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**Changes in Test Anxiety amongst University Students after
undergoing the Acceptance and Commitment Therapy-based
Intervention “Geluk en zo”**

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Abstract

The current study examined whether participants underwent changes in levels of test anxiety, anxiety, and subjective well-being after participating in the Acceptance and Commitment Therapy-based (ACT) intervention “Geluk en zo”. ACT is based on the psychological flexibility model and makes use of acceptance, mindfulness, and activation methods to change the impact of maladaptive thoughts and behaviors. Eighteen students from the University of Twente took part in the 2-weeks long paper pen version of this intervention. They underwent 10 exercises where they 1) determined valuable thoughts, behaviors, and/or feelings they wanted to achieve, 2) monitored their activities three times a day for 10 – 11 days, and 3) evaluated their findings. The results indicated that their anxiety, test anxiety, and subjective well-being levels did not change significantly in the posttest, though their anxiety and test anxiety levels decreased into the hypothesized direction. The research showed that levels of anxiety and test anxiety could change if the intervention is intensive enough and if participants have higher-than average levels of test anxiety and anxiety, as a ceiling effect could be inferred for normal and lower levels. Further research has to be done on levels of subjective well-being, as a ceiling effect might have also been present regarding the averagely levels of subjective well-being compared to the norm group of peers.

Introduction

Test anxiety is a common state of mind amongst university students, as between 25% to 40% of students experience it (Cassady, 2010). Therefore, it is necessary to help students suffering from test anxiety to learn to cope with it and behave appropriately, e.g. by dealing with it instead of avoiding it. For this reason, the current research was concerned with the intervention “Geluk en zo” (Dutch, translated to “Happiness and such”), which is based on Acceptance and Commitment Therapy (“ACT”). More specifically, this research focused on the intervention’s possible influence on test anxiety, anxiety, and subjective well-being.

Anxiety is defined as a sense of discomfort and worry regarding an undefined threat (Taylor & Arnou, 1988). Test anxiety is one form of anxiety that refers to evaluative situations (Friedman & Bendas-Jacob, 1997), such as exams. Liebert and Morris (1967) distinguished between two components of test anxiety, namely worry and emotionality. Worry relates to a cognitive concern about the own performance, consequences of failing, and similar thoughts and feelings. Emotionality refers to self-perceived autonomic arousal, which represents itself through amongst others sweaty hands (Liebert & Morris, 1967).

Test anxiety is associated with poor academic performance (Cassady & Johnson, 2001; Steinmayr, Crede, McElvany, & Wirthwein, 2016). The degree of test anxiety is amongst others moderated by the temporal distance to the exam date. The closer the date of the exam comes, the higher test anxiety becomes (Lotz & Sparfeldt, 2016). Furthermore, the influence of test anxiety is not only restricted to one’s performance, but also influences one’s subjective well-being. It has been shown, that higher levels of test anxiety negatively affected levels of subjective well-being (Steinmayr et al., 2016). Thus, the importance of reducing test anxiety becomes apparent as subjective well-being increases when test anxiety decreases.

Living according to worthwhile aspects of life is associated with greater health, and greater subjective well-being (Hayes et al., 2012). As subjective well-being has been shown to

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be an important aspect of a person's life and due to the fact that ACT has the potential to improve well-being and reduce anxiety, "Geluk en zo" has been developed. Currently, the intervention is in its second generation of development, and in its final state it will be released as an application ("app") for smartphones. ACT aims at the use of acceptance, mindfulness, and activation methods to change the impact of maladaptive thoughts and behaviors. The goal is thus not to reduce or remove difficult and unwanted feelings, but to focus on worthwhile aspects of life, including those potentially negative aspects that are inevitable (Hayes, Strosahl, & Wilson, 2012). ACT is based on the psychological flexibility model. To achieve greater acceptance of maladaptive thoughts and behaviors, this model tries to increase the psychological flexibility of an individual (Hayes et al., 2006). Psychological flexibility is defined as "the ability to contact the present moment more fully as a conscious human being, and to change or persist in behavior when doing so serves valued ends" (Hayes & Strosahl, 2004, p. 5).

The model is based on the following six core processes to achieve psychological flexibility: Acceptance, cognitive defusion, present-focused attention, self-as-context, values and commitment action (McCracken & Morley, 2014). According to Hayes, Luoma, Bond, Masuda, and Lillis (2006), the core processes are described as follows: **Acceptance** refers to letting feelings be as they are without trying to block, avoid or change them. For example, people with test anxiety should not try to focus on reducing their feelings of anxiety, but they should accept them as they are. **Cognitive defusion** is a technique used to change the unwanted functions of thoughts. Functions of thoughts are automatic negative thoughts that can lead to negative emotions, control behavior, and impact daily functioning. Thoughts should be seen as simply thoughts and not be taken literally. A new context will be created so that the undesirable function is removed, thus enabling a person to have thoughts that do not affect them as strongly. **Present-focused attention** refers to the awareness of the here and now. The individual learns how to experience the here and now with openness, interest and

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receptiveness. **Self-as-context** refers to taking an observational perspective to become aware of one's own experiences without being attached to them. This allows a person to foster his defusion and acceptance. **Values** refers to identifying those aspects of life that are important to oneself. A person chooses these values for him/herself and this helps to avoid those verbal processes that could lead to choices based on avoidance or fusion. Finally, **committed action** refers to actions associated with the chosen values. The values themselves are not seen as goals, but rather goals are set that are in line with the values.

