



THE EFFECT OF AN ONLINE POSITIVE PSYCHOLOGY EXERCISE AND MOTIVATING PICTURES ON WELL-BEING

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Abstract

Background: This research is aimed to investigate whether pictures in online positive psychology interventions heighten participants' motivation and in turn lead to increased levels of subjective well-being. In addition, this research investigates if personality traits, especially the Big Five (extraversion, agreeableness, openness, conscientiousness and neuroticism) have an impact on changes in well-being.

Hypotheses: It was expected that participants who received a motivational picture ("picture group") have a greater increase in positive affect at the end of the intervention than participants who did not receive a motivational picture ("no picture group"). Furthermore, it was expected that participants in the "picture group" have a greater decrease in negative affect at the end of the intervention than participants in the "no picture group". Finally, it was expected that the addition of the motivation groups to each of the Big Five dimensions separately as well as its addition to all of the Big Five dimensions jointly leads to significant improvements in predicting the changes in positive and negative affect from the pre- to the post-measurement.

Method: The sample was composed of 44 participants (65,9% female, 34,1% male) aged 20 to 65. They completed the whole online intervention, including the German versions of the Big-Five 10 personality test, the positive and negative affect schedule (PANAS) and the positive psychology exercise, "the three good things" (3GT).

Results: In this study the picture did not lead to additional motivation. Participants who received a motivational picture did not show a greater increase in subjective well-being than participants who underwent the online intervention without getting a motivational picture. The whole intervention was effective in decreasing negative affect. In both, the picture and the no picture group, the positive affect did not increase. Future research should examine if the extension of the duration of the intervention program or a combination of two or more positive psychology exercises would lead to an increase in participants' positive affect. In this study, the Big Five dimensions had no influence on the changes in the participants' subjective well-being. Neither the intrinsic nor the extrinsic motivation to do the 3GT exercise had an additional impact on the changes in subjective well-being, besides the Big Five dimensions.

Samenvatting

Achtergrond: Het doel van deze studie was om te onderzoeken of motiverende afbeeldingen in online positieve psychologie interventies, tot een verhoogde mate van welbevinden leiden. Bovendien, werd na gegaan of persoonlijkheidskenmerken, met name de Big Five (extraversie, mildheid, autonomie, ordelijkheid en emotionele instabiliteit) een invloed op veranderingen in het welbevinden hebben.

Hypothesen: Er werd verwacht dat deelnemers die een motiverende afbeelding toegestuurd kregen (afbeelding groep) een sterkere toename in het positieve affect aan het eind van de interventie beleefden, dan de deelnemers die geen motiverende afbeelding hebben ontvangen (geen afbeelding groep). Bovendien werd verwacht dat deelnemers in de afbeelding groep een grotere afname in negatief affect ervaren aan het eind van de interventie dan de deelnemers uit de geen afbeelding groep. Verder werd verwacht dat het toevoegen van de motiverende groepen (afbeelding of geen afbeelding groep) aan de Big Five dimensies, apart en samen, leiden tot significant betere voorspellingen van de veranderingen in positief en negatief affect.

Methode: De steekproef was samengesteld uit 44 deelnemers (65,9% vrouwen, 34,1% mannen) tussen 20 en 65 jaar. Zij hebben deze hele interventie afgemaakt, met inbegrip van de Duitse versie van de Big-Five 10 persoonlijkheidstest, de positive and negative affect schedule (PANAS) en de positieve psychologie oefening “the three good things” (3GT).

Resultaten: In deze studie had de afbeelding geen extra motiverend effect. De deelnemers, die nog extra een motiverende afbeelding kregen, lieten niet meer subjectief welbevinden zien dan de deelnemers die de online interventie hebben afgemaakt zonder een motiverende afbeelding te ontvangen. De gehele interventie was effectief in het verminderen van negatief affect voor beide groepen. Het positieve affect is in de twee groepen niet toegenomen. In vervolgonderzoek zou nagegaan moeten worden of de verlenging van de duur van het interventie programma of een combinatie van twee of meer positieve psychologie oefeningen tot een verhoging van het positieve affect zou leiden. In deze studie hadden de Big Five dimensies geen invloed op de veranderingen van het subjectieve welbevinden van de deelnemers. Naast de Big Five dimensies hadden nog de intrinsieke nog de extrinsieke motivatie om de 3GT oefening te doen, een extra invloed op de veranderingen in het subjectieve welbevinden.

