

**Student satisfaction of the Positive Psychology App “Training in Positivity”: a qualitative  
user interview study**

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**Abstract**

Mental health issues, particularly depression and anxiety are a prevalent problem among student populations. The Training in Positivity, or “TIP” application is a tool, designed to increase the users well-being throughout different Positive Psychology interventions (PPIs). Research has shown that the TIP app has a positive effect on the well-being of students. Despite the proven effectiveness of PPIs on improving well-being, there is a gap in understanding how user satisfaction influences the effectiveness of positive psychology applications. This research explored the user satisfaction, dissatisfaction and suggestions for improvement of students with the Training in Positivity, or “TIP” application. In this qualitative study 17 participants used the application for three weeks and semi-structured interviews were conducted afterwards. The collected data was analysed with a thematic analysis. Participants generally expressed satisfaction with the exercise content, features of the app and the accessibility. Key factors mentioned with which the participants were dissatisfied with were exercise length and app structure. The participants mentioned several suggestions for improvement, including the themes going back in exercises, available in English and personalization. The findings show the importance of user satisfaction. It can be concluded that enhancing personalization and app structure could improve the user satisfaction and therefore possibly the overall effectiveness. Future research should investigate demographic influences on satisfaction and explore the correlation between user satisfaction and app effectiveness more. Additionally, larger and more diverse samples could support the generalisability of the app. This study highlights the potential of the TIP app to support students in improving their mental health, while emphasising the need for improvement in areas to maximise the apps effectiveness.

## Introduction

Mental health issues are a widespread problem in society. In student populations it is the most prevalent health issue (Blanco et al., 2008). Depression and anxiety are the most common mental health issues, with a prevalence up to 40% in developing countries in student populations (Azad et al., 2017). In addition, research by the American Psychological Association stated, that more than 60% of students met the criteria for at least one mental health problem in 2021 (Abrams, 2022). Mental health can be defined as “state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community” (World Health Organization, 2022, para. 1). When this state is not fulfilled one can speak about mental health problems.

One cause of the mental health issues students experience is stress (Rajabi et al., 2024). It can be argued that the stress students experience can be divided in internal and external causes (stressors). Internal stressors can be thoughts or behaviours and appear from one’s own mindset (Greene, 2017). An example is when someone puts pressure on themselves to speak perfectly in front of a group or someone who has negative self-talk (Greene, 2017). Moreover, a constant conflict with housemates having different belief systems can be cognitively challenging (Arnett, 2000). External stressors can not be controlled easily and arise from another source than one’s own thoughts. These can be financial worries or a death of a beloved one (Greene, 2017). Students might have to work part-time next to their academic load and adult-like responsibilities (Pedrelli et al., 2019). When experienced over a longer period of time, both types stressors have a negative impact on the student’s health and well-being (American Psychological Association, 2022).

Mental health problems can have a huge negative impact on the student’s life. Academic consequences are higher drop-out rates, lower academic success and a negative impact on cognitive functioning in general (Saipanish, 2003). Moreover, social consequences like fewer and less meaningful social contacts can follow (Eisenberg et al., 2019). Further, the chance of developing more mental illnesses increases and the ability to perform daily life activities decreases (Hysenbegasi et al., 2005). These consequences do not only affect the student’s current life, but can also affect their future, as it decreases the probability of the students to finish their degree (Beiter et al., 2015). Further it decreases their self-image on a long run (Beiter et al., 2015). It can be said that the mental health issues from students are therefore a major problem.

What makes the problem difficult to tackle, is that many students do not feel able to reach out for help for various reasons. Ning et al. (2022) distinguishes three reasons for that. One of these reasons is that people often experience long waiting times for getting therapists (Ning et al., 2022). Another possible reason is that people might feel ashamed to speak with professionals and rather speak with friends or family (Ning et al., 2022). A third reason is that some students do not reach out for professional help because they feel like there are people who need the therapy spot more (Ning et al., 2022). Further, some students do not perceive the problems as urgent and indicate having a lack of time for professional help (Pedrelli et al., 2019). Moreover, shame and stigmatisation in society are reasons for students to not reach out for help (Barney et al., 2006). Another factor is, that students indicate the wish to solve their problems on their own (Eisenberg et al., 2009). These factors lead to less than half of the students with mental health problems at various Midwestern colleges receiving treatment over a two-year period (Zivin et al., 2009). Further, the Healthy Minds study stated that only approximately a third of the students with mental health problems received treatment in the same year (Eisenberg et al., 2011). The barrier for students to seek for help to tackle their mental health problems is concerning, indicating the need to help students with accessible approaches.

### **Positive Psychology**

Throughout the previous, it becomes clear that accessible approaches to help students in improving their mental health are needed. One approach is to make use of positive psychology. The founding paper for positive psychology was published in the year 2000 by Seligman and Csikszentmihalyi (2000). They stated an alternative approach to the focus on the negative in the psychological research. A commonly accepted definition by Peterson states that “Positive Psychology is the scientific study of what makes life most worth living” (Peterson, 2008, para. 4). This might sound broad at first, but when going beyond this definition, positive psychology is an approach focusing on the positive subjective experience, including positive traits with the goal of maintaining someone’s mental well-being (Peterson, 2008; Seligman & Csikszentmihalyi, 2000). It focuses on someone’s strengths instead of their weaknesses. Therefore, it can be said, that positive psychology is a scientific approach focusing on positive experiences and positive traits.

