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Effects of an ACT-based online intervention on university students' psychological flexibility, well-being and study skills

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Abstract

Online interventions based on Acceptance and Commitment Therapy (ACT), combining psychological flexibility and study skills training, show promise in supporting university students' well-being and studying. However, less is known about the factors behind their effectiveness. This study examines the impact of an ACT-based online intervention on students' well-being and study skills and explores participants' experiences of the intervention and its components based on psychological flexibility processes. Using a mixed-methods approach, the findings show improvements in study skills, psychological flexibility, and emotional and psychological well-being compared to a control group. Students found ACT components and exercises supportive of their well-being and learning in varied ways. Reflecting on personal values clarified what mattered in life and studies while practising self-compassion helped reduce self-criticism and accept feelings and thoughts. Mindful presence supported coping with stressful situations, and peer support was seen as a meaningful part of the intervention. The benefits of the intervention were shaped by individual differences, highlighting personal factors that influence how students engage with and benefit from the intervention.

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Practitioner Notes

1. Practitioners are advised to consider integrating ACT-based online interventions with study skills training to enhance university students' well-being and academic success.
2. Encouraging self-compassion, value reflection, and peer support that foster experiences of common humanity can support students' well-being and studying.
3. Practitioners are encouraged to consider how students' backgrounds, goals, and prior knowledge may shape the benefits they gain from different intervention components.
4. Examining how students benefit from different ACT processes can support more tailored and effective interventions.
5. Embedding ACT-based online interventions into curricula can provide accessible support for a wide student population.

Keywords

Psychological flexibility, Acceptance and Commitment Therapy, studying, well-being, higher education

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Introduction

In today's academic world, the increasing prevalence of stress and mental health issues among university students is a cause of concern. Research has shown that these challenges not only affect students' well-being but also hinder their academic performance (Puolakanaho et al., 2019; Mofatteh, 2021; Baalmann, 2023). Conversely, struggles with mental health can also threaten academic success (Emerson et al., 2022; Baalmann, 2023). Thus, there is a pressing need to investigate ways to support students' well-being and academic outcomes. Moreover, it is essential to explore large-scale, cost-effective, and low-risk interventions to promote the well-being of university students (Lahtinen et al., 2023).

Acceptance and Commitment Therapy (ACT) -based online interventions offer a promising approach to addressing these challenges by combining techniques of psychological flexibility and study skills training (Asikainen, 2018; Asikainen et al., 2019; Hailikari et al., 2022; Räihä et al., 2024). Studies have demonstrated the effectiveness of ACT in improving well-being through acceptance and mindfulness techniques, to build commitment and behaviour change (Hayes et al.; 2006; Hayes et al., 2013; Swain et al., 2015; Räsänen et al., 2016). ACT, rooted in cognitive behaviour therapy (CBT; Hayes et al., 2006; Hayes et al., 2011), aims to enhance psychological flexibility (Hayes et al., 2006). The goal of psychological flexibility is to increase positive psychological skills (Hayes et al., 2006) and life satisfaction in the face of challenges (Dindo et al., 2017). Alongside ACT, study skills training helps students develop organised studying, such as time-management skills (Entwistle & McCune, 2004), which are positively connected to both students' studying and overall well-being (Asikainen et al., 2020).

ACT-based interventions can increase self-awareness, acceptance, and cognitive defusion skills in the context of academic life (Puolakanaho et al., 2019), and these skills can be incorporated into university studies alongside practising organised studying. Online platforms make these interventions accessible and encourage active participation in improving one's well-being, which increases a sense of empowerment among participants (Räsänen et al., 2016). Promoting psychological flexibility, learning to be more open and accepting of one's thoughts and feelings, and willingness to take on challenges can improve students' academic skills and well-being (Hailikari et al., 2021). Consequently, the integration of organised study skills and ACT-based interventions into higher education curricula could provide students with tools that can benefit them in all aspects of their lives. Therefore, this study investigates the effects of an ACT-based online intervention on university students' well-being and learning. A deeper understanding of which aspects of these interventions are perceived as beneficial and why is required, and this study aims to add significant insights to this gap in the literature.

Literature

Psychological flexibility in promoting university students' well-being

According to the World Health Organization (WHO; 2022), mental health relates to coping with life stressors, recognising one's abilities, and being able to perform in different aspects of life as an individual and a part of society. Extending this definition, Galderisi et al. (2015) underscore the role of cognitive and social skills, the ability to recognise, regulate, and express one's emotions,

having empathy as well as flexibility, and coping with adverse life experiences. However, they also emphasise how all these components are not mandatory aspects of mental health but rather represent some of the factors influencing mental health. Individuals also display varying abilities and features of well-being in different ways. Subjective well-being, which emphasises the importance of individuals' own evaluations of their well-being (Deci & Ryan, 2008), allows people to determine whether their lives are satisfying based on their values (Diener et al., 1998). In addition to personal factors, social-environmental and cultural factors play a role in one's subjective well-being (Deci & Ryan, 2008; Diener et al., 2018). Thus, psychological well-being can be defined as a multifaceted domain encompassing self-acceptance, positive relations with others and the environment, autonomy, ongoing growth, and purposeful living (Ryff & Keyes, 1995).

Psychological flexibility has been shown to have positive effects on one's well-being (Hayes et al., 2006). For instance, psychological flexibility has been found to help with coping with stress (Puolakanaho et al., 2019) and in recognising and regulating one's emotions (Beauchemin et al., 2008), as described important aspects of mental health by Galderisi et al. (2015). Similarly, psychological flexibility promotes subjective well-being as defined by Diener et al. (1998), and psychological well-being (Ryff & Keyes, 1995), through value-based living and self-acceptance (Hayes et al., 2006). Psychological flexibility is a combination of several processes (Hayes, 2004) aiming to increase positive psychological skills, contrary to merely avoiding psychopathology (Hayes et al., 2006).

The core processes of psychological flexibility are cognitive defusion, acceptance, self as a context, contact with the present moment, committed action, and values-based life (Hayes et al., 2012). Cognitive defusion refers to the acknowledgment of thoughts and feelings (Beauchemin et al., 2008). Cognitive defusion occurs, when one learns to observe their thoughts as they occur (Hayes et al., 2013) and see them simply as they are, which can help diminish their negative impact (Hayes et al., 2011). This lays the groundwork for acceptance (Hayes, 2004), which, in ACT, refers to the acceptance of thoughts and emotions as they arise (Blackledge & Barnes-Holmes, 2009). Learning to see the self as a context helps in this process by allowing an individual to explore their inner experiences more objectively (Hayes et al., 2013). Connection with the present moment, on the other hand, can enhance self-management and reduce ruminating (Hayes et al. 2011). These sub-processes are meant to help toward a more value-based life (Hayes et al., 2006), while committed action refers to altering behaviour on one's chosen values (Blackledge & Barnes-Holmes, 2009). In turn, all six principles also have antitheses that can be the cause of psychological inflexibility (Hayes et al., 2013).

Psychological flexibility can be seen to relate closely to the concept of self-compassion (Psyzkowska & Rönnlund, 2021), which refers to a similar sense of caring towards ourselves that we tend to apply to the people closest to us (Neff, 2011). Furthermore, self-compassion entails pausing in the moment to consider, acknowledge, and accept one's negative thoughts and emotions as well as struggles as a part of shared human experience (Neff & Dahm, 2015). Therefore, self-compassion lines up with the components of presence, acceptance, and exploration of inner experiences characteristic of psychological flexibility (Blackledge & Barnes-

Holmes, 2009). Furthermore, practising mindfulness is characteristic of both self-compassion (Neff & Dahm, 2015) and psychological flexibility (Beauchemin et al., 2008; Hayes et al., 2011), with the aim of better emotional well-being.

ACT-based interventions have been found to increase self-awareness, acceptance, and defusion skills in the context of academic life (Puolakanaho et al., 2019). These interventions have been shown to have positive effects on students' well-being in both preventive (Biglan et al., 2008; Levin et al., 2014; Puolakanaho et al., 2019) and promotive ways (Katajavuori et al., 2021). Consequently, promoting psychological flexibility, for example resulting in being more willing to engage in challenges could improve the well-being and academic skills of students (Hailikari et al., 2021). More research is needed on the effects of interventions that combine psychological flexibility and study skills training (Asikainen et al., 2018; Puolakanaho et al., 2019; Hailikari et al., 2022), and more specifically about how different components of these interventions affect their impact for different individuals (Kinnunen et al., 2019). For example, improvements in well-being during ACT-based interventions are associated with increases in defusion and value-based action in those with mental health problems, but more research is needed to examine how the different processes of psychological flexibility affect the benefits of ACT on different individuals (Bramwell & Richardson, 2018).

