity with other aspects of mental well-being (e.g., Lee et al., 2015). A sample item is “In the last month, how often have you felt that difficulties were piling up so high that you could not overcome them?” (1 = *never* to 5 = *very often*). Higher scores reflect more perceived stress. The Cronbach’s alpha in our sample was high ($\alpha = .775$).

2.5.4 Positive Well-Being

Participants’ baseline positive well-being was assessed using the 7-item Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS; Ng Fat et al., 2017; Tennant et al., 2007), which has demonstrated good internal validity and test-retest reliability (e.g., Kalok et al., 2020;

Mallett et al., 2021). Sample items include “I’ve been feeling optimistic about the future” and “I’ve been feeling relaxed” (1 = *none of the time*” to 5 = *all of the time*.) Scores are summed, ranging from 7–35, with higher scores indicating more positive well-being. The Cronbach’s alpha in the current sample was high ($\alpha = .876$).

2.5.5 Engagement with App Self-Help Features

We defined repeated app engagement as the completion of more than one self-help feature, as this reflects a more intentional and proactive effort to improve mental health. In contrast, using only a single feature is often interpreted as casual or exploratory use, lacking strong commitment to self-care (e.g., Bernstein et al., 2025; Lattie et al., 2022; Pham et al., 2019; Wong et al., 2021). In this study, we assessed repeated engagement—our central outcome—by examining whether participants completed more than one self-help feature within 3 months of the intervention (33.7% showed repeated engagement). Additionally, as secondary analyses, we assessed this with respect to distinct types of self-help features: low-, moderate-, and high-intensity.

Intellect’s full range of guided self-help features include “Mood and Stress Monitoring,” “Daily Toolkits,” “Rescue Sessions,” “Guided Journaling,” and “Learning Paths.” These features are categorized into three levels of intensity based on engagement time. Low-intensity features require relatively little effort and take less than 1 minute which include “Mood and Stress Monitoring.” Moderate-intensity features (“Daily Toolkits” and “Rescue Sessions”) require more effort and about 2 to 5 minutes to complete. Finally, high-intensity features (“Guided Journals” and “Learning Paths”) require the most effort and at least 10 minutes of focused engagement, including activities like writing and reflection. All three types of features on Intellect have been demonstrated to improve mental well-being in previous randomized controlled trials (Kosasih et al., 2023; Li et al., 2024; Toh et al., 2022; Toh et al., 2023; Yokomitsu et al., 2025).

2.5.5.1 Low-Intensity Feature: Mood and Stress Monitoring

“Mood and Stress Monitoring” allows users to log their current mood or stress levels. Users record their mood by sliding a scale and selecting from emojis labeled “terrible,” “not

good,” “content,” “good,” and “happy.” A similar scale is used for stress, with options ranging from “very stressed” to “not stressed at all.” After logging their entries, users can view their previous moods and stress levels in a calendar format, allowing them to track emotional trends over time and gain insights into their emotional patterns. In line with recent studies (Caldeira et al., 2018; Schueller et al., 2021), mood-tracking features have been shown to help users identify patterns and potential causes of mood shifts, enabling them to take more informed actions to improve their well-being. We operationalized repeated engagement with low-intensity features by logging mood and stress levels at least twice (29.4% of the sample showed repeated engagement of low-intensity features).

2.5.5.2 Moderate-Intensity Features: Rescue Sessions and Daily Toolkits

“Rescue Sessions” are designed to alleviate in-the-moment anxiety through mindfulness and cognitive restructuring exercises. These sessions target common challenges, such as overthinking, high stress, low resilience, and burnout, and users may choose sessions that address their immediate concerns. Such challenges are often sustained by negative thought patterns (Watkins, 2008). Similar to CBT and mindfulness, “Rescue Sessions” guide users to either challenge the validity of their thoughts through Socratic questioning (Overholser & Beale, 2023; Vittorio et al., 2022) or to observe their thoughts from a distance and in a non-reactive manner (Raes et al., 2009; Toh et al., 2024). Each session concludes with a recommendation for users to apply these techniques in their daily life.

Similarly, “Daily Toolkits” are brief mindfulness-centered features aimed at promoting a structured self-care routine throughout the day while addressing any negative thoughts that may arise. The morning segment consists of deep breathing exercises to focus on the present moment. Grounding techniques are introduced in the afternoon segment to help maintain mindfulness. Finally, the night segment promotes restful sleep through meditation and cognitive restructuring techniques (Huberty et al., 2021). We operationalized repeated engagement with moderate-intensity features by completing at least two “Rescue Sessions,” or “Daily Toolkits,” or at least

one of each. (23.4% of the sample showed repeated engagement of moderate-intensity features).