During the last years the focus to achieve well-being is not just defined throughout the absence of a mental health disorder, but also throughout the presence of positive psychological resources (Sin & Lyubomirsky, 2009). These positive resources are aimed to be grown and strengthened throughout Positive Psychology Interventions (PPIs). They can be defined as “the treatment methods or intentional activities aimed at cultivating positive feelings, positive behaviours, or positive cognitions” (Sin & Lyubomirsky, 2009, p.467). PPIs can be divided into seven categories, namely savouring, gratitude, kindness, empathy, optimism, strengths, and meaning (Parks & Titova, 2016; Wood, 2016). Carr et al. (2020) conducted a meta-analysis of PPIs, comparing 347 studies with over 72000 participants. The participants belonged to different age groups, different countries, and different mental health conditions. Moreover, clinical and non-clinical populations were included as well as different PPI types. The effect of PPIs had a significant small to medium positive effect on well-being and strengths. Further a small to medium negative effect was portrayed on depression, anxiety and stress (Carr et al., 2020). This demonstrates the widespread effectiveness of PPIs in enhancing mental health.

PPIs are not only studied in adult samples and in the general population, but there are also studies focusing on student samples. An experimental research study with randomized controlled trial by Yurayat & Seechaliao (2021) analysed the effectiveness of PPIs on student’s mental health. Here students were defined as the group most frequently using the internet and mobile applications (Yurayat & Seechaliao, 2021). They stated that the use of PPI applications increases the resilience, level of happiness and psychological well-being of university students (Yurayat & Seechaliao, 2021). Therefore, it can be claimed that PPIs in the form of applications are suitable for students. Another study by Krifa et al. (2021) showed that PPIs have promising results in increasing students well-being and their academic performance. Moreover, it decreased their stress, anxiety and depression symptoms (Krifa et al., 2021). These findings emphasise the potential of positive psychology to significantly benefit student populations in improving their mental health.

### **Positive Psychology Applications**

It has been shown that PPIs can be effective in improving mental health, but the questions on how to reach students and make it easy for them to use PPIs remains. The popularity of smartphones is rising and the end of 2012 the global mobile phone penetration reached already

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91% (Donker et al., 2013). Mobile applications can be effectively used to promote health and well-being (Uribe et al., 2023). A study by Harrison et al. (2011) evaluated the effectiveness of the app *myCompass*, a mobile health app based on positive psychology, in which the participants conducted a six-week program with real-time self-monitoring and short messages. It showed that the symptoms of stress and anxiety and overall psychological distress was significantly reduced (Harrison et al., 2011). A study by Marshall et al. (2021) evaluated the effectiveness of five different apps based on positive psychology. These apps were *SuperBetter*, *Smiling*, *MoodMission*, *MindShift*, and *Destressify*. The study was conducted over a period of three weeks, in which the participant used the app for 10 minutes on five days per week. Moreover, there was a follow up interview after six months. In the study evidence was found that the apps were effective at improving multiple dimensions of well-being. The researchers emphasised that the effects were bigger in younger participants than in older, indicating that the effectiveness for students might be bigger. Moreover, the regular use of the apps was stated as an indicator for their effectiveness (Marshall et al., 2021). These studies highlight the effectiveness of positive psychology applications in decreasing stress and anxiety and increasing well-being.

Mobile health applications have the advantages of the accessibility of smartphones, the real-time symptom treatment, personalized feedback and the portability and flexibility of smartphones (Donker et al., 2013). Further benefits of smartphones are their mobility and the rapid access to information that they enable (Oliveira et al., 2021). Especially students are shown to be using technology and smartphones often, which is why it can be argued that the accessibility of positive psychology applications through smartphones works better in comparison to other media (Shaw et al., 2016). Disadvantages like battery failures, security and privacy issues need to be considered as well, when it comes to mental health applications (Donker et al., 2013). The widespread use of smartphones among students and the effectiveness of PPIs in increasing mental health are a promising argument in regards to making these applications accessible.

### **User Satisfaction**

While the use of mobile applications increases, understanding how user satisfaction influences PPIs remains crucial. User satisfaction can be defined as the “a subjective judgement of the user against the information they find in comparison to the information they expect that

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exceeds their internal standard judgement” (Ramadiani et al., 2017, p. 377). A study by Ramadiani et al. (2017) showed that there is a highly significant correlation between the variables effectiveness and user satisfaction. User satisfaction has an impact on the effectiveness of an application or treatment (Prastyo et al., 2021).

The University of Twente developed an app using PPIs with the goal to increase resilience and overall mental well-being. The app is called Training in Positivity (TIP). A pilot on the effectiveness of the TIP app in students showed positive effects on well-being and symptoms of anxiety and depression (Baars, 2022; Winkelmann, 2022). Further, a study by Jansen (2022) aimed to determine user satisfaction in a quantitative way. Jansen (2022) found that the user satisfaction on the TIP app, was average, meaning that half of the participants indicated that they would use the app again, while the other half said that they would not use it again. From that, it can be learned, that there is still a lot of room for improvement regarding the user satisfaction. Yet, in the study was missing with which parts of the TIP app the clients were satisfied with and with which parts they were dissatisfied with (Jansen, 2022). The limitation of the study by Jansen (2022), leaves a gap, which is aimed to solve with this current study, namely a deep dive into finding out with which aspects of the TIP app the users are satisfied with and with which parts they are dissatisfied with. This could possibly mean that the parts with high user satisfaction are more effective than other parts. On the basis of the previous research something that is missing and that needs to be investigated further is the variable user satisfaction, as there is no qualitative research on the topic yet. Despite the promising evidence on PPIs applications, one can conclude that literature is missing on the degree to which users find the application satisfactory.

### **Current study**

The current study aims to examine the user satisfaction of the TIP app. There will be three research questions in order to not only know what aspects the users are satisfied or dissatisfied with, but to also get insight on the suggestions for improvement the participants have. The present study sought to answer the following research questions:

1. With what elements of the TIP app are the participants satisfied with?
2. With what elements of the TIP app are the users dissatisfied with?
3. What are the main suggestions the participants have to improve the TIP app?

## **Methods**

### **Design**

In order to examine the student satisfaction with the TIP app, a qualitative research method with semi-structured interviews was used. An interview study is the most suitable approach because here, the participants have space to express their opinions flexibly. Throughout that the relevant topics can be covered, as the interviewer can ask questions relevant to them and the participants can include the experiences that are important to them.

