Client satisfaction and the impact of the positive psychology app 'Training in Positivity' on the ability to adapt and positive reframing

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Abstract

It is crucial to increase well-being among students, as a large part of the student population is currently battling feelings of anxiety and depression. In order to do this, positive psychology interventions (PPI's) may be used, as studies have shown their effectiveness. One such intervention, which has not yet been tested, is the Training in Positivity, or 'TiP' app. This app focuses on implementing different positive psychology exercises to increase the user's well-being. This pilot study determines the impact of the 'Tip' app on the variables 'positive reframing' and 'ability to adapt', as these are both factors which might be important in determining well-being. In order to do this, linear mixed models were run and cohen's d is determined. Solely males seemed to be significantly positively impacted in their ability to adapt. Females were not significantly impacted, neither were both groups taken together. On positive reframing, no groups were significantly impacted. This pilot study also aims to determine client satisfaction with the app in general by using the mean scores obtained from the client satisfaction questionnaire. The mean scores proved to be average, leaving room to improve. In conclusion, solely males were impacted in their ability to adapt and no groups were impacted in their ability to positively reframe by using the 'TiP' app. Moreover, users were not very satisfied with the 'TiP' app in general.

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Lately, students' well-being seems to be sub-optimal. In 2019, the University of Twente performed a study which showed that 80% of its students either had complaints of depression or anxiety, or both (Borgerink, 2019; Oosterom, 2019). Moreover, a later study showed the same problem occurring in other universities (Van der Aa, 2021). Therefore, it is important to increase the well-being of the students mentioned. In order to do this, positive psychology may be employed. Positive psychology is a way of approaching psychology by emphasizing the positive aspects of a person; it is centred around an individual's strengths and virtues; on what a person already possesses instead of on what a person still needs to achieve (Gable & Haidt, 2005; Sheldon & King, 2001).

Positive psychology has been implemented by using interventions. Positive Psychology Inventions (PPI's) make use of specific exercises, such as cultivating meaningful subjective experiences and highlighting character traits, which are meant to push an individual towards a life that satisfies them and allows them to function optimally (Schotanus-Dijkstra et al., 2019; Meyers et al., 2013). These interventions can be successfully used as add-ons for (one-on-one) therapy (Becker et al., 2019). Furthermore, several meta-analyses found that PPI's enhance well-being and decrease depressive symptoms (Sin & Lyubomirsky, 2009; Chakhssi et al., 2018; Hendriks et al., 2020). Two of these meta-analyses focus on both nonclinical and clinical samples (Sin & Lyubomirsky, 2009; Hendriks et al., 2020), while one focuses solely on clinical samples involving clinical disorders (Chakhssi et al., 2018). Becker et al. (2016) found that emotional vulnerability was reduced and positivity bias was strengthened in students who participated in positivity training. This positivity training compared an approach-positive-avoid-negative tactic with an approach-negative-avoid-positive mindset and showed that employing the first strategy increased positivity in the participants (Becker et al., 2016).

Furthermore, in cases where additional studies were conducted on the results, therapeutic value in the training was found, which helped "cure" depression (Becker et al., 2016).

As stated earlier, students' well-being seems to be at a low point. To help these students PPI's may be used. One medium in which PPI's are implemented, are apps. As an example, a positive psychology app which has been tested, has been shown to improve both positive and negative affect (Lee et al., 2021). The app is called SnapAppy; it makes use of momentary photography to increase someone's mood and positive affect (Lee et al., 2021). Meaning is added to photos using annotation, descriptions and categories (Lee et al., 2021). Another example is the "Zo Erg Nog Niet" (Not that Bad) or "ZENN" intervention, which has been tested to be effective in increasing well-being (Kloos, n.d.; University of Twente, 2021). The "ZENN" intervention makes use of different exercises, all highlighting gratitude (University of Twente, 2021). Recently, the 'Training in Positivity' app (TiP) has been developed and its effectiveness has not yet been tested.