Organised studying in promoting university students' academic performance

One aspect affecting student performance at the university is organised studying. Academic challenges are usually more related to poorly organised studying than to a lack of intelligence (Hassanbeigi et al., 2011). Organised studying can be defined as time and effort management in studies (Entwistle & McCune, 2004). Organised studying correlates with diligence and enthusiasm for studying as well as skills of overcoming obstacles when studying and skills of self-regulation (Hailikari & Parpala, 2014). Organised studying is also positively related to academic success (Asikainen et al., 2014) and study progression (Rytkönen et al., 2012). On the other hand, poor study skills are associated with increased procrastination (Svartdal et al., 2022) and slow study progression (Asikainen et al., 2020).

Poor academic performance can also lead to increased stress and mental health problems (Mofatteh, 2021) and conversely, poor mental health can impact academic performance (Emerson et al., 2022; Baalmann, 2023). For example, deep level understanding and effort and time management skills are key factors in promoting students' well-being and study progression (Asikainen et al., 2020). Self-regulation skills such as time management are significant in predicting the levels of stress and psychological well-being (Durand-Bush et al., 2015; McClelland et al., 2018) and by developing these skills, students have gained tools to keep adequate levels of mental health when facing adversity (Durand-Bush et al., 2015).

Furthermore, effective time and effort management facilitates psychological flexibility by enabling individuals to allocate time for living a value-based life (Kashdan & Rottenberg, 2010). This, in turn, promotes committed action and enhances well-being, thereby aiding academic success. Notably, time management skills positively influence study habits and stress management (Claessens et al., 2007). Consequently, psychological flexibility and time management skills have

been shown often to go hand in hand (Hailikari et al., 2021). Psychological flexibility has, thus, been found to relate not only to increased well-being (Asikainen et al., 2019) but also to academic progression (Asikainen, 2018; Asikainen et al., 2018; Puolakanaho et al., 2019; Hailikari et al., 2022).

Building on a large body of evidence on the effectiveness of ACT, this study aims to deepen understanding of the benefits of ACT-based online interventions for university students' learning and well-being. While many studies have confirmed the effectiveness of ACT-based interventions, establishing that ACT works does not tell us *how* it works (McLoughlin & Roche, 2023). Thus, understanding the underlying mechanisms behind the effectiveness of ACT-based interventions is needed and exploring participants' experiences to identify factors that contribute to their success can elucidate this gap in the literature. This study, accordingly, examines students' experiences with an ACT-based online course and its components, aiming to increase understanding of factors underlying its benefits in promoting well-being and academic success.

Aim of the study

To evaluate the benefits of the intervention course, the study investigates changes in students' well-being, psychological flexibility and study skills compared to a control group. In addition, it explores students' experiences of the course's weekly modules, each of which focuses on a sub-process of psychological flexibility (see Table 1), to gain an in-depth understanding of how the intervention affects different individuals.

Based on the purpose and aim of this study, the research questions are as follows:

1. What effects does the ACT-based course have on students' well-being, psychological flexibility, and organised study skills?
2. What kind of experiences do students have on the course?
3. How do the students experience the different course modules and their usefulness?

Method

The study focused on students taking part in a web-based course *Towards Better Well-being and Studying* in 2021 at the University of Helsinki, Finland. The course integrated ACT methods with organised study skills training and its primary goal was to support students' well-being, learning and studying through weekly reflective assignments designed to enhance psychological flexibility (Asikainen & Katajavuori, 2021). The course was optional, open to all students, and worth three credits (ECTS), assessed on a pass-fail basis. Delivered over eight weeks, the course focused on a different theme each week accompanied by corresponding reflective assignments. Central themes, based on the sub-processes of psychological flexibility, included identifying personal values and thoughts, practising relaxation techniques, fostering self-compassion, and developing lifestyle and study skills (see Table 1). The course also comprised weekly peer group meetings during which central experiences were discussed.

In addition to the theoretical content and related exercises, the course provided information about support services by the University of Helsinki and Finnish mental health associations. It was

communicated to students that the course was intended to support studying and well-being but was not a replacement for therapy. However, if any of the course topics or exercises triggered distressing thoughts, students were encouraged to contact the course teacher and/or well-being professionals and to use the support resources available on the course platform.

Ethical Considerations

The study adhered to the ethical principles outlined in the Declaration of Helsinki (World Medical Association, 2013) and followed the responsible conduct of research as outlined by the Finnish National Board of Research Integrity (TENK, 2019) as well as the ethical standards outlined by Purvis and Crawford (2024). Participation was voluntary, and participants could withdraw from the study at any time without any consequences. Informed consent was obtained in advance, after receiving clear and comprehensive information about the study via the course's online platform. The study involved adult participants capable of giving informed consent, and the data were collected using non-invasive self-report methods. Personal data were pseudonymised, with unique identification numbers used to link responses across questionnaires while ensuring privacy. Neither participants nor their data can be identified in the reported findings or quoted excerpts. All data handling and storage procedures were designed to ensure confidentiality at every stage of the study.

Participants

One hundred forty-one students self-enrolled in the course, and 115 consented to the use of their responses in research. Of these, 109 students completed pre- and post-course questionnaires. The study followed a quasi-experimental design, with a control group of 27 students on a self-selected waiting list for the course. Thirty-seven participants (27%) from the intervention group did not complete the post-course Mental Health Continuum Short Form (MHC-SF), which measures psychological, social, and emotional well-being, most likely due to a technical error. Missing data is common in research (Popovich, 2024), but in this case, it appeared concentrated and non-random (Anderson et al., 2010), potentially affecting the generalisability and reliability of results (Tabachnick & Fidell, 2014), reducing sample size, and introducing biased estimates (Van Buuren, 2018).

To examine sample comparability, a one-way ANOVA was used to compare survey means between respondents who completed all questionnaires and those missing the final MHC-SF. No significant differences were found, suggesting sufficient similarity between groups. Therefore, 72 participants were included in the well-being analyses, while the full sample of 109 was used for the other two measures. Retaining respondents with missing MHC-SF data aimed to reduce potential bias in well-being estimates (Tabachnick & Fidell, 2014), especially given the high rate of missingness (Anderson et al., 2010). A smaller sample would have lowered statistical precision and increased the margin of error (Conroy, 2016). Addressing missing data transparently, while not uncommon in research, is essential for research integrity (Papageorgiou et al., 2018).

Among participants, 17 identified as male, 90 as female, 5 as another gender, and 3 did not specify. Most (72%) were aged 20-30, 16% were 31-40, and 4% were over 40; nine did not report

their age. Participants came from diverse study stages, spanning one to eight years, and represented 11 faculties, with most from Education (28%), Arts (27%), and Biological and Environmental Sciences (14%).

Measures

Quantitative data were collected via pre- and post-course questionnaires. The 14-item MHC-SF assessed (1) emotional well-being (EWB, 3 items), (2) social well-being (SWB, 5 items), and (3) psychological well-being (PWB, 6 items) (Keyes, 2009; Luijten et al., 2019). Psychological flexibility was measured with the Comprehensive Assessment of Acceptance and Commitment Therapy Processes (CompACT) covering openness to experience, behavioural awareness, and valued action (Francis et al., 2016). Organised studying was measured using a four-item scale from the HowUlearn questionnaire (Parpala & Lindblom-Ylänne, 2012). All measures have demonstrated strong internal consistency and validity (Parpala & Lindblom-Ylänne, 2012; Francis et al., 2016; Luijten et al., 2019).

Module feedback was collected in two formats; students rated module usefulness on a scale of 1-10 and provided open-ended feedback on the respective module's theme and assignments. Numeric ratings were given by 105 students. On average, 29 students provided written feedback per module, though this varied, for example with 48 responses for the first module and 16 for the seventh.