2.5.5.3 High-Intensity Features: Learning Paths and Guided Journals

“Learning Paths” are self-guided, structured activities that provide in-depth psychoeducation and CBT-based self-help for various mental health problems. These features begin with an introduction to CBT principles, followed by guidance to enhance self-awareness of thoughts. Users then write about their own maladaptive thought–action cycles before receiving additional guidance to cognitively reframe these dysfunctional patterns. As an example, the “Feeling Depressed” learning path teaches users about common cognitive distortions, such as all-or-nothing thinking or overgeneralization (Beck, 1963). Through structured exercises, users then reflect on their own distorted beliefs and write more balanced, evidence-based statements to reframe these negative thoughts.

“Guided Journals” prompt users to reflect on specific themes by recording their thoughts and then guiding them through cognitive restructuring techniques to reframe negative reflections (e.g., Roche et al., 2023). These journals cover a broad range of themes, from challenges like ‘anxiety and depression’ and ‘poor self-esteem,’ to proactive improvements like ‘goal-setting’ and ‘sleep improvement,’ to maintaining mental well-being by highlighting positive factors (e.g., gratitude for positive events that occurred during the day). We operationalized repeated engagement with high-intensity features by completing at least two “Learning Paths” or “Guided Journals” or at least one of each. (42.9% of the sample showed repeated engagement of high-intensity features.)

2.6. Analytic Approach

All analyses were conducted using SPSS V29.0. To test hypotheses, we used the PROCESS macro V.4.2. (Model 1) in SPSS (Hayes, 2012) to examine whether baseline well-being variables (anxiety and depression, perceived stress, and positive well-being) moderated the effect of treatment condition on the likelihood of repeated engagement of self-help features. Continuous independent and moderating variables were mean-centered. Following past mindset

intervention research (O’Keefe et al., 2023), age and gender (1=*female*, 0=*not female*) were included as covariates. Overall repeated engagement with self-help features was coded as a binary variable (0 = *no repeated engagement*, 1 = *repeated engagement*). Additionally, repeated engagement with each type of self-help feature (low-, moderate-, or high-intensity) was coded as binary (0 = *no repeated engagement*, 1 = *repeated engagement*). Since the outcome variables are binary, logistic regression was used for analysis.

For our primary analysis, we tested the interaction of condition and baseline well-being on overall repeated engagement. Because we had three distinct baseline well-being moderators, we conducted a separate model for each one (totaling three central models). Subsequently, to better understand which type of features drove our primary effects, we conducted those same three models separately for low-, moderate-, and high-intensity self-help features. Statistical significance was set at $\alpha = 0.05$. Controlling for the age and gender covariates did not change the significance or patterns of our findings.

3. Results

3.1. Analyses of Excluded Participants

Out of the 272 participants who enrolled in the study, 136 were randomly assigned to the growth mindset condition, while 136 were allocated to the active control condition. Among the 136 participants in the intervention group, 11 were excluded due to (a) bot-detected fraudulent responses (3/136, 2.21%), (b) duplicate responses (7/136, 5.15%), as well as (c) hasty responses (< 4 minutes; 1/136, .74%). As for the 136 control group participants, 9 were excluded for similar reasons: (a) bot-detected fraudulent responses (3/136, 2.21%), (b) duplicate responses (1/136, .74%), (c) blanks, nonsensical or casual answers (e.g., “NA,” “Yes,” “Don’t know”) for all writing activities (3/136, 2.21%), and (d) hasty responses (2/136, 1.47%). This exclusion rate did not differ between conditions ($ps > .05$). Moreover, independent sample *t*-tests and χ^2 tests

confirmed that excluded participants were not significantly different from our final sample on any demographic or baseline variables ($ps > .05$).

3.2 Descriptive Analyses

Descriptive statistics for all baseline variables by condition are reported in Table S1 of Supplementary Material A. Table 1 presents the descriptive statistics and intercorrelations of study variables for the full sample. The average participant was 32.5 years old, identified as male, had no prior experience using Intellect, reported mild levels of anxiety, depression and stress, and felt generally positive. Table 2 presents baseline descriptives by condition. No significant differences were found between conditions on baseline variables ($ps > .05$).

