Living What Truly Matters: Exploring the Effectiveness of a Values-Based Online Intervention on Valued Living, Adaptability and Flexibility among Dutch Students, a Randomised Control Trial

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Bachelor Thesis

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July 1st, 2025

Word count: 6015

Abstract

Background: As student mental health concerns rise and traditional interventions often fail to provide long-term, meaningful solutions, innovative and accessible interventions are needed. This study examined the effectiveness of a values-based online intervention, with and without visual support, in enhancing psychological well-being among Dutch university students. The study assessed the intervention impact on valued living, psychological flexibility, and adaptability, and whether flexibility mediates the relationship between valued living and adaptability. It was hypothesised that participants in the intervention conditions would show greater improvements in all outcomes compared to the control group, with flexibility potentially mediating the relationship between valued living and adaptability. **Methods:** A randomised, three-group, pre-post-design (n = 97) was utilised to evaluate a 9-day online values-based intervention. **Results:** A significant improvement in valued living was found (p =.03), but no significant effects were found for flexibility (p =.40), adaptability (p =.27), or the mediation role of flexibility (p =.25). **Discussion:** The findings suggest that while values clarification can positively impact valued living, it may not be sufficient to influence broader psychological constructs without integrating additional Acceptance Commitment Therapy components. Future research should investigate alternative mechanisms such as those proposed by Self-Determination Theory, which indicate that increases in autonomy and intrinsic motivation, rather than flexibility or adaptability, might explain the observed non-significant results. Thus, it is essential to further explore which processes best support broader psychological outcomes. Nevertheless, this study contributes to preventive digital mental health by demonstrating that value-based interventions can promote meaning and direction among students.

Keywords. Online Intervention, Valued Living, Adaptability, Flexibility, Randomised Controlled Trial

Background

University students increasingly face mental health challenges as well-being levels are often moderate to low (Roberts et al., 2023). Psychological well-being can be defined as a mental state that allows an individual to achieve their full potential and deal with daily stressors (Wan et al., 2025). Throughout students' academic education, one in three suffers from psychological distress and low well-being (Sanci et al., 2022). As a result, students report higher levels of distress, anxiety, and depression than the general population (Auerbach et al., 2018; McCloud et al., 2023). Within the Netherlands, nearly half of the university students experience mental health issues, affecting their academic and social life (National Institute for Public Health and the Environment, 2023). These challenges are often linked to the high demands of higher education, including pressure, competitiveness, and heavy workloads, and can impair performance, motivation, and well-being (Campbell et al., 2022; Chu et al., 2022; Dias Lopes et al., 2020).

Despite increased awareness of student mental health issues, mental health services such as therapy remain limited, and many do not seek help due to stigma or lack of information (Abrams, 2022; McCormick et al., 2024). Over 20% of students who sought mental health care were unable to obtain it. This highlights the discrepancy between demand and accessible possibilities (Sanci et al., 2022). Online interventions have emerged as accessible, flexible, and cost-effective tools for promoting student well-being (Harrer et al., 2018; Davies et al., 2014). Mindfulness exercises such as meditation within online interventions have been shown to improve mental health outcomes, by enhancing emotion regulation and reducing attention bias toward negative stimuli, therefore enhancing ell-being (Ma et al., 2018; Wu et al., 2019; Wu et al., 2025). However, there are still some drawbacks. For instance, many of these digital interventions target either depression or anxiety, but only a few treat both illnesses at the same time, which can limit the efficacy of interventions for

those with comorbid symptoms (Lattie et al., 2019). Thus, there is a need for broader approaches that also promote personal growth and coping strategies (Lattie et al., 2019). Moreover, although the potential of visual enhancement strategies (for example, using personal photographs) to deepen value engagement in value-based interventions has been shown, it is still underexplored (Ginicola et al., 2012). Finally, online programs based on positive psychology, mindfulness, and Acceptance and Commitment Therapy (ACT) have shown efficacy in reducing distress and enhancing well-being (Han & Kim, 2022; Levin et al., 2023). ACT-based interventions specifically target psychological flexibility and valued living as mechanisms for improving mental health outcomes (Levin et. al., 2012). However, only a few studies examined valued living's independent role in influencing mental health outcomes (Levin et. al., 2012; Tunç et al. 2024). For example, Tunç et al. (2024) addressed this gap and demonstrated that valued living significantly reduced depression and anxiety symptoms.

Valued living refers to engaging in actions aligned with one's core personal belief of what is important, which has been shown to enhance well-being (Donahue et al., 2017; Hanel et al., 2023; Moyer et al., 2018). It consists of two elements: identifying personal values (for instance, occupation, family) and acting consistently with them (Finkelstein-Fox et al., 2019). Acting in accordance with personal values enhances intrinsic motivation and satisfaction, making valued-consistent behaviour inherently rewarding, which increases life satisfaction (Wilson & DuFrene, 2009).

Moreover, psychological flexibility is the ability to stay present in the moment and take value-driven actions even in the face of distress (Hayes et al., 2006). It encompasses emotion regulation and resilience and is a key mechanism for navigating through academic stress (Kashdan & Rottenberg, 2010). Higher psychological flexibility is associated with better learning strategies (adapting different learning behaviours), reducing burnout, and

being better at self-regulating emotions (staying motivated during academic challenges), which are all important for academic accomplishment (Asikainen et al., 2023; Hailikari et al., 2022).

Adaptability is defined as cognitive, behavioural, and emotional adjustment in response to changing circumstances, requiring both internal regulation and situational awareness (Martin et al., 2012). Roy's adaptation model (RAM) suggests that humans respond to internal and external inputs to maintain balance (Roy, 2011). Successful adjustment restores internal harmony and integrity during disruptions, which enhances well-being, while failure to adapt can cause distress (DeSanto-Madeya & Fawcett, 2009; Franken et al., 2023). Students with higher levels of adaptability cope better with challenges and maintain motivation, whereas low levels of adaptability is associated with self-handicapping or disengagement from academic activities (Franken et al., 2023; Martin, 2013).

