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Bachelorthesis: “To what extent can personality predict adherence and effectivity in a positive online intervention?”



Picture is to find via: <http://www.askdoctork.com/how-does-positive-psychology-work-201211223727>

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Abstract

Background: Health is more than the absence of disease and especially positive psychology tries that the focus is not only on ways to reduce illness but also on possibilities to improve well-being by focusing on e.g. increasing positive emotions because they can increase social and health benefits. Personality can be an important determinant of well-being because of its relationship with emotional reactivity. One problem that interferes with intervention seems to be non-adherence because it could lessen the effect of the intervention and it would be difficult to derive the maximum benefit from the intervention.

Objective: The purpose of this study was to gain more insight into the relationship between the big five personality constructs and adherence. In addition to that the study investigated what the relationship between the personality constructs and the effect of the intervention on positive and negative emotions is.

Method: The intervention was a quantitative research with a pre-test (BFI-10; PANAS) in the beginning of the one-week intervention and a post-test (PANAS) to evaluate the difference in positive and negative affect score after participating on the intervention. The participants choose one of four positive psychology exercises and received daily a questionnaire in order to evaluate their exercise (used to measure their adherence). The relationships between the big five personality constructs and adherence and effect on the positive and negative emotions were analyzed by using the Pearson correlation.

Results: The result show that only the construct extraversion is significant related to adherence (negative relationship). Furthermore, the personality construct neuroticism is significantly positive related to the difference in effect on positive emotions. The personality constructs extraversion and openness are negative related to the difference in effect on positive emotions. The results also showed that the construct neuroticism is also positive related to the difference in effect on negative emotions and that the constructs extraversion and agreeableness are significantly negative related to the difference in effect on negative emotions.

Conclusion: In conclusion, it could be suggested that positive psychology exercises could be especially helpful for people who score high on neuroticism to increase their positive emotions. Adherence was only significant negative related to extraversion. To get a deeper insight in adherence, researchers in future interventions could send questionnaires to ask extravert respondents about their motives that lead to the point to stop with the intervention.

Samenvatting:

Achtergrond: Bij gezondheid gaat het om meer dan om de afwezigheid van ziekte en vooral de positieve psychologie probeert mogelijkheden te vinden om welbevinden te verbeteren door bijvoorbeeld positieve emoties te verhogen omdat daardoor sociale en gezondheidsvoordelen verhoogd worden. Persoonlijkheid kan belangrijk zijn voor het welbevinden omdat het op de manier hoe mensen emotioneel op externe stimuli reageren van invloed is. Een probleem dat interventies beïnvloedt blijkt non-adherentie te zijn omdat deze het effect van de interventie kan verminderen en het zo moeilijk het maximale baat uit de interventie te trekken.

Doelstelling: Het doel van deze studie was om meer inzicht te krijgen in de relatie tussen de Big Five persoonlijkheidsconstructen en adherentie. Verder is onderzocht worden wat de relatie is tussen de Big Five constructen en het verschil in effect op positieve en negatieve emoties..

Methode: De één-week web-gebaseerde interventie was een kwantitatief onderzoek met een voormeting (BFI-10; PANAS) en een nameting (PANAS) om het verschil van de positieve en negatieve effect na de interventie te onderzoeken. De respondenten hebben een van vier positieve psychologie oefeningen gekozen en hebben dagelijks een evaluatieformulier ontvangen gebruikt om adherentie te meten). De relatie tussen de Big Five persoonlijkheidsconstructen en adherentie en het verschil in effect op positieve en negatieve emoties is met behulp van de Pearson correlatie onderzocht worden.

Resultaten: Uit de resultaten blijkt dat alleen het construct extraversie een significante (negatieve) relatie toont met adherentie. Het construct neuroticisme laat een significant positieve relatie zien tot het verschil in effect op positieve emoties, terwijl de constructen extraversie en openheid erop een negatieve relatie tonen. Verder wordt duidelijk dat het construct neuroticisme ook een positieve relatie heeft tot het verschil in effect op negatieve emoties en dat de constructen extraversie en vriendelijkheid een significante negatieve relatie hebben tot het verschil in effect op negatieve emoties.

Conclusie: Concluderend kan aangemerkt worden dat positieve psychologie oefeningen vooral hulprijk zijn voor mensen die hoog op neuroticisme scoren, om positieve emoties te verhogen. Adherentie had alleen een significante relatie tot extraversie. Om een diepere inzicht in adherentie te krijgen kunnen onderzoekers in toekomstige interventies vragenlijsten zenden om extraverte respondenten naar hun motieven te vragen waarom deze de interventie hebben afgebroken.