Table 1. Descriptive and Intercorrelations among Baseline Variables

Baseline Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
Age	32.48	7.70						
Female	.450	.500	-.031					
Anxiety and Depression	7.96	2.53	-.220**	-.040				
Perceived Stress	11.09	2.80	-.095	-.050	.657***			
Positive Mental Wellbeing	23.04	4.80	.060	.097	-.572**	-.695**		
Downloaded Intellect Before	.410	.490	.111	.009	.029	.035	-.041	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 2. Descriptive Statistics for Baseline Variables by Condition

Variables		Growth-Mindset Condition (<i>n</i> = 125)	Active Control Condition (<i>n</i> = 127)	<i>p</i> -value
		<i>M</i> (<i>SD</i>) / <i>n</i> (%)	<i>M</i> (<i>SD</i>) / <i>n</i> (%)	
Age		33.01 (8.13)	31.95 (7.24)	0.277
Gender	Female	49 (39.2%)	63 (49.6%)	0.229
	Male	74 (59.2%)	63 (49.6%)	
	Others	2 (1.6%)	1 (0.8%)	
Anxiety and Depressive Symptoms		7.92 (2.43)	8.00 (2.65)	0.803
Perceived Stress		11.0 (2.71)	11.1 (2.89)	0.825
Positive Mental Wellbeing		22.9 (4.85)	23.2 (4.75)	0.592
Downloaded	No	67 (53.6%)	82 (64.6%)	0.077
Intellect Before	Yes	58 (46.4%)	45 (35.4%)	

3.3 Primary Analysis: Overall Repeated Engagement of Self-Help Features

Table 3 presents the main effects of condition, baseline well-being variables, and their interaction on repeated engagement with any of Intellect's self-help features. No main effects emerged. As hypothesized, the growth-mindset condition interacted with each of the three baseline well-being variables to predict a significantly higher likelihood of repeated engagement with the self-help features.

Figure 2 illustrates the conditional effects of treatment condition on likelihood of repeated engagement at +1 *SD* and -1 *SD* on each baseline well-being measure. These presented a consistent pattern: among participants with lower baseline well-being, those who completed the growth-mindset intervention (vs. control condition) were significantly more likely to repeatedly engage with self-help features. By contrast, and as predicted, there were no differences between conditions among participants with higher baseline well-being. Thus, the intervention was particularly effective for those experiencing mental health problems.

Specifically, the growth-mindset intervention (vs. control) significantly increased the

likelihood of repeated engagement with self-help features among participants who were doing worse at baseline (i.e., higher anxiety/depression, $b = 1.00$, $SE = .390$, $p = .010$, OR = 2.72; higher perceived stress, $b = .995$, $SE = .394$, $p = .011$, OR = 2.71; lower positive mental well-being, $b = 1.10$, $SE = .397$, $p = .005$, OR = 3.01). By contrast, there was no condition difference in the likelihood of repeated engagement among participants who were doing better at baseline (i.e., lower anxiety/depression, $b = -.184$, $SE = .393$, $p = .640$, OR = .832; lower perceived stress, $b = -.161$, $SE = .393$, $p = .682$, OR = .851; higher positive mental wellbeing, $b = -.323$, $SE = .401$, $p = .421$, OR = .724).

Table 3: Interaction of Baseline Wellbeing and Condition on Likelihood of Repeated Engagement of Any Self-Help Features

Variables	Outcome: Repeated Engagement with Self-Help Features (Yes/No)				
	β	<i>SE</i>	<i>p</i> -value	LLCI	ULCI
Moderator: Anxiety and Depression					
Constant	-.798	.634	.208	-2.04	.445
Condition	.407	.276	.140	-.133	.947
Anxiety and Depression	-.062	.077	.420	-.212	.088
Condition $\times$ Anxiety and Depression	.234	.110	.033	.018	.450
Moderator: Perceived Stress					
Constant	-.784	.623	.209	-2.01	.438
Condition	.410	.276	.137	-.131	.951
Perceived Stress	-.053	.069	.447	-.189	.083
Condition $\times$ Perceived Stress	.207	.100	.039	.010	.403
Moderator: Positive Mental Wellbeing					
Constant	-.741	.628	.239	-1.97	.491
Condition ^a	.381	.279	.173	-.167	.928
Positive Mental Wellbeing	.036	.042	.390	-.047	.119
Condition $\times$ Positive Mental Wellbeing	-.149	.059	.013	-.265	-.032

Note: ^a Reference category: Active Control; Age and dummy-coded gender (reference category: "Not Female") were controlled for in all models. *LLCI*=Lower limit of 95% confidence interval. *ULCI*=Upper limit of 95% confidence interval.