Research has shown that interventions based on ACT can influence both anxiety and well-being (Hayes, 1987; Trompetter, Lamers, Westerhof, Fledderus, & Bohlmeijer, 2017; Räsänen, Lappalainen, Muotka, Tolvanen, Lappalainen, 2016). In support of these results, a meta-analysis indicated that interventions based on ACT have a potential to impact anxiety (Öst, 2014). Another meta-analysis showed that ACT is equally successful as cognitive behavioral therapy, and compared to control conditions it is superior for primary outcomes of treatments based on waitlists, psychological placebo, and treatment as usual (A-Tjak et al., 2015). Additionally, ACT showed to be superior on secondary outcomes such as life satisfaction (A-Tjak et al., 2015). Lastly, a randomized controlled trial has shown that acceptance-based behavior therapies can be effective in treating test anxiety (Brown et al., 2010). Based on these results and due to the close relationship between anxiety and test anxiety (Friedman & Bendas-Jacob, 1997), interventions based on ACT, including “Geluk en zo”, have the potential to reduce test anxiety among students.

Current Study

Today's study is concerned with the effectiveness of the intervention “Geluk en zo”, which is particularly focused on values, committed action, and experiential avoidance. In order to test the potential of the intervention in regards to university students, the focus lays on reduction of test anxiety. Lowering test anxiety in students is of importance as it not only

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can increase their academic achievement, but also increase their overall subjective well-being.

To find out whether the intervention in its current state has a potential impact on test anxiety, the following research question has been established: “To what extent does the test anxiety level of university students change after participating in the intervention “Geluk en zo”?”

One hypothesis has been established to test the research question:

1. The average posttest score of test anxiety is significantly lower than the pretest score.

Due to the close relation between test anxiety and anxiety (Friedman & Bendas-Jacob, 1997), and test anxiety and subjective well-being (Steinmayr et al., 2016), two additional hypotheses have been established. The possibility exists that a change in anxiety and subjective well-being levels could occur after participating in the intervention:

2. The average posttest score of the anxiety is significantly lower than the pretest score.
3. The average posttest score of subjective well-being is significantly higher than the pretest score.

Methods

This research followed a repeated measures pretest-intervention-posttest design with one condition.

Participants

Eighteen students of the University of Twente participated in the current study. They were sampled through convenience sampling. Either the researcher recruited them personally or they were sampled by means of SONA Systems, a system where students receive test-subject credits for participating. One participant has been excluded from analysis due to signing up, but not starting the intervention because of personal time constraints. This resulted in a final number of 17 participants. Seven male and ten female students took part. The ages

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ranged between 19 and 28 years, $M = 22.47$, $SD = 2.83$. Twelve of them were psychology students, the other five were students of other fields.

Procedure

Two meetings were set up with each participant. They took part in different locations, such as a booked room in the library or at the participant's home. The choice of location depended on whether it was quiet or not, and the accessibility.

During the first meeting, participants received the paper-pen version of the intervention and the manual, and an oral explanation of the entire intervention, including a short description of each exercise. Then, the pretest was taken. Afterwards, if the participants had any questions, they were answered by the researcher. Then they began the intervention a day after the first meeting. After two weeks, a second meeting was held. During that meeting, the researcher was given back the intervention, participants took the posttest, and the short evaluative questionnaire was given to them.

Materials

Manual. A handbook was written by the creators of the intervention, which explains the background of the intervention and each step to be done. It gives a full description of each exercise, and when and what has to be done. Furthermore, it gives examples for every exercise.

Intervention. The intervention consists of ten exercises. The exercises are split over two weeks. They consist of four phases, namely "Values and experiential avoidance", "Registration/monitoring", "Reflection", and "Behavior change". Table 1 gives an overview of the phases with their respective points in time they take place and exercises.

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Table 1

Four phases of the intervention with their respective points in time, exercises, and titles of exercises

Phase	Point in time	Exercises	Title
Values and experiential avoidance	Day 1	1 + 2	1: What do I want? 2: What do I want to avoid?
Registration/monitoring	Week 1	3	3: What am I doing and what do I think about it?
Reflection	Day 1 of Week 2	4 – 9	4: Experience approaching values 5: State of affairs 6: Conclusions 7: The benefit of approaching values 8: Does experiential avoidance help? 9: Conclusions
Behavior change	Week 2	10	10: Doing what yields something