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1.1.Introduction

In the past years it has become obvious that not only physical health is important, but also positive mental health. But first of all, it is necessary to define health. There are several definitions of health. One that has become most common and cited in articles is the definition of the World Health Organization. They describe health as a “state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (Slade, 2010, p. 1). This leads to the point that for improving health it is important to focus not only on illness-oriented services but also on health-oriented services. Positive Psychology can therefore be important because it tries to change the point of view. It focuses not only on ways to reduce illness, but also on possibilities to improve mental health by focusing on the positive aspects (Seligman & Csikszentmihalyi, 2000). A meta-analysis of Chida and Steptoe (2008) shows that psychological well-being reduces the mortality rate. In addition, experimental and longitudinal studies point to the fact that positive emotions increase the social, occupational, and health benefits (Schueller & Parks, 2012). Positive emotions (e.g. joy, contentment, love) are markers of well-being or flourishing (Fredrickson, 2001). Sin and Lyubomirsky (2009) define a positive psychology intervention as an attempt to increase positive feelings, positive behaviors or positive cognitions. Furthermore, other benefits of well-being are improved productivity at work, better physical health and having more meaningful relationships (Bolier, Haverman, Westerhof, Riper, Smit & Bohlmeijer, 2013).

Positive Psychology and Positive Emotions in particular offer many advantages and it is worth to consider this approach in an attempt to improve (mental) health. This upcoming field is more and more the topic of several studies. The relationship between positive psychology and the Big Five personality constructs also have been investigated. The Big Five are broad categories of personality traits. The five categories are neuroticism, extraversion, openness to experience and conscientiousness (McCrae & Costa, 1992). But so far this relationship has barely been investigated in an actual positive psychology intervention. Thus, what is the relationship between the Big Five personality constructs and the experienced amount of positive and negative affect actually used in an intervention? Are the personality constructs related to positive and negative emotions and if so: what is the result of the positive psychology intervention related to the different personality constructs. Another question is to find out to what extent the adherence rate (= does the respondent follow the intervention until

the last day) is related to the Big Five constructs in a positive psychology intervention. These are the topics this study will mainly focus on.

1.2. Positive Psychology and well-being

Positive psychologists play an important role in studying mental health and well-being, in particular in studying “*positive emotions, positive character traits, and enabling institutions*” (Seligman, Steen, Park & Petersen, 2005). Well-being is an important part in the studying of Positive Psychology and it can be distinguished into the three components: psychological well-being, social well-being and emotional well-being.

In the context of psychological well-being people are stated as mentally healthy when they are fully functioning in their life. Aspects which are important for a functioning life are e.g. self-acceptance, autonomy, personal growth and positive relations with others (Ryff, 1989). In addition to that psychological well-being can also be a protective factor from getting future episodes of major depression (Schueller & Parks, 2012).

For social well-being it is necessary to function in community life because individuals are part of social structures and community. According to the definition of social well-being, individuals are mentally healthy when they understand the society and when they are a part of it and contribute to it (Keyes, 1998).

The third component of well-being and the component we mainly focus on in this study is emotional well-being. In contrast to the other two components, this component is about the balance of positive and negative emotions and the degree of life satisfaction (Lamers, Westerhof, Kovács & Bohlmeijer, 2012). Feelings that could be considered as positive affect are enthusiasm, joy or hope and emotions that refer to negative affect are for example anger, fear and despair. In this study we will focus on both, the positive affect and also on the negative affect and the difference in effect after the intervention. In the context of emotional well-being the “broaden and build theory” from Fredrickson should be mentioned. They stated that positive emotions are not only about feeling well, but that they can also help on other topics. According to this theory, positive emotions (e.g. happiness, joy, interest, proud) broadens the awareness of someone and helps them to develop novel thoughts or a new point of view and help them to explore the environment. This broadened view through positive emotions lead to new build skills. For example, having joy on a mathematic exercise

could lead to improved grades in this course. Through the changing attention emotional well-being could be enhanced (Fredrickson & Joiner, 2002).

Schueller and Parks (2012) assume also that increasing emotional well being can decrease negative states. This assumption is supported by studies testing the “Undoing hypothesis” (Fredrickson, 2001). This hypothesis states that through positive emotions it is possible to reduce or undo the aftereffects of negative emotions. In their study, Fredrickson and Levenson (1998) created for their participants an anxiety provoking situation by asking them to prepare a speech. Shortly after the participants start to prepare the speech, the participants get to know that they do not have to hold the speech actually. Instead they were randomly assigned into a condition where they watch a video that generate positive emotions, negative emotions or a neutral video that general neither of these two states. Afterwards the duration of cardiovascular reactivity is measured. This is the time the participants take to recover from anxiety provoking situation before the film. The results of Fredrickson and Levenson (1998) show that participants who watch the video that generate positive emotions, recover faster from the effect of negative emotions than participants in the other conditions (Fredrickson, 2001). Thus, this clarifies the importance of positive emotions by developing strategies to reduce negative emotions.