Table 1

The content of the Towards Better Well-being and Studying course

Module	The themes and assignments of the course (sub-processes of psychological flexibility)	Measurements and data collection conducted
1.	**Orientation to the course;** familiarising oneself with the concept of psychological flexibility, assessing one's well-being, setting goals for the course, initiating time management, start of group work.	**Preliminary questionnaires;** Well-being (MHC-SF), psychological flexibility (CompACT), organised study skills (HowUlearn). An open question about how useful the students found the module's theme and tasks.
2.	**Values;** learning about values and their meaning in one's well-being, recognising and reflecting on one's values and strengths. Individual assignments and group reflection.	An open question about how useful the students found the module's theme and tasks.
3.	**Relaxation and concentration (being present/acceptance);** learning about stress as a phenomenon and about exercises that can help to reduce stress (e.g., meditation). Individual assignments and group reflection.	An open question about how useful the students found the module's theme and tasks.
4.	**Thoughts (cognitive defusion/self as a context);** learning about factors affecting thoughts and emotions and their connection to well-being and procrastination. Individual assignments and group reflection.	An open question about how useful the students found the module's theme and tasks.
5.	**Lifestyle skills and learning techniques (committed action);** sleep, exercise, nutrition, and organised study skills. Individual assignments and group reflection.	An open question about how useful the students found the module's theme and tasks.
6.	**Self-compassion (acceptance, self as a context);** learning about self-compassion and its connection to well-being. Individual assignments and group reflection.	An open question about how useful the students found the module's theme and tasks.
7.	**Values-based life (committed action);** practising committed actions and a flexible self-concept. Learning to live a life according to values by observing goals, choices, and actions. Individual assignments (learning report) and group reflection.	An open question about how useful the students found the module's theme and tasks. **Final questionnaires;** Well-being (MHC-SF), psychological flexibility (CompACT), organised study skills (HowUlearn).
8.	**The course summary;** giving peer feedback on learning reports and giving course feedback.	

Note. The table is based on Asikainen and Katajavuori's (2021) illustration of the contents and themes of the Towards Better Well-being and Studying course. In the module descriptions, the concepts in brackets refer to the sub-processes of psychological flexibility on which the module's contents are based.

Analysis

A mixed-methods approach was utilised, combining statistical and open-ended measures (Johnson & Onwuegbuzie, 2004), with an explanatory sequential design (Creswell, 2022). SPSS Statistics 28 software was used to compare intervention and control group data over time with repeated measures ANOVA (Lee, 2015). Course module usefulness ratings were measured using mean and standard deviation calculations (Figure 1). Qualitative methods explored students' subjective experiences, using inductive content analysis to identify emerging themes and establish links between research objectives and data findings (Thomas, 2003). Raw data was anonymised, coded, and categorised into themes (Graneheim et al., 2017). First, all students' comments from each module were classified revealing six general themes prevalent across the modules. Module-specific experiences were then explored to identify which aspects of the course components students found useful and why. The themes will be presented first, followed by a module-by-module analysis. Interpretations are then drawn from analyses and theoretical frameworks to form a coherent narrative of study findings (Vears & Gillam, 2022).

Results

Reliability analysis indicated high Cronbach's alphas with a mean of 0.90 (Table 2). Repeated-measures ANOVA revealed statistically significant Time x Group interaction for psychological flexibility, organised studying, emotional well-being, and psychological well-being compared to the control group (Table 2). For social well-being, the changes were statistically non-significant (Table 2). The partial eta squared (η2) analysis showed quite small effect sizes for the variables. The results of the repeated measures ANOVA can be seen in Table 2.

Table 2

Results of the repeated measure ANOVA

	Intervention group			Control group			Time x Group				
	N	**Mean1 (SD)**	**Mean2 (SD)**	**N**	**Mean1 (SD)**	**Mean2 (SD)**	**df**	**F**	***p***	**η2**	**α (before – after)**
Organised studying	109	3.09 (0.96)	3.41 (0.80)	27	3.60 (0.86)	3.59 (0.81)	1,134	6.60	**.011***	.05	0.89-0.88
Psychological flexibility	109	3.50 (0.90)	3.96 (0.85)	27	3.77 (0.77)	3.86 (0.71)	1,134	4.83	**.030***	.03	0.90-0.89
Emotional well-being	72	3.54 (0.91)	3.79 (0.83)	27	3.61 (0.85)	3.50 (1.02)	1,97	4.17	**.044***	.04	0.88-0.88
Psychological well-being	72	3.46 (0.87)	3.69 (0.84)	27	3.56 (0.79)	3.46 (0.89)	1,97	5.25	**.024***	.05	0.88-0.88
Social well-being	72	2.70 (0.89)	2.90 (1.08)	27	2.76 (0.98)	2.84 (1.05)	1,97	1.03	.311	.01	0.88-0.88

*p < 0.05

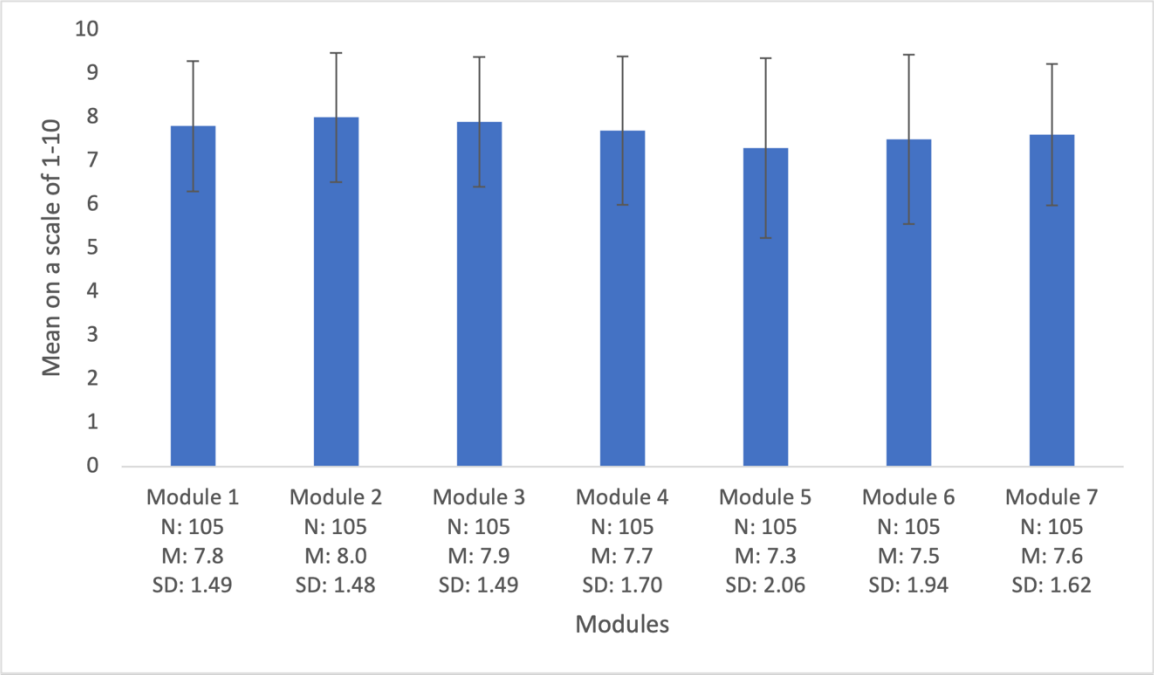
Note. N indicates the number of students that responded to the questionnaires. SD and values in brackets represent standard deviation. Values given in bold are statistically significant.

Students' experiences of the course

The study aimed to examine the underlying factors behind the benefits of an ACT-based online intervention. The following sections present students' responses regarding the usefulness of different components of the intervention, namely, the course modules based on psychological flexibility processes, as well as open-ended reflections on these evaluations.