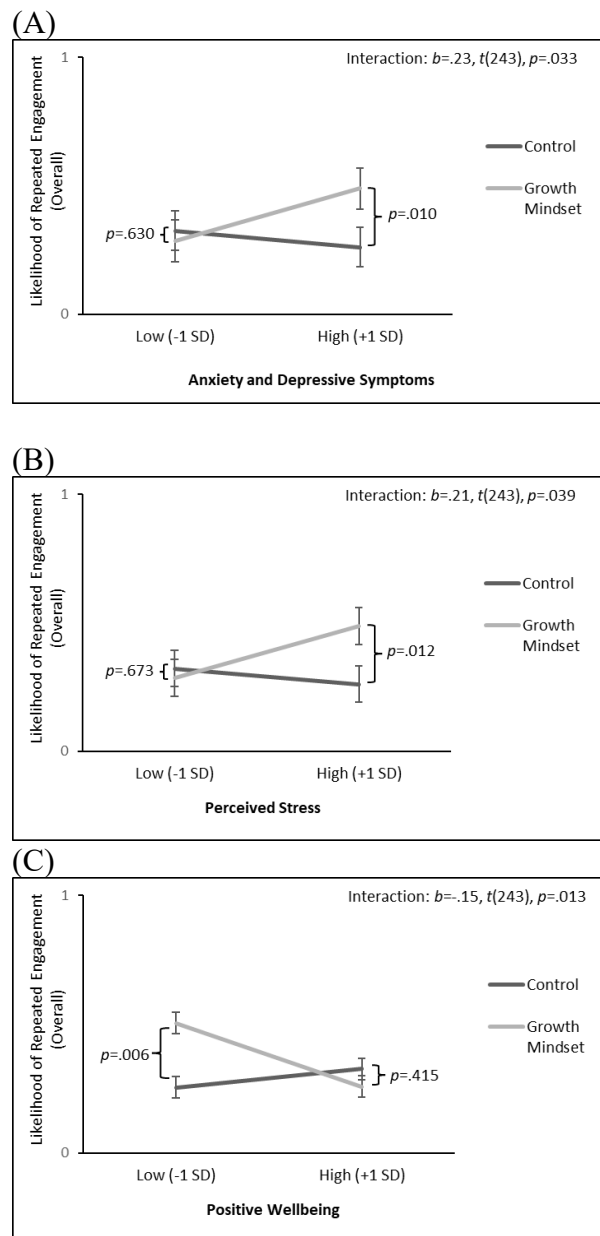


Fig 2: Interaction between Baseline Wellbeing and Condition on Likelihood of Repeated Engagement of Any Self-Help Features

3.4 Secondary Analyses: Repeated Engagement with Different Types of Self-Help Features

To determine the nature of participants' repeated engagement, we tested the interaction of treatment condition and baseline well-being measures separately for low-, moderate-, and high-intensity self-help features.

3.4.1 Repeated Engagement with Low-Intensity Self-Help Features

Table 4 presents the results for the likelihood of repeated engagement with low-intensity self-help features. No main effects of treatment condition emerged. Treatment condition significantly interacted with two of the three baseline well-being dimensions: perceived stress and positive mental wellbeing (but not anxiety and depression).

Figure 3 illustrates the conditional effects of treatment condition across baseline perceived stress and positive well-being (± 1 *SD*). As shown, the growth-mindset intervention (vs. control) led to an increased likelihood of repeated engagement with low-intensity features among participants with higher ($+1$ *SD*) baseline perceived stress ($b = .839$, $SE = .405$, $p = .038$, $OR = 2.31$) and among those with lower (-1 *SD*) baseline positive mental wellbeing ($b = .850$, $SE = .404$, $p = .035$, $OR = 2.34$). In contrast, there were no condition differences among participants with lower (-1 *SD*) baseline perceived stress ($b = -.345$, $SE = .408$, $p = .397$, $OR = .708$) or higher ($+1$ *SD*) positive mental wellbeing ($b = -.407$, $SE = .414$, $p = .325$, $OR = .665$).

Table 4: Interaction of Baseline Wellbeing and Condition on Repeated Engagement with Low-Intensity Features

Variables	Outcome: Repeated Engagement with Low-Intensity Features (Yes/No)				
	β	<i>SE</i>	<i>p</i> -value	LLCI	ULCI
Moderator: Anxiety and Depression					
Constant	-1.02	.657	.119	-2.31	.264
Condition ^a	.242	.284	.394	-.314	.799
Anxiety and Depression	-.057	.079	.471	-.211	.097
Condition $\times$ Anxiety and Depression	.180	.112	.108	-.039	.399
Moderator: Perceived Stress					
Constant	-1.06	.648	.103	-2.33	.214
Condition ^a	.240	.286	.402	-.320	.800
Perceived Stress	-.069	.072	.338	-.210	.072
Condition $\times$ Perceived Stress	.211	.103	.040	.009	.414
Moderator: Positive Mental Wellbeing					
Constant	-1.01	.651	.120	-2.29	.263
Condition ^a	.213	.289	.461	-.353	.779
Positive Mental Wellbeing	.037	.043	.398	-.048	.122
Condition $\times$ Positive Mental Wellbeing	-.131	.060	.030	-.249	-.013

Note: ^a Reference category: *Active Control*; Age and dummy-coded gender (reference category: "Not Female") were controlled for in all models. *LLCI*=Lower limit of 95% confidence interval. *ULCI*=Upper limit of 95% confidence interval.