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1. Introduction

A new challenge in psychology is to deal with both, healing mental illnesses and identifying human's strengths in order to experience a feeling of satisfaction in life. In my opinion, Aristotle's famous quote "*Happiness is the meaning and purpose of life, the whole aim and end of human existence*" fits well in this context. According to Aristotle, it is people's main aim to become happy. Positive psychology aims to investigate how people can become happy and which influence this in turn has on people's health. That is why positive psychology interventions are so different from the traditional psychological approaches and why it is so important to further develop them, in my view. Probably, there are many people who are not aware of the positive things in their daily life. I believe that people take much for granted or do not have enough appreciation for the positive experiences during their day. For me, it was interesting to examine if a positive psychology exercise is able to shift their focus towards the positive experiences of their day and if this, in turn, would lead to greater well-being. Furthermore, I was curious about whether or not the memory of positive experiences of the day would increase people's well-being since it would induce satisfaction with their daily life. Prior to the experiment I had hoped that encouraging subjects to reflect on their influence on the positive things they experienced that day would strengthen their self-esteem. In addition to that, I wanted to investigate how to motivate participants in a manner that induces a greater well-being after having undergone a positive psychology intervention.

2. Background

2.1 Positive psychology

In the past decade, the traditional focus in psychology gently turned from pathology towards understanding and developing human's strengths and psychological capabilities (Seligman, 2002). Today, positive experiences that define life-quality are steadily more emphasized (Myers & Diener, 1995). This new movement in the field of psychology is called positive psychology. It is still in its infancy but has established itself as a strong sub-discipline of psychology (Coetzee & Viviers, 2007). There are many definitions of positive psychology. Gable and Haidt (2005) define positive psychology as: "(...) the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" (p. 104). Positive psychology strives for a balanced approach in which suffering and pathology as well as positive states and traits are taken into account (Seligman, Parks & Steen, 2004). Positive psychology interventions focus on heightening people's well-being and increasing their happiness (Sin & Lyubomirsky, 2009). An increased level of happiness correlates with improved health (Emmons & Mishra, 2011). However, a major problem observed within the sector of health care is peoples' tendency to drop out of health-promoting programs (Dishman & Ickes, 1981). Therefore, it is important to examine how people can be motivated to fully undergo health-promoting interventions. It can be expected that if participants fully undergo health-promoting interventions, the effectiveness of these interventions is greater than if people drop out. In this study effectiveness implies increases in people's positive and decreases in their negative affect. The research question that this study is aimed to examine is "to what degree does a participants' motivation change the effectiveness of a positive psychology intervention?".

2.2 Subjective well-being

Seligman (2012) states that increasing people's subjective well-being is the primary goal of positive psychology. Subjective well-being refers to people's subjective perceptions and evaluations; therefore, the term "subjective well-being" is commonly used (Diener, Oishi & Lucas, 2003). The term "subjective well-being" often refers to the good life and is sometimes termed happiness (Diener, 2000). Subjective well-being contains several components. According to Diener (2000) it includes life satisfaction and satisfaction with relevant

domains, for example satisfaction with work. Furthermore, it involves high levels of positive affect and low levels of negative affect. Positive affect indicates the degree of a person's enthusiasm, activeness and alertness (Watson, Clark & Tellegen, 1988). A high positive affect is characterized by an energized, concentrated and pleased state. On the other hand, negative affect can be described in terms of the degree in which people struggle with unpleasant feelings. A high negative affect indicates aversive emotional states like anger, disgust and nervousness. Heightened levels of well-being can be a benefit for the whole society. People experiencing a high degree of well-being tend to volunteer more, show a more desirable work-behavior and other positive characteristics, like being well-organized, spending time with social contacts and working on personal health (Diener, Lucas & Oishi, 2002). In addition to that, a heightened well-being can prevent the occurrence or limit damage of mental illnesses, stress and disorders (Gable & Haidt, 2005). The present research is aimed to analyze two factors, motivation and personality. Theoretically, both of these factors have been shown to influence the relation between positive psychology interventions and participants' subjective well-being (Lyubomirsky & Layous, 2013).

2.3 Positive psychology interventions

According to Seligman (2012) there are interventions in the field of positive psychology that are able to increase people's well-being. Seligman, Steen Park and Peterson (2005) coined the term "Three Good Things" (3GT), which is a gratitude exercise that is often used and is supposed to increase happiness. This exercise can lead to an increase in happiness and to a reduction of depressive symptoms within one week. According to Emmons and Mishra (2011) being grateful increases people's subjective well-being and strengthens their social actions and relationships. The 3GT asks participants to review their day by writing down three occurrences every evening, that have gone well and why these occurrences went well (Seligman et al., 2005). In this study, the 3GT exercise has been selected because of both, its effectiveness within one week and because it helps prevent people to think more about the negative things of their daily life than is beneficial to them (Seligman, 2012).