These three constructs (valued living, flexibility and adaptability) work in synergy. Valued living provides direction and purpose, flexibility supports being persistent towards the aim even in distress (which can be seen as a mechanism), and adaptability ensures effective behaviour response within the situation (Finkelstein-Fox et al., 2019; Hayes et al., 2012; Martin, 2013). Together, they are part of the ACT model, which aims to enhance well-being (Asikainen et al., 2023; Levin et al., 2012). However, despite their theoretical relevance, it is not yet well understood whether value-based online interventions, which include mindfulness exercises and visual aids (for example photos), increase these mediators or how they influence each other within the process of change.

Current study

Based on the increasing need for accessible and flexible mental health support among students, the present study aims to evaluate a values-based online intervention among Dutch

students to promote valued living, flexibility and adaptability and a potential mediation effect. Therefore, the first research question is: "To what extent does a value-based online intervention, with or without visual support, increase valued living, psychological flexibility, and ability to adapt among Dutch university students?" The second research question is: "Does psychological flexibility mediate the relationship between valued living and adaptability?" Firstly, it is hypothesised that students in the intervention conditions, with or without visual support, will demonstrate a greater increase in valued living after the intervention compared to the control group. Secondly, students in the intervention conditions, with or without visual support, will demonstrate a greater increase in psychological flexibility after the intervention compared to the control group. Thirdly, students in the intervention conditions, with or without visual support, will demonstrate a greater increase in adaptability after the intervention compared to the control group. Lastly, it is hypothesised that psychological flexibility mediates the relationship between increases in valued living and improvements in adaptability across both intervention groups, with and without pictures, and the control group.

Methods

Study design

The study utilised a randomised controlled trial (RCT) using a three-group, pre-post intervention design (for an example of a RCT with a pre-post design, see Dominguez-Rodriguez et al., 2024). The Ethics Committee of the University of Twente approved the study (Application Number 240732). This study was part of a bigger research project investigating multiple variables. However, the focus of this thesis is on the intervention`s effectiveness in improving flexibility, adaptability, and valued living. Participants were randomly assigned, utilising the Study Randomiser Software (2017), to one of the three conditions: A control group (condition one), an intervention group without photo (INWP)

(condition 2) and the other Intervention group with photos (IWP) (condition 3). The control group (condition 1) only received the daily questionnaire and two questions throughout the day about their values, but no exercises. In contrast, the intervention group without photo (INWP) (condition 2) was asked to write down five values and to later on note them down on any device easily available for them. Participants in the Intervention with photographs (IWP) (condition 3) were given the assignment to save five photographs on their phone, each reflecting a personal value. Both intervention groups received the same mindfulness-based audio meditation via the TIIM application.

Content Delivery via TIIM

All groups received three daily value reminders (Module 1_C, see Figure 1) from day two to nine, prompting reflection with the question: "To what extent have you been consciously aware of your values since the last notification?" which was answered on a scale from 0 to 100. Moreover, only intervention groups (conditions 2 and 3) received audio-guided exercises via the TIIM app. On day one, this included a values visualisation designed to help participants identify their core personal values. On days two to nine, participants listened to a different exercise aimed at reinforcing the stated values. Participants from all conditions (1, 2, and 3) completed daily assessments covering variables such as well-being and mental imagery use. Intervention groups (conditions 2 and 3) additionally answered two open-ended questions about their audio exercise experience.

Materials

Qualtrics and Twente Intervention and Interaction Machine (TIIM)

The survey consisted of two parts: first, a Qualtrics (Qualtrics, 2021), survey, which is a common online platform for designing and distributing customizable questions (Cushman et al., 2021; Van 't Klooster et al., 2024). Afterwards, participants were asked to download the TIIM application on a mobile device. The TIIM application was developed by the Behavioural Management and Social Science (BMS) lab at the University of Twente (BMS

lab, 2025). It allows researchers to schedule and deliver interventions, assessments and notifications over a specific timeframe, and participants receive prompts to engage with the intervention content.

Participants

Recruitment methods

The recruitment took place from March to April 2025, using two different methods. The first approach used the SONA study system, available to students and researchers at the University of Twente. Using convenience sampling, study program credits could be earned by students from the BMS faculty participating in research studies. The second approach combined snowball sampling and convenience sampling. Direct approaches through different social networks, such as WhatsApp, Instagram, and LinkedIn, were utilised to recruit participants from the researcher's networks.

Inclusion and exclusion criteria

Several criteria for inclusion and exclusion were established to determine eligibility for participation in this study. To be included in this study, the participant had to be enrolled in a Dutch university, following either a bachelor's, master's, or PhD program, and at least 18 years old. Being fluent in English was required for participation, as the intervention was only available in English. Additionally, participants needed to be familiar with using a mobile device and have daily access to both the device and the internet.

On the other hand, participants with serious mental disorders, such as major depressive disorder, bipolar disorder, schizophrenia, or borderline personality disorder, were omitted. Furthermore, participants who were prescribed psychiatric medication, had suicidal thoughts and or suicide attempts, or were already undergoing treatment, were not eligible for this study. The research assessed these criteria by self-reporting "yes" or "no" answers to questions.

Intervention

The intervention lasted nine days, with a follow-up questionnaire on day 22.

Day Zero

Participants accessed the study by scanning a QR code leading to a questionnaire (via Qualtrics), providing them with general information about the study, including the risks associated with participation and their rights. Moreover, the questionnaire assessed participants' demographics to determine eligibility. Those who met inclusion criteria then completed 136 items to determine the baseline. Participants then received instructions via email on how to download and register for the TIIM app. After registration, they were randomly assigned to one of the three conditions (control, INWP, IWP) and received an email with their exercise schedule. Although participants were unaware of other experimental groups, they knew which condition they were in.