Exercises one through three were done within the first week, exercises four through ten in the second week. In the first exercise, participants had to work out feelings, behaviors, and/or thoughts they wanted to get away from (“experiential avoidance”, Dutch: “vandaan”). These refer to things they did not want to experience anymore, because they were not valuable to them and did not lead to happiness. In the second exercise, they had to work out feelings, behaviors, and/or thoughts they wanted to move towards to because they are important or valuable to them (“approaching values”, Dutch: “naartoe”). These two exercises were done at the beginning of the intervention. The third exercise spans a period of one week. At three or four days within that week, participants had to note down at three specific points in a day what they were doing. The goal of this exercise was to get a short overview of how an average week looks like. Two of those days should be on working days and one at a weekend day. The fourth day is optional in case participants wanted an additional day to do the exercise. Then, they had to note down whether the activity was a from-activity, routine

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activity, or toward-activity. Finally, they had to rate nine statements about that activity, for example: 'I find it nice to do this activity' (Dutch: "Deze activiteit vind ik leuk om te doen") or 'I think that I have to do it' (Dutch: "Ik denk dat ik dit moet doen"). These statements are rated on a 5-point Likert scale [from 1 = "Never true" (Dutch: "Helemaal niet waar"), to 5 = "Always true" (Dutch: "Helemaal wel waar")].

At the first day of the second week, participants went through exercises four through nine. In exercise four, they were asked to describe the feeling they had when they engaged in a toward-activity. In exercise five, they were asked to count the amount of from-activities, toward-activities, and routine activities. Then, they had to note down the patterns that correspond to each of the three, which they noted down in exercise three while rating the nine statements, for example "nice" (Dutch: "leuk") or "exhausting" (Dutch: "inspannend"). In exercise six, they noted down the conclusions they drew from exercise five. Exercises seven and eight were similar to exercise two and one respectively. There, participants had to relate their experiences from what they noted down during the first week to what they wrote down during the first two exercises. In exercise seven, they worked out why precisely they wanted to move towards the thoughts, behaviors, and/or feelings they wrote down in exercise two, and why it was important to them. In exercise eight, they worked out what they wanted to move away from, how they could achieve that, and whether they thought it was possible for them to do so or not. In exercise nine, they summarized their conclusions from exercises seven and eight. The participants ended the intervention with exercise ten, which spans over the second week. Similar to exercise three, they noted down three times a day, but daily, what they were doing and whether it was a "from-activity", "routine activity", or "toward-activity". Then, they completed one of two statements at each time point they note down what they were doing: "I continue doing that because..." (Dutch: "Ik blijf dit doen want...") or "I will do something different, namely..." (Dutch: "Ik ga iets anders doen, namelijk...").

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Measures. Three questionnaires were chosen by the researcher to be used as pre- and posttests. Anxiety was measured by the *Beck Anxiety Inventory (BAI)*. This is a self-report measure of anxiety and consists of 21 items. Participants had to rate how much they had been bothered by a symptom during the past month. The items were rated on a 4-point Likert scale (from 0 = “Not at All” to 3 = “Severely – it bothered me a lot). The final score is calculated by creating the sum of all individual score, which ranges from 0 – 63. Scores at or below 21 indicate *low anxiety*. Scores between 22 – 35 indicate *moderate anxiety* and scores at or above 36 indicate *potentially concerning levels of anxiety* (Beck, Epstein, Brown, & Steer, 1988). Sample items include “Numbness or tingling” and “Shaky/unsteady”. A high internal consistency ($\alpha = .92$) and test-retest reliability ($r = .75$ across one week) have been established for samples of 160 and 83 participants respectively (Beck, Epstein, Brown, & Steer, 1988). A moderate correlation with the revised Hamilton Anxiety Rating Scale (.51), and mild correlation with the Hamilton Depression Rating Scale (.25) have been found, which indicate a good validity (Beck et al., 1988). For the current sample, the Cronbach’s alpha for the pre- and posttests were .79 and .72, respectively.

Test anxiety was measured by the “Negative fear of failure” subscale of the *Prestatie Motivatie Test (PMT)*; Dutch translated to “Achievement Motivation Test”). The entire scale consists of 90 items divided into three subscales. The two other subscales are positive fear of failure and achievement motive. The questionnaire is not visibly divided into the subscales as the items are ordered randomly. Depending on the question, the statements on the PMT were answered on a 2-point, 3-point, or 4-point Likert scale. Positive fear of failure refers to high work pressure and much responsibility that motivates to achieve better results (Hermans, 1969). It consists of 19 items. A sample item includes “I have the experience that when I have light anxiety feelings, my reaction ability...” (Dutch: Ik heb de ervaring dat als ik lichte angstgevoelens heb, mijn reactievermogen...). Achievement motive refers to a stabile personality disposition that leads to a higher degree of achieving (Hermans, 1969). It consists

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of 45 items and was removed from the current study in order to reduce the total length of the pre- and posttest for the participants. Negative fear of failure refers to anxiety in situations under stressful conditions and a high difficulty, such as during exams (Hermans, 1969). It consists of 26 items. Each answer has either a score of 0 or 1, which is used to calculate the total score by creating the sum of all individual items. The total score for the subscale ranges from 0 – 26. Scores between 10 – 12 represent the average scores (Hermans, 2004). A sample item includes “When I failed once, it inhibited me...” (Dutch: “Als ik een keer gefaald heb, dan hinder dat mij...”). For this subscale, a high internal consistency ($\alpha = .88$) was established (Hermans, 2004). The authors of the questionnaire indicate a good validity, though not naming any specific values (Hermans, 2004). For the current sample, the subscale indicates a Cronbach’s alpha of .636 and .773 for the pre- and posttest respectively.