1.3. Positive psychology exercises

In the Positive Psychology are different possibilities and techniques available to increase emotional well-being. There are several kinds of Positive Psychology exercises in different core areas like optimism, positivity, happiness and gratitude.

Optimism

Optimistic people are individuals who expect desirable future outcomes (Carver, Scheier & Segerstrom, 2010) and optimism is for example also associated with reduced stress and reduced depression among individuals who are about to transit to college. Furthermore, optimism has been related to interpersonal well-being in several studies (Fincham & McNulty, 2012). An example for an exercise which is also used in this study is that participants had to write down about the best event that happened to them during the day and refer them to stable, global and internal factors. Through this exercise happiness should be increased and depressive symptoms decreased (Bannink, 2009).

Positivity

Another example for a Positive Psychology exercise is the positivity exercise. As stated earlier positive emotions are from importance for the emotional well-being. The level of (emotional) well-being is characterized by the proportion between the amount of positive and negative emotions (Fredrickson & Losada, 2005). An exercise for increasing positive emotions is to do five nice things for someone else and to remember the good feeling at the end of the day and to sum up if they actually were able to do five good things for someone else. The results from a study of Buchanan and Bardi (2010) showed that participants who were randomly assigned to perform daily acts of kindness during 10 days were more satisfied with their lives than participants in the control group.

Happiness

According to a study of Lyubomirsky, King and Diener (2005) happiness can have an impact on different areas in life, like success in work, relationship with others and also on health. Results from another study showed that people who reflect on positive moments of their life have higher levels of positive emotions (Schueller & Parks, 2012) and that positive emotions are the reason for feeling happy (Lyubomirsky et al., 2005). An exercise in this field is to reflect each day on what they did to make themselves content or what someone else did to make them feel good and if they reacted adequately so that the person would repeat this behavior.

Gratitude

The results from several studies have shown that gratitude is related to life satisfaction and is therefore integrated as a Positive Psychology exercise. An example in the field of gratitude is the exercise in which participants had to reflect each day on three good things that happened to them during the day. They had to write these things down and should also write how they happened and what kind of impact they had on them (Bannink, 2009). The results of Seligman et al. (2005) study show that the three good things in life exercise increase happiness and that it also decrease depressive symptoms up to six months. This is similar to an application on the social network site “Facebook”. The Facebook app is created by a research group of the University of Michigan who base their idea on Seligman’s studies (Seligman et al., 2005). The aim of the app “three good things” is to create a wellness intervention by using social computing and to support the exercise of Seligman. The three good things exercise is an

exercise in which people write each day three good things down and explain why they happened to them. The Facebook application was not evaluated for effectivity but it is reported that an increase in usage of the app was remarked which might be a sign that people are interested in this kind of exercise (Schueller & Parks, 2012).

1.4. Effectivity of Positive Psychology interventions

In a meta-analysis of 51 interventions with 4162 individuals, about the question if positive psychology interventions enhance well-being and improve depressive symptoms, the results show that these Positive Psychology interventions actually have the expected effect (Sin & Lyubomirsky, 2009). Sin and Lyubomirsky point in their meta-analysis out that several factors have an impact on the effectiveness of the intervention. These influential factors are: the depressive status of the participant (non-depressive/depressive), age of participants (the analysis show that benefits of Positive Psychology interventions increase linearly with age), self-selection (does the participant self-selected to participate on the intervention or is does someone else decide that he should participate on the intervention) and the format and time spend on the intervention. In the intervention of Sin and Lyubomirsky (2009) the duration was up to 4 weeks, 5-7 weeks, 8-12 weeks or more than 12 weeks. The results show that the longer participants spent on the intervention the greater the gain in general well-being. Thus, this shows that it is important for well-being that participants do Positive Psychology exercises more often. A possible explanation for this relationship could be that through doing the exercises more often, participants have the possibility to integrate the learned positive activities into their daily life and to benefit from it by improving their well-being (Sin & Lyubomirsky, 2009). In our study participants do daily a Positive Psychology exercise to increase their emotional well-being.

1.5. Web-based interventions in Positive Psychology

Interventions can also be delivered online. This is according to Schueller and Parks (2012) especially for Positive Psychology exercises reasonable because “the brief duration and universal appeal of these strategies make Positive Psychology interventions ideal candidates for online administration.” He also points to the fact that the first empirical tests of Positive Psychology were conducted via the internet. Positive Psychology interventions are defined as “treatment methods or intentional activities aimed at cultivating positive feelings, positive behavior or positive cognitions (Sin & Lyubomirsky, 2009, p.467). This means that these

kinds of interventions try to increase positive feelings, positive behavior or cognitions. A meta-analysis of 39 studies on effectiveness in Positive Psychology in interventions show that Positive Psychology interventions significantly enhance psychological well-being, subjective well-being and can also lead also to a decrease in depressive symptoms (Bolier et al., 2013).