Day One

Day one marked the official beginning of the intervention. Participants in the intervention groups had access to Module 1_A via the TIIM app (see Figure 1). After a short pre-assessment, participants followed an audio-guided values clarification exercise (exercise 1). They were asked to imagine their 50th birthday and reflect on what significant others would say about their life choices and values (see Appendix A). Afterwards, participants were asked to briefly describe their personal values. These responses were stored and used in the follow-up exercises. Finally, participants answered two brief questions regarding their experience and the area where they conducted the exercise.

Days Two to Seven

Participants in both intervention groups performed a daily Module 1_B module, which was available every morning (see Figure 1). This session began with a quick assessment similar to the day one assessment, with the exception that the valued living questions were reduced to two important items: value clarity and the intention to act

accordingly. Before each activity, participants reviewed the five values they established on day one, which were given as text to the INWP group or images for the IWP group. The audio exercise (exercise 2) encouraged participants to reconnect with their basic beliefs and envision situations in their daily lives in which they could act on those ideals. The exercise stressed gratitude for this connection and encouraged participants to maintain it throughout the day (Appendix A). After each exercise, participants were asked questions about the setting where they completed the exercise, about their values, and a brief post-assessment was conducted. Additionally, all participants received three daily value reminders (Module 1_C) asking: "Since the last notification, to what extent have you been consciously aware of your values?" Responses were scored using a slider ranging from 0% ("Not at all") to 100% ("Very much") (see Figure 1).

Day Eight

On the last day, the participants received the same questionnaire as on day zero to enable a pre-post comparison (see Figure 1).

Figure 1

Intervention Setup
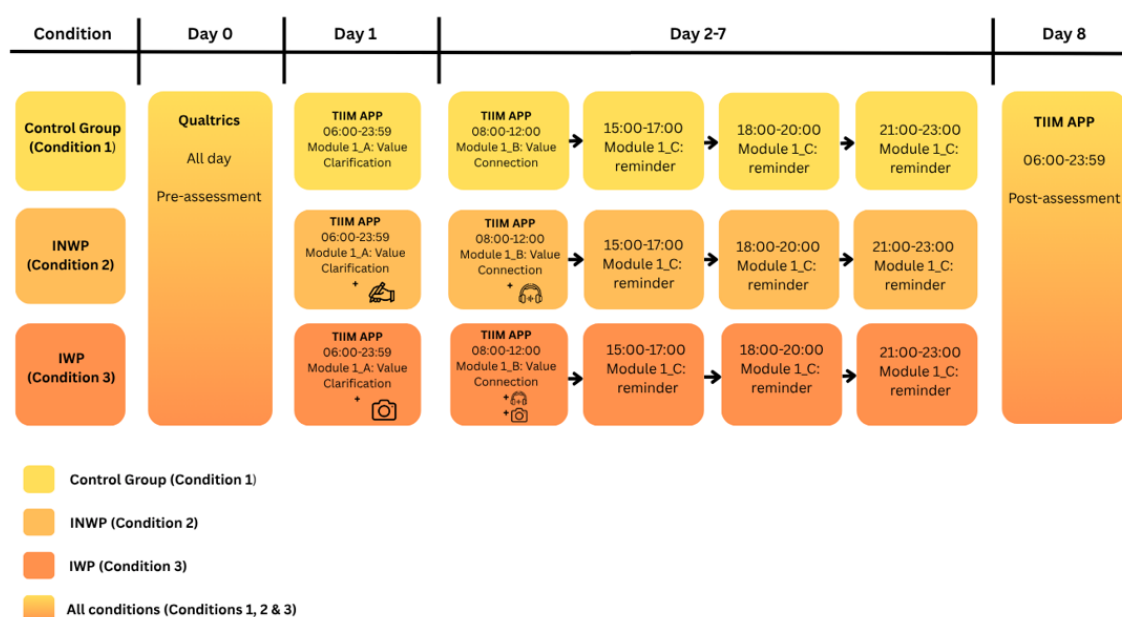
Note. Module 1_B includes all content provided to participants on day one, including evaluation questions and audio exercises. On day two, participants receive Module 1_B, which includes reduced assessment questions and audio exercises. Module 1_C serves as a constant reminder with consistent information. This graphic was designed using the website Canva (free version).

Measures

Adaptability (GSAAS)

Adaptability was measured by using the Generic Sense of Ability to Adapt Scale (GSAAS) (Franken et al., 2023). This 10-item scale measures the ability to readjust after a personally difficult event. For instance, "I can handle setbacks well". The items are rated on a 5-point scale, ranging from 1 (not at all) to 5 (completely). The total score is calculated as the sum of the 10 items. The total mean score ranges from 1 to 5, with higher scores indicating better ability to adapt. GSAAS has good reliability (Cronbach´s α = .87-.89) and validity (Franken et al., 2023). Similarly, the reliability of the current study was Cronbach's α = .91, which indicates an excellent reliability (Pallant, 2016).

Multidimensional Psychological Flexibility Inventory (MPFI)

The Multidimensional Psychological Flexibility Inventory (MPFI) was applied to measure psychological flexibility (Rolffs et al., 2018). This questionnaire consists of a 60-item scale that measures twelve independent dimensions of the hexaflex model (Hayes et al., 2006; Rolffs et al., 2018). In the scope of this study, 4 dimensions were measured from this scale: Contact with values (5 items) (for example, "I was very connected with what is important to me and to my life"), Committed Action (5 items) (such as "Even in the face of failure I did not stop pursuing what is important to me") Lack of Contact with Values (5 items) (for instance "Often my priorities and values were left behind in my daily life") Inaction (5 items) (in example "Often negative emotions paralyzed me and prevented me from acting"). All items are rated on a 6-point scale, ranging from 1 (Never true) to 6

(Always true). The total mean subscale scores were calculated, which ranged from 1 to 6, with higher scores indicating higher levels of each dimension. MPFI has good reliability (Cronbach´s α = .87- .97) and validity (Rolffs et al., 2018). This is opposite to the sample of this study's reliability of Cronbach's α = .66, indicating a questionable reliability among the items on the scale (Pallant, 2016).