### **Participants**

A part of the participants was recruited throughout the SONA system. This is a website of the University of Twente on which psychology and communication science students can earn SONA credits. The students need to earn 15 credits before graduating. Students gained 2.5 SONA credits as compensation for their participation. Moreover, snowball sampling was used, as the number of participants gathered from SONA was not sufficient. The researchers started with their personal network. Snowball sampling is a recruitment technique in which the participants are asked to find more participants, with the hope that they know other participants fitting to the inclusion criteria (Oregon State University, 2017). Since the app is in Dutch, an inclusion criterion was that the participants are able to speak Dutch. Further inclusion criteria were that the participants were students, that they had an email address and a smartphone or tablet to have access to the internet and the app. The research was approved by the Ethics Committee of the Faculty of Behavioural, Management and Social Science at the University of Twente. Prior to the study, all participants were required to give their informed consent and were informed that they could withdraw at any time without having to provide a reason. The final sample size consisted of 17 participants.



## Materials

### *The Tip App*

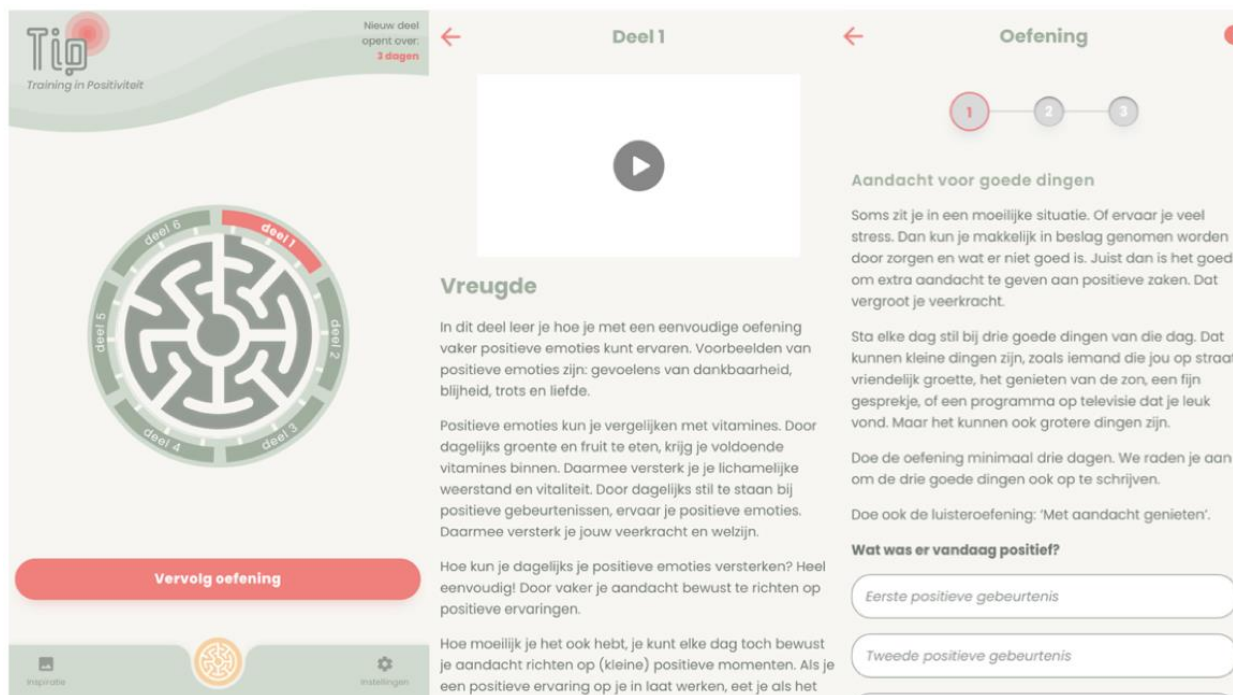
The TIP app consisted of six modules, with each a different topic, namely, *happiness*, *confidence in yourself*, *confidence in the future*, *friendliness*, *resilience*, and *affiliation*. A description of the modules can be found in Appendix A. Each topic included a different exercise:

1. Three good things (happiness)
2. Asking other people about one’s own strengths (confidence in yourself)
3. Visualizing optimal self (confidence in the future)
4. Self-compassion during setbacks (friendliness)
5. Finding of unexpected positive results from setbacks (resilience)
6. Kind actions towards others (affiliation)

The app is designed in the form of a labyrinth, and it is necessary to complete one part in order to start with the next one (Figure 1). Each part was structured in the same way. Firstly, the participants watched an introductory video on the topic, then they received an explanatory note and after that they had to do a small exercise (Figure 1). One of the exercises was to write down three positive events of the day (Figure 1). This exercise focused on happiness and on concentrating on the positive instead of the negative. Throughout that a positive mindset should be encouraged. Other exercises included also other people with the focus of confidence in oneself. The participants had to ask their friends to name character strengths about them, to get an external point of view. Throughout that, they can become more confident when hearing what other people value about them and learn about strengths that they are possibly not aware of. Each of the modules had a different focus. Participants had to work on three consecutive days on each module. Before and after each module the participants had to complete a short assessment questionnaire, displaying their personal level of the specific topic they worked on, enabling them to see the progress they made. Moreover, the participant received motivational feedback including quotes. Further, the participants received daily reminders in the form of push-notifications to use the TIP app, which could be turned off in the settings of the phone or laptop. The exercise took approximately 15 minutes each day for three weeks. After these three weeks the participants conducted an online interview with one of the researchers. Currently the app is only available in Dutch and not yet available in any app store.