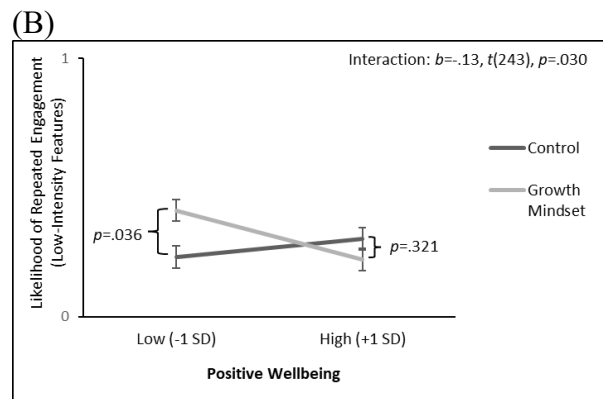
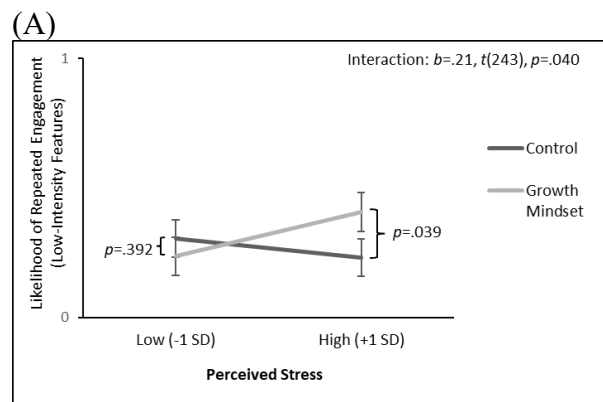


Fig 3: Interaction between Baseline Wellbeing and Condition on Repeated Engagement with Low-Intensity Features

3.4.2 Repeated Engagement with Moderate-Intensity Self-Help Features

Table 5 presents the results for moderate intensity self-help features. As shown, treatment condition interacted with all three baseline well-being measures to predict likelihood of repeated engagement with moderate-intensity self-help features.

Table 5: Interaction of Baseline Wellbeing and Condition on Repeated Engagement with Moderate-Intensity Features

Variables	Outcome: Repeated Engagement with Low-Intensity Features (Yes/No)				
	β	<i>SE</i>	<i>p</i> -value	LLCI	ULCI
Moderator: Anxiety and Depression					
Constant	-1.47	.724	.043	-2.89	-.047
Condition ^a	.198	.312	.526	-.412	.810
Anxiety and Depression	-.049	.085	.565	-.216	.118
Condition $\times$ Anxiety and Depression	.274	.122	.025	.035	.514
Moderator: Perceived Stress					
Constant	-1.44	.713	.043	-2.84	-.047
Condition ^a	.204	.312	.513	-.408	.817
Perceived Stress	-.029	.077	.708	-.179	.121
Condition $\times$ Perceived Stress	.228	.112	.042	.009	.446
Moderator: Positive Mental Wellbeing					
Constant	-1.32	.710	.062	-2.72	.068
Condition ^a	.217	.313	.489	-.397	.830
Positive Wellbeing	.038	.047	.417	-.054	.130
Condition $\times$ Positive Wellbeing	-.128	.064	.048	-.254	-.002

Note: ^a Reference category: Active Control; Age and dummy-coded gender (reference category: "Not Female") were controlled for in all models. LLCI=Lower limit of 95% confidence interval. ULCI=Upper limit of 95% confidence interval.

As illustrated in Figure 4, the growth-mindset intervention (vs. control) increased the likelihood of repeated engagement with moderate-intensity features for participants with higher (+1 *SD*) baseline levels of anxiety and depression ($b = .895$, $SE = .423$, $p = .034$, OR = 2.45), higher perceived stress ($b = .849$, $SE = .424$, $p = .045$, OR = 2.34) and lower (-1 *SD*) baseline positive mental wellbeing ($b = .837$, $SE = .433$, $p = .05$, OR = 2.31). By contrast,

there were no condition differences for participants with lower ($-1\ SD$) anxiety and depression ($b = -.494, SE = .456, p = .279, OR = .610$), lower perceived stress ($b = -.425, SE = .459, p = .355, OR = .654$), nor for participants with higher ($+1\ SD$) positive mental wellbeing ($b = -.388, SE = .446, p = .385, OR = .679$).