Subjective well-being was measured by the *Mental Health Continuum-Short Form (MHC-SF)*. It consists of three subscales and in total 14 items. The first subscale is emotional well-being (Dutch: “Emotioneel welbevinden”) and refers to life satisfaction and positive emotions (Diener, Suh, Lucas, & Smith, 1999). It consists of three items. The second subscale is social well-being (Dutch. “Sociaal welbevinden”) and refers to an optimal functioning of a person. More specifically, it focuses on optimal functioning in society (Keyes, 1998). It consists of five items. The last subscale is psychological well-being and also refers to the optional functioning of a person, but focuses on optimal personal functioning (Ryff, 1989). It consists of six items. Participants had to rate questions relating to their feelings of the past month on a 5-point Likert [from 0 = “Never” (Dutch: “Nooit”) to 5 = “Every day” (Dutch: “Elke dag”)]. The final score ranges from 0 – 5. Mean scores have been established for different age groups. The overall mean score for the Dutch population is 2.98 (Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011). A sample item includes “During the last month, how often did you have the feeling that you were happy?” (Dutch: “In de afgelopen maand, hoe vaak had u het gevoel dat u gelukkig was?”). The total scale has a

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high internal consistency ($\alpha = .89$) and test-retest reliability (three and nine months, $r = .65$; Lamers et al., 2011). It correlates $-.22$ with the General Health Questionnaire (Keyes et al., 2008). For the current sample, the scale indicates a Cronbach's alpha of $.827$ and $.865$ for the pre- and posttest respectively.

Evaluation. In addition to the measures, an evaluative questionnaire created by the authors of the intervention was used to gather opinions about the intervention itself and its procedure (see Appendix). It consists of eight open questions and one closed question that has to be rated on a 3-point Likert scale [0 = "Less good" (Dutch: "Minder") to "Precisely good" (Dutch: "Juist goed")]. Alternatively, the last question can also be treated as an open question instead of a closed question. Sample items include "Does the intervention have an influence on your activities?" (Dutch: "Heeft de interventie invloed op je activiteiten?") and "What do you think of the two beginning-exercises where you describe where you want to move towards to and where you want to move away from?" (Dutch: "Wat vind je van de twee beginoefeningen waarin je beschrijft waar je naartoe wilt en waar je vanaf wilt?").

Additionally, one more closed question has been added to ask whether the participants had an/multiple exam(s) a few days before, while, or a few days after the intervention. This is not part of the evaluation itself, but it was added to see if having an exam shortly before, while, or shortly after the intervention has an impact on the results of the measures.

Analysis

SPSS (Statistical Program for Social Sciences) was used to analyze the collected data. Multiple variables were created additionally. There were no missing values.

Before starting the analysis, the Shapiro-Wilk test was used to test the distribution of the sample because it provides a good power for small samples sizes (<25 ; Steinskog, Tjøstheim, & Kvamstø, 2007). It tests whether the scores in the sample are significantly different from a normal distribution (Ghasemi & Zahediasl, 2012). The test indicated that the

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current sample was normally distributed for each measure's pre- and posttest. Afterwards, as having an exam was a possible confounding variable that could have an influence on the test scores, a two-way ANOVA with the difference score of each test as dependent variable and having an exam before, while, and/or after the intervention as fixed factors was performed. Then, to compare the scores of the pre- and posttests after undergoing the intervention, a paired-sample t-test was conducted. Here, 1-tailed p-values were handled at a significance level of .10, as the sample size was rather small. Because three from each other independent paired sample t-tests were performed, a Bonferroni correction was done. This resulted in a significance level of .033 for the results to be handled at. Finally, two post hoc independent paired sample t-tests were performed with the pre- and posttest scores of the negative fear of failure subscale of the PMT. The goal was to find out whether test anxiety levels significantly changed after the intervention for people with above-average and below-average levels of test anxiety. For the former, only scores above 12, for the latter only scores at or below 12 were included, as scores between 10 – 12 represent the norm average (Hermans, 2004). The data of six participants was used for above-average, the data of 11 participants for below-average levels of test anxiety. Here, also a significance level of .10 was chosen due to the small sample size and 1-tailed p-values were used.

Results

Confounding Variables: Closeness of Exam

Table 2 shows the degree of freedoms, F-scores, and p-values for each tests' difference score during each possible exam period. The first analysis revealed that having an exam shortly before, while, and/or shortly after the intervention did not have a significant influence on the scores of the pre- and posttests.

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Table 2

Degree of freedoms, F-scores, and p-values for each tests' difference score during each possible exam period.