Positive psychology interventions can be evaluated in different ways, focusing on different aspects. One important aspect is how much PPI's increase well-being and/or mental health (Chakhssi et al., 2018). However, there are more specific outcomes and/or mediators which might be important as well, such as gratitude, positivity bias and emotional vulnerability (Lambert et al., 2012; Becker et al., 2016). In the same line of thinking, a possible important outcome for general well-being and mental health is positive reframing. Positive reframing may be defined as taking a different look at something that was previously viewed negatively to see it in a more positive light (Lambert et al., 2012). Lambert et al. (2012) performed multiple studies to prove that positive reframing had an indirect effect on lowering depressive symptoms. Moreover, Eisenbeck et al. (2021) insinuated that positive reframing could alleviate mental suffering. Positive reframing was further researched as a coping strategy by Ferreira et al. (2021), showing it predicted better mental health. Furthermore, in order to increase someone's

well-being and mental health, the ability to adapt could be important. This can be seen as a person's resilience, seeing as this may be defined as someone's ability to adapt to adverse circumstances (Gabana et al., 2020; Anderson et al., 2021). Resilience may be important, as it has been shown to increase mental health because it is associated with low depression as well as high social functioning and overall better quality of life (Anderson et al., 2021; Terrill et al., 2014). However, the research into both positive reframing and ability to adapt in relation to PPI's is limited. Therefore, this paper will focus on these variables and research them.

Another important aspect in evaluating the effectiveness of an intervention is client satisfaction with an app, as this can greatly improve clarity and ease of use by users (Jaffar et al., 2021). Jaffar et al. (2021) performed a usability evaluation on an mHealth application using different heuristic questionnaires as well as expert's opinions. To further show the relevance of satisfaction, specifically among psychology interventions, Otero et al. (2020) conducted an intervention study in which client satisfaction was measured in order to show its acceptability and feasibility.

Based on this background, there will be three research questions which will form the main focus of this study. The first one is: "Does the 'TiP' app have an effect on a student's ability to use positive reframing?". The null-hypothesis and main hypothesis for this question are: H_0: "The 'Tip' app does not have an effect on a student's ability to use positive reframing."; H_1: "The 'TiP' app has a significant positive effect on a student's ability to use positive reframing.". The second research question is: "Does the 'TiP' app have an effect on a student's ability to adapt?". The null-hypothesis and main hypothesis for this question are: H_0: "The 'TiP' app does not have an effect on a student's ability to adapt."; H_1: "The 'TiP' app has a significant positive effect on a student's ability to adapt.". The third and last research question is as follows: "To which extent are the users of the app satisfied with the 'TiP' app?". For this

research question, no hypotheses were set because there are always ways to improve upon a client's satisfaction.

Methods:

Study design:

In order to determine the effect that the positive psychology app 'Training in Positivity' has on ability to adapt and positive reframing as well as the user evaluation, a pilot study is conducted. This pilot study may be defined as a one group pretest posttest design, which can be used to determine the effect of an intervention on a specific sample (Allen, 2017) Specifically, the research is an intervention study, which will be implemented using two separate measures, meaning the participants will fill in a questionnaire before starting the intervention as well as after having completed it. Due to this being a pilot study, there will be no control group.

Participants:

Partly, the participants for this study were recruited through SONA, a platform on which psychology and communication science students from the University of Twente are able to sign up for multiple studies in return for receiving SONA credits. SONA credits are points which psychology and communication science students at the University of Twente must obtain before graduating. Moreover, participants in a minor (physiotherapy) at the Saxion were recruited for this particular study.

This research was approved by the University of Twente's Ethics Committee. Prior to the study, all participants gave their informed consent and were informed that they could withdraw from the study at any time without having to give a reason. Moreover, there were multiple inclusion criteria: participants must be in possession of an e-mail address, as well as a smartphone or tablet with daily access to good internet. This is necessary due to the app needing internet to function properly. Participants must also be able to read and write

sufficient Dutch. Moreover, participants were asked to not participate in this study when battling severe mental health issues. Lastly, being older than 18 was a requirement as well.