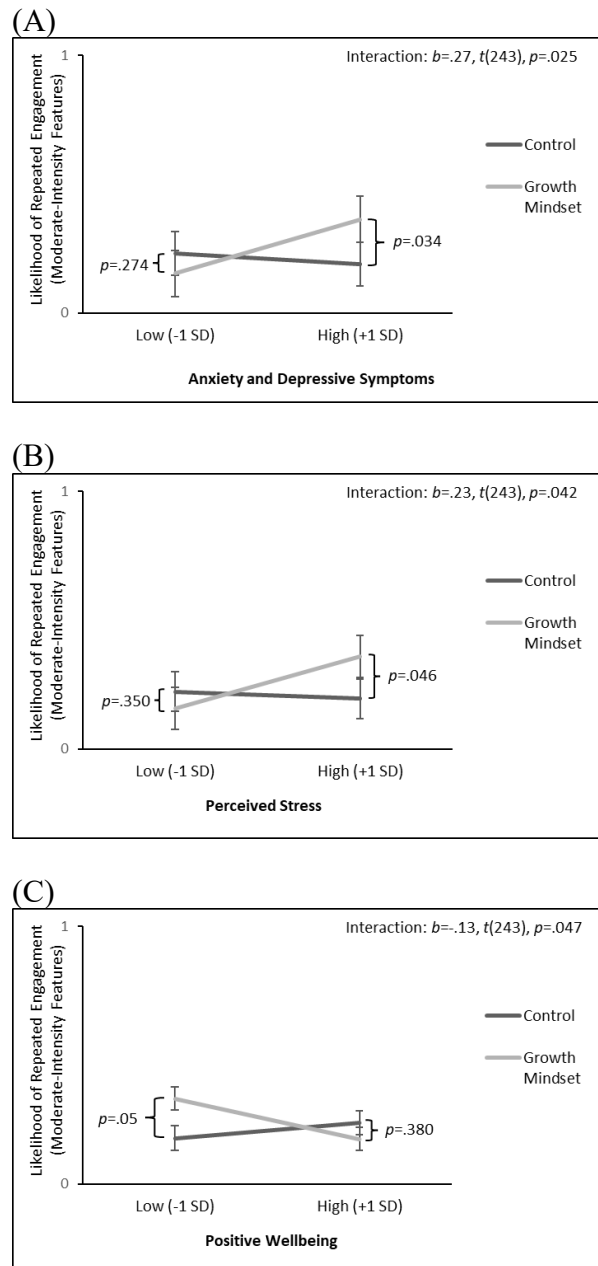


Fig 4: Interaction between Baseline Wellbeing and Condition on Repeated Engagement with Moderate-Intensity Features

3.4.3 Repeated Engagement with High-Intensity Self-Help Features

None of the baseline well-being measures interacted with treatment condition to

predict the likelihood of repeated engagement with high-intensity self-help features (see Table 6).

Table 6: Interaction of Condition and Baseline Wellbeing on Repeated Engagement with High-Intensity Features

Variables	Outcome: Repeated Engagement with High-Intensity Features (Yes/No)				
	β	<i>SE</i>	<i>p</i> -value	LLCI	ULCI
Moderator: Anxiety and Depression					
Constant	-1.71	.617	.006	-2.91	-.498
Condition ^a	.425	.263	.107	-.091	.942
Anxiety and Depression	-.042	.072	.562	-.183	.099
Condition $\times$ Anxiety and Depression	.174	.105	.097	-.031	.379
Moderator: Perceived Stress					
Constant	-1.67	.605	.006	-2.85	-.480
Condition ^a	.425	.263	.106	-.090	.940
Perceived Stress	-.016	.065	.810	-.143	.112
Condition $\times$ Perceived Stress	.106	.094	.262	-.079	.291
Moderator: Positive Mental Wellbeing					
Constant	-1.65	.606	.006	-2.84	-.463
Condition ^a	.409	.264	.121	-.107	.926
Positive Mental Wellbeing	.012	.040	.763	-.066	.090
Condition $\times$ Positive Mental Wellbeing	-.080	.056	.153	-.189	.030

Note: ^a Reference category: Active Control; Age and dummy-coded gender (reference category: "Not Female") were controlled for in all models. *LLCI*=Lower limit of 95% confidence interval. *ULCI*=Upper limit of 95% confidence interval.