Lyubomirsky and Layous (2013) present a positive-activity model that clarifies under which conditions the performance of positive activities, like the 3GT exercise, work best. According to this model, positive activities heighten positive emotions, thoughts and behaviors, which in turn increase well-being. In this study, the 3GT represents the positive activities of the model. Two variables influence the degree to which well-being is improved

(Lyubomirsky & Layous, 2013). On the one hand, it depends on the features of the positive activities, like dosage and diversity. On the other hand, it depends on personality, how motivated the person is and how much effort someone exerts. The overlap between the activity and personal characteristics, which is called the optimal person activity-fit, further serves as an indicator of predicting increased well-being. This research focuses on two features of the person, their motivation and their personality. The model shows that people can benefit from positive activities and perceive more well-being, if they exert effort to engage in it, are motivated to become happier, and when they believe in its potential personal benefits. The present study aims to increase participants' motivation and strives to investigate if this heightened motivation leads to a greater effectiveness of the 3GT exercise, in terms of increases in positive affect and decreases in negative affect. With respect to personality, it will be investigated if motivation, in addition to the personality, improves the prediction of the changes in positive and negative affect of the participants.

2.4 Motivation

It is difficult to define motivation, because there is little agreement about its defining criteria (Bolles & Zeigler, 1967). Maslow (1968) defines motivation by stating that someone is motivated when he or she feels a desire or want to achieve something or if the person experiences feelings of deprivation.

There are two different forms of motivation, which are labeled intrinsic and extrinsic motivation. People are intrinsically motivated when activities appear rewarding enough in and of itself (Deci & Ryan, 2002). Intrinsically motivated people act because they are interested in the task for its own sake rather than experiencing a reward. A theory, which focuses on people's intrinsic motivation, is the Self-Determination theory (SDT) (Woolfolk Walkup & Hughes, 2013). The SDT states that people's *intrinsic* motivation arises by three different needs: their need for competence (achievement), autonomy and control (power), and relatedness to others (affiliation). People experience satisfaction when these needs are fulfilled (Deci & Ryan, 2012). This feeling of satisfaction leads to *intrinsic* motivation and people act with full endorsement and volition. In contrast, if people's basic needs are not fulfilled, they either perceive a controlled motivation or are amotivated. A controlled motivation includes a perceived pressure to behave in a particular manner while amotivation implies that they have no intentionality and are thus unwilling to become active. The central statement within the SDT is that the more people's motivation is autonomous the higher is the quality of their engagement, performance, and well-being. In contrast, the more controlled

people's motivation is perceived the lower the quality of these factors is. In sum, the SDT stresses the autonomy of a person as an important motivating factor. In this study, asking the participants, which influence they had on the three good things of the day, mainly emphasizes their feelings of competence, which is also an important factor within the SDT. By realizing their positive influence on the three good things of the day, the participants experience a greater feeling of competence. The 3GT exercise is supposed to increase the participants' intrinsic motivation by heightening their subjective well-being and stressing their feelings of competence.

When people are extrinsically motivated to do something, they care about the gain, not about the activity itself (Deci & Ryan, 2002). External factors such as rewards and punishments make up their motivation. External motivated behaviors occur after demands. When these demands are followed, then a positive reinforcement can be expected. External motivation can become problematic if people lose their intrinsic motivation by a permanent supply of external stimuli. According to Lepper, Greene and Nisbett (1973) intrinsic motivation decreases when people are offered external rewards such as money. People who received a reward for their activity were less interested to do this activity again than the people who did not receive a reward. However, these results are disputable. A meta-analysis conducted by Cameron, Banko and Pierce (2001) indicates that there are no negative effects on people's intrinsic motivation if they are rewarded for their actions.

A study conducted by Lyubomirsky, Dickerhof, Boehm and Sheldon (2011) demonstrated that people's motivation in positive psychology interventions plays an important role. The adherence and the probability to further profit from positive psychology interventions through an increased subjective well-being, was higher for participants who really showed the will to engage and who found a proper way. In this study, a motivational picture functions as an extrinsic motivation, like a reward. The meta-analysis of Cameron et al. (2001), as mentioned above, demonstrates that extrinsic motivation has no negative effects on intrinsic motivation. This study aims to investigate if the extrinsic motivation in addition to the intrinsic motivation heightens the effectiveness of the 3GT exercise, in terms of increases in positive and decreases in negative affect, even more.

2.5 Personality

The positive-activity model shows that the motivation as well as the personality plays an important role in positive psychology interventions. McCrae and Costa (1990) define

personality traits as “... dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings and actions” (p.23). Today the five-factor model is commonly used to represent the human trait structure (Roccas, Sagiv, Schwartz & Knafo, 2002). It states that there are five basic factors that describe most personality traits: extraversion, agreeableness, openness, conscientiousness and neuroticism.