The concept of using the internet to deliver health interventions and to provide information about it, leads to some advantages. In general, in web-based interventions the intervention is offered online and people who are interested in it can read the provided information about it and can then choose if they want to take part on the intervention. Advantages through this kind of interventions could be that everyone who has internet access is able to participate on the intervention (Griffiths, Lindenmeyer, Powell, Lowe & Thorogood, 2006). Furthermore web-based intervention reduces the cost of an intervention and increases at the same time the convenience for users and they are able any time to gather more information or to get in contact via e-mail. In addition to that, people who usually won't participate in an intervention, where they have to attend the intervention personally, are thus given another opportunity (Griffiths, et al., 2006). An upcoming field in the context of health care, during the past years, is e-health which is also stated to being effective and becoming more popular (Donkin, Christensen, Naismith, Neal, Hickie & Glozier, 2011). Eysenbach (2001) defined e-health as a growing field with the aim to deliver or enhancing health services and information through the Internet and related technologies and to improve health care not only locally but worldwide by using information and communication technology. This definition states that one goal of e-health is to enhance the quality of health care and the distribution of information about this topic and also reach more people through delivering information worldwide.

1.6. Adherence

One problem that interferes with e-health intervention and interventions in general seems to be the different adherence rate of participants. Adherence can be defined as “the extent to which a person’s behavior corresponds with agreed recommendations from a health care provider” “or in the context of web based interventions it may be “defined as ‘the extent to which individuals experience the content of the intervention” (Graham, Cha, Papandonatos, Cobb, Mushro, Fang, Niaura & Abrams, 2013, page 2). Non-adherence can become a problem because it could lessen the effect of the intervention and it would be difficult to derive the maximum benefit from the intervention. Kelders, Kok, Ossebaard and Gemert-Pijnen (2012)

found in a meta-analysis of 83 interventions that 50 % of the participants adhere to the web-based intervention, but there is also a wide range in level of adherence detectable. In six interventions the adherence rate is below 10 % and in five interventions it is 90% or even higher. Thus, the variation in adherence rate among the different interventions is high and it is difficult to make a statement about adherence rate that is generally accepted for all interventions.

When it comes to adherence, there is often the so called dose-response curve described. This curve is in the pharmaceutical trial described as the optimal level of medication that lead to the desired response they wanted from the patient (Donkin et al., 2011). In other words, the change of effect is caused by different levels of exposure to a stressor after different time periods and this process helps to conclude which doses might lead to the best response. A study of Donkin et al., (2011) shows a relationship between completing an activity/ program and the results of mental health interventions. The more participants do the activity and spend time on it, the higher the impact on well-being.

1.7. Personality

1.7.1. Personality and emotional well-being

An important determinant of well-being is personality. Garcia (2011) suggests that this could be caused through its relationship with emotional reactivity, the different individual responses to an emotional event and the duration of it. In the past years there has been much research done about the relationship between personality and psychopathology but there was less focus on the relationship between personality and health in terms of social, physical and emotional well-being (Cloninger & Zoha, 2011). As stated in the introduction health is more than the absence of disease and studying the relationship between emotional well-being and personality could be helpful to understand it better and to improve mental health interventions.

Personality traits can be categorized into the Big Five model which consists of five main domains. “Each bipolar factor (e.g. Extraversion vs. Introversion) summarizes other multiple facets. The five main domains are Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness (Soto, John, Gosling & Potter, 2011). In a meta-analysis from Schmidt, Shultz and Steel (2008) the results show that there is a strong relationship between four dimensions of the Big Five with all components of well-being

(happiness, positive and negative affect, overall affect and quality of life), despite the dimension openness to experience which was close related to well-being facets of positive affect, happiness and quality of life (Gomez, Krings, Bangerter & Grob, 2009).

Neuroticism

This construct measures the degree of emotional stability (e.g. anxiety). This dimension refers to the “tendency to experience psychological distress and emotional instability”

(Vazifehdoost, Akbari & Charsted, 2012, p.246). People who tend to be neurotic seem to be more sensitive when it comes to negative life events and interpret these events in a more negative way. They are also more likely to spill their negative emotions from one life area to another, which was actually not even related to it in the beginning. This process is called the neurotic cascade (Lamers et al., 2012) and could be a possible explanation for the strong association between neuroticism and the experience of negative emotions.