Due to there being three different research questions, two determining the effect of the app on different variables and one determining the client satisfaction, two separate datasets had to be used, leading to different participants. Regarding the first two research questions, 138 responses were recorded, with ages ranging from 17 to 30 ($Mean_{age} = 21.17;\ SD_{age} = 2.448$), of which 84 participants responded to the pre-questionnaire and 54 participants also responded to the post-measure. Of the 84 participants who responded to the pre-questionnaire, 74 filled in their sex (27 male, 47 female). More demographics regarding these respondents can be found in Appendix A. During the post-measure, 51 participants filled in their sex (15 male, 36 female) while the remaining three abstained from doing so. Regarding the final research question, due to only using the post-questionnaire, 54 responses were recorded with ages ranging from 18 to 29 ($Mean_{age} = 20.95;\ SD_{age} = 2.195$) with the same male-female division as mentioned before.

Materials:

Regarding the pre-questionnaire, there are multiple parts. Firstly, there is the question of informed consent. Secondly, there are some general demographical questions about the person in question (e.g. age, gender). Thirdly, the questionnaire contains multiple pre-existing questionnaires. There are multiple questionnaires used which have no relevance to this study, because this research is part of a larger study, involving more variables. These questionnaires can be found in Table 1. Lastly, participants were able to make comments about the current study.

Table 1

Questionnaires included in the pre- and post-measurement

Questionnaire	Number of questions	Source

Mental Health Continuum-Short Form	14	(Lammers et al., 2010)
Patient Health Questionnaire-9	9	(Kroenke et al., 2001)
Generalized Anxiety Disorder-7	7	(Spitzer et al., 2006)
General Self Efficacy Scale	10	(Scholz et al., 2002)
Spiritual Attitude and Involvement List-Short Form	7	(De Jager Meezenbroek et al., 2012)
Savoring Beliefs Inventory	4	(Bryant, 2003)
Forms of Self-Criticising/Attacking and Self-Reassuring Scale	8	(Baião et al., 2014)
Positive Reinterpretation Subscale of the Coping Orientations and Problems Experienced Inventory	4	(Carver et al., 1989)
Perseverative Thinking Questionnaire	15	(Ehring et al., 2011)
Generic Sense of Ability to Adapt Scale	10	(Schuffelen et al., in preparation)
Client Satisfaction Questionnaire	8	(Larsen et al., 1979)

In this research, the Generic Sense of Ability to Adapt Scale (GSAAS) and the positive reinterpretation subscale of the Coping Orientations and Problems Experienced inventory (COPE) are used. The GSAAS is a recently developed scale which measures the perceived ability to adapt through 10 items (Hering, 2021). The participants indicate responses on a 5-point likert scale to what extent they agree with the given prompt (Hering, 2021). A higher sum score shows a larger ability to adapt in a person (Hering, 2021). Regarding the internal consistency the scale has a score classified as "good" ($a = 0.84$) (Hering, 2021). Test-retest reliability has not yet been measured.

The COPE inventory measures important coping processes through 13 different scales, one of which is called positive reinterpretation (Carver et al., 1989). The positive reinterpretation subscale is typified by reframing the stressor in positive terms, which is why this research uses it to determine positive reframing (Carver et al., 1989). Every question can be scored from 1 to 4, ranging from "I usually don't do this at all" to "I usually do this a lot" (Carver et al., 1989). Concerning the internal consistency the general Cronbach's alpha ranges from 0.45-0.92 ($Mean = 0.71$) with the positive reinterpretation scale being slightly lower than the mean ($\alpha = 0.68$) (Carver et al., 1989). Moreover, the test-retest reliability

after six weeks showed scores ranging between 0.42-0.89 ($Mean = 0.66$) with the positive reinterpretation scale again being slightly lower ($r = 0.63$).

'TiP' is a 3-week structured intervention. Every three days, the participants will receive a new exercise aimed at improving their mental well-being and resilience. The participants will be instructed to do this exercise for a minimum of three days. This will generally take around 15 minutes per day. 'TiP' includes six separate exercises:

1. Three good things (savoring);
2. Asking three people about the participant's strong points (knowledge of strong points)
3. Visualizing optimal self (optimism)
4. Self-compassion during setbacks (self-compassion)
5. Finding of unexpected positive results from setbacks (positive reframing)
6. Kind actions towards others (positive relations)

The users receive short motivational feedback after having performed an exercise, for example praising them for doing the exercise and informing them about the usefulness of the exercise. After every module, there is a short explanation about the following module. Moreover, before and after every module, the users fill in a short questionnaire that measures the skill that was used in that particular module. The participants will receive feedback on the progress they made in terms of how many points they earned before and after the exercise, this way the progress that has been booked can be measured.