Valued living (ELS-16)

The variable valued living was analysed utilising the Engaged Living Scale (ELS-16), which was designed to assess individuals' engagement in valued life activities (Trompetter et al., 2013). The questionnaire consists of 16 items, which include a subscale for valued living (items 1-10) and life fulfilment (items 11-16). Hereby, only the valued living subscale with 10 items was used, which has good internal consistency (Cronbach´s α = .86) (Trompetter et al., 2013). This is in line with this study as the scale of valued living showcased an excellent reliability, Cronbach´s α = .95 (Pallant, 2016). For example, an item of the subscale was "I know what motivates me in life". A 5-point Likert scale, ranging from 1 (never) to 5 (almost always), was utilised as a measurement. The total mean score of the subscale was computed, ranging from 1 to 5. Higher scores indicate a higher level of valued life. None of the items of the subscale were modified or revised.

Data analysis

Descriptive statistics was used to analyse the demographic variables of the survey and the baseline of the sample. Two outliers were omitted from the dataset. To test the first three hypotheses, which hypothesised a significant enhancement of valued living, psychological flexibility, and adaptability within the intervention groups compared to the control group after the intervention, a linear mixed model (LMM) was performed for each dependent variable (flexibility, adaptability and valued living) to account for repeated measures. Time (baseline vs. post-intervention) was a within-subjects factor, whereas group (intervention with visual

support, intervention without visual support, and control) was a between-subjects factor. The focus of these models was weather the interaction between time and group showed that the intervention groups improved more after the intervention compared to the control group. The four assumptions (independence, linearity, equal variances, and normal distribution) were tested, and linearity and homogeneity were violated for all variables. Henceforth, a non-parametric test (Wilcoxon rank-sum test) was calculated to assess whether the intervention had a significant effect (p-value). The Intraclass Correlation Coefficient (ICC) was used to determine the extent to which the variance was due to differences between participants. In addition, fixed effects predictions were used to assess the model's ability to reliable forecast individual scores based on measured time points. Additionally, r square was calculated to assess how much variance in scores was explained by the model, both by the fixed effects alone (marginal R^2) and by the combined fixed and random effects (conditional R^2) and Cohen's d was applied to analyse how big the difference between the groups is. To test the last hypothesis, which hypothesised a mediation role of flexibility on the relationship of valued living and adaptability, a mediation analysis examined whether increases in valued living led to greater adaptability through improvements in psychological flexibility. RStudio (version 4.1.2) was utilised to analyse the collected data.

Results

Sociodemographic

In total, 386 participants were recruited. Any participants who did not meet the inclusion criteria, dropped out, had not completed the study yet or did not give consent in the briefing (n=289) were omitted. Thus, the sample consisted of 97 participants whereby 73 were female (74.5%), 22 were male (22.4%) and three non-binary (3.1%), (M_{age} = 21.82 years, SD = 3.95 years, Range = 18 – 45 years). The sample consisted of 36 Germans (37.1%), 33 Dutch (34%) and 28 other nationalities (28.9%), 16 participants from other EU

countries (16.5%) and 11 from non-EU countries (12.4%). The educational level most participants had was undergraduate (bachelor's degree) (78.6%), followed by a postgraduate level (master's degree) (15.3%), and doctorate students (6.1%). Furthermore, 71.4% of the sample had never received psychological treatment, while 28.6% had received therapy in the past. Thus, most of the participants had never received a mental health diagnosis (84.7%), followed by participants who had received a clinical diagnosis in the past (11.2%) and participants who had a recent mental health diagnosis, which was not one of the exclusion criteria (4.1%). Overall, there were 31 participants in condition 1 (30.1%), 35 participants in condition 2 (34%) and 31 participants in condition 3 (30.1%).

Descriptive Statistics

Across the total sample (n= 97), valued living scored increased from pre- intervention (M = 3.36, SD = .73, Var = .94, rang e= 1.8- 5) to post- intervention (M = 3.56, SD = .74, Var = .54, ranged= 1.75- 6) (maximum score = 6), indicating a moderately high degree of valued living of the sample. Moreover, adaptability scores remained relatively stable across time from pre (M = 3.36, SD = .73, Var = .54 range= 1.8- 5) to post (M = 3.56, SD = .74, Var = .54, range = 2-5) (maximum score= 5), suggesting moderately high adaptability of the sample. Psychological flexibility showed a small decrease from pre- intervention scores (M = 3.33, SD = .34, Var = .16, range= 2.3- 4.3), to post- intervention scores (M = 3.27, SD = .40, Var = .16, range= 2.- 4.3) (maximum score= 5), suggesting moderately high flexibility of the sample with a slight decline over time (see Table 1).

Table 1

Descriptive Statistics of the Whole Sample on Valued Living, Flexibility, and Adaptability Pre and Post Intervention, (n=97)

Condition/ Variable	Pre-assessment	Post-assessment

	M	*Var*	Range	*M*	*Var*	Range
	(SD)			*(SD)*		
Valued living	3.81 (.97)	.94	1.5- 6	3.56 (.74)	.54	1.75- 6
Flexibility	3.33 (.34)	.16	2.3- 4.3	3.27 (.40)	.16	2.4- 4.3
Adaptability	3.36 (.73)	.54	1.8- 5	3.56 (.74)	.54	2.0- 5

Note[1]. RStudio (version 4.1.2) was utilised to create the table above.