According to a study of Weiting (2009) the relationship between neuroticism and positive emotions could also depend on the circumstances the participant is in. The results show that participants high in neuroticism feel less positive emotions in a slightly unpleasant situation than participants who are low in neuroticism. But in a slightly pleasant situation it is possible for participants high on neuroticism to experience positive emotions. This could be a sign that people who tend to be high neurotic are also capable of feeling nearly the same amount of positive emotion as low neurotic people under certain circumstances (Weiting, 2009). Thus, studies should not focus only on how to decrease negative affect and negative emotion but also consider that people who score high on neuroticism are capable of feeling positive emotions in a certain situation. Researchers could try to focus on how to increase positive affect or change the circumstances of the person in order to increase emotional well-being.

Extraversion

Another construct of the Big Five is extraversion. This construct is occupied with the degree of interpersonal interaction. Extravert people are described as being active, social and to have a tendency to experience positive emotions (Vazifehdoost et al., 2013). Facets from this construct are for example also assertiveness, excitement seeking, friendliness (McCrae & Costa, 1992). People who score high on extraversion experience often more positive life events and tend to have in social situations a higher level of positive emotions than people

who are neurotic. An explanation for their higher level of positive emotions could be that extraverted people engage more in social situations and have therefore a greater possibility to subsequently experience greater positive affect (Lamers et al., 2012).

Openness to experience

In contrast to the previously described constructs neuroticism and extraversion, there is not much known about the other three personality constructs when it comes to Positive Psychology. The third construct of the Big Five is openness to experience and this construct estimates the willingness of someone to accept novel ideas. For example facets representing this construct are openness to aesthetics, openness to ideas and emotionality (McCrae & Costa, 1992). This personality construct shows not such a strong relationship to well-being as the constructs described earlier but nevertheless has the construct a positive correlation to well-being (McCrae & Costa, 1992). According to Quevedo and Abella (2011) openness to experience is related to positive affect and negative affect.

Agreeableness

This construct estimates the quality of interpersonal orientation and has also positive correlation to well-being (Schmidt et al., 2008), but seems to be stronger associated to life satisfaction and happiness than to positive affect (PA) and negative affect (NA) (McCrae & Costa, 1992). According to Vazifehdoost et al. (2012) people who score high on this construct are sympathetic, trusting and cooperative (e.g. altruism, compliance).

Conscientiousness

The fifth construct estimates motivation in goal directed behavior (e.g. order, self-discipline). People who score high on this dimension are e.g. well organized and self-disciplined (McCrae & Costa, 1992). As the personality constructs openness to experience and agreeableness, there is weaker relationship between the construct conscientiousness and emotional well-being when you compare them to the first two constructs (neuroticism & extraversion). This construct seems to be positive related to positive affect and is negative related to negative affect (Schmidt et al., 2008).

Personality constructs and their relationship to results of Positive Psychology interventions about emotional well-being

Due to the literature research it is detectable that there are many studies about the general amount of positive emotions and negative emotions people experience in daily life and how they affect the life of people. Fredrickson (1998) stated that psychologists favored to explore negative emotions and to build hypothesis about them because many psychologists were in the opinion that negative emotions can be more problematic for individuals. They can lead to anger, aggression or violence (Fredrickson, 1998) and that the focus therefore at that time was merely on positive emotions. According to Bolier et al., (2013) the attention was more on positive emotions since the publication of Seligman and Csikszentmihaly’s review about Positive Psychology in 2000. As stated earlier there are studies about the Big Five personality constructs and their relationship to positive and negative emotions, but there are barely results about the Big Five personality constructs and their effect on results of Positive Psychology interventions. The results of this study could be useful to get an insight to what extent the personality constructs are influential on the results (or effects) of positive and negative emotions and the conducted intervention.

1.7.2. Personality and adherence

Some researchers were also occupied to explore the relationship between adherence and personality. The results from one study indicate that conscientiousness is positive related with adherence to medicament regimens (Emilsson, Berndtsson, Lötval, Millqvist, Lundgren, Johansson & Brink, 2011), but according to a study from Jerant, Chapman, Duberstein, Robbins and Franks (2010) only the domain neuroticism is significantly related to non-adherence. Courneya and Hellsten (1997) acknowledged also with their study that Extraversion, Conscientiousness and Neuroticism were the dimensions of personality which are related to adherence. By comparing these different studies about the effect of personality on adherence, it is difficult to find a consistent result but it would be interesting to study if there is a relationship detectable between personality and adherence in the context of Positive Psychology because in this case this could lead to the opportunity to improve further interventions and to adapt them to the needs of the participants.