## Figure 1

### Home screen, instruction, and exercise



### The Interview Scheme

The aim of the interview was to cover all of the relevant topics that are needed to answer the research questions, but also to give the participant space to express further ideas and leave room for a flexible schedule and further topics. For that purpose, semi-structured interviews were conducted, as the participants could express their thoughts, without being influenced by external factors. This interview style has the benefit of ensuring that all relevant topics from the interviewer can be covered and the participant can still include their experiences. For this purpose, mainly open questions were asked. During the interviews the *Client Change Interview Protocol* was used as it allows the participants to speak about the app in their own words (*Client Change Interview Protocol*, n.d.). Yet, the following adaptations in the scheme were made. The introductory questions focused on questions about the participants and what causes them stress. There were three main topics in the interview guideline.

The first topic focused on the first research question and was therefore about the parts the participants were satisfied with. The satisfaction was measured with the questions “Which elements or aspects of the app do you think have contributed to the various changes that you

*have experienced? (both inside and outside the app)?” and “Can you tell me what has been helpful about the app? (e.g. specific exercises)?”.*

The second main topic was about the second research question. To explore with which parts of the app the participants were dissatisfied with, two questions in the interview were asked focusing on these aspects. The questions were *“Which elements or exercises in the app have been hindering, unhelpful, negative or disappointing for you? (e.g. specific exercises)?” and “Were there things in the app that were difficult or painful, but still okay or perhaps helpful? What kind of things/exercises? “.*

The third main topic was about the third research question and therefore about the ideas for suggestions the participants had. The questions used for the third topic were *„Did you miss anything in the app that could be helpful? A specific exercise? Topics to be discussed? “and “Do you have any suggestions for us to further improve the app? “.*

Next to the listed questions, there were other questions included in the interview scheme, that are not necessarily relevant for this research. The reason for that, is that the interview scheme was used by two researchers with different studies. The whole interview scheme can be found in Appendix B.

## **Procedure**

Participants were recruited via SONA and eligible friends were asked if they were interested in participation. After signing up for the study the students gave informed consent and then they received instructions about the download of the app and the download code. Then the participants had to download the app which could be done throughout Android or iOS. There they had to create their own personal account. After the participants used the app for three weeks, each interview was conducted with each participant individually. After introducing the participant to the study objective and allowing time for questions, the transcription and recoding on Microsoft Teams started. All interviews were conducted online via Microsoft Teams in the month of April in 2024. To prepare for the data analysis the transcription from Microsoft Teams was used after it was proof-read and checked for grammar and content. The participants got a number assigned and are referred to by “participant X” in the following report.

## Data Analysis

The transcripts were analysed using thematic analysis. It is a widely used method for qualitative data analysis in psychology (Braun & Clarke, 2006). Throughout that, one can get a detailed overview of the topic (Braun & Clarke, 2006). In a thematic analysis, relevant topics that occur often are identified as *themes*. The themes were developed inductively, meaning that the analysis was data driven (Braun & Clarke, 2006). The data is coded without trying to fit it into a pre-existing frame. For the analysis the six phases of a thematic analysis by Braun & Clarke (2006) were followed.

The first phase is to familiarize yourself with the data (Braun & Clarke, 2006). This includes becoming familiar with the content throughout reading through the transcripts and noting initial ideas. Secondly, one should generate initial codes, in which interesting topics or features that occurred often were collected for each code (Braun & Clarke, 2006). Initial codes were for example the names of the different exercise, which were then later grouped together as one code. Moreover, initial codes were about various ideas for improvements the participants had, which were also later grouped together as one code. The third phase is to search for themes. For this, the codes were grouped together into potential themes. The fourth phase is to review the themes (Braun & Clarke, 2006). This includes checking if the themes work in relation to the codes and the entire data set. With consideration of the research questions, the codes were grouped together into themes if they concerned the same topic, for example if the codes affected parts of the app the participants were satisfied with. The fifth phase is to define and name the themes (Braun & Clarke, 2006). Here an ongoing process was conducted with the goal of refining and getting clear definitions and names for each theme. The themes regarding the research questions, so, *satisfaction*, *dissatisfaction* and *suggestions for improvement* were conducted with subthemes for each of them. The sixth phase is to produce the report (Braun & Clarke, 2006). In this phase quotes were selected and the report of the analysis produced. At the end of the coding process, the themes and subthemes were organized in a table (Table 1).

## Results

In the thematic analysis three themes with subthemes were conducted, which are portrayed in Table 1. The first theme is *satisfaction* with the subthemes *exercise content*, *features of the app* and *accessibility* (Figure 2). The second theme is *dissatisfaction* with the subthemes

*exercise length* and *app structure* (Figure 3). The third theme is *suggestions for improvement*, which includes the subtheme *personalization of the app* (Figure 4).

In total 17 participants signed up for the study of which 14 identified as female and 3 identified as male. All of the participants were students, of which one is in the second year, 13 are in the third and three are in their fourth year of their study.

## Table 1

### *Overview of Themes*

Theme	Subtheme
<b>1. Satisfaction</b>	Exercise content Features of the app Accessibility
<b>2. Dissatisfaction</b>	Exercise length App structure
<b>3. Suggestions for Improvement</b>	Personalization of the app Going back in exercises Language

## Satisfaction

### *Exercise content*

The subtheme exercise content concerns the aspects of the content of the exercises the participants are satisfied with. The following aspects were the ones the participants said the most often that they were satisfied with. The majority of participants said to be satisfied with the exercises overall. Exercises regarding gratitude, exercises in which other people are involved and exercises in which participants had to find the positive in the negative were especially liked the participants. For instance, one participant mentioned, “I think it was the most important exercise to make you think about the day in a positive instead of a negative way” (Participant 5). The

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exercise about the own vulnerability was liked by the participants, as illustrated by a participant’s comment: “I thought imagine someone I really love has this vulnerability. How would you treat them? So why don’t I make time for myself? I think for me that was the best exercise”

(Participant 16). The exercises were not only liked for their content, but they also enable the participants to reflect upon themselves and gain insights into their behaviour and thoughts. They can become more self-aware and get a deeper understanding of their emotions, throughout which they can grow personally.