	PMT_Difference			MHC-SF_Difference			BAI_Difference		
	df	F	p	df	F	p	df	F	p
Exam_Before	1, 13	2.75	.121	1, 13	.26	.621	1, 13	.81	.384
Exam_While	1, 13	.50	.492	1, 13	.01	.947	1, 13	.19	.667
Exam_After	1, 13	2.00	.181	1, 13	.72	.413	1, 13	.98	.340

Changes after Intervention

Table 3 shows the respective means, standard deviations, difference scores, and p-values of the pre- and posttests for each questionnaire. For the MHC-SF, the analysis revealed that the average score on the posttest is not significantly different from the average score on the pretest, $t(16) = -.384$, $p = .353$. The participants scored on average .03 points higher than on the pretest.

Table 3

Mean scores of the pre- and posttest for the PMT, MHC-SF, and BAI with their respective standard deviations (n = 17)

	Mean Pre (SD)	Mean Post (SD)	Difference Score	1-tailed p-value
PMT: Negative Fear of Failure	11.65 (3.90)	10.82 (4.79)	-.83	.093
MHC-SF: Total Score	3.29 (.73)	3.32 (.72)	.03	.353
BAI: Total Score	14.65 (7.10)	12.41 (5.90)	-2.24	.098

For both the negative fear of failure subscale of the PMT [$t(16) = 1.383$, $p = .093$] and the BAI [$t(16) = 1.352$, $p = .098$], the analysis revealed that the average scores on the

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posttests are not significantly different than the average score on the pretests, but they are close to be significant and go into the hypothesized direction. The participants scored on average .83 points less on the negative fear of failure subscale's posttest than on the pretest. In the BAI, the participants scored on average 2.24 points less on the posttest than on the pretest.

Ceiling Effect

The analysis revealed that the average score on the negative fear of failure subscale of the PMT posttest ($M = 13.33$, $SD = 4.84$) is significantly different from the average score on the pretest ($M = 15.17$, $SD = 2.64$) for participants who scored above 12 points on the pretest, $t(5) = 1.808$, $p = .065$. Participants scored on average 1.83 points less on the posttest than on the pretest. For participants scoring 12 or below points in the pretest, the analysis revealed a non-significant difference from posttest ($M = 9.73$, $SD = 3.01$) to pretest ($M = 9.45$, $SD = 4.37$), $t(10) = .382$, $p = .356$. Participants scored .28 points less on the posttest than on the pretest.

Evaluative Questionnaire

The participants were asked nine evaluative questions. Table 4 gives an overview of the questions and the most common answer. Here it is noteworthy that almost nobody neither felt an influence on their activities through the intervention ($n = 12$) nor thought of the intervention ($n = 13$). Nine participants agreed that the title "Geluk en zo" is fitting, but four felt that the title seems unserious and indifferent to the user's happiness. Furthermore, 12 participants felt that the explanation of the intervention's background was clear. 13 participants thought that the first two exercises were good because they make a person think about things one would not otherwise think about. It is important to note that nine participants felt that the expressions "vandaan", "routine", and "naartoe" were not clear to them and they had to re-read it. Additionally, they sometimes had trouble matching their current activity to

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one of the three. Finally, 15 people thought that being asked to note down the current activity three times a day was precisely good.,

Table 4

Questions of the evaluative questionnaire and the most common answers with the number of participants.

Question	Common answers	n
What was your global impression of the intervention?	Good, makes one think about daily structure	6
	Unsure whether it helped due to too generic activities	4
Did you think of the intervention outside of the exercises?	No	13
	Yes, because of being concerned with the subject of happiness	3
Did the intervention have an influence on your activities?	No	12
What do you think of the title “Geluk en zo”?	Fitting/good	9
	Seems unserious/indifferent	4
What do you think of the explanation of the intervention’s background?	Good/clear	12
What do you think of the first two exercises?	Good, makes one think about things one would not otherwise think about	13
	Terms “experiential avoidance” (vandaan), “routine”, and “approaching values” (naartoe) unclear	9
What do you think of the content of the questions regarding your activities when noting them down?	Okay, but sometimes it was difficult to determine what I was doing is irrelevant or not	8
What do you think of the amount of noting down three times a day?	Precisely good	15
Do you have other comments?	Expected to have more exercises to see how happiness changes after keeping doing what you do	1

Discussion

The intervention “Geluk en zo” has been used to examine whether students undergo a change in levels of test anxiety after participating in the said intervention. As test anxiety, anxiety, and subjective well-being are closely related (Friedman & Bendas-Jacob, 1997; Steinmayr et al., 2016), changes in their respective levels have also been predicted. More specifically, it was hypothesized that the posttest scores of test anxiety and anxiety decrease, whereas posttest scores of subjective well-being increases significantly with regards to their respective pretests scores. The results indicated that having an exam shortly before, during, or shortly after the intervention did not influence the pre- and posttest scores and thus was not a confounding variable. Furthermore, the results showed that none of the hypotheses were confirmed.