1.8. Research questions

Results from Positive Psychology are important to mental health services because they can be useful for developing strategies to help people to increase their well-being. Positive Psychology exercises can help them to focus on the good things in life and might help them to increase positive emotions and to decrease negative emotions. In order to learn more about effectivity and non-adherence it could be useful to explore what the relationship towards personality is in this context. The results can help to improve future interventions in the case of a significant result. The results could be useful by conducting new interventions to increase positive emotions and decrease negative emotions.

This study will mainly focus on three research questions:

1.) What is the relationship between personality and adherence in this Positive Psychology intervention?

The aim of this research question is to get a deeper insight to what extent personality is related to the participation rate (adherence) for the entire Positive Psychology intervention. And in the case that there is a significant relationship between the personality constructs and adherence, is the relation between them positive or negative? Due to the literature research it is difficult to say how the Big Five personality constructs are related to adherence because of the inconsistent findings of for example Jerant et al. (2010), Emilsson et al. (2011) and Courneya and Hellsten (1997). It would be of expectance that there is a negative relationship between the construct neuroticism and adherence like Jerant et al. (2010) and Courneya and Hellsten (1997) stated. Emilsson et al. (2011) found a positive relationship between conscientiousness and adherence to medication regimens but it is difficult to say, if this positive relationship is also detectable in a Positive Psychology intervention because it is difficult to say to what extent the two situations are comparable. If the results show that the different constructs are significant related to the adherence rate of this Positive Psychology intervention, it could be worth to consider the personality constructs when conducting new interventions in the field of Positive Psychology.

2. What is the relationship between personality and effectiveness on positive emotions in this Positive Psychology intervention?

→ This research question aims to explore the relationship between the Big Five personality constructs and positive emotions after participating on this intervention. Is there a significant difference in the amount of experienced positive emotions noticeable? And in the case of a significant relationship, are constructs positive or negative related to the effect on positive emotions? Due to the literature research it is noticeable that there are many studies about exploring the relationship between the Big Five constructs and positive emotions in general, but it is actually barely explored, how the Big Five personality constructs are related to positive emotions after participating on a positive Psychology intervention. It is therefore difficult to say how the personality constructs are actually related to the difference in effect after the one week intervention. Based on description of the construct neuroticism (McCrae & Costa, 1992; Weiting, 2009) I would expect a significant relationship between this personality construct and the difference in effect on positive emotions.

a.) In the case of a significant relationship between the Big Five personality constructs and effectivity of the intervention on positive emotions: To what extent are the personality constructs related to the positive affect in the pre-test and post-test of this intervention?

→ This research question aims to explore the relationship between the Big Five personality constructs and how the positive emotions before and after the intervention are related to it. There are results of studies which indicated that neuroticism could play a role when it comes to the experienced amount of negative emotions (Lamers et al., 2012) and extraversion in the context of the experienced amount of positive emotions (De Neve and Cooper, 1998; Lamers et al., 2012; Weiting, 2009). In this intervention I would expect to find a relationship between the Big Five construct neuroticism and the amount of experienced positive emotions. In addition to that I would expect to find a positive correlation for participants, who score high on the trait extraversion and their positive affect score

before the intervention and also a positive correlation for their positive affect score after the intervention

There is not much known about the relationship between the other three personality constructs and their relationship to positive emotions and how there are related to the results of a positive psychology intervention.

3. What is the relationship between personality and effectiveness on negative emotions in this positive psychology intervention?

During the literature research it is noticeable that there are rarely studies which explore the relationship of the personality constructs and their influence on negative emotions in the context of a positive psychology intervention. This study will also explore to what extent the Big Five personality constructs are related to the negative affect score.

a.) In the case of a significant relationship between a Big Five personality constructs and effectivity of the intervention on negative emotions: Are the significant personality constructs also related to the negative affect in the pre-test and post-test?

➔ It is possible that there is a positive relationship between neuroticism and the amount of negative emotions in the pre-test. This means that respondents who score high on the construct neuroticism also will score high on negative emotions in the pre-test. Respondents who score high on neuroticism interpret negative life events in a more negative way (Lamers et al., 2012) before participating on the intervention and have therefore probably in the pre-test a higher amount of negative emotions. Due to the literature research it is difficult to say how the other constructs are related to negative emotions.

2. Method

2.1.Design

The intervention was a quantitative research with a pre-test in the beginning of the one-week intervention and a post-test to evaluate the difference in positive and negative affect score after participating on the intervention. The intervention was designed by Dr. Saskia Kelders and we translated the intervention into German.

Recruitment

In this research 49 men and 134 women participated in the intervention (M: 29,17; SD:12,68). These participants were recruited through the snowball principle. This means that that we send the link with the online intervention to acquaintances from us and that we asked those to send the link further to other people, so that we gather as many as possible participants to have a representative sample.