Research shows that there is a relationship between personality traits and subjective well-being. Personality traits are regarded as a strong predictor for subjective well-being (Diener, Suh, Lucas & Smith, 1999). Fujita (1991) states that extraversion correlates generally high with pleasant affect. Furthermore, neuroticism correlates to lower levels of subjective well-being (Steel, Schmidt & Schultz, 2008). The other personality traits from the Five Factor Model (openness, conscientiousness and agreeableness) also correlate with subjective well-being, but these correlations are not as strong as the ones mentioned above. Costa and McCrae (1980) also show that there are associations between happiness and greater extraversion and lower neuroticism. Research conducted by Hayes and Joseph (2003) further supports the assumption that there are differences in personalities in terms of happiness. Some people are characteristically happier than others. It can be concluded that all personality traits affect people’s subjective well-being, but especially extravert and non-neurotic persons show a greater impact on subjective well-being.

In this study, the focus lies on the influence of motivation. The positive-activity model as well as existing literature, stress the importance of personality with regard to positive and negative affect. Therefore, this study investigates if motivation, in addition to the personality, improves the predictions of the changes in participants’ subjective well-being. It would be beneficial to gain knowledge about which personality in combination with intrinsic and extrinsic motivation improves the predictions of the effectiveness of the 3GT exercise. In this case, the next step would be to examine what changes in positive and negative affect are predicted. If it were known, which type of personality in combination with which kind of motivation (intrinsic and/ or extrinsic) benefits most from the 3GT exercise, the intervention program could be offered directly to the appropriate target group.

2.6 Hypotheses

In order to be able to examine the effect of motivation, this research will compare two different groups. Both groups are supposed to do the 3GT exercise every day. After having done the exercise both groups receive feedback mail. Whereas the feedback mail in the picture group contains a motivational picture in addition to a short feedback, the no picture

group receives only the short feedback.

As mentioned above, the SDT states that feelings of competence increase people's intrinsic motivation. In this study, feelings of competence can arise due to a heightened subjective well-being as a result of the 3GT exercise. It is expected that both groups experience intrinsic motivation due to the effects of the 3GT exercise. It is expected that higher levels of motivation have positive influence on the effectiveness of the intervention, which means that participants perceive an increase in positive affect and a decrease in negative affect. The picture group is expected to not only experience intrinsic motivation but also extrinsic motivation. Therefore, the hypothesis that "participants who receive a motivational picture (picture group) have higher levels of positive affect at the end of the intervention than participants who do not receive a motivational picture (no picture group)", is going to be tested.

In addition to that, the second hypothesis, namely "participants who receive a motivational picture (picture group) have lower levels of negative affect at the end of the intervention than participants who do not receive a motivational picture (no picture group)", is going to be examined.

Finally, this research aims to investigate if the motivation groups, in addition to the personality, better predicts changes in people's subjective well-being, which implies changes in their positive and negative affect. As already mentioned, all personality traits of the Big Five can affect people's subjective well-being (Diener et al., 1999). For this reason, there are two further hypotheses going to be tested. The first hypothesis that is going to be examined is that "the addition of the motivation groups to each of the five personality traits, separately as well as its addition to all of the personality traits jointly, leads to significant improvements in predicting the changes in positive affect from the pre- to the post-measurement". The second hypothesis that is going to be investigated is that "the addition of the motivation groups to each of the five personality traits, separately as well as its addition to all of the personality traits jointly, leads to significant improvements in predicting the changes in negative affect from the pre- to the post-measurement".

3. Method

3.1 Participants

The sample was originally composed of 266 participants. Due to technical problems there were incomplete questionnaires and missing information on the participants. Therefore some data for the analysis were excluded. 133 participants did not receive the personality questionnaire (BFI-10). Furthermore, there were 19 participants who did not receive all the necessary informational emails. Another technical problem arose because eight participants did not receive a personal ID code. Finally the data on 62 participants were not complete because they did not join the last section of the measurement. Accounting for these missing observations, the data sample analyzed was comprised of 44 self-selected participants from Germany.

The inclusion criteria was an age of 18 years or older and the ability to speak German. The participants were randomly assigned to either the picture group (N= 22), which received a motivational picture in addition to the positive psychology intervention, or the no picture group (N=22). An informed consent was obtained from each participant via the internet. The ethics committee of the University of Twente approved to this research.

3.2 Materials

3.2.1 Demographic information

Demographic information of the participants' age, gender and occupation was collected.

3.2.2 Brief Big Five Inventory (BFI-10)

The BFI-10 is an abbreviated version of the well-proven 44 items from the BFI (Rammstedt & John, 2007). It is a 10-item measure of personality, which measures each of the five factors with two items. The Big Five personality trait factors, which are measured are extraversion ($\alpha = .707$), agreeableness ($\alpha = .414$), conscientiousness ($\alpha = .413$), neuroticism ($\alpha = .286$) and openness ($\alpha = .299$). For this research the German-language version was chosen. The participants were asked to rate the extent to which each statement, e.g. "I see myself as someone who tends to be lazy", refers to their personality by using a 5-point Likert-type scale (1 = *trifft überhaupt nicht zu* (disagree strongly), 5 = *trifft voll und ganz zu* (agree strongly)).