Figure 1

Means given by the participants for each module during the course

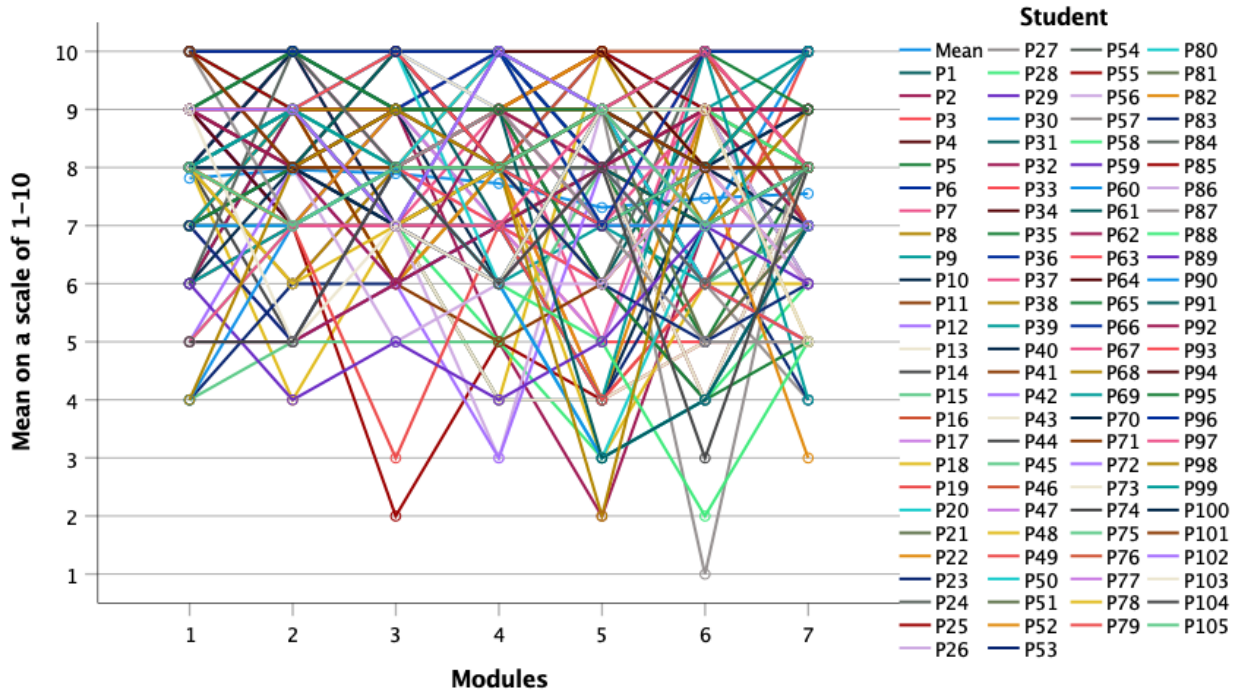


Note. N indicates the number of numerical responses by participants from each module. The bars represent the means of the modules during the intervention (error bars show standard deviations).

Looking at the perceived effects of the course, the seven weekly modules, each focusing on distinct psychological flexibility processes, were considered comparatively equally useful (Figure 1). However, the variation between individuals' ratings was considerable (Figure 2), demonstrating the importance of exploring students' individual experiences of the different course modules. Students' open reflections provide deeper insights into these evaluations and are presented in the following sections.

Figure 2

Variation between students' ratings across the modules



Note. This figure illustrates the variation between individual students' ratings of the course modules in terms of their perceived usefulness. The lines in the graph and values on the right represent the 105 students answering the questionnaire after each module.

Six key themes were identified from students' feedback, offering insight into their experiences during the course. The first theme, **satisfaction with the course and its impact on well-being** showed how activities and exercises of different modules supported students' well-being, for example by reducing perceived stress. The second theme concerned **expanding thinking and gaining new insights through practical exercises**. In addition to well-being effects, students found the topics and exercises valuable in improving their study routines, which contributed to academic progress. These tangible **improvements in learning and study skills** formed the third theme.

Some students were already familiar with some of the course topics and exercises, which influenced how useful they found the modules. However, many found it helpful to strengthen their understanding**,** which led to increased awareness of their actions. Thus, the **reinforcement of existing skills and knowledge** emerged as the fourth theme. The fifth theme focused on **peer support and connections**, such as learning from others and realising they were not alone in their challenges. Students appreciated the opportunity to share experiences and hear different perspectives from others. While most students found the course useful, some students made suggestions for improvement and noted that their personal workload or life situation affected their

engagement with the exercises. Thus, **challenges and ideas for improvement** formed the sixth theme of the analysis.

Students' experiences of the course components

Students' weekly reflections revealed recurring themes across the modules, as outlined above. However, each module emphasised these themes in slightly different ways, and individuals benefited from different components of the course in varying degrees (see Figure 2). This section demonstrates in more detail how each course module was experienced, in line with the research objective of exploring the factors behind the impact of the course components.

The first module introduced the concept of psychological flexibility, initiated time-tracking, and involved setting a personal goal for the course. Among the 48 students who provided written responses, many described increased awareness of their well-being and study-related habits. The time management and goal-setting exercises encouraged students to improve their study skills and consider why this is important. As Student 94 addressed; "... This all clarifies why we study, what we want to do with our knowledge and skills, what mark we want to leave on the world, and how we want to live."

Module two focused on personal values and encouraged students to reflect on their alignment with their actions. Of the 36 students who wrote reflections, many noted connections between their actions, thoughts, and well-being. This was reflected by Student 4:

> Now that I have used the exercises to remind myself of what is important to me, I believe I can make better choices and actions that are in line with my values. I can also better understand why certain choices or actions cause more anxiety or stress than others.

Some students recognised strong value-action alignment, while others noticed discrepancies. Many found value reflection helpful, though one student shared that thinking about values and the good life initially felt depressing but hoped this would improve as the course progressed. Some reflections also placed the module topics in a broader societal context, such as Student 109's:

> These are important things that you should be able to talk about more openly, but it feels like society or others may judge you for your ideas. Unfortunately, this is just the world we live in, but I wish it would change. You don't have to accept other people's ideas, but it is important to respect them, no matter how different they are from your own.

The third module addressed relaxation and concentration. Of the 32 students who reflected, many emphasised the benefits of the practical exercises. Relaxation practices, which students mentioned wanting to incorporate into their daily lives, were found to reduce stress and enhance well-being, thereby supporting learning and perseverance. As Student 67 noted, "Students are often in a pretty constant state of stress, so even taking those five breaths to calm down can make

a big difference”. Some students also recognised the importance of balancing achievement with relaxation and better presence, emphasising the link between well-being and studying.

In the fourth module, which involved exploring thoughts and emotions, 22 students provided reflections at the end of the module. Most students felt that the week's theme and exercises helped them better understand their feelings and thoughts and how they relate to everyday life and studies. The exercises had a tangible impact on moving towards more meaningful actions, as described by Student 4:

> The week's exercises helped me realise that I am not the same as my feelings and thoughts, but I can make a distinction between the two. I feel that I can learn to make more conscious choices toward my goals by disregarding discouraging thoughts as they are not helpful.

One student, however, found facing their thoughts distressing, despite being aware that it was important. Several students found the group discussions valuable because they allowed them to look at their thoughts and see others had similar issues, for example with procrastination.

Module five addressed lifestyle and study techniques, with 26 students submitting reflections. Perceptions of the module’s usefulness varied slightly (Figure 1), as shown in their written responses. Some students found the content familiar, which reduced its perceived relevance, while others appreciated the reminder, as these topics are easily forgotten amid busy everyday life. The module was seen as helpful for studying, especially for those whose course goals were related to improving study skills. Peer learning was also seen as valuable, as described by Student 56:

> In addition to the theoretical part, I also learned a lot from the group discussion, when we were able to share our own experiences and tips with each other. I felt that I was able to help myself and get help from others with challenges related to my studies.

In module six, students were introduced to the concept of self-compassion, at the end of which 25 students wrote reflections on the topic. Through practical activities, such as audio imagery exercises and reflective assignments, many students learned to pause and consider their personal growth during the course. One student found the module to be the most beneficial of the course because it helped reduce self-criticism, while another mentioned realising things they might not have otherwise thought about. The theme of self-compassion had students realise the importance of accepting themselves from new perspectives, as illustrated in Student 4 reflection:

> It was eye-opening to learn more about the concept of self-compassion and how to practice and improve one’s self-compassion. … Personally, I would see it as being particularly important to teach self-compassion from an early age, as many of life's challenges would be easier if you could treat yourself with the same kindness and understanding as those around you. Many people put enormous pressure on

themselves to perform and blame themselves for the challenges and failures in their lives, rather than trying to positively encourage themselves and understand their challenges.

The seventh module focused on values-based living and reflecting on personal goals and actions. Students retook the well-being questionnaires and wrote reflections on the whole course. At the end of this module, 16 students provided their reflections and most of them expressed gratitude for the useful and interesting course. Student 34 noted that while the course topics were really important, putting them into practice can be challenging, especially in times of exhaustion, "... You've seen it in the news, e.g., the exhaustion rate of university students is really high, and this gives you really good tools for it, but the exhaustion doesn't necessarily allow you to work on these things all by yourself". Despite these challenges, the overall tone of the reflections was hopeful. Students reported that they had learned valuable skills and expressed a desire to continue applying the course content in the future.