After having participated in the intervention, the participants are asked to fill in another questionnaire. This questionnaire contains multiple parts. Firstly, the participant is asked his/her age and sex. Secondly, the participant is asked the same questions from the same questionnaires as posed in the pre-measurement. Thirdly, the participant is asked to evaluate the app using the Client Satisfaction Questionnaire, in which the participant can

answer between 1-4, with 1 being least satisfactory and 4 being most satisfactory. Lastly, the participant is asked about potential comments for the researcher.

Procedure:

First, the participants were sent an e-mail containing an information letter about their participation along with the link to the first questionnaire (pre-measurement) and the download instructions for the app. The participants were asked to give their informed consent as part of the first questionnaire. After having filled in the pre-measurement, the participants started to use the app. The participants used the app for 3 weeks, after which they were sent the link to the post-measurement questionnaire. After having completed the app's exercises, the participants filled in the post-measurement questionnaire.

Data analysis:

The data was analysed using the statistical analysis software program: 'SPSS' version 27. The demographics of the participant were reported using frequency tables. After having looked at the frequency tables, the data from the pre- and post-measurement was analysed. To analyse the data regarding ability to adapt and positive reframing, two linear mixed models were employed, because of its usefulness in determining the impact of one factor on another (Frey, 2018). In order to determine the effect of gender, separate datasets were used, one containing all females and one containing all males. The dependent variable used in the first model was the summed result from the Generic Sense of Ability to Adapt Scale (GSAAS). The dependent variable used in the second linear mixed model was the summed score of the Positive Reinterpretation Subscale of the Brief Coping Orientations and Problems Experienced Inventory (COPE). In both models the independent fixed factor used was the measure (pre and post). The participants are the clustering variable taken as a random effect. Moreover, Cohen's $d = \frac{mean\ difference}{standard\ deviation}$ was calculated in order to estimate the effect size of the scales and interpreted using the benchmarks set forth by Cohen himself (Lakens, 2013). Regarding the

Client Satisfaction Questionnaire, means are determined and looked at. Both individual means (per question) and grouped means (all questions together) will be used to determine user satisfaction. Individual means will show which aspects might need some more work as well as which aspects are already satisfactory to the client.

Results:

Ability to adapt and positive reframing

In total, 138 responses were recorded, counting both pre- and post-measures, of these responses 28 were removed due to incomplete attempts, a percentage of 20%. Moreover, there was one participant aged below 18, leading to that response also being removed. The results showed that the intervention did not have a significant effect on all the participants taken together regarding ability to adapt and positive reframing as can be seen in Table 2 and Table 3. However, there was one significant effect observed, namely the effect of the intervention on the ability to adapt in males. According to Cohen's d, the observed effect is medium in effect size (Lakens, 2013).

Table 2

Results linear mixed model analysis with ability to adapt as the dependent variable

Variable:	β	p	t	d*	$Mean_{pre}$	SD_{pre}	$Mean_{post}$	SD_{post}
Female	1.74	0.22	1.23		23.1	9.25	24.8	5.81
Male	3.87	0.03	2.22	0.53	27.4	8.74	31.2	5.11
Total	2.20	0.07	1.83		24.6	9.89	26.8	6.06

*Cohen's d is only calculated for significant outcomes

Table 3

Results linear mixed model analysis with positive reframing as the dependent variable

Variable:	β	p	t	d*	$Mean_{pre}$	SD_{pre}	$Mean_{post}$	SD_{post}
Female	0.24	0.63	-0.49		12.0	3.20	12.3	2.01
Male	1.32	0.07	1.88		12.5	3.54	13.8	2.07
Total	0.26	0.53	0.63		12.5	3.36	12.8	2.06

*Cohen's d is only calculated for significant outcomes

Client satisfaction

To determine client satisfaction, the data from the post-questionnaires at both the University of Twente and the Saxion was used. This merged dataset contained the data of 54 participants, of which 13 had to be removed due to incomplete attempts. In order to be able to make relevant conclusions regarding client satisfaction, both means and standard deviations were calculated for all individual questions as well as group-means using SPSS, as can be seen in Table 4. The individual means showed a range of 2.34 to 2.90, with answer possibilities 1-4. According to these means, question 5 (amount of support received) was rated most highly, while question 8 (likeliness of using 'TiP' again) was rated the lowest.