It has been shown that test anxiety levels of university students not-significantly decreased after undergoing treatments based on ACT (Brown et al., 2010). In line with this, the current results indicate that participants showed a slight, but non-significant, decrease in test anxiety levels. The current results can be explained by a relatively large standard deviation in the pretest, which indicates a large spread of scores. This means that in the current sample, there are too many individual differences between participants in terms of their baseline test anxiety levels in order to find significant differences. In the study of Brown et al. (2010), although the sample size was almost the same as the current sample size, all participants suffered from some level of test anxiety. Based on this, one could infer a ceiling effect regarding the intervention. The intervention might not be effective below a certain lower and/or above a higher boundary of test anxiety. This claim is supported through the post hoc analysis, which showed that participants with an above-average level of test anxiety showed a significant decrease from pre- to posttest, whereas participants with at-or below-average levels of test anxiety did not. Consequently, it was more likely for Brown et al. (2010) to find significant results in contrast to today’s research. Thus, in future research, one

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should take the levels of test anxiety or any other concept into account. It is recommended to include only cases with above-average levels of test anxiety. This way it is more likely to achieve significant change if a ceiling effect is indeed present. In addition, the sample size could also be a cause of the almost-significant result. In both the current and Brown et al.'s (2010) research, small sample sizes were used. The current results might not have been as expected due to the combination of a large variation and a small sample size. Thus, the sample size should be larger in future research, especially if all levels of test anxiety are incorporated. This makes the results more reliable compared to a small sample size such as in today's study. Therefore, it is still expected to have significant decreases in test anxiety levels in future research if the sample size will be large enough and if sufficient participants with above-average levels of test anxiety are incorporated. A last explanation of the results can be made by looking back at the core processes (Hayes et al., 2006). The evaluative questionnaire showed that both "achieving greater present-focused attention" and "identifying those aspects of life that are important to oneself" (i.e. values) were stimulated during the intervention. Many participants said that the intervention helped them in getting insight about their daily structure, but also the motivation behind individual actions. This is in line with the core process "achieving greater present-focused attention". Participants learned to be more aware of the here and now by actively focusing on what they are doing at a given moment. Furthermore, special attention was laid on the core process values during the second and fourth exercises, where participants wrote down what behaviors, thoughts, and/or feelings they wanted move towards to. Participants said that it helped them because they had to actively think about it and write it down, and because they otherwise would not have thought about these values. This does not mean that the other four core processes (i.e. acceptance, cognitive defusion, self-as-context, committed action) have not been incorporated at all or enough. The evaluative questionnaire might not have been specific enough to find out more about the other four. Thus, for future research two conclusions can be made based on the core

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processes: either the intervention is not intensive enough as only two of the six core processes have been stimulated, or the evaluative questionnaire should be changed to gather more information regarding these four processes.

The results further indicate a tendency towards a significant decrease in anxiety levels. Similar to the test anxiety results, the standard deviations for the anxiety pretests were very large. Thus, the non-significant decrease can be explained through the small sample size and large variation. In earlier researches it has been predicted that interventions based on ACT can possibly influence levels of anxiety (Swain, Hancock, Hainsworth, & Bowman, 2013; Öst, 2014). These suggestions and the current results are in line with recent research indicating potential significant decreases in anxiety levels amongst participants with anxiety symptoms.

With regards to subjective well-being, the results indicated almost no change from the MHC-SF pre- to posttest. On the one hand, this is surprising regarding the fact that multiple researches have shown that subjective well-being increases after undergoing an intervention based on ACT (Räsänen et al., 2016; Trompetter et al., 2017). On the other hand, if one looks closer at the data, differences between the experiments are visible. Participants of the current research scored averagely compared to their norm group, thus displaying a healthy level of subjective well-being (Lamers et al., 2011). In the research of Räsänen et al. (2016), the MHC-SF was also employed and participants scored lower-than-average on the pretest, but averagely on the posttest. Thus, referring to the current sample, it can only be said that already healthy levels of subjective well-being did not change, but the findings do not contradict other researches as the baselines differed. Similar to test anxiety, this also may indicate a ceiling effect. Changes in levels of subjective well-being seem to occur only if they are not on a healthy level.

Several additional, more generic explanations exist to why the results were not as expected. On a content level, the evaluative questionnaire indicated that there has been some

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confusion about the expressions “vandaan”, “routine”, and naartoe”. On the one hand, the expressions were not fully clear to some participants. Although they indicated that they understood the exercises regarding these expressions when they were explained to them by the researcher, they later said that they were not sure about the meaning of the words while going through the exercises, especially “vandaan”. Consulting the manual helped several participants with this problem and other minor issues they encountered during the intervention. On the other hand, participants sometimes had trouble assigning their current activity to either one of the three. As these are important concepts in the intervention, it is important that these expressions are fully understood, as they otherwise might mitigate the effectiveness of the intervention. The term “vandaan” refers to experiential avoidance. Therefore, it should represent this concept more clearly. A recommendation for the future would be the use of the expression “vermijding”, which is the Dutch word for “avoidance”. This does not only describe the activity they are doing as “avoiding something” (i.e. negative feelings), but also emphasizes the fact that this specific activity is something they want to stop doing, or avoid.