3.2.3 Positive and Negative Affect Schedule (PANAS)

The PANAS briefly assesses two primary mood-dimensions of the participants, their positive and negative affect (Watson, Clark & Tellegen, 1988). It is a questionnaire, consisting of two scales, which include altogether 20 items. Each scale contains ten items either related to positive (e.g., “enthusiastic”, “interested”) or negative affect (e.g., “irritable”, “guilty”). The participants were asked to rate each item by a 5-point Likert-type scale (1 = *trifft überhaupt nicht zu* (disagree strongly), 5 = *trifft voll und ganz zu* (agree strongly)). They had to agree or disagree if the respective items represent their feelings during a specific period. High scores for each scale suggest high levels of either positive or negative affect. In this study, the reliability of the German version of the PANAS is good ($\alpha = .86$ for the positive affect-scale and $\alpha = .87$ for the negative affect scale).

3.3 Procedure

The participants were personally recruited and via the internet. It was asked if they would also sent the link of this study to friends and acquaintances. They were randomly assigned to either the picture group or the no picture group. They were asked to take part in this online intervention for seven days. On the first day they were informed about the research and the intervention via the internet. The participants were asked to accept the informed consent and to fill in their e-mail address so that they could receive an e-mail every day. The e-mail is intended to remind and motivate the participants to do the exercises and additionally gives a short feedback of their actual feelings. They were assured that their data were handled anonymously. The participants had to fill in a name by which they would like to be addressed in the emails. Afterwards, they received an ID in order to register. They were asked to answer demographic questions and to fill in the BFI-10 as well as the PANAS. After that, the positive intervention was explained. The participants were encouraged to do the exercise “Three good things” for seven days. In the 3GT, participants are asked to, in the evening write down three things that went well, why these things went well and which influence they had. After that, they had to log in with their ID and had to fill in the PANAS. This procedure took about 10 minutes. Over the period of one week, the participants did the 3GT exercise and filled in the PANAS afterwards. Both the picture as well as the no picture group underwent the positive psychology intervention. The only difference was that the picture group received in their feedback-mail a motivational picture (figure 1). The motivational picture consists of a bonnet and a tree. The term motivational picture implies that the picture becomes more appealing

with every feedback mail. It turns from a black and white picture to a colorful one and in addition to that a bike completes the picture. This is supposed to heighten the attractiveness of the picture.



Figure 1. Motivational picture

At the end of the week, participants received a last e-mail to conclude the previous week's intervention and show them gratitude for participation.

3.4 Statistical Analysis

In this research, all participants that took part in the intervention on the first as well as on the last day were included into the statistical analysis.

First the values of Shapiro-Wilk test were checked to find out if the two sub-scales of the PANAS (positive and negative affect) on the first and the last measurement, the changes in positive and negative affect and the Big Five dimensions were normally distributed.

In order to test the first hypothesis, "the participants who receive a motivational picture (picture group) have a more increased level of positive affect at the end of the intervention than participants who did not receive a motivational picture (no picture group)", and the second hypothesis, "participants who receive a motivational picture (picture group) have a more decreased level of negative affect at the end of the intervention than participants who did not receive a motivational picture (no picture group)", a repeated measurement analysis of variance (ANOVA) with the normally distributed sub-scales of the PANAS was made. The within-subject factor is the scores on the different sub-scales of the PANAS and

consists of two levels (pre- and post-measurement). The between-subject factor is the motivation group and also contains two levels (picture and no picture group).

The third hypothesis, “the addition of the motivation groups to each of the five personality traits, separately as well as its addition to all of the personality traits jointly, leads to significant improvements in predicting the changes in positive affect from the pre- to the post-measurement.” and the fourth hypothesis, “the addition of the motivation groups to each of the five personality traits, separately as well as its addition to all of the personality traits jointly, leads to significant improvements in predicting the changes in negative affect from the pre- to the post-measurement.”, were examined via a multiple regression analysis. While the group (picture/ no picture group) and changes in the scores on the BFI-10 were the independent variables, the range of the changes in the test-scores from the pre- to the post-measurement on the two different sub-scales of the PANAS formed the dependent variable.

4. Results

4.1 Description of the demographic characteristics of the participants

In this study, the sample consisted of 44 participants (15 males and 29 females), who fully completed the intervention (table 1). The mean age was 42 years ($SD_{age} = 15.27$). The youngest participant was 20 and the oldest participant was 65 years old. The average educational status of the sample was high. Almost half of the participants (45,50%) had a university degree.