### ***Features of the app***

The subtheme features of the app concerns features that do not regard the content, with which the participants are satisfied with. A part of the app that the participants reported satisfaction with was the voice feature of the app, which was described as calming. One participant mentioned: “She sounded very sweet and calm and I think if it has been another voice that I wouldn’t have liked it also that much” (Participant 1). Another participant agreed and said: “I liked the woman who explained the exercises, that you could do, she had a very calming voice” (Participant 3). The design was liked for its clean appearance: “The app itself was very nice and had very calm colours” (Participant 3). Additionally, push-notification were said to be a helpful tool in reminding the participants of doing the app: “But then I got the reminder and was like, oh, I still have to do that.” (Participant 4). The features of the app that were liked by the participants enhance the overall user experience with the TIP app. This leads to the app not only being functional and useful with its content, but also enjoyable for the user. The calm and pleasant voice and the design help to create a positive environment that supports the mindfulness and supports the user in enhancing their well-being.

### ***Accessibility***

The accessibility, meaning that the app can be used anywhere was named as a helpful aspect. One participant said, “Yes it should be doable anywhere” (Participant 4). Participants indicated that they were satisfied with being able to incorporate the app into their daily life, how it suits them the best: “I did, I think twice the exercises while I was in the bus or train or whatever. I liked that a little more because I would just incorporate it in my daily life” (Participant 17). Another participant stated, “I liked mostly being able to do it at your own time somewhat through the day” (Participant 7). A further aspect mentioned was that the participants like the accessibility because then they could use traveling times for example more productive. A

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participant said: “If I have to sit in a train for an hour then I’d rather to something useful” (Participant 17). The accessibility of the app is especially useful for students who often have busy schedule, which can change often. The flexibility of the app allows them to incorporate it into their daily life, so that it fits their individual lifestyle. Throughout the regular use of the app, the benefits of it can be maximised.

**Dissatisfaction*****Exercise length***

The subtheme exercise length concerns aspects of the amount of time the participants need to invest in an exercise, with which they were dissatisfied.

The participants reported that they were dissatisfied with some (parts) of the exercises. The aspect that the most participants were dissatisfied with was the length of the exercise and the fact that they sometimes had to list ten things. For example, one participant said, “At one point I felt like I was making something up because it was so much” (Participant 16), and another noted, “Sometimes ten minutes can be really long” (Participant 7). The dissatisfaction of the exercise length shows the request for changed or more flexible time requirements. The users have different preferences and attention spans. If they get frustrated or annoyed by the time an exercise requires, they ultimately also get annoyed by the exercises itself, which leads to them being less effective for some individuals. While some participants might benefit from longer exercises, it is important that the tasks are manageable for the individual user.

***App structure***

The subtheme app structure concerns aspects of the app, that do not concern the content, the participants were dissatisfied with.

Moreover, participants mentioned that they could not go back within the exercises to see what they wrote or answered before. The exercise that was dissatisfying for some of the participants was the exercise regarding their future goals, as the thought of the future was perceived as pressuring: “I find it hard to like think about what really my goals are ... I am thinking about the future a lot and I am stressing about the future a lot” (Participant 1). Another part that participants were dissatisfied with is the amount of push-notifications, which cannot be personalized in the amount, but only turned on or off: “The notifications, they could be a bit much (Participant 8). The dissatisfaction of the app structure consists of the inability to go back

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in exercises, a certain exercise that was perceived as stressful and the lack of being able to customize the amount of notifications. It suggests, that while the app has useful content, its structure can hinder the user experience and therefore possibly the effectiveness of the improvement on well-being. Changing the parts of the app structure could therefore enhance the user satisfaction.

## **Suggestions for Improvement**

### ***Going back in exercises***

The subtheme going back in exercises concerns suggestions for improvement the participants had regarding the one-way use of the app.

One suggestion the participants had was the possibility to go back in the app to see what they answered to questions before: “Mostly being able to go back to see what you answered, yeah and then maybe to reflect on that too, for yourself” (Participant 7), and: “You can go back and forth and see, oh these were my goals” (Participant 17). The improvement of enabling the users to go back in the exercises would make the app more interactive and user-friendly. Next to the advantage of more satisfied users, it also is beneficial for the effectiveness of the app. Users can review and reflect on their past answers in the app and can then see their development or be reminded of their goals or previous thoughts. Through that, they could gain deeper self-reflection and increase their overall well-being.

### ***Available in English***

The subtheme available in English concerns suggestions for improvement the participants had regarding the language availability of the app.

The participants suggested to make it possible to make the app available in English, also to keep the original meaning of the quote. One participant expressed; “I prefer the original English quote, because when you translate it to Dutch, sometimes it’s a bit cringy” (Participant 4). The suggestion for making the app available in another language draws attention to the chances for broader applicability of the app. Moreover, if the quotes retaining the quotes in English could ensure that it keeps the intended emotional meaning.

### ***Personalization***

The subtheme personalization concerns suggestions for improvement the participants had regarding the customization of the app, both content, and non-content wise.



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Another aspect that was requested by the participants was to be able to personalize the app more in multiple ways. The participants suggested that the user should be able to choose the exercises they want to do: “I personally would have liked to do the first module for a longer period of time, ... so you can just start different modules when you would like it” (Participant 10), throughout which they can also decide how often they want to do a certain exercise. The participants suggested that it would be an improvement if the participants are able to choose the number of push-notifications they want to receive: “I did receive a lot of emails, which I did not really check, but that is a personal preference ... I think it was just a reminder that I don’t forget to do the task ... but that was not really necessary for me” (Participant 16). Throughout that it would be able to make the app more personal. It can be said, that if it would be possible to tailor the app to the user’s preferences it would increase the satisfaction and therefore, possibly also the engagement of the users. The individual needs could be met and throughout that, the app could be more effective in increasing the well-being of the user.