Baseline assessment

No significant difference was found during the baseline assessment of all groups. At pre-assessment, the control group (*M* = 3.86, *SD* = 0.95, range = 2.06-5.88) reported a similar score in valued living as the intervention group (M = 3.83, SD = 0.81, range = 2.88-4.81). Post-assessment, the control group showed a small improvement (*M* = 3.97, *SD* = .96, range = 2.31-6), while the intervention group showed a larger increase (*M* = 4.44, *SD* = 1.20, range = 3.12-5.69). For psychological flexibility, both groups (control and intervention groups) reported identical baseline scores (*M* = 3.35, *SD* =.43, range = 2.60-4.05). Post-assessment, both groups showed a slight decrease (*M* = 3.26, *SD* = .36, range = 2.55-4.15) Adaptability scores were slightly higher at baseline in the intervention group (*M* = 3.62, *SD* = .80, range = 2.10 - 5) than the control group (*M* = 3.46, *SD* = .72, range = 1.9 - 5). Post–assessment scores increased slightly in both groups, with the intervention groups at (*M* = 3.62, *SD* = .80, range = 2.10- 5) and the control group at (*M* = 3.58, *SD* = .75, range = 2.60 - 4.40) (see Table 2).

Table 2
Descriptive Statistics by Group for Valued Living, Flexibility, and Adaptability Pre and Post Intervention, (n = 97)

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[1] *M* = Mean, *SD*= Standard Deviation, *Var* = Variance

Condition/ Variable	Pre-assessment				Post-assessment			
	Control group		Intervention group		Control group		Intervention group	
	M (SD)	Range	*M (SD)*	Range	*M (SD)*	Range	*M (SD)*	Range
Valued ling	3.86 (.95)	2.06-5.88	3.83 (.81)	2.88-4.81	3.97 (.96)	2.31-6	4.44 (1.20)	3.12-5.69
Flexibility	3.35 (.43)	2.6-4.05	3.35 (.43)	2.6-4.05	3.26 (.36)	2.55-4.15	3.26 (.36)	2.55-4.15
Adaptability	3.46 (.72)	1.9-5	3.50 (.83)	2.6-4.5	3.62 (.80)	2.1-5	3.58 (.75)	2.6-4.4

Note[2]. RStudio (version 4.1.2) was utilised to create the table above.

Testing the effect of the intervention

A linear mixed model was conducted to evaluate the effectiveness of the intervention on valued living (H1). Results showed no statistically significant main effect of time ($b = .11$, $SE = .15$, $t = .75$) or group ($b = -.09$, $SE = .21$, $t = -.43$). The interaction between time and group was also not statistically significant ($b = .20$, $SE = .18$, $t = 1.15$) (see Table 3). However, the Wilcoxon rank sum test revealed a statistically significant difference between the control group and the intervention group (*p =.03*). Thus, the intervention group statistically significantly improved, which supports H1. The effect size was small (Cohen`s *d* = -.025, 95% CI [-.69, .18], indicating minimal differences in pre- and post-intervention scores between the groups. The intraclass correlation coefficient (ICC) was .66, which suggests that 65.53% of the variance was attributable to individual differences, while the remaining 34.47% might be due to residual or within-person differences. The marginal R² of

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[2] *M*= Mean, *SD*= Standard Deviation

the model was .02, while the conditional R² was .66, indicating that most explained variance

stemmed from between-subject variability. A fixed effects prediction plot revealed that

predicted scores closely aligned with observed scores across the full range of values,

demonstrating good model fit.

To test H2, a linear mixed model was conducted to evaluate the effectiveness of the

intervention on the control group and the intervention groups and the flexibility scores before

and after the intervention. The model revealed a non-statistically significant effect of time (b

$= .06$, $SE = .04$, $t = -1.31$) or group differences. The interaction effect was also non-

significant, indicating that the intervention did not significantly improve flexibility compared

to the control condition (see Table 3). Consistently, the Wilcoxon rank sum test did not reveal

a statistically significant difference ($p = .40$), providing no support for H2. The effect size

was small (Cohen's $d = .24$), 5% CI [-.61; .12]), suggesting minimal between-group

differences in change scores. Additionally, the intraclass correlation coefficient (ICC = .46)

indicated that 45.5% of the variance was due to between-subject differences. The marginal R²

was .01, showing that time explained little variance, while the conditional R² was .46,

highlighting the importance of individual-level variability. A fixed effects prediction plot

showed a moderate alignment between predicted and observed psychological flexibility

scores. However, greater dispersion at the low and high ends indicates reduced model

accuracy outside the mid-range and should therefore be interpreted with caution.

To investigate the effectiveness of the intervention on the different groups on the

adaptability scores (H3), a linear mixed model was conducted. The analysis revealed a non-

significant change from pre- to post-intervention ($b = -.20$, SE $= .06$, $t = -3.36$, $p = .001$),

indicating that scores improved significantly over time, regardless of the group (see Table 3).

This is aligned with the Wilcoxon rank sum test as no significant difference between the

groups was found ($p = .27$). Henceforth, H3 can be rejected. Moreover, Cohen's d suggested

a minimal difference in adaptability improvement between the intervention groups and control group (Cohen's d = .04, 95% CI [-.29, .37]). The intraclass correlation coefficient (ICC = .69) showed that 69.2% of the variance in adaptability scores was attributable to individual differences. The marginal R^2 was .02, indicating that the fixed effect of time explained only 1.8% of the variance, while the conditional R^2 was .70, suggesting that the model explained 69.8% of the total variance when accounting for both fixed and random effects. The model fit was further examined using a fixed-effects prediction. Predicted values closely aligned with observed scores, with data points clustering around the diagonal reference line, suggesting the model reliably estimated adaptability across the full range of values.