The proportion of the two motivation groups (picture and no picture group) was equal. Each group included 22 participants. In addition to that, there are no significant differences in the ratio of females to males between the two motivation groups. However, both groups were comprised of more female than male participants. The educational status in both motivation groups also did not significantly differ. Nearly half of both groups had a university degree. The mean age in the no picture group was 39 years while the picture group's mean age was 44 years.

Table 1. *Demographic information of n=44 participants, separated into two groups (picture and no picture group)*

	Total <i>n</i> = 44 <i>n</i> (%)	No picture group <i>n</i> = 22 <i>n</i> (%)	Picture group <i>n</i> = 22 <i>n</i> (%)	χ^2	<i>T</i>	<i>p</i>
<u>Gender</u>				.1		1.00
Man	15 (34.10%)	8 (36.40 %)	7 (31.80 %)			
Woman	29 (65.90 %)	14 (63.60 %)	15 (68.20 %)			
<u>Education</u>				2.43		.79
Lowest school graduation	2 (4.50 %)	1 (4.50 %)	1 (4.50 %)			
Mid school graduation	2 (4.50 %)	2 (9.10%)	0 (.00 %)			
Higher school graduation (permission for university of applied science)	2 (4.50 %)	1 (4.50 %)	1 (4.50 %)			
Highest school graduation (permission for university)	11 (25.00 %)	6 (27.30 %)	5 (22.70 %)			
University of applied science degree	7 (15.90 %)	3 (13.60 %)	4 (18.20 %)			
University degree	20 (45.50 %)	9 (40.90 %)	11 (50.00%)			
Others	0 (.00 %)	0 (.00 %)	0 (.00 %)			
<u>Age</u>					-1.05	.30
Mean	41.73	39.32	44.14			
SD	15.27	14.66	15.81			

4.2 Normal distribution

In this study, the negative affect of the post-measurement was not normally distributed (table 2). The values of all Big Five dimensions were not normally distributed.

Table 2. *Shapiro-Wilk test for normal distribution of the PANAS (pre-measurement (T0) and post-measurement (T1)), the changes in positive and negative affect and the BFI-10, for the whole sample*

	Whole sample (n=44)	
	<i>Statistic</i>	<i>p</i>
Positive Affect T0	.98	.46
Positive Affect T1	.97	.36
Negative Affect T0	.95	.06
Negative Affect T1	.79	.00
Extraversion	.93	.02
Agreeableness	.94	.02
Openness	.93	.01
Conscientiousness	.93	.01
Neuroticism	.93	.01
Changes in positive affect	.99	.83
Changes in negative affect	.97	.30

4.3 The first and the last measurement of the PANAS of the two groups

There were no significant differences between the picture and the no picture group with regard to their positive and negative affect on the first (T0) and the last measurement (T1) (table 3).

Table 3. *Means (M) and standard deviations (SD) for the sub-scales of the PANAS (pre-measurement (T0) and post-measurement (T1)), separated into two motivation groups and parametric and non-parametric independent sample t-tests to compare the two groups*

	No picture group (n=22)		Picture group (n=22)		<i>T</i>	<i>Z</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Positive Affect T0	3.21	.73	3.50	.46	-1.56		.13
Positive Affect T1	3.30	.65	3.47	.84	-.76		.45
Negative Affect T0	2.26	.80	2.26	.66	-.02		.98
Negative Affect T1 (Median, IQR)	1.15 (.55)		1.30 (.68)			-.73	.47

4.4 Testing the hypotheses

There was no significant main effect of positive affect found ($F(1,42)=.044, p=.83$). On the average, the participants did not report significantly higher levels in positive affect after the intervention ($M=3.39; SD=.11$) than before ($M=3.36; SD=.09$).

There was also no significant main effect of motivation groups ($F(1,42)=2.30, p=0.14$). The interaction effect between positive affect and the two groups was not significant ($F(1,42)=0.16, p=0.69$).

The changes in positive affect did not significantly differ between the motivation groups (see table 3 for means and standard deviations). The first hypothesis “participants who receive a motivational picture (picture group) have higher levels of positive affect at the end of the intervention than participants who do not receive a motivational picture (no picture group)” is rejected.

A significant main effect of negative affect was found ($F(1,42)=40.71, p<.001$). Participants reported significantly lower levels in negative affect after the intervention program ($M=1.39; SD=.08$) than before the intervention ($M=2.26; SD=.11$). There was no significant main effect of the motivation groups ($F(1,42)=.11, p=.74$). The interaction effect between negative affect and the two groups was not significant ($F(1, 42)=.079, p=.780$). The changes in negative affect did not significantly differ between the two motivation groups (see table 4 for means and standard deviations). Therefore, the second hypothesis “Participants who receive a motivational picture (picture group) have lower levels of negative affect at the end of the intervention than participants who do not receive a motivational picture (no picture group)” must also be rejected.