## **Discussion**

### **Main Findings**

The study explored the user satisfaction of university students with the TIP app. The aim was to identify parts of the study related to the research questions on the topics of satisfaction, dissatisfaction, and suggestions for improvement. For that key themes were identified throughout a thematic analysis. The novelty of the study is its focus on understanding the user satisfaction with the TIP app. While previous research focused on the effect of the app on improving the well-being, there is a gap in the literature on user satisfaction with it. Further, previous research used quantitative measures on the effectiveness, while this study used qualitative measures, which can provide deeper insights on user experience. The necessity of the study arises from the high prevalence of mental health issues, especially among students. There are barriers for students to reach traditional help for their mental health issues, which is why the TIP app aims to offer a digital alternative. In order to be effective, it is crucial to understand not only if the content of the app is effective, but also how satisfied users are and if the effectiveness increases with an increased satisfaction.

In general, participants emphasised to be satisfied with multiple parts of the app. They drew attention to their satisfaction with the content of the exercises and highlighted satisfaction with exercises about the involvement of others, in which participants had to ask other people, for example their friends, what they think their strengths are. Throughout that, they get an external point of view and develop personal growth. Another exercise that was emphasised to be liked by the participants was an exercise in which they had to name three positive things of the day. This exercise helps in getting a positive mindset and getting gratitude, which actively helps to shift the focus from the negative to the positive experiences. Throughout that, stress can be reduced and the overall well-being enhanced. They reported that especially these exercises were insightful and beneficial for self-reflection. Moreover, the features of the app, like the voice of the woman, the clean design and the push-notifications contributed to their satisfaction as well. This is in line with research, as a simple design can increase the user satisfaction and decrease frustration because of a confusing and complex design (Sigma Software, 2023). The fact that the app could be used anywhere and at any time was seen as useful as well. Accessibility is another factor supporting the effectiveness of a mental health app (Sigma Software, 2023). The push-notifications were seen as a useful tool to be reminded of the app use. In persuasive technology

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principles push-notifications are a tool to remind or trigger people in order to reinforce positive behaviours (Fraser et al., 2019). In this case they were used to reinforce people in using the app. Throughout that attitude and behaviour can be changed positively (Wildeboer et al., 2016). There is a positive relationship between persuasive technology principles, in this case push-notifications and the effectiveness of web-based mental health interventions (Wildeboer et al., 2016). From the areas of satisfaction, it can be concluded that the exercises that include external perspectives and focus on gratitude are effective. These exercises should be kept in the TIP app. Moreover, the app features, including the design, the voice of the woman should also be kept in the app. The simplicity of the design enhances user satisfaction, engagement and therefore also the effectiveness of the app. Further, the accessibility of the app on a mobile device contributes to a satisfied user. Push-notifications were an effective tool in reminding the user to engage with the app, which supports the use of persuasive technology principles in the context of mental health apps. It can be said that these aspects of the app should be kept in the future, to ensure user satisfaction.

Despite the areas of satisfaction, there were also areas in which the participants expressed dissatisfaction. The length of the exercises was the main mentioned issue. Some participants felt overwhelmed by the length which led to them feeling as if they were answering the questions in an unauthentic manner. One exercise required the participant to list ten things, which was perceived as burdensome. The high number of items felt repetitive, which led to annoyance among the users. Instead of fostering positivity, it became a source of stress, which negatively influenced the user experience. Moreover, participants mentioned that they disliked the inability to go back in exercises. Throughout that, they were not able to reflect on their previous answers to some exercises and get motivation from their improvement. Reflection is an effective tool in improving attitudes and learning, which can be beneficial in learning on how to deal with situations that are challenging for one's mental health (Winkel et al., 2017). Self-reflection itself is stated to be in strengthening resilience, which is why going back in exercises to reflect on previous answers could be beneficial in improving the participants' overall well-being (Crane et al., 2019). There is research stating that goal-setting increases the motivation to acquire these goals and leading to more effectiveness (Travers et al., 2015). Yet, there is also research that there are differences in the future thinking of young people (Tang et al., 2023). For some people it can be stressful to think about the future and having to think about it, might worsen their negative feelings and

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avoidance towards the future (Tang et al., 2023). In the current study, some participants expressed that they found the future goal exercise rather stressful and experienced anxiety and stress, which is in line with the research by Tang et al. (2023). While stress can be motivation when one thinks positively about a topic, it can also be a negative force, when people experience the stress as burdensome and experience anxiety with it (American Psychological Association, 2022). This can have negative consequences on one's well-being and health (American Psychological Association, 2022). This suggests a need for a different and possibly more flexible approach in the goal-setting exercise. Moreover, some participants reported that the push-notifications were perceived as annoying, and they missed the opportunity to customize the frequency of them. It can be concluded that it could be beneficial to change or delete some parts of the app. One reason for that, is the dissatisfaction the users express. Another reason is the research that showed the effectiveness of reflecting, which would be enabled when users could see their previous answers.

The participants mentioned several suggestions for improvement, which are in line with the parts of satisfaction and dissatisfaction the students mentioned. Many participants suggested that the ability to go back in the app and review their previous answers would be helpful. This is in line with research, stating that reflection strengthens resilience and the overall mental well-being (Crane et al., 2019). Throughout reflection, people focus more on their strengths, can process experiences and make meaning of them (Crane et al., 2019). Moreover, there was a strong call to increase the opportunities for a personalization of the app. According to the participants the most requested features are to be able to choose the specific exercises and adjust the frequency of the push-notifications. Throughout that, the user satisfaction could be improved, as the user would engage on a more personal level with the content. If the user is able to personalize the amount of push-notifications, they could engage with them, without being annoyed by them. Moreover, if the app would be more personal for the user, they might feel more comfortable using it and opening up for sensitive topics. Another suggestion for improvement was to be able to use the app in different languages, for example English, in order to make the app accessible for more people and maintain the original meaning of the quotes. If the app would be available in different languages, it would be useful for a wider audience. Participants could then choose the language in which they want to use the app, which could ensure that the content is understood. Moreover, if some participants prefer the quotes in their original language, they

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could select that language, to keep the original meaning. It is important to have a good translation to keep the app’s effectiveness in different languages. These suggestions could improve the user satisfaction with the app, which could lead to more effectiveness in the end.