Table 3

Linear Mixed Model: Effect of the Online Intervention on Valued Living, Flexibility, and Adaptability, (n = 97)

Outcome/ Variable	Fixed Effect	Estimate *(β)*	*SE*	*t*	*p*
Valued Living	Intercept	3.88	.18	21.87	<.001*
	Time (Post)	.11	.15	.75	.46*
Flexibility	Intercept	3.33	.04	-1.13	<.001*
	Time (Post)	-.06	.04	-1.13	.19*
Adaptability	Intercept	3.37	.07	45.26	<.001*
	Time (Post)	.20	.06	3.36	.001*

Note.[3]The Linear mixed model function in RStudio (version 4.1.2) was applied to create the table above.
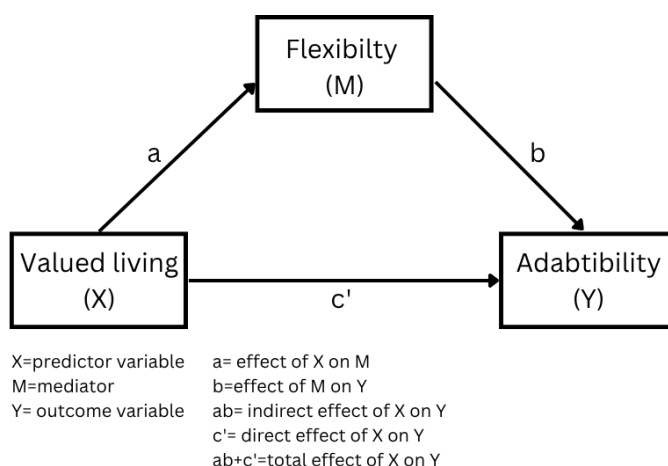
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[3] Estimate *(β)*= Slope, *SE*= Standard Error, *t*= t-value, *p*= p-value

*p < .05

Lastly, a mediation model was tested to determine whether psychological flexibility change (M) mediates the relationship between valued living change (X) and adaptability change (Y) (see Figure 2). First, valued living significantly predicted adaptability ($b = 0.45$, $SE = 0.06$, $t = 7.99$) (total effect, see Figure 2). Second, valued living did not significantly predict psychological flexibility change ($b = .07$, $SE = .05$, $t = 1.24$, $p = .22$) (a-path, see Figure 2). Third, when both valued living and flexibility change were entered as predictors of adaptability change, flexibility remained a significant predictor ($b = .32$, $SE = .11$, $t = 3.07$, $p = .003$) (b-path, see Figure 2), and the direct effect of valued living also remained significant ($b = .43$, $SE = .05$, $t = 7.89$, $p < .001$) (c′-path), indicating no mediation effect. As visualised in Figure 3, only the direct relationship of valued living and adaptability and from flexibility and adaptability showed clear positive trends with narrower 95% confidence intervals, while the relationship from valued living to flexibility was weaker and not statistically significant. The indirect effect was not statistically significant as indicated by the Sobel test ($z = 1.15$, $p = .25$), and thus, no evidence was found for an indirect influence from valued living to adaptability through flexibility. Therefore, H4 can be rejected.
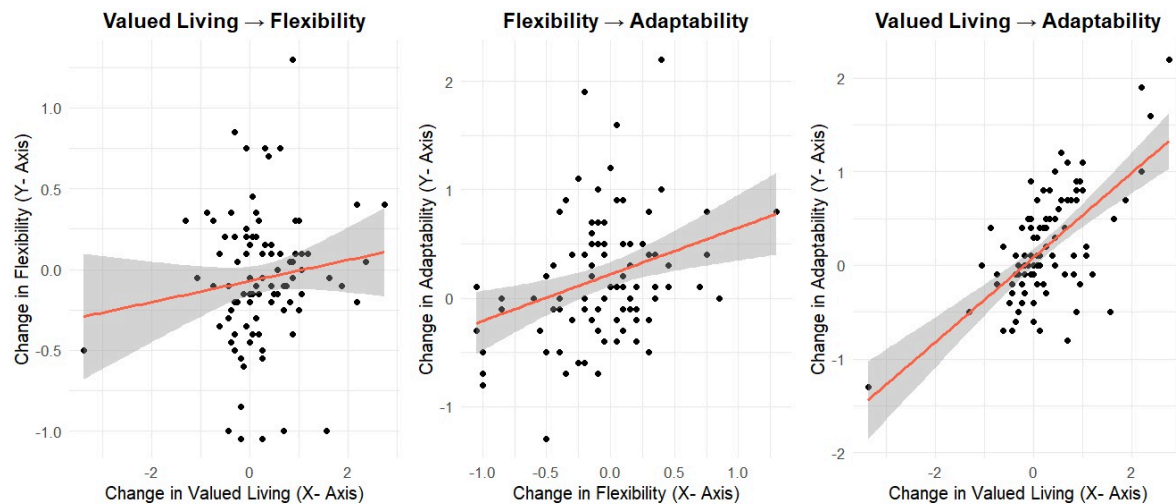
Figure 2

Mediation Model of Valued Living, Flexibility, and Adaptability

X=predictor variable   a= effect of X on M
M=mediator   b=effect of M on Y
Y= outcome variable   ab= indirect effect of X on Y
                        c'= direct effect of X on Y
                        ab+c'=total effect of X on Y

Note. This picture was designed with Canva free version.

Figure 3

Scatterplots Mediation Effect of Flexibility on the Relationship of Valued Living and

Adaptability, (n = 97)

Note. The figure shows scatterplots with regression lines and 95% confidence intervals (shaded area) illustrating the relationships between change in valued living and change in flexibility (X → M)(left), change in flexibility and change in adaptability (M →Y) (middle), and change in valued living and change in adaptability (X → Y) (right); axes represent standardised change scores. R Studio (version 4.1.2) was utilised to create the graph.