For this intervention were only three inclusion criteria:

- 1.) Respondents need to have access to the internet
- 2.) Respondents were only included if they were of full age (18 or older)
- 3.) They have to complete the pretest questionnaire

Study Procedures

De participants enrolled for the intervention via an online questionnaire, but in the first place they were informed about the intervention and they had to tick on the agreement box (informed consent). In the pre-test questionnaire the participants had first to fill out the BFI-10 (Rammstedt, Kemper, Klein, Beierlein, Kovaleva, 2012) test and afterwards the PANAS (Krohne, Egloff, Kohlmann and Tausch, 1996) to measure the positive and negative affect score before the intervention started and later in the post-test questionnaire they had to fill out the PANAS again because it was necessary for measuring the effect of the intervention (Krohne et al., 1996).

The instruction for the chosen exercise and the ID number of the participant was automatically send to them by e-mail. Afterwards they had to do the exercise each day. In addition to that, the respondents received daily a reminder e-mail to fill out the evaluation questionnaire. The aim of this daily reminder was to increase the adherence rate of the respondents. In the daily reminder was a hyperlink that redirects the respondents to the

website with the questionnaire that asked them if they did the exercise successfully and how they rated the exercise. The possible options they could select were: “yes/ no or a little bit” for the first question and “easy/doable/ difficult” for the second question. Following the evaluation, the respondents got automatically a feedback report via email.

During the one-week intervention it was always possible for the participants to contact the researcher through the given e-mail address on the first day of the intervention (see enrollment site) or through the feedback e-mail. After seven days they filled out the post-test and get one last feedback e-mail and they were thanked for their participation on the intervention.

2.2.Measurements

PANAS

For measuring the affect the PANAS (positive and negative affect schedule) was used (Krohne et al., 1996). In this self-item report the respondents got a list of 20 words, which described different feelings and emotions (e.g. hostile, inspired and enthusiastic). There are two scales and each scale is represented by 10 items. To get the positive affect score the scores of the ten items are added. The score is ranged from 10 to 50. A higher score on the positive affect scale represents a higher level of positive affect. The negative affect score is calculated by the same principle, but lower scores on this scale represent lower levels of negative affect. The respondents had to answer in a 5-point Likert scale to what extent they experienced the feeling over the past week. The scale went from “not at all” to “extremely” (Krohne et al., 1996). They fill the PANAS on the first day out and after the one-week intervention on the 7th day.

BFI-10

Furthermore, the respondents had to fill out the BFI-10 (Big Five inventory) in the pre-test measurement. This self-item report consisted of 10 items and was used to assign the participants to the five dimensions of personality. Each personality dimension was presented by two items (Rammstedt, et al., 2012). To test the reliability of the personality constructs the correlation of the two items of each construct were calculated.

The construct neuroticism was measured by two items ($r = .343$). These were item 4 and 9 (e.g. “I see myself as someone who gets nervous easily”). The construct extraversion

($r = .625$) was measured by item 1 and 6. An example for this construct was the statement: “I see myself as someone who is outgoing, sociable”). The third construct was openness to experience ($r = .278$) and was measured by item 5 and 10. A statement from this construct was for example: “I see myself as someone who has an active imagination”. The construct agreeableness consisted also of two items ($r = .191$). This construct was measured by item 2 and 7 (e.g. “I see myself as someone who is generally trusting”). The last construct was conscientiousness ($r = .369$) and it was measured by item 3 and 8. An example for this construct was: “I see myself as someone who does thorough job”.

The items 1, 3, 4, 5 and 7 were negative scaled (e.g. “I see myself as someone who has few artistic interests”). Respondents could choose in a 6-point Likert scale if the statement had fit them not at all or if it fits them totally. Afterwards the personality constructs were build by adding the two items which belonged to the construct and to divide the sum with two to get the mean score of the construct.

Adherence

In this study we measure the adherence rate by counting the days the respondent actually fill out the daily questionnaire after doing the daily positive psychology exercise during the one-week intervention. . The respondents get after their administration the instructions for the exercise. On the next day they have to fill out the first daily evaluation questionnaire. This is counted as the first day (adherentie =1) and when they daily fill out the questionnaires the maximal adherence rate will be 6. The adherence rate can be between 0 - 6.

Positive psychology exercises

The respondents were able to choose one of the four exercise choices from the field of positive psychology. The possible choices were optimism, positive emotions, happiness or gratefulness.

Exercise 1: Optimism

In this exercise participants had to write every evening about the best event from the day. For example, they have to write one sentence in which they relate the positive event to themselves: “I get this compliment because I did a great job.”

Exercise 2: Positivity

In this exercise participants had to do five nice things for someone else and to remember the good feeling at the end of the day and to sum up if they actually did five good things for someone else. An example for a nice thing they could do, was to give someone a compliment.