Table 4

Means and standard deviations retrieved from the CSQ

Question:	Mean	SD
Q1: What do you think of the quality of 'TiP'	2.71	0.680
Q2: Did you receive the support you hoped to get from 'TiP'?	2.68	0.756
Q3: To what extent did 'TiP' not meet your wishes?	2.54	0.636
Q4: Imagine someone you know would need the same kind of support, would you recommend 'TiP'?	2.56	0.776
Q5: To what extent are you content with the amount of support you received from 'TiP'?	2.90	0.625
Q6: Did 'TiP' help you to better deal with your current situation?	2.68	0.610
Q7: In general, how content are you with 'TiP'?	2.80	0.715
Q8: Would you use 'TiP' again if you needed to?	2.34	0.762
Sum of all questions:	2.65	0.577

Discussion:

The purpose of this study is to determine the effect of the positive psychology app: "Training in Positivity" on the variables ability to adapt and positive reframing as well as determine how users evaluated the app. In order to do this, data was collected by way of pre- and post-questionnaires. To interpret this data, a linear mixed model was run, and means were calculated. The linear mixed model analysis showed that there was no significant effect of the "TiP" app on the variables ability to adapt and positive reframing when all participants were

grouped together, therefore the two hypotheses put forth in the beginning of this paper can be rejected. Nevertheless, there was a significant effect found when viewing only the males in the dataset, namely an effect of the ‘TiP’ app on the males’ ability to adapt. This effect is positive, meaning that the intervention increased the males’ ability to adapt. This effect is classed as being medium (Lakens, 2013). According to the model of sustainable mental health, gratitude interventions like ‘TiP’ can increase resources such as positive reframing and positive emotions and decrease barriers such as repetitive negative thinking in people as needed resulting in a larger ability to adapt (Bohlmeijer & Westerhof, 2021). Thus, Bohlmeijer and Westerhof (2021) mention an indirect relationship between gratitude interventions and ability to adapt which can be directly linked to the positive results found, significant and non-significant in this pilot study. Tunariu et al. (2017) found, during their research into the effects of a PPI on children, a marginally significant effect of gender on resilience which can be linked to the results regarding ability to adapt. Moreover, also during the research a large difference between gender baselines was noticed, as is seen in this pilot study (Tunariu et al., 2017).

This pilot study found a non-significant positive effect of the intervention on positive reframing. This can be linked to the fact that the ‘TiP’ app has the aim of bettering mental health and well-being as positive reframing seems to be associated with positive mental health (Ferreira et al., 2021). Furthermore, one of the resources mentioned in the model of sustainable mental health is positive reframing, indicating a direct relationship between gratitude interventions such as ‘TiP’ and positive reframing (Bohlmeijer & Westerhof, 2021). However, this pilot study did not find a significant positive effect of the intervention on positive reframing, not showing a direct relationship.

Means were calculated to interpret the data from the Client Satisfaction Questionnaire, not showing much variation between the questions. The question which was

rated most poorly asked participants to rate whether they would use ‘TiP’ again and according to the answers given, over half of the participants would not. This shows that there is a lot of room to improve the app. The aspect which, according to the participants, has the least to improve, is the amount of support ‘TiP’ is currently giving its users. Although this mean was close to being satisfactory, it is still only marginally above average, especially when taking the standard deviation into account. The overall rating as measured by the CSQ showed an average score, meaning approximately half of the users were content while the other half were disappointed. According to the questionnaire, participants were content with the amount of support received, but this support was not the kind they wished for. One reason for this could be the fact that positive psychology was used instead of traditional psychology as PPI’s can be too content-focused, leading to participants losing sight of the context and possibly feeling hopeless (Ciarrochi et al., 2016). In order to prevent this, a contextual approach must be taken, meaning participants must take into account the possibilities and impossibilities of their situations (Ciarrochi et al., 2016). This is further supported by Gable and Haidt (2005), who mentioned positive psychology neglecting the negative parts of life, an aspect in which ‘TiP’ could possibly improve.