The means of the two motivation groups on the BFI-10 did not significantly differ (table 4). The highest mean scores of both, the picture and the no picture group regarded the personality traits openness and conscientiousness, whereas the lowest mean score concerned neuroticism.

A comparison between the scores on the personality traits of the picture and the no picture group indicated no significant differences.

Table 4. Means (*M*), standard deviations (*SD*), median and interquartile range (*IQR*) for the sub-scales of the BFI-10, separated into two motivation groups and non-parametric independent sample *t*-tests to compare the two groups

	No picture group (n=22)				Picture group (n=22)				<i>Z</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>IQR</i>	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>IQR</i>		
Extraversion	3.34	.85	3.50	1.50	3.45	.92	3.50	1.63	-.48	.63
Agreeableness	3.20	1.03	3.50	1.50	3.30	.68	3.00	1.00	-.24	.81
Openness	3.70	.88	4.00	1.50	3.95	.74	4.00	1.00	-.86	.39
Conscientiousness	3.93	.54	4.00	1.00	3.73	.84	4.00	.75	-.82	.41
Neuroticism	3.10	.67	3.00	1.50	3.14	.82	3.00	1.50	-.25	.80

The variables negative affect and neuroticism correlated significantly, $r(42)=.30, p=.047$ (table 5). There is a positive relation between negative affect and neuroticism. In this sample, there were no significant differences between the two motivation groups. Neurotic people in both groups tend to have greater negative affect. There were no significant correlations between positive and negative affect and the other personality traits of the Big Five.

Table 5. Pearson's correlations among positive and negative affect and the Big Five

	Positive affect (T0)	Negative affect (T0)
Extraversion	.02	.07
Agreeableness	.23	-.02
Openness	.08	-.05
Conscientiousness	.14	.08
Neuroticism	-.19	.30*

* $p<.05$ (two-tailed)

By using multiple regression analysis it was tested if adding the motivation groups to the personality traits resulted in a significant improvement in predicting the changes of participant's positive and negative affect (table 6).

Table 6. *Multiple regression predicting the increase in positive and negative affect (PANAS) on the basis of personality traits and the motivation groups*

Predicting variable	Positive affect			Negative affect		
	R^2	F	p	R^2	F	p
Step 1. Personality	.069	.564	.727	.068	.559	.731
Step 2. Personality x motivation group	.072	.476	.822	.070	.463	.831
Step 2. Extraversion x motivation group	.025	.531	.592	.002	.046	.956
Step 2. Agreeableness x motivation group	.005	.112	.894	.010	.211	.810
Step 2. Openness x motivation group	.027	.575	.567	.007	.149	.862
Step 2. Conscientious- ness x motivation group	.007	.153	.859	.003	.069	.933
Step 2. Neuroticism x motivation group	.007	.136	.874	.056	1.206	.310

The regression analysis showed that the personality did not significantly predict the changes in both positive ($R^2=.069$, $F(1,42)=.564$, $p=.727$) and negative affect ($R^2=.068$, $F(1,42)=.559$, $p=.731$).

The addition of the two motivation groups to the five personality traits, separately as well as jointly, did not significantly account for some extra variance in predicting both, positive and negative affect. Therefore, the hypothesis that “the addition of the motivation groups to each of the five personality traits, separately as well as its addition to all of the personality traits jointly, leads to significant improvements in predicting the changes in positive affect from the pre- to the post-measurement”. as well as the hypothesis that “the addition of the motivation groups to each of the five personality traits, separately as well as its addition to all of the personality traits jointly, leads to significant improvements in predicting the changes in negative affect from the pre- to the post-measurement”. are rejected.

5. Discussion

The goal of this research was to examine if a motivational picture heightens the effectiveness of online positive psychology interventions, in terms of an increase in positive affect and a decrease in negative affect. If the extrinsic motivation, in addition to the intrinsic motivation, is able to heighten the effectiveness of positive psychology interventions, different ways could be explored to raise the extrinsic motivation, which, in turn, would make interventions more effective. The existing literature shows that personality traits are strongly associated with people's subjective well-being (Diener et al., 1999). Therefore, this research is aimed to examine if the addition of the motivation groups (picture and no picture group) to the personality traits of the Big Five dimensions, individually as well as jointly, leads to a better prediction of the changes of positive and negative affect.

In this study, the picture and the no picture group underwent the positive psychology exercise 3GT. This exercise consisted of daily recordings of three good experiences and an explanation of why those were good. The two groups only differed only in one aspect. Both groups received a short feedback mail while the picture group also received a motivational picture that became more appealing with every mail.