4. Discussion

4.1. Summary of Findings

The present study investigated whether a single-session growth-mindset-of-mental-health intervention could promote repeated engagement with self-help features on an evidence-based MHA, particularly among employees with poorer baseline mental well-being. Consistent with our hypotheses, the intervention significantly increased the likelihood of repeated app engagement among participants who began the study with diminished well-being at baseline (i.e., higher levels of anxiety and depression, perceived stress, or lower positive mental well-being). By contrast, and as predicted, the intervention had no significant effect on repeated self-help engagement among participants with better mental health at baseline. Our secondary analyses revealed that these moderation effects were most evident for low- and moderate-intensity app features. For low-intensity features, the intervention increased repeated engagement among those with higher stress and lower positive well-being at baseline. For moderate-intensity features, the intervention led to increased repeated use among those with higher anxiety and depression, higher stress, and lower positive well-being. No effects of the intervention were observed for high-intensity features, regardless of participants' mental health status at baseline.

4.2 Theoretical and Practical Implications

Our findings show that a single-session growth-mindset intervention, when carefully designed to target a relevant psychological barrier, can meaningfully promote repeated MHA engagement among people who might otherwise be less likely to seek or persist with mental health support.

How might this work? Individuals with more clinically relevant symptoms may have a greater psychological need for change, which in turn enhances their receptiveness to belief-shifting interventions. As shown in previous studies, individuals often perceive clinical

symptoms to be more urgent, which creates a psychological state that heightens their motivation to seek relief (Doll et al., 2021). When presented with the idea that mental health is malleable and can be improved through effort, they are more likely to process the message deeply, recognize its personal relevance, and feel motivated to take action. This process ultimately contributes to their meaningful engagement with therapeutic features in the app.

Our study contributes to the growing body of research on “Wise Interventions,” which are brief, targeted interventions designed to modify specific psychological processes in order to initiate recursive and lasting improvements in behavior (Walton & Wilson, 2018), as demonstrated by previous growth mindset interventions (Burnette et al., 2023; O’Keefe et al., 2023; O’Keefe et al., 2025; Schleider et al., 2016; Schleider et al., 2020). Consistent with this framework, we targeted a specific belief that may undermine sustained engagement in mental health care, namely the belief that mental health is fixed and cannot be improved. Based on previous research linking fixed mindsets to the avoidance of proactive behaviors for well-being (e.g., Schroder et al., 2015, 2016; Schroder, 2021), we hypothesized that this fixed mindset of mental health would serve as an important psychological barrier to engaging with mental health resources consistently, such as an MHA. Our intervention was designed to shift this belief by fostering the understanding that mental health is improvable and can be strengthened through intentional effort. In doing so, it significantly increased the likelihood of repeated engagement with effective self-help features on a digital mental health intervention. These findings not only showed that a growth mindset can enhance motivation for health-promoting behaviors, but also provided further evidence for the effectiveness of “Wise Interventions” in facilitating beneficial behavioral change.

Our findings also speak to emerging directions in mindset science and “Wise Interventions,” particularly in response to recent calls to better understand “for whom” and under what conditions these interventions are most effective (Bryan et al., 2021; Burnette et al., 2023). The long-term effects of mindset and other wise interventions hinges not only on how precisely

the intervention shifts the targeted belief, but also on the affordances of the situation—that is, whether the surrounding environment supports or hinders the intervention's intended effect—and on the needs of the person receiving the intervention. For instance, O’Keefe et al. (2023b) developed a growth-mindset-of-interest intervention that encouraged students to view academic interests as malleable. They found that the intervention was especially effective at boosting interest and achievement in math and science among arts students who did not initially identify with those subjects, but who nonetheless had opportunities to engage with those subjects. Similarly, Paunesku et al. (2015) found that a growth mindset of intelligence intervention had its strongest effects among students who were underperforming and at risk of dropping out. These findings suggest that individual differences can play a powerful role in shaping the effectiveness of an intervention. In line with these studies, we found that employees who benefited most from our intervention were those experiencing greater mental health difficulties at baseline. This may reflect a form of psychological affordance, where poorer baseline well-being and fixed mindsets create a greater opportunity for the growth-mindset-of-mental-health intervention to be relevant and have a positive effect, ultimately increasing the likelihood of repeated treatment-seeking behavior on the MHA.