Discussion

The objective of this study was to investigate the effectiveness of a values-based

online intervention with or without visual support on enhancing valued living, flexibility, and

adaptability among Dutch university students, and whether flexibility mediates the

relationship between valued living and adaptability. The findings of this study revealed that

the value-based online intervention had a positive effect on valued living, as participants in

the intervention groups demonstrated a stronger alignment between their actions and

personally meaningful beliefs compared to the control group, suggesting the usefulness of

value-based online interventions with visual support and mindfulness meditation exercises.

However, no significant effects were found for psychological flexibility or adaptability and therefore also no evidence supporting a mediating role of flexibility. Thus, the intervention did not impact broader psychological constructs such as flexibility or adaptability. Nevertheless, the improvement in valued living despite the insignificant change in flexibility and adaptability suggests that value-aligned behaviour can occur independently of flexibility and adaptability changes.

The significant improvement in valued living observed in this study is consistent with previous research on Acceptance and Commitment Therapy (ACT) based online interventions. For instance, Viskovich & Pakenham (2020) found increased valued living among university students who followed a web-based ACT program. Similar outcomes have been found when ACT interventions are combined with positive psychology techniques such as gratitude and self-compassion (Rao & Kemper, 2016; Wersebe et al., 2017). These findings support the ACT model, which is theorised to enhance psychological resilience and facilitate goal-directed behaviour, even under conditions of emotional or cognitive distress (Hayes et al., 2006; LeJeune & Luoma, 2021).

However, no significant enhancement was found in psychological flexibility or adaptability, and no support was found for the hypothesised mediation role of flexibility. The limited internal consistency of the flexibility questionnaire (Cronbach's $\alpha = .66$) in this study might have influenced the results. However, these findings contradict prior studies as ACT-based interventions reported improvements in flexibility and adaptability (Ruuska et al., 2025; Kämper et al., 2025). One explanation is the limited focus on values and committed action, without addressing key components like acceptance or cognitive diffusion, which might have influenced the absence of broader psychological effects within the present study (Hayes et al., 2006; Levin et al., 2012).

An alternative explanation for the findings might lie in Self-Determination Theory (SDT), which emphasises autonomy and intrinsic motivation (Deci & Ryan, 2000). While ACT targets psychological flexibility, the intervention's effect on valued living may instead reflect increased alignment with personal goals and values. This suggests the intervention may have fostered self-congruence and motivation, rather than altering responses to internal discomfort as ACT typically aims to do. Additionally, research suggests that self-focused attention and negative affect, which can both interfere with adaptive functioning, are more prevalent in female-dominated samples (Blanchflower Bryson, 2024; Mor & Winquist, 2002). As the current study's sample has a high proportion of female participants (74.5%), it can be argued that this might have influenced the results.

Limitation

A limitation of this study is the narrow focus of the intervention, as it targeted only the values and committed action components of ACT. While these elements can support value-congruent behaviour, ACT is designed as a multifaceted model, and its broader psychological benefits are most often achieved when additional processes, such as acceptance, cognitive diffusion, and present-moment awareness, are included (Hayes et al., 2006; LeJeune & Luoma, 2021). Henceforth, targeted components of ACT, such as valued living, can support specific outcomes, but it is often insufficient to produce broader psychological change (Levin et al., 2012).

Another limitation is the technical requirements associated with the TIIM application, as it is only compatible with Android and Apple devices with the software iOS 17 or later. This restricts accessibility for users with older Apple devices and might exclude potential participants, limiting the inclusivity and generalizability of the findings. As prior research has shown, this issue reflects a broader challenge in mobile health (mHealth) interventions, where

device compatibility issues often hinder adaptation and reduce engagement, particularly among individuals who have limited access to the newest technology (Alzghaibi, 2025).

Moreover, the gender imbalance of the sample of the current study (74.5% female, male 22.4%, non-binary 3.1% non-binary) might have affected the generalizability of the findings as research has shown that overrepresentation of female participants is common in psychological studies and can limit applicability to more diverse populations (Dickinson et al., 2012).

Strengths

A strength of the study is its innovative focus on values as the primary mechanism of change, rather than a supporting component of broader treatments. The majority of ACT interventions are evaluated and designed primarily with symptom reduction (for example, reducing depression, anxiety, etc.) as their primary outcome and overlook value-driven behaviour as a direct focus (Gloster et al., 2020; Levin et al., 2023).

Additionally, this study has a preventative approach by targeting university students, a group at high risk for mental health issues often left undiagnosed or untreated due to access barriers and subclinical symptoms (Auerbach et al., 2018). By focusing on early support rather than treatment, the intervention addresses the need for accessible mental health resources during a critical transitional period (Son et al., 2020).

Another strength of this intervention is the inclusion of techniques and tools that improve accessibility and help deepen value clarification for better engagement, as shown by Robertson et al. (2024). Visual tools like photographs can facilitate deeper emotional reflection, especially for individuals with lower visualisation abilities (Ginicola et al., 2012). Audio meditation supports emotion regulation by improving emotional memory processing and reducing attention bias towards negative stimuli (Wu et al., 2019).

Future Directions and Implications

The broader effectiveness of ACT is well established (Hayes et al., 2006; Levin et al., 2012). Thus, future research should further explore how value-focused ACT components compare to full models in influencing psychological flexibility and adaptability. Investigating which ACT processes are essential for specific outcomes could support the development of more targeted interventions for broader applications.

Additionally, future research should explore the mechanisms through which values-based interventions exert their effects. Frameworks like Self-Determination Theory (SDT), which emphasise autonomous motivation, perceived competence, and goal self-concordance, may help explain how value-consistent behaviour enhances psychological outcomes (Deci et al., 2000). Investigating these complementary pathways could clarify for whom such interventions are most effective and support the development of more targeted approaches to promoting well-being.