Discussion

The study explored the impact of an ACT-based online course on students' well-being, psychological flexibility, and organised study skills. It also aimed to enhance understanding of how students perceived the benefits of the course modules based on psychological flexibility processes, entangling the factors behind the impacts of the course.

Changes in well-being and study skills

The findings revealed improvements in psychological flexibility, study skills, and emotional and psychological well-being. These results align with previous studies demonstrating ACT-based interventions' positive effects on university students' well-being (Biglan et al., 2008; Räsänen et al., 2016; Levin et al., 2017; Asikainen & Katajavuori, 2021; Katajavuori et al., 2021), psychological flexibility (Räsänen et al., 2016; Hailikari et al., 2022) and study skills (Asikainen & Katajavuori, 2021; Hailikari et al., 2021; Katajavuori et al., 2021; Räihä et al., 2024).

Although social well-being increased, it did not reach statistical significance compared to the control group. This may be due to the lingering pandemic lockdowns, which forced most students in Finland into remote study through fall 2021. Remote learning's impact on limited integration into the student community and reduced social interaction has been linked to feelings of loneliness and lower social well-being (Marler et al., 2021; Kohls et al., 2021; Sarasjärvi et al., 2022; Asikainen & Katajavuori, 2022). While low-threshold support services and interventions have helped with the resulting mental health challenges (Kohls et al., 2021) the intervention's effect on social well-being remained statistically insignificant.

Nevertheless, the findings underscored the perceived importance of peer support (Browning et al., 2023) in supporting well-being and academic progress. Collaborative work helped students recognise shared challenges, aligning with self-compassion and common humanity (Neff, 2011). Additionally, social-environmental factors influence subjective well-being (Deci & Ryan, 2008; Diener et al., 2018), which the course addressed as students reflected on their lives and well-being (Diener et al., 1998; Deci & Ryan, 2008). Subjective well-being is also linked to better social

relationships (Diener et al. 1998) and psychological well-being (Hayes, 2006), with social well-being considered a component of psychological well-being alongside emotional well-being (Ryff & Keyes, 1995). Overall, both quantitative and qualitative findings indicate that the course increased students' well-being comprehensively. Well-being is, after all, a multidimensional concept with intertwined components (Ryff & Keyes, 1995).

Student experiences of the course modules

The course modules followed a cohesive progression where psychological flexibility and time management laid the foundation while exploring values supported ongoing self-reflection, highlighting the interconnectedness of ACT sub-processes (Blackledge & Barnes-Holmes, 2009). Recognising and expressing emotions and coping with life's challenges are essential for well-being (Galderisi et al., 2015). Accordingly, students' reflections displayed heightened self-awareness and acceptance of feelings and thoughts, indicative of self-compassion and psychological flexibility (Hayes et al., 2006). This enabled them to distinguish facts from feelings and explore and accept inner experiences – an alignment with cognitive defusion and self as a context (Blackledge & Barnes-Holmes, 2009). Similar findings of benefits on studying and well-being through increased self-awareness and acceptance (Katajavuori et al., 2021) support the significance of these insights.

Students also committed to adopting new well-being practices to their everyday lives, aligning with ACT principles (Hayes, 2004). Consistent with recent findings (Browning et al., 2023), examining values both alone and with others prompted students to clarify their values and adjust their behaviour accordingly, which is an essential part of psychological flexibility (Blackedge & Barnes-Holmes, 2009). Additionally, students appreciated pausing and relaxation exercises in their hectic lives, emphasising a connection with the present moment (Hayes et al., 2011).

The course's incorporation of ACT sub-processes with time management, procrastination, multitasking, and study techniques enhanced students' organised study skills (Claessens et al., 2007; Hassanbeigi et al., 2011). These skills, coupled with psychological flexibility and self-regulation, can reduce procrastination, and improve academic outcomes (Häfner et al., 2014; Hailikari et al., 2021). Students acknowledged that monitoring time use helped them prioritise activities with their goals, values, and studies. Thus, practising time management helped students to better allocate their time to a value-based life (Kashdan & Rottenberg, 2010).

Moreover, relaxation exercises and taking breaks contributed to both well-being and reduced procrastination. Recognising the interrelated nature of psychological flexibility, well-being, and study skills (Asikainen et al., 2019), interventions combining study skills and psychological flexibility training proved beneficial (Hailikari et al., 2021), which was evident in students' responses and statistical measures. More research is needed on interventions combining psychological flexibility and study skills training (Asikainen et al., 2018; Puolakanaho et al., 2019; Hailikari et al., 2022), and this study aims to add to the evidence on this topic.

Person-centred factors behind the implications of the course

While we know that ACT interventions have positive effects at the group level, as this study confirms, less is known about the factors underlying these effects (McLoughlin & Roche, 2023); which psychological flexibility processes are most beneficial for whom, and how interventions can be tailored to meet diverse needs. This study offers valuable insights for the research community into students' experiences of how components based on psychological flexibility sub-processes support well-being, highlighting how individuals benefit differently from such interventions (Kinnunen et al., 2019). As the findings show, all components were perceived as rather beneficial. Beyond assessing mean values (Figure 1), it is important to consider individual variation in students' experiences (Figure 2) and the factors shaping them. These insights contribute meaningfully to the field.

The study identified personal workload and life circumstances as influencing students' engagement and perceptions of the course's usefulness, aligning with previous research (Asikainen et al., 2020; Katajavuori et al., 2021). Amid academic pressures, multiple risk factors, including psychological, academic, biological, lifestyle, social and financial factors, can affect students' well-being, varying according to individual backgrounds (Mofatteh, 2021). Individual factors also shape how people define subjective well-being and what contributes to it (Deci & Ryan, 2008). In this study, the diverse backgrounds influenced how participants experienced the course in relation to their well-being and its benefits. For example, some had previously reflected more deeply on their values, while others needed more time and attention to practise self-compassion or mindful presence.

As noted by Katajavuori et al. (2021), students' mental well-being or life circumstances may affect how beneficial they find such interventions. In this study, one participant described initial distress when confronting certain thoughts, while another found reflecting on values and good life initially depressing. Still, both emphasised that these considerations were important or expressed hope that their perspective would evolve during the course. These varied reactions illustrate the importance of recognising and addressing aspects of psychological inflexibility, such as experiential avoidance and cognitive fusion (Dindo et al., 2017). People often avoid difficult thoughts and emotions (Wilson & Murrell, 2004), and being encouraged to face and become more aware of them can initially evoke distressing feelings. However, while avoidance may provide short-term relief, it can lead to increased distress over time (Dindo et al., 2017). Tendencies to accept or judge one's inner experiences can also vary between individuals, significantly affecting their daily lives and longer-term outcomes (Ford et al., 2018). This highlights the importance of acknowledging individual differences, particularly in how people process emotions and approach challenging thoughts.

To address potential distress, the course provided information about university support services on the course platform and encouraged students to contact the teacher if needed. While universal programs can enhance well-being, some individuals may require more tailored, personalised, or additional support. One participant noted that the course offered valuable tools to address exhaustion but emphasised that further support might be necessary to tackle such challenges.

Thus, ensuring access to appropriate resources is crucial when designing and implementing such interventions.

Limitations

The study has limitations that may affect the generalisability of its findings. Missing responses in one questionnaire posed a reliability challenge due to biased estimates and a reduced sample size (van Buuren, 2018). Retaining the full sample was preferred to maintain statistical power and avoid distorting the sample value of the well-being variables (Tabachnick & Fidell, 2014). As missing data is a common issue in research (Srijan & Rajagopalan, 2024), identifying and addressing it transparently is essential to research credibility (Popovich, 2024). In this study, the limitations and handling of such issues have been acknowledged and reported to maintain the integrity of the findings (Papageorgiou et al., 2018; Srijan & Fidell, 2024). Publishing studies with transparent discussions of missing data ensures that findings, even when imperfect, contribute to scientific progress, however, future studies should consider designing strategies to minimise missing data (Popovich, 2024).