This pattern of repeated engagement emerged only for the MHA’s low- and moderate-intensity features. Employees with higher perceived stress or lower positive well-being were significantly more likely to repeatedly track their mood. Meanwhile, those who also reported higher anxiety and depressive symptoms at baseline were more likely to engage not only with low-intensity tools but also with moderate-intensity features, such as breathing techniques and thought-challenging exercises. Yet, we did not find higher repeated engagement with high-intensity features. One possible reason is that the level of psychological affordance appears mismatched, where the motivation to seek immediate relief does not align with the cognitive demands of the feature (Geraghty et al., 2010). High-intensity features often demand a level of cognitive effort, time, and emotional investment that can feel overwhelming for individuals

already experiencing significant psychological symptoms. For example, features like guided journaling or structured learning paths typically involve deep reflection of newly learned psychoeducational content, and skill application through writing, which can be particularly taxing for individuals struggling with their mental health. It is also possible that participants, even if they had endorsed a growth mindset toward mental well-being, were hesitant to engage with high-intensity features due to other concerns about confronting distressing emotions or perceiving a lack of short-term relief. In short, low- and moderate-intensity features may have felt more manageable and accessible than high-intensity features, and thus were more likely to be selected for repeated engagement. Future research should aim to replicate these findings and further examine the factors that motivate participants' feature selections on digital interventions.

From a practical standpoint, our findings carry important implications for mental health care delivery. While MHAs offer a promising avenue for expanding access to evidence-based mental health support, particularly for individuals who lack the time and resources to pursue in-person care, their potential continues to be significantly limited by persistently low engagement rates. Our findings suggest that existing efforts to promote engagement (such as technical enhancements; see Alqahtani & Orji, 2020; Borghouts et al., 2021; Saleem et al., 2021) may not be enough to drive engagement. Instead, our research suggests that mindsets may play a critical role. We showed that adopting the view that mental health is not unchangeable but instead is improvable can be a powerful and underutilized strategy for increasing repeated engagement with MHAs. This kind of mindset shift may serve as a motivational gateway that technical features alone cannot unlock. Our study is also among the first to apply a growth mindset theory to mobile app engagement, and also one of the very few to examine help-seeking using objective behavioral data rather than self-reported attitudes or intentions. This offers new evidence that belief-shifting wise interventions can meaningfully influence real-world help-seeking behavior in digital mental health contexts.

4.3 Strengths, Limitations, and Future Directions

Several limitations should be noted. First, our app engagement data were collected over a 3-month period, which provides a meaningful snapshot of short-term behavioral use but did not capture longer-term engagement trajectories. As such, it remains uncertain whether the observed effects of the intervention would persist, intensify, or diminish over time. Given that mindset interventions have been theorized to initiate recursive processes that can amplify over time (Walton, 2014; Walton & Wilson, 2018), future studies should incorporate extended follow-up periods to assess long-term usage patterns.

Second, although our primary outcome was based on objective behavioral data, we were unable to analyze mental health outcomes longitudinally. Consequently, it remains an open question whether increased and sustained engagement with the app translates into clinically meaningful improvements in mental health. Prior trials of the Intellect app have demonstrated such benefits (Li et al., 2024; Toh et al., 2022), but future research should examine whether behavioral engagement serves as a mediator between mindset interventions and improvements in psychological well-being.

Third, by design, the intervention itself did not reference the app nor include explicit encouragement to engage with it. As such, the observed behavioral changes likely occurred through an indirect pathway, wherein participants who adopted a more malleable view of mental health may have felt more motivated to take proactive steps toward self-care, including, but not limited to, repeated app use. Notably, participants voluntarily returned to the app multiple times, suggesting they may have internalized the intervention's message and interpreted mental health improvement as an ongoing, effortful process rather than a one-time action. Future work should explore the mechanisms driving this effect and examine whether mindset interventions also promote other forms of self-initiated help-seeking behavior, such as pursuing therapy or adopting lifestyle changes. It is also worth noting that we only collected data on whether participants had previously downloaded the app before the study, not on their prior experiences

with *Intellect*. It is possible that earlier exposure to the app could have shaped their likelihood of re-engaging with it during the study period.

4.4 Concluding Remarks

This study demonstrates that a brief, scalable growth-mindset-of-mental-health intervention can increase repeated engagement with a mental health app particularly among those who may need support the most. By targeting users' beliefs about the changeability of mental health, this intervention offers a novel and promising strategy to address a persistent challenge in digital mental health: helping people not only access support, but continue using it.

Data Availability

The data analyzed in this study are not publicly available due to restricted permissions and confidentiality shared between Intellect and its users. The data can be made available upon reasonable request to the corresponding author.

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The study did not require any external funding.

Declaration of competing interest

The authors declare the following interests which may be considered as potential competing interests: Oliver Suendermann (OS) holds the position of Vice President Clinical Director at Intellect Pte Ltd; he also reports holding equity in Intellect. At the time of data collection, Sean Toh Han Yang (STHY) and Feodora Kosasih (KS) were Clinical Research Associates for Intellect. E. J. Horberg (EJH) and Paul A. O'Keefe (PAO) have never had an affiliation with Intellect.

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