### **Strengths & Limitations**

The research does provide valuable insights into the user satisfaction with the TIP app, yet some limitations need to be considered. A major strength of the study was that one could get very detailed information from the participants because of the interviews. Moreover, throughout ensuring the ethical approval the participant knew that their data was handled safely, which possibly lead to trust in the study and them sharing their honest opinion. Yet, throughout the difficulty to gather participants, a small sample size limits the generalizability of the findings. Further, the study only included Dutch students, which also decreases the opportunity for broader applicability as possible culture related differences could not be considered. Another limitation might be, that the researchers knew most of the participants, partly throughout the snowball sampling. This could have influenced the way the participants answered the questions or how comfortable they were in speaking about private topics like their mental health or their opinion about the app. Further, students were required to use the app every day. It can be questioned if it has an impact on the student’s satisfaction and the effectiveness of the app, if users can decide themselves how often they want to use the app. Moreover, throughout the sampling method, the researcher knew the most participants, which could have also influenced the way they answered the questions. Potential bias could appear or the comfort level could be influenced.

### **Future Research**

Future research is needed to address the limitations. A larger and more diverse sample could increase the generalizability of the findings. Throughout that, information can be gathered on how different groups can benefit from the app. There is a need in researching how demographic factors such as age, gender and cultural background might influence the satisfaction with and effectiveness of the TIP app. Further, future research is needed to see if more opportunities for personalization increase the user satisfaction and the effectiveness of the app. Studies could investigate whether opportunities for personalization and language opportunities also lead to better outcomes in regards to a better well-being. Moreover, longitudinal studies to study the

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long-term effects of the TIP app on well-being and user satisfaction for students could provide insights into the effectiveness over time. Throughout that it can be investigated if the benefits increase more when participants use in regularly over a longer period of time. Further it might be interesting to see if it has a changed effect if students can decide themselves how often they would like to use the app, as they were now required to do that every day. If client satisfaction correlates with more effectiveness of the application should also be studied more in the future, as there is only limited research on that. It would be interesting to understand the relationship more and see if there are other factors which have an influence as well. Future studies could also do a meta-analysis and compare the TIP app with other mental health interventions to evaluate its effectiveness in contrast to other tools. Throughout that, more areas for improvement can be determined and the strengths can be compared to other applications. Moreover, research could focus on how the app can be integrated into other mental support systems for example study advisors, peer support groups or counselling groups. The app might be a tool that study advisors could explain to the students when they experiencing stress. In stressful periods it is likely that they reach out to supervisors. Moreover, it would be interesting to see if the app would work in a peer group, as users could exchange opinions about some exercises and the app would be used more interactively. Research is needed to see if that would be effective.

### **Practical implications for students**

The TIP app and similar positive applications can be a valuable tool for students to support them in coping with their stress and improve their mental well-being. The exercises can support to students in fostering a positive mindset. The accessibility of the app makes it practical for students and can decrease the barriers for seeking help. Further, the app encourages students to reflect on their behaviour and their mindset, which can both contribute to a better mental health. Moreover, the app can be helpful in getting more structure in the daily life, which can be challenging for students. If they use the app everyday they learn a new habit. The app can therefore be integrated into their academic life and ultimately also support the students in managing stress, which can appear from academic pressure. With the app they can get help at any time they need, with a low barrier. They can get motivational quotes from the app, which can encourage them to use it. Moreover, students spend a lot of their time on their phones, which is

why the app has potential to be used by a lot of students. Throughout that, mental health support can become more accessible to a broader audience.

### **Conclusion**

In summary, the TIP app is a promising positive psychology tool for students to increase their mental well-being. It can help students in managing their stress and improving their overall mental health. The study showed high levels of user satisfaction for the content of the exercises, features of the app, like the design and the accessibility. However, dissatisfaction in personalization, app structure and parts of the exercises lead to feelings of stress and annoyance. This shows that change is needed to improve the user satisfaction. Future research is needed to explore long-term impacts and discover how diverse groups perceive that app. Moreover, it is needed to investigate the impact of an increased personalization of the app on user satisfaction and effectiveness. It needs to be investigated further how client satisfaction influences the effectiveness of the app. Moreover, the TIP app should be compared to other mental health apps. By refining the areas of dissatisfaction and gaining more insight throughout future research, the TIP app can be even more effective for a wider student population to support their mental health.