Participant self-selection is another limitation. Students voluntarily enrolled in the course based on personal interests and needs, introducing potential selection bias, and affecting the study's external validity (Ferguson, 2004). Random assignment was not feasible, as the intervention was integrated into an existing course in a real-world university setting. A quasi-experimental design was therefore adopted to reflect the self-selected participation (Handley et al., 2018). Randomised controlled trials (RCTs) are, however, considered most reliable in assessing causality and minimising selection bias (Handley et al., 2018), and it is important for further studies to apply these methods to reflect best practices in experimental control group research. Regardless, the comparison between the experimental and control groups (Au et al., 2020), allowed for a degree of generalisation (Creswell, 2022), as even small control groups can generate valid evidence (Hutchins et al., 2015). Thus, the non-randomised wait-list design of this study serves as a basis for a larger, randomised study. Further studies could enhance reliability by including an active control group to better identify the most effective elements of well-being interventions.

The study also did not account for participants' age, stage of studies, or life situation, which may have influenced changes in their well-being and study skills, and the dependability of qualitative findings. Factors such as life experiences, mental health issues, attendance at therapy, or other forms of support during the intervention were not considered however mentioned by some study participants. Moreover, the lack of exploration into longitudinal effects limits our understanding of the intervention's sustained impact over time, highlighting areas for consideration in future studies.

Lastly, the second and third authors were also course instructors, which may have influenced participant's responses and engagement. However, all data were pseudonymised before analysis to protect participants' identities and reduce bias in interpretation. Importantly, the first author had no prior relationship with the participants and led the data analysis and manuscript writing independently. Future studies should continue to consider how dual roles as instructors and researchers may influence the research process more broadly.

Long-term follow-up studies are needed to better understand the lasting effects of well-being interventions (Asikainen et al., 2019). Mixed-methods designs could also provide richer insights into how students apply and sustain well-being practices in daily life post-intervention. Further research is also needed to explore ACT processes, specifically building on process-based measures of ACT models (Browning et al., 2023) and develop targeted interventions based on individual needs to recognise, capture, and benefit different at-risk groups (Kinnunen et al., 2019; Katajavuori et al., 2021).

Conclusion

The study provides valuable insights into the effects of an ACT-based online course on university students' well-being and study skills, addressing the gap in the literature regarding the factors contributing to the intervention outcomes (Bramwell & Richardson, 2018; McLoughlin & Roche, 2023). By exploring students' experiences of course components, the study revealed how specific course processes, such as mindfulness, self-reflection, and study skills enhancement, supported improved studying, self-compassion, and emotional self-awareness, aligning with the course's objectives.

Individuals derived diverse benefits from the course, illustrating the intervention's richness in providing participants with diverse tools to promote their well-being and learning through themes based on the sub-processes of psychological flexibility. These insights highlight not only the statistical improvements in well-being, psychological flexibility, and study skills but also provide insights into the *how* behind these changes. This comprehensive approach contributes to a richer understanding of the intervention course's impact and its person-centred underlying factors.

Theoretical and practical implications

A key strength of the study was the use of a mixed methods approach, which enabled a holistic understanding of the phenomenon and uncovered nuanced data discoveries and insights that might have been missed using a single method (Johnson & Onwuegbuzie, 2004; Creswell, 2022). This design offered a well-rounded answer to the research questions and strengthened the evidence base and generalisability of the study's conclusions (Johnson & Onwuegbuzie, 2004) while allowing for a more comprehensive understanding of the possible practical implications and addressing the need to support students' personal and academic well-being.

The intersection of higher education and mental health is crucial for nurturing academic success and well-being among young adults (Asikainen, 2018; Baalmann, 2023). Online interventions that combine study skills and ACT-based practices, such as the course under study, show the potential to promote students' well-being and academic skills (Hailikari et al., 2021). Web-based ACT interventions can reach a wide range of students (Räsänen et al., 2016), addressing the need for interventions tailored to larger student groups (Regehr et al., 2013). Ultimately, the goal of a process-based approach to ACT is to provide effective and inclusive psychological care, providing universities with a means to support students from diverse backgrounds (Browning et al., 2023). While not a replacement for therapy, the course raised awareness about available well-being services, helping students regardless of their potential psychological challenges (Emerson et al., 2022). Awareness of such services can be increased by providing added support

or information about resources for those in need, and this should be considered when designing such interventions.

Participants emphasised the importance of the intervention course, advocating for its implementation within curricula to foster discussion on mental health challenges that remain stigmatised (Mofatteh, 2021). The findings suggest that ACT-based interventions could be integrated into existing higher education contexts, with elements of the course embedded into orientation programs to reach more students. This can help incoming students build early resilience, manage academic stress, set realistic goals, and proactively develop tools for success from the beginning of their university journey. Incorporating mental health discussions and ACT practices into course curricula, such as in time management or study skills courses, can promote psychological flexibility and help students balance academic challenges with well-being. Furthermore, universities could offer self-paced, online ACT-based interventions through their digital platforms, providing accessible support for stress management and academic anxiety, available whenever students need it. These practical strategies can enhance both academic performance and overall mental health, benefiting a broad and diverse student population.

The adaptability of these interventions makes them relevant not only within specific cultural contexts but also for international student populations, offering universal strategies to foster mental well-being and academic success. By building on existing curricula, universities can create practical, scalable opportunities to address students' mental health and learning needs while fostering psychological flexibility and academic performance. Raising awareness through interventions like the one in this study can at its best shift societal attitudes, encourage proactive measures, promote self-compassion, and reduce barriers to seeking help. This ultimately enhances the well-being and academic success of different individuals and a wide population of students in higher education.

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References

Asikainen, H. (2018). Examining indicators for effective studying – The interplay between student integration, psychological flexibility and self-regulation in learning. *Psychology, Society & Education*, *10*(2), 225–237. https://doi.org/10.25115/psye.v10i2.1873

Asikainen, H., Hailikari, T., & Mattsson, M. (2018). The interplay between academic emotions, psychological flexibility and self-regulation as predictors of academic achievement. *Journal of Further and Higher Education*, *42*(4), 439–453. https://doi.org/10.1080/0309877x.2017.1281889

Asikainen, H., Kaipainen, K., & Katajavuori, N. (2019). Understanding and promoting students' well-being and performance in university studies. *Journal of University Teaching and Learning Practice*, *16*(5), 4–19. https://doi.org/10.53761/1.16.5.2

Asikainen, H., & Katajavuori, N. (2021). Development of a web-based intervention course to promote students' well-being and studying in universities: Protocol for an experimental study design. *JMIR Research Protocols*, *10*(3), e23613. https://doi.org/10.2196/23613

Asikainen, H., & Katajavuori, N. (2022). First-year experience in the COVID-19 situation and the association between students' approaches to learning, study-related burnout and experiences of online studying. *Social Sciences*, *11*(9), 390. https://doi.org/10.3390/socsci11090390

Asikainen, H., Parpala, A., Lindblom-Ylänne, S., Vanthournout, G., & Coertjens, L. (2014). The development of approaches to learning and perceptions of the teaching-learning environment during bachelor level studies and their relation to study success. *Higher Education Studies*, *4*(4). https://doi.org/10.5539/hes.v4n4p24

Asikainen, H., Salmela-Aro, K., Parpala, A., & Katajavuori, N. (2020). Learning profiles and their relation to study-related burnout and academic achievement among university students. *Learning and Individual Differences*, 78, 101781. https://doi.org/10.1016/j.lindif.2019.101781

Au, J., Gibson, B. C., Bunarjo, K., Buschkuehl, M., & Jaeggi, S. M. (2020). Quantifying the difference between active and passive control groups in cognitive interventions using two meta-analytical approaches. *Journal of Cognitive Enhancement*, *4*(2), 192–210. https://doi.org/10.1007/s41465-020-00164-6

Anderson, R. E., Babin, B. J., Black, W. C., & Hair, J. F. (2010). *Multivariate data analysis: a global perspective* (7th ed.). Pearson Prentice Hall.