It is important to note the limitations of the current research. Firstly, the sample is very specified, meaning that only students who study in Enschede participated, making it a very select sample size. Secondly, this study did not include a control group, as is preferred with these kinds of intervention studies (Allen, 2017). Therefore, it is impossible to know whether the data found is reliable. Thirdly, 30 out of 84 participants only filled in the first questionnaire, neglecting to either participate in the app and/or fill in the post-questionnaire. This might lead to the data being less representative with the post-questionnaire data only showing the participants who continued. This is especially crucial for the CSQ as the users who were most likely to be unhappy with the app did not fill in this questionnaire. Therefore,

these scores might be an overestimation. Fourthly, there were 15 participants who did not finish the app and/or did not do all the app's exercises. As can be imagined, this might lead to the app having less of an effect. Lastly, this was a pilot study, therefore only a small number of people participated. This makes for a not very representative sample, as outliers may skew the data too much (Qualtrics, 2022). However, there are also many advantages to a pilot study as pilot studies enhance reliability and validity in research, due to its nature is to determine the need for further research (Malmqvist et al., 2019).

Recommendations for research can be made on the basis of the above-mentioned flaws. Firstly, research involving a more varied and larger sample size would be high on the priority list. A larger study could also include other variables, such as well-being and anxiety because these variables are also the intended outcomes of this app. Secondly, it would be very interesting to see how this research would compare to a similar study employing an experimental design. Mostly, the introduction of a control group would allow for more clear insight. This would also be more reliable, seeing as one would know both the effect of doing the intervention and not doing it (Allen, 2017). Thirdly, going in a different direction, it would be interesting to know whether other positive psychology apps or interventions do prove to have a significant effect on either someone's ability to adapt or use of positive reframing. It would be especially interesting to include a context-based intervention, to determine the impact of a contextual perspective. This would yield more specific information about positive psychology interventions in general as well as the above-mentioned variables. Lastly, a deep dive into what it is that makes users dissatisfied with the app is necessary before moving on. A focus group could be a good way of implementing this, as they are often used for qualitative evaluations (Edmunds, 1999). During this focus group, special attention could be brought to the kind of support the participants want and how to keep users engaged to continue the evaluation to the end.

Concluding, the ‘Training in Positivity’ app did not have a significant effect on the participants’ ability to adapt or their ability to positively reframe situations. Nevertheless, the males who participated did prove to be impacted by the ‘TiP’ app, allowing them to achieve higher scores on their ability to adapt after having completed the intervention. This effect was classified to be a medium size. Moreover, client satisfaction was rated to be average by the participants, allowing for room to improve on this subject.

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Appendices:

Appendix A: Demographics of participants

	All participants	Men	Women
Living situation: Living alone	9	5	4
Living situation: Living with partner	4	1	3
Living situation: Living at parent's	17	6	11
Living situation: Living with others	6	2	4
Marital status: Never been married/registered partners	36	14	22
Country of residence: Netherlands	29	12	17
Country of residence: Other	7	2	5
Country of origin: Netherlands	22	10	12
Country of origin: Other	14	4	10
Mother's country of origin: Netherlands	17	9	8
Mother's country of origin: Other	19	5	14
Father's country of origin: Netherlands	19	9	10
Father's country of origin: Other	17	5	12
Work: Paid work	2	1	1
Work: Independent contractor	1	1	0
Work: Student	33	12	21
Schooling: Primary school	1	1	0
Schooling: VMBO/MAVO	5	1	4
Schooling: MBO	3	2	1
Schooling: HAVO/VWO	23	8	15
Schooling: HBO	2	0	2
Schooling: Other	2	0	2