The observed data reveal that people from both groups experienced a decrease in negative affect but no increase in positive affect. This result is not in line with literature. According to Seligman et al. (2005) the 3GT exercise is able to heighten happiness and can reduce depressive symptoms within one week. Therefore, it was expected that the 3GT exercise would be able to heighten people's subjective well-being in terms of an increase in positive and a decrease in negative affect in both groups and an even greater increase was expected in the group that received a motivational picture. The characteristics of the sample in this study might have had an influence on this unexpected finding. In the study of Seligman et al. (2005) the effectiveness of the 3GT exercise within one week was proven by a sample that had clinically significant levels of depressive symptoms. In this sample participants had an above average score on positive affect prior to the intervention. Therefore, it might be that the participants in this study did not have much to gain by performing the 3GT exercise. Online positive psychology interventions like the 3GT exercised by people who are not (mildly) depressed might be effective if the exercise is continued for longer durations than one week. Another possibility would be that a combination of two or more positive psychology exercises would lead to an increase in positive affect. Seligman et al. (2005) suggest a combination of the following positive psychology exercises: the 3GT exercise, the gratitude visit, you at your best exercise, using signature strengths in a new way exercise and identifying signature

strengths exercise.

According to Sin and Lyubomirsky (2009) motivation serves as a mediator with regard to the effectiveness of positive psychology interventions. It was expected that the participants of both groups would be intrinsically motivated. The participants of the picture group would additionally be extrinsically motivated because of the motivational picture. The picture was supposed to heighten the participants' motivation and additionally increase the effectiveness of the intervention. Thus, the extrinsic motivation was supposed to have a moderating effect on the relation between the intrinsically motivated person and the effectiveness of the 3GT exercise. This expectation was not confirmed. In this study, there were no statistical significant differences in effectiveness of the intervention between the two groups. The result indicates that extrinsic motivation does not function as a moderator between intrinsic motivation and the effectiveness of the positive psychology intervention. Due to technical problems in this study it is not certain that all participants of the picture group noticed the motivational picture. Therefore, it cannot totally be excluded that the extrinsic motivation had a moderating effect on the relation between the intrinsic motivated person and the effectiveness of the 3GT exercise. In future research it should be technically ensured that every participant is able to see the picture immediately in the feedback mail. An external company could be incorporated into the intervention program in order to ensure the accuracy of the process of the intervention program. Additionally, it would be interesting to examine if extrinsic motivation functions as a moderator between intrinsic motivated people and their adherence. Therefore, a follow-up measurement three weeks later would be beneficial. This follow-up study would allow the researcher to compare post intervention behavior between the two groups. If more participants in the no picture group would continue with the exercise this could indicate that the 3GT exercise on its own heightened the participants' subjective well-being and raised their intrinsic motivation to continue with the exercise. If more participants in the picture group would continue with the 3GT exercise, this could be an indicator that the 3GT in combination with a motivational stimulus would have heightened the extrinsic and intrinsic motivation to continue with the exercise. In this case the motivational stimulus would have had a moderating effect on the relation of the intrinsic motivated person and his or her adherence.

Another goal of this research was to investigate if the two motivation groups and personality traits of the Big Five, alone or altogether, improve the prediction of the changes of positive and negative affect. In this study, the personality had no predictable value, neither for positive nor for negative affect. Apparently, in this study the personality traits of the Big Five did not have a significant impact on the effectiveness of the 3GT exercise. These findings are

not in line with literature. According to Diener et al. (1999) personality traits are regarded as a strong predictor for subjective well-being. A possible explanation for these findings with regard to personality might be that all dimensions of the Big Five were not normally distributed. A quite small sample size might account for this finding. According to Moore and McCabe (2005) the number of participants influences the reliability of the results. The more participants take part in the study, the more reliable the results are and the smaller the variability. Future research should consider obtaining data from a larger sample. The addition of the two motivation groups to the personality traits did not improve the prediction of the effectiveness of the 3GT exercise. This is in line with the finding of this study. There were no differences in the effectiveness of the intervention between the two motivation groups. The two groups did not have an influence on the effectiveness of the 3GT so it does not have an additional significant predicting value to the personality.

All in all, it can be concluded that the most important finding of this study was that the 3GT exercise leads to a decrease in negative affect in a population sample that, on average, did not show (mild) depressive symptoms. However, there was statistically no significant increase in positive affect. The reason for this might be that the participants already scored above the mean at the beginning of the intervention. Therefore, it might be advisable to extend the duration of the intervention program or to try a combination of two or more positive psychology exercises. The 3GT exercise was equally effective, regardless of the personality and of the presence of extra extrinsic motivation. Apparently, in this sample, the intrinsic motivation to do the 3GT exercise on its own is satisfactory enough to decrease the participants' negative affect. In sum, the 3GT exercise is an effective intervention and should be offered to any population in order to improve subjective well-being.

6. References

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