Baalmann, T. (2023). Health-related quality of life, success probability and students' dropout intentions: evidence from a German longitudinal study. *Research in Higher Education*, *65*(1), 153-180. https://doi.org/10.1007/s11162-023-09738-7

Bramwell, K., & Richardson, T. (2018). Improvements in depression and mental health after Acceptance and Commitment Therapy are related to changes in defusion and values-based action. *Journal of Contemporary Psychotherapy*, *48*, 9-14. https://doi.org/10.1007/s10879-017-9367-6

Browning, M. E., Morena, A., Gould, E. R., & Lloyd-Richardson, E. E. (2023). Brief ACT for undergraduates: A mixed-methods pilot investigation of Acceptance and Commitment Therapy delivered over Zoom. *Journal of College Student Psychotherapy*, *37*(3), 279–299. https://doi.org/10.1080/87568225.2022.2029659

Biglan, A., Hayes, S. C., & Pistorello, J. (2008). Acceptance and commitment: Implications for prevention science. *Prevention Science*, *9*(3), 139–152. https://doi.org/10.1007/s11121-008-0099-4

Blackledge, J. T., & Barnes-Holmes, D. (2009). Core processes in Acceptance and Commitment Therapy. *Acceptance and commitment therapy: Contemporary theory, research, and practice*, 1, 41–58. Retrieved from https://contextualscience.org/sites/default/files/Blackledge_Barnes-Holmes_2009.pdf

Beauchemin, J., Hutchins, T., & Patterson, F. M. (2008). Mindfulness meditation may lessen anxiety, promote social skills, and improve academic performance among adolescents with learning disabilities. *Complementary Health Practice Review*, *13*(1), 34–45. https://doi.org/10.1177/1533210107311624

Conroy, R. M. (2016). The RCSI Sample size handbook. *A rough guide,* 59–61. https://doi.org/10.13140/RG.2.2.30497.51043

Claessens, B. B., Eerde, V. W. W., Rutte, C. C., & Roe, R. (2007). A review of the time management literature. *Personnel Review*, *36*(2), 255–276. https://doi.org/10.1108/00483480710726136

Crawford, J., Cowling, M., Ashton-Hay, S., Kelder, J. A., Middleton, R., & Wilson, G. S. (2023). Artificial intelligence and authorship editor policy: ChatGPT, Bard Bing AI, and beyond. *Journal of University Teaching and Learning Practice, 20*(5). https://doi.org/10.53761/1.20.5.01

Creswell, J. W. (2022). *A concise introduction to mixed methods research* (Second edition). SAGE.

Deci, E. L., & Ryan, R. M. (2008). Hedonia, eudaimonia, and well-being: an introduction. *Journal of Happiness Studies*, *9*(1), 1–11. https://doi.org/10.1007/s10902-006-9018-1

Diener, E., Sapyta, J., & Suh, E. M. (1998). Subjective well-being is essential to well-being. *Psychological Inquiry*, *9*(1), 33–37. https://doi.org/10.1207/s15327965pli0901_3

Diener, E., Oishi, S., & Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour*, *2*(4), 253–260. https://doi.org/10.1038/s41562-018-0307-6

Dindo, L., Liew, J. R., & Arch, J. J. (2017). Acceptance and commitment therapy: A transdiagnostic behavioural intervention for mental health and medical conditions. *Neurotherapeutics*, *14*(3), 546–553. https://doi.org/10.1007/s13311-017-0521-3

Durand-Bush, N., McNeill, K., Harding, M., & Dobransky, J. (2015). Investigating stress, psychological well-being, mental health functioning, and self-regulation capacity among university undergraduate students: Is this population optimally functioning? *Canadian*

Journal of Counselling and Psychotherapy, *49*(3). Retrieved from https://cjc-rcc.ucalgary.ca/article/view/61066

Emerson, D. J., Hair, J. F., & Smith, K. J. (2022). Psychological distress, burnout, and business student turnover: The role of resilience as a coping mechanism. *Research in Higher Education*, *64*(2), 228–259. https://doi.org/10.1007/s11162-022-09704-9

Entwistle, N., & McCune, V. (2004). The conceptual bases of study strategy inventories. *Educational Psychology Review*, *16*(4), 325–345. https://doi.org/10.1007/s10648-004-0003-0

Ferguson, L. (2004). External validity, generalizability, and knowledge utilization. *Journal of Nursing Scholarship*, *36*(1), 16–22. https://doi.org/10.1111/j.1547-5069.2004.04006.x

Finnish National Board on Research Integrity TENK. (2019). *The ethical principles of research with human participants and ethical review in the human sciences in Finland*. Retrieved from https://tenk.fi/sites/default/files/2021-01/Ethical_review_in_human_sciences_2020.pdf

Ford, B. Q., Lam, P., John, O. P., & Mauss, I. B. (2018). The psychological health benefits of accepting negative emotions and thoughts: Laboratory, diary, and longitudinal evidence. *Journal of Personality and Social Psychology*, *115*(6), 1075. https://doi.org/10.1037/pspp0000157

Francis, A., Dawson, D. L., & Moghaddam, N. (2016). The development and validation of the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT). *Journal of Contextual Behavioral Science*, *5*(3), 134–145. https://doi.org/10.1016/j.jcbs.2016.05.003

Galderisi, S., Heinz, A., Kastrup, M., Beezhold, J., & Sartorius, N. (2015). Toward a new definition of mental health. *World Psychiatry*, *14*(2), 231. https://doi.org/10.1002/wps.20231

Graneheim, U. H., Lindgren, B., & Lundman, B. (2017). Methodological challenges in qualitative content analysis: A discussion paper. *Nurse Education Today*, *56*, 29–34. https://doi.org/10.1016/j.nedt.2017.06.002

Hassanbeigi, A., Askari, J., Nakhjavani, M., Shirkhoda, S., Barzegar, K., Mozayyan, M. R., & Fallahzadeh, H. (2011). The relationship between study skills and academic performance of university students. *Procedia-Social and Behavioral Sciences*, *30*, 1416–1424. https://doi.org/10.1016/j.sbspro.2011.10.276

Hutchins, S. S., Brown, C., Mayberry, R., & Sollecito, W. (2015). Value of a small control group for estimating intervention effectiveness: results from simulations of immunization effectiveness studies. *Journal of Comparative Effectiveness Research*, *4*(3), 227-238. https://doi.org/10.2217/cer.15.11

Häfner, A., Oberst, V., & Stock, A. (2014). Avoiding procrastination through time management: an experimental intervention study. *Educational Studies*, *40*(3), 352–360. https://doi.org/10.1080/03055698.2014.899487

Hailikari, T., Katajavuori, N., & Asikainen, H. (2021). Understanding procrastination: A case of a study skills course. *Social Psychology of Education*, *24*(2), 589–606. https://doi.org/10.1007/s11218-021-09621-2

Hailikari, T., Nieminen, J., & Asikainen, H. (2022). The ability of psychological flexibility to predict study success and its relations to cognitive attributional strategies and academic emotions. *Educational Psychology*, *42*(5), 626–643. https://doi.org/10.1080/01443410.2022.2059652

Hailikari, T., & Parpala, A. (2014). What impedes or enhances my studying? The interrelation between approaches to learning, factors influencing study progress and earned credits. *Teaching in Higher Education*, *19*(7), 812–824. https://doi.org/10.1080/13562517.2014.934348

Hayes, S. C. (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioural and cognitive therapies. *Behavior Therapy*, *35*(4), 639–665. https://doi.org/10.1016/s0005-7894(04)80013-3

Hayes, S. C., Levin, M. E., Plumb-Vilardaga, J. C., Villatte, J. L., & Pistorello, J. (2013). Acceptance and Commitment Therapy and Contextual Behavioral Science: Examining the progress of a distinctive model of behavioral and cognitive therapy. *Behavior Therapy*, *44*(2), 180–198. https://doi.org/10.1016/j.beth.2009.08.002

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, *44*(1), 1–25. https://doi.org/10.1016/j.brat.2005.06.006

Hayes, S. C., Villatte, M., Levin, M., & Hildebrandt, M. (2011). Open, aware, and active: Contextual approaches as an emerging trend in the behavioral and cognitive therapies. *Annual Review of Clinical Psychology*, *7*, 141–168. https://doi.org/10.1146/annurev-clinpsy-032210-104449

Handley, M. A., Lyles, C. R., McCulloch, C., & Cattamanchi, A. (2018). Selecting and improving quasi-experimental designs in effectiveness and implementation research. *Annual Review of Public Health*, *39*(1), 5-25. https://doi.org/10.1146/annurev-publhealth-040617-014128

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, *33*(7), 14–26. https://doi.org/10.3102/0013189x033007014

Keyes, C. L. M. (2009). Atlanta: *Brief description of the mental health continuum short form (MHC-SF).* Retrieved from http://www.sociology.emory.edu/ckeyes/

Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review*, *30*(7), 865–878. https://doi.org/10.1016/j.cpr.2010.03.001

Katajavuori, N., Vehkalahti, K., & Asikainen, H. (2021). Promoting university students' well-being and studying with an acceptance and commitment therapy (ACT)-based intervention. *Current Psychology*, *42*(6), 4900–4912. https://doi.org/10.1007/s12144-021-01837-x

Kinnunen, S. M., Puolakanaho, A., Tolvanen, A., Mäkikangas, A., & Lappalainen, R. (2019). Does mindfulness-, acceptance-, and value-based intervention alleviate burnout? A person-centered approach. *International Journal of Stress Management, 26*(1), 89–101. https://doi.org/10.1037/str0000095

Kohls, E., Baldofski, S., Moeller, R., Klemm, S., & Rummel-Kluge, C. (2021). Mental health, social and emotional well-being, and perceived burdens of university students during COVID-19 pandemic lockdown in Germany. *Frontiers in Psychiatry*, *12*. https://doi.org/10.3389/fpsyt.2021.643957

Lahtinen, O., Aaltonen, J., Kaakinen, J., Franklin, L., & Hyönä, J. (2023). The effects of app-based mindfulness practice on the well-being of university students and staff. *Current Psychology*, *42*(6), 4412-4421. https://doi.org/10.1007/s12144-021-01762-z

Levin, M. E., Haeger, J. A., Pierce, B. G., & Twohig, M. P. (2017). Web-based acceptance and commitment therapy for mental health problems in college students: A randomized controlled trial. *Behavior Modification*, *41*(1), 141–162. https://doi.org/10.1177/0145445516659645

Levin, M. E., Pistorello, J., Seeley, J. R., & Hayes, S. C. (2014). Feasibility of a prototype web-based acceptance and commitment therapy prevention program for college students. *Journal of American College Health*, *62*(1), 20-30. https://doi.org/10.1080/07448481.2013.843533

Lee, Y. S. (2015). What repeated measures analysis of variances really tells us. *Korean Journal of Anesthesiology*, *68*(4), 340. https://doi.org/10.4097/kjae.2015.68.4.340

Marler, E. K., Bruce, M. J., Abaoud, A., Henrichsen, C., Suksatan, W., Homvisetvongsa, S., & Matsuo, H. (2021). The impact of COVID-19 on university students' academic motivation, social connection, and psychological well-being. *Scholarship of Teaching and Learning in Psychology*. https://doi.org/10.1037/stl0000294

McClelland, M., Geldhof, J., Morrison, F., Gestsdóttir, S., Cameron, C., Bowers, E., ... & Grammer, J. (2018). Self-regulation. *Handbook of Life Course Health Development*, 275–298. https://doi.org/10.1007/978-3-319-47143-3_12

McLoughlin, S., & Roche, B. (2023). ACT: A process-based therapy in search of a process. *Behavior Therapy*, *54*(6), 939–955. https://doi.org/10.1016/j.beth.2022.07.010

Mofatteh, M. (2021). Risk factors associated with stress, anxiety, and depression among university undergraduate students. *AIMS Public Health*, *8*(1), 36–65. https://doi.org/10.3934/publichealth.2021004

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and Personality Psychology Compass*, *5*(1), 1–12. https://doi.org/10.1111/j.1751-9004.2010.00330.x

Neff, K. D., & Dahm, K. A. (2015). Self-Compassion: what it is, what it does, and how it relates to mindfulness. In *Springer eBooks* (pp. 121–137). https:/n/doi.org/10.1007/978-1-4939-2263-5_10

Parpala, A., & Lindblom-Ylänne, S. (2012). Using a research instrument for developing quality at the university. *Quality in Higher Education*, *18*(3), 313–328. https://doi.org/10.1080/13538322.2012.733493

Papageorgiou, G., Grant, S. W., Takkenberg, J. J., & Mokhles, M. M. (2018). Statistical primer: how to deal with missing data in scientific research? *Interactive Cardiovascular and Thoracic Surgery*, *27*(2), 153-158. https://doi.org/10.1093/icvts/ivy102

Popovich, D. (2024). How To Treat Missing Data In Survey Research. *Journal of Marketing Theory and Practice*, 1–17. https://doi.org/10.1080/10696679.2024.2376052

Puolakanaho, A., Lappalainen, R., Lappalainen, P., Muotka, J., Hirvonen, R., Eklund, K., Ahonen, T., & Kiuru, N. (2019). Reducing stress and enhancing academic buoyancy among adolescents using a brief web-based program based on Acceptance and Commitment Therapy: A randomized controlled trial. *Journal of Youth and Adolescence*, *48*(2), 287–305. https://doi.org/10.1007/s10964-018-0973-8

Purvis, A.J. & Crawford, J. (2024). Ethical Standards in Educational Research and Publication. *Journal of University Teaching and Learning Practice, 21*(9). https://doi.org/10.53761/hqnqr710

Räsänen, P., Lappalainen, P., Muotka, J., Tolvanen, A., & Lappalainen, R. (2016). An online guided ACT intervention for enhancing the psychological wellbeing of university students: A randomized controlled clinical trial. *Behaviour Research and Therapy*, *78*, 30–42. https://doi.org/10.1016/j.brat.2016.01.001

Regehr, C., Glancy, D., & Pitts, A. T. (2013). Interventions to reduce stress in university students: A review and meta-analysis. *Journal of Affective Disorders*, *148*(1), 1–11. https://doi.org/10.1016/j.jad.2012.11.026

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, *69*(4), 719–727. https://doi.org/10.1037/0022-3514.69.4.719

Räihä, K., Katajavuori, N., Vehkalahti, K., Huotilainen, M., & Asikainen, H. (2024). University students' stress and burnout risk: results of an ACT-based online-course using self-assessments and HRV-measurements. *Current Psychology*, 1-14. https://doi.org/10.1007/s12144-024-05800-4

Rytkönen, H., Parpala, A., Lindblom-Ylänne, S., Virtanen, V., & Postareff, L. (2012). Factors affecting bioscience students' academic achievement. *Instructional Science*, *40*(2), 241–256. https://doi.org/10.1007/s11251-011-9176-3

Svartdal, F., Sæle, R. G., Dahl, T. I., Nemtcan, E., & Gamst-Klaussen, T. (2022). Study habits and procrastination: the role of academic self-efficacy. *Scandinavian Journal of Educational Research*, *66*(7), 1141–1160. https://doi.org/10.1080/00313831.2021.1959393

Sarasjärvi, K. K., Vuolanto, P., Solin, P., Appelqvist-Schmidlechner, K., Tamminen, N., Elovainio, M., & Therman, S. (2022). Subjective mental well-being among higher education students in Finland during the first wave of COVID-19. *Scandinavian Journal of Public Health*, *50*(6), 765–771. https://doi.org/10.1177/14034948221075433

Srijan, S., & Rajagopalan, I. R. (2024). Best practices for handling missing data. *Annals of Surgical Oncology*, *31*(1), 12-13. https://doi.org/10.1245/s10434-023-14471-7

Tabachnick, B. G., & Fidell, L. S. (2014). *Using multivariate statistics* (6th ed.). Pearson New International Edition). Pearson.

Thomas, D. R. (2003). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*. 27. 237-246. https://doi.org/10.1177/1098214005283748

van Buuren, S. (2018). Flexible imputation of missing data, (2nd ed.). Chapman and Hall/CRC. https://doi.org/10.1201/9780429492259

Vears, D. F., & Gillam, L. (2022). Inductive content analysis: A guide for beginning qualitative researchers. *Focus on Health Professional Education: A Multi-disciplinary Journal*, *23*(1), 111–127. https://doi.org/10.11157/fohpe.v23i1.544

Wilson, K. G., & Murrell, A. R. (2004). Values Work in Acceptance and Commitment Therapy: Setting a Course for Behavioral Treatment. In S. C. Hayes, V. M. Follette, & M. M. Linehan (Eds.), *Mindfulness and acceptance: Expanding the cognitive-behavioral tradition* (pp. 120–151). The Guilford Press.

World Health Organization. (2022, June 17). *Mental health: strengthening our response*. Retrieved August 10, 2023, from https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

World Medical Association. (2013). World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *Jama*, *310*(20), 2191-2194. https://doi.org/10.1001/jama.2013.281053