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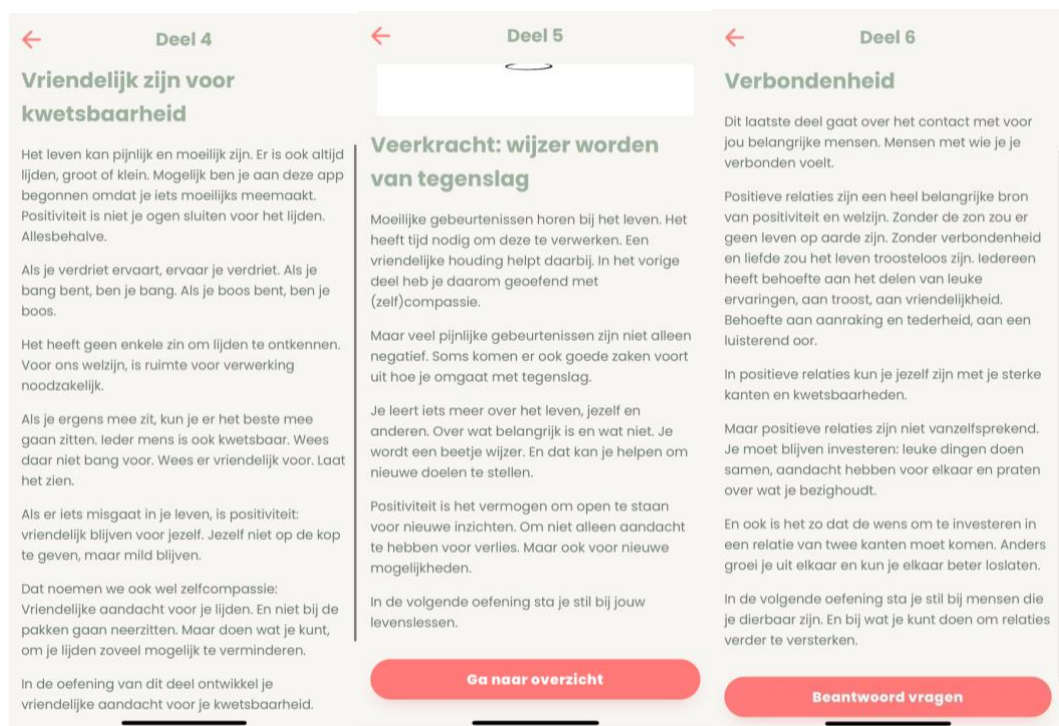
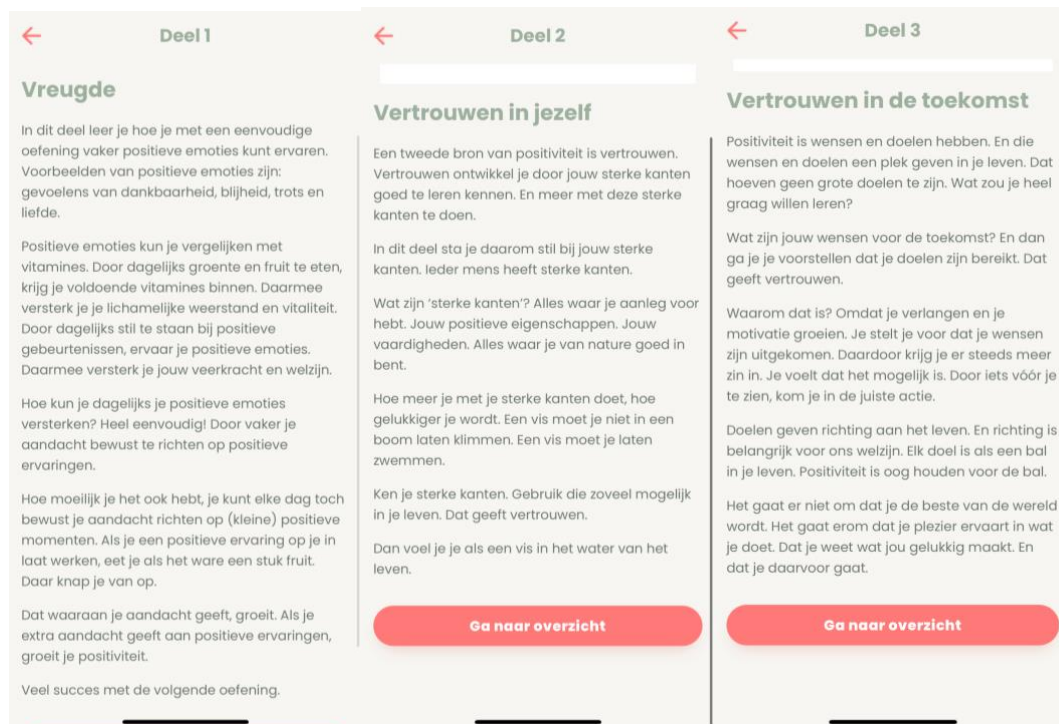
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## Appendix A

*The six modules of the app*

## Appendix B

### *The interview scheme*

#### **Introduction**

1. What phase of your study are you in? (e.g. first year, etc.)
2. What causes you stress during your studies?
3. What was the reason you signed up yourself for the use of the app?
4. What modules of the app did you finish?

#### **Changes**

5. How did you perceive your mental health before using the app?
6. Did something change in your mental health status after using the app and so yes what changed?
7. To be a bit more specific what do you think caused these changes in your mental well-being?
8. Have you experienced any changes in doing/feeling/thinking since you started using the app?

What changes did you experienced? Did you expect these things to change?

*[ask for each mentioned change]*

9. Do you think these changes would also have happened if you had not used the app?

*[ask for each mentioned change]*

10. How important are these changes for you/your life?

*[ask for each mentioned change]*

11. Has anything changed for the worse since you started using the app?
12. Is there anything that you wanted or hoped to change/improve by using the app, but that hasn't changed?

#### **(un)helpful aspects of the app**

13. Which elements or aspects of the app do you think have contributed to the various changes that you have experienced? (both inside and outside the app)
14. Can you tell me what has been helpful about the app? (e.g. specific exercises)
15. Which elements or exercise in the app have been hindering, unhelpful, negative or disappointing for you? (e.g. specific exercises)
16. Where there things in the app that were difficult or painful, but still okay or perhaps helpful? What kind of things/exercises?

#### **Improvement**

17. Did you miss anything in the app that could be helpful? A specific exercise? Topics to be discussed?
18. Do you have any suggestions for us to further improve the app?

#### **Implementation**

19. When we would like to broader implement or promote this app among students, what tips could you give us?
20. When do you recommend us to inform students about the app? (e.g. specific study phase)
21. How would you like to be informed about the app? (e.g. via Canvas, study advisor etc.)
22. Do you think it might be helpful to do the app in, unguided, groups? So one can exchange experiences and support each other?
23. Would you be willing to participate in a cocreation group discussing optimal implementation strategies?

#### **Round up**

24. What did you learn from the app?
25. Is there anything you want to say about the app, the content, the design or about stress among students in general?