Lastly, the finding of this study (that valued living significantly improved after the intervention) supports previous research showing that value-consistent behaviour is positively associated with well-being, even in non-clinical populations (Grégoire et al., 2021). Encouraging students to reflect on their personal values and develop self-awareness could be a valuable addition to support programmes or curricula aimed at promoting well-being (Gayo et al., 2025; Russo-Netzer & Atad, 2024). By engaging more in valued living, well-being can be increased, which is associated with better academic performance (Campbell et al., 2022; Chu et al., 2022; Dias Lopes et al., 2020). However, the absence of change in psychological flexibility and adaptability indicates that broader emotional or behavioural shifts might require more comprehensive ACT components, such as acceptance and diffusion.

Conclusion

This study demonstrates that a values-based online intervention can enhance valued living among Dutch university students. However, no significant improvements were observed in psychological flexibility or adaptability, and no mediating effect of flexibility was found. These findings suggest that focusing only on values and committed action might be insufficient to influence broader self-regulatory outcomes (such as adaptability and flexibility), as ACT's full effectiveness often depends on integrating multiple core processes. Furthermore, the limited generalisability of the findings, due to the intervention's narrow scope of values, technical restrictions, and gender discrepancy, highlights the need for more inclusive, flexible, and comprehensive approaches. Future research should explore how values-based strategies interact with other psychological mechanisms, for example, such as those proposed in SDT, to better understand how they support student well-being. Enhancing students' well-being is of great importance as it contributes to greater academic success.

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Appendix A

Intervention Design

Module 1_A: Availability from 06:00 – 23:59
Mindfulness exercise 1

Let's start with a first exercise. Press play and close your eyes (if you have them, we recommend using headphones).

[Audio starts*] I would like you to do an exercise that could help you clarify your central values that drive your life. This is a visualization to discover what you consider important in this life. People have all sorts of different experiences with this exercise. This visualization has proven to be revealing for some people, while for others it has simply confirmed something they have always known, or it has had no effect at all. So there are no right or wrong experiences, nor better or worse experiences. I just ask you to observe whatever arises within you. Are you ready?*

Great, let's begin by closing your eyes or, if you prefer, you can fix your gaze on a point on the floor. Take a moment to notice your breathing and how your body feels. (Pause). If you get distracted or notice your mind wandering, that's okay. Just notice and bring your attention back to this exercise. (Pause)

Let's start by visualizing your own figure in front of you, in that mental visual space (pause). When you have your figure, imagine that we are moving forward in time. Picture yourself ageing and growing older as the years pass. You have reached the age of 50 and observe how your figure looks again—what do you look like? I will ask you to become, for a moment, that figure, and start to feel yourself in that body in the first person (pause). Now, imagine that you are celebrating your 50th birthday.

It has not been just any life, but a life that you would be proud to have lived. You have lived it your way, and you have decided and chosen how you wanted to live it, despite any difficulties that may have arisen. Take a moment to feel this. (Pause)

The most special people to you, those you care about the most, have come to celebrate your 50th birthday with you. I invite you to imagine not who you think might be there, but who you would most like to be at your 50th birthday party. These people are here for you and because of you.

It is now time for several people to start dedicating words to you. Again, I am not asking you

to imagine what they would probably say. I invite you to imagine what you would most like them to say. Imagine who is the first person you are visualizing to start.

Visualize how this person approaches you, stands in front of you, and takes a moment to speak. Observe the face. And try to really listen to what this person is going to say to you. And

remember, imagine you have been living the life you chose and wanted. Listen, (1) What does this person say about how you have lived this life? (2) What does this person say about what you have dedicated your time and energy to in recent years? (3) What does this person say about what you have found important in your life? And observe how you feel as you listen to their words.

Now, imagine how a second person approaches. Who is this person? Observe the face and imagine what you would most like this person to say about the life you chose and wanted. Listen, (1) What does this person say about how you have lived this life? (2) What does this person say about what you have dedicated your time and energy to in recent years? (3) What does this person say about what you have found important in your life? And observe how you feel as you listen to their words.

Now, imagine how a third person approaches. Who is this person? Observe the face and imagine what you would most like this person to say about the life you chose and wanted. Listen, (1) What does this person say about how you have lived this life? (2) What does this person say about what you have dedicated your time and energy to in recent years? (3) What does this person say about what you have found important in your life? And observe how you feel as you listen to their words.

Your values are what is important to you in life. This means that you determine what you believe is valuable and prioritized in your life, what makes everything worth it, and what motivates you. Values become more visible in our moments closest to our farewell. It is when we realize what truly deserves our time and energy. [Audio ends].

In relation to the audio: What are some of the words they have used to describe the person you have become and the life you have chosen to live? [OPEN QUESTION]

Thinking about what your 50-year-old self would say, what are the ways of acting or living during life that have been most important to you above all else, that is, your values? Write down the 5 most important ones. For example, 1) Spending quality time with my dog... When you finish, take a screenshot of these values or write them down (on your notes app or on

paper), as you will need them in the coming days. Then, continue to the next question.
[OPEN

QUESTION]

Module 1_B: Availability from 06:00 – 12:00 2

Let's go to today's morning visualization (3 minutes). Before listening to the audio, please

remember your central values (or read them in your notes).

Mindfulness exercise 2

[Audio starts] *Take a few moments to connect with what matters to you (pause), with what is*

most important to you in your life (pause). Connect with each of your central values and feel

the significance of each as it resonates in your heart. (30' pause)

Now, think about why these values matter to you and how they shape your life. (30' pause)

Now, visualize moments in your day where you can do things that are aligned with these

values. Picture yourself engaging in these activities. (30' pause)

Take a moment to appreciate this connection (pause) and when you're ready, gently bring

your awareness back to the present, carrying this sense of alignment with you throughout

your day. Thank you for taking this time to connect with your values. [Audio ends]

Module 1_C: Availability from 15:00 – 17:00 / 18:00 – 20:00 / 21:00 – 23:00

Since the last notification, to what extent have you been consciously aware of your values?

Now, take a moment and think about your central values.