On a methodological level, the questionnaires themselves could also explain the results. Both the MHC-SF and BAI ask participants to rate questions with regards to their thoughts and feelings of the past month. As the intervention only spans a period of two weeks, participants’ ratings during the posttests include their thoughts and feelings from before the intervention as well. Consequently, the posttest scores could be biased and not represent the actual score participants should or could have. It is of course not clear which time period participants actually incorporated in their thought processes during the pre- and posttests, but it is important to be aware of this issue. Thus, in future research these periods should be adapted. Especially during the posttest, the period should not include the time before the intervention, but only the duration of the intervention if it is shorter than what the questionnaire originally asks. This way the posttest scores represent the time during which the

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intervention actually took place. An additional explanation is the lack of a control group, which limits an experiment in the conclusions one can draw from it; did the results arise due to the intervention itself or due to other confounding variables, by repeated measurement or just by natural fluctuations of outcomes? Thus, for future studies it is recommended to incorporate a control group. This enables one to conclude that results were caused by the intervention. An additional explanation for the results can be confounding variables. Although excluding exams shortly before, during, or shortly after the intervention as a confounding variable strengthens the interpretation of the current results, it is still possible that other confounding variables exist, which have not been either controlled for or thought of. Thus, it is recommended to think of and control for as many confounding variables as possible. A last possible explanation is that the intervention was not intensive enough with regards to the duration of the intervention. A two weeks long intervention is regarded as rather short to achieve change in people. Furthermore, the first week only consists of monitoring, whereas the second week is the actual part of the intervention where change is stimulated and should occur. Many ACT interventions consist of 10 – 20 sessions (A-Tjak, 2015). As the second week is the part of the intervention where change should occur and one reflects upon the first week, each of those days could be seen as a single session. To fall between the recommended amounts of sessions, it is recommended to increase the duration of the second half of the intervention in future research to at least two weeks. This way it is more likely to see significant change in participants after the intervention.

Today's research showed that the ACT-based intervention "Geluk en zo" is promising in decreasing levels of test anxiety and anxiety. Additionally, it gives an good overview of participants' evaluation of the intervention itself and how to improve it for further research.

References

- A-Tjak, J. G. L., Davis, M. L., Morina, N., Powers, M. B., Smits, J. A. K., & Emmelkamp, P. M. G. (2015). A Meta-Analysis of the Efficacy of Acceptance and Commitment Therapy for Clinically Relevant Mental and Physical Health Problems. *Psychotherapy and Psychosomatics*, *84*(30), 30-36. doi:10.1159/000365764
- Beck, A. T., Epstein, N., Brown, G., Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, *56*(6), 893-897.
- Brown, L. A., Forman, E. M., Herbert, J. D., Hoffman, K. L., Yuen, E. K., & Goetter, E. M. (2010). A Randomized Controlled Trial of Acceptance-Based Behavior Therapy and Cognitive Therapy for Test Anxiety: A Pilot Study. *Behavior Modification*, *35*(1), 31-53. doi:10.1177/0145445510390930
- Cassady J. C. (2010). Test anxiety: Contemporary theories and implications for learning. In J. C. Cassady (Ed.), *Anxiety in school: The causes, consequences, and solutions for academic anxieties* (pp. 7–26). New York, NY: Peter Lang.
- Cassady J. C., & Johnson R. E. (2002). Cognitive test anxiety and academic performance. *Contemporary Educational Psychology*, *27*, 270–295.
<https://doi.org/10.1006/ceps.2001.1094>
- Chin, E. C. H., Williams, M. W., Taylor, J. E., & Harvey, S. T. (2015). The influence of negative affect on test anxiety and academic performance: An examination of the tripartite model of emotions. *Learning and Individual Differences*, *54*, 1-8.
- Diener, E., Suh, E. M., Lucas, R., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, *125*(2), 276-302.

TEST ANXIETY AMONGST UNIVERSITY STUDENTS

- Friedman, I. A., & Bendas-Jacob, O. (1997). Measuring Perceived Test Anxiety in Adolescents: A Self-Report Scale. *Educational and Psychological Measurement*, 57(6), 1035-1046.
- Ghasemi, A. & Zahediasl, S. (2012). Normality Tests for Statistical Analysis: A Guide for Non-Statisticians. *International Journal of Endocrinology & Metabolism*, 10(2), 486-489. doi:10.5812/ijem.3505
- Hayes SC. *A contextual approach to therapeutic change*. In: Jacobson N, editor. *Psychotherapists in clinical practice*. Guilford Press; New York: 1987. pp. 327–387.
- Hayes, S.C., Luoma, J.B., Bond, F.W., Masuda, A., & Lillis, J. (2006) Acceptance and commitment therapy: model, processes and outcomes. *Behavior Research and Therapy*, 44, 1-25.
- Hayes, S. C., & Strosahl, K. (2004). *A Practical Guide to Acceptance and Commitment Therapy* (1st ed.). doi:10.1007/1978-0-387-23369-7
- Hayes, S.C., Strosahl, K., & Wilson, K.G. (2012). *Acceptance and Commitment Therapy: The process and practice of mindful change* (2nd ed.) New York: Guilford Press
- Hermans, H. J. M. (1969). De invloed van situatie en conditie op de beantwoording van vragenlijsten. *Sociologische Gids*, 16(4).
- Hermans, H. J. M. (2004). *Handleiding bij de Prestatie Motivatie Test (PMT)*. Amsterdam: Harcourt Assessment B.V.
- Keyes, C.L.M. (1998). Social well-being. *Social Psychology Quarterly*, 61(2), 121-140.
- Keyes, C.L.M., Wissing, M., Potgieter, J.P., Temane, M., Kruger, A., & van Rooy, S. (2008). Evaluation of the mental health continuum-short form (MHC-SF) in Setswana-speaking South Africans. *Clinical Psychology & Psychotherapy*, 15(3), 181-192. doi:10.1002/cpp.572

TEST ANXIETY AMONGST UNIVERSITY STUDENTS

Lamers, S.M.A., Westerhof, G.J., Bohlmeijer, E.T., ten Klooster, P.M., & Keyes, C.L.M.

(2011). Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHCSF). *Journal of Clinical Psychology*, *67*(1), 99-110.

Liebert, R. M., & Morris, L. W. (1967). Cognitive and emotional components of test anxiety: A distinction and some initial data. *Psychological Reports*, *20*, 975–978.

Lotz, C., & Sparfeldt, J. R. (2016). Does test anxiety increase as the exam draws near? – Students' state test anxiety recorded over the course of one semester. *Personality and Individual Differences*, *104*, 397-400.

McCracken, L. M., & Morley, S. (2014). The psychological flexibility model: A basis for integration and progress in psychological approaches to chronic pain management. *The Journal of Pain*, *15*, 221–234.

Öst, L. (2014). The efficacy of Acceptance and Commitment Therapy: An updated systematic review and meta-analysis. *Behaviour Research and Therapy*, *61*, 105-121.
doi:10.1016/j.brat.2014.07.018

Ruiz, F. J. (2012). Acceptance and Commitment Therapy versus Traditional Cognitive Behavioral Therapy: A Systematic Review and Meta-analysis of Current Empirical Evidence. *International Journal of Psychology & Psychological Therapy*, *12*(2), 333-357.

Ryff, C.D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069-1081.

Steinskog, D. J., Tjøstheim, D. B., & Kvamstø, N. G. (2007). DJ. A cautionary note on the use of the Kolmogorov-Smirnov test for normality. *American Meteor Society*, *135*, 1151-1157. doi:10.1175/MWR3326.1

TEST ANXIETY AMONGST UNIVERSITY STUDENTS

- Steinmayr, R., Crede, J., McElvany, N., & Wirthwein, L. (2016). Subjective Well-Being, Test Anxiety, Academic Achievement: Testing for Reciprocal Effects. *Front. Psychol.*, 6. doi:10.3389/fpsyg.2015.01994
- Swain, J., Hancock, K., Hainsworth, C., & Bowman, J. (2013). Acceptance and Commitment Therapy in the treatment of anxiety: A systematic review. *Clinical Psychology Review*, 33(8), 965-978. doi:10.1016/j.cpr.2013.07.002
- Taylor, B. C., & Arnou, B. A. (1988). *The nature and treatment of anxiety disorders*. New York: Free Press.
- Trompetter, H. R., Lamers, S. M. A., Westerhof, G. J., Fledderus, M., & Bohlmeijer, E. T. (2017). Both positive mental health and psychopathology should be monitored in psychotherapy: Confirmation for the dual-factor model in acceptance and commitment therapy. *Behavior Research and Therapy*, 91, 58-63. doi:10.1016/j.brat.2017.01.008
- Wilson, K. G., & Murrell, A. R. (2004). Values work in Acceptance and Commitment Therapy: Setting a Course for Behavioral Treatment. In Hayes, S. C., Follette, V. M., & Linehan, M. (Eds.), *Mindfulness & Acceptance: Expanding the cognitive-behavioral tradition* (pp. 120-151). New York: Guilford Press.

Appendix

Evaluatievragen

1. Will je hier onder je globale indruk van deze interventie opschrijven?
2. Heb jij nog aan de interventie gedacht buiten de momenten van registratie?
3. Heeft de interventie invloed op je activiteiten?
4. Wat vindt je van de titel “Geluk en zo”?
5. Wat vindt je van de uitleg over de achtergrond van de interventie?
6. Wat vind je van de 2 beginoefeningen waarin je beschrijft waar je naartoe wilt en waar je vanaf wilt?
7. Wat vindt je van de inhoud van de vragen die je 3 keer per dag kreeg?
8. Wat vind je van het aantal momenten van 3 op een dag?
 - a. Minder
 - b. Meer
 - c. Juist goed
 - d. Anders:
9. Had jij een aantal dagen vóór begin, tijdens, of een aantal dagen na de interventie één of meerdere examens? (Kruis alle antwoorden van toepassing aan)
 - a. Vóór
 - b. Tijdens
 - c. na
10. Heb jij nog andere opmerkingen?