Exercise 3: Happiness

This exercise asked the participant to reflect each day on what they did to make themselves content or what someone else did to make them feel good and if they reacted adequately so that the person would repeat this behavior.

Exercise: Gratefulness

In this exercise the participant reflected each day on three good things that happened to them during the day. They had to written these things down and should also write how they happened and what kind of impact they had on them.

2.3. Analysis

The results were analyzed through the statistical program SPSS. First of all the demographic data were being analyzed. The demographic data asked for in the intervention were age, nationality and education. In addition to that the results from the BFI-10 test were used to build the five constructs neuroticism, extraversion, openness to experience, agreeableness and conscientiousness and to explore their relationship to adherence and the PANAS. To test the reliability of the personality constructs the correlation of the two items of each construct were calculated. In addition the differences between the respondents, who completed the post-test questionnaire and the respondents who did not complete the questionnaire were analyzed. The aim of this analysis was to see if there were any differences in adherence, in positive and negative affect or differences on the personality constructs between those two groups. The mean scores for adherence, positive and negative affect and the average score on the Big Five constructs were calculated for the two groups and with the level of significance ($p < .05$) it was possible to see if there were any significant differences between those two groups.

Furthermore, the relationship between the constructs of personality and adherence and effect of the intervention were studied. For analyzing the relationship between personality constructs and adherence the Pearson correlation was used. The Pearson correlation was used to find a correlation between the two linear variables. The value of Pearson was between -1 (perfect negative correlation), 0 (no correlation) and 1 (perfect positive correlation).

In addition to that the Pearson correlation was also used as a method to analyze to what extent the Big Five dimensions (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness) were related to the effect on positive emotions in the intervention. To measure the effectivity of the intervention, the difference score was first calculated. The difference score is calculated by subtracting the PA score from the pre test from the score on PA from the post test. After calculating the difference score on PA, the correlation between the difference score and the personality constructs were measured. The Pearson correlation showed if the personality constructs were significantly correlated to the effect on positive emotions after participating on the intervention and also if the correlation between the constructs and the difference score is positive or negative related. To get a deeper view into the significant relationships of the earlier analysis, for the relevant constructs were analyzed if they were also significantly related to the score on PA before the intervention (pre-test score) and significantly related to the post-test score on PA .

The same analysis procedure (with Pearson correlation) was also used to explore to what extent the personality constructs were related to the effect on negative emotions after participating on the intervention and how the relationship for the relevant constructs is for NA on the pre-test and post-test score.

3. Results

Demographical data

In the following Table 1 are the demographic data is shown as total number of participants, age, education, and how many people actually participated in the pretest and post-test and differences for respondents who completed the questionnaires and who don't completed it are listed. In total, 183 respondents with an average age of 29 years participated in the intervention and 105 of them completed the intervention. When it comes to the participation rate, it is detectable that the sample consisted of 49 men and 134 women, so nearly three-fourths of the sample was women (73, 2%). In the sample itself nearly half of the male participants decided not to complete the intervention. The sample consisted predominantly of respondents with a higher education. (Educational levels which were categorized as higher education were for example “Abitur”, “Fachhochschulabschluss” or “Hochschulabschluss.”) In the whole sample were only five respondents with a low educational level (graduation levels which were considered as low education, were having a “Hauptschulabschluss” or “Volksschulabschluss”). By comparing the average score for positive affect (PA) and the average score for negative affect (NA) in the pretest, it is observable that respondents, score on average nearly 12 points higher on PA than on NA. This is also recognizable for the scores of affect in the posttest.

The results of table 1 also show how the average distribution for the pretest and posttest between respondents who complete the post-test and the others is. By comparing these two groups there is a not a significant difference detectable ($p > .05$). Respondents who complete the post-test, score in average only two points higher on the positive affect schedule and one point lower on the negative affect schedule in the pre-test. It stands out that from the total sample of 183 participants, only 105 respondents also completed the posttest and were useful for measuring the effect of the intervention. In addition to that the correlation between PA and NA was measured for the two groups. The Pearson correlation shows in the pre-test a significant negative relationship between PA and NA for respondents who does not complete post-test ($p < .05$). This means that respondents in this group who score high on PA, tend to score low on NA in the pre-test. For the respondents who completed the post-test questionnaire is no significant relationship detectable ($p > .05$). But in the post test the pearson correlation shows for respondents who completed the intervention a negative relationship between PA and NA. So, these respondents score in the post-test high on PA and

tend to score low on NA.

In addition, the demographic table listed more information. It listed how respondents, who fill out the post-test and those who do not complete it, score on average on the Big Five personality constructs. The score range goes from 1 (they score very poor on this construct) to 5 (they score very high on this construct). The respondents who do not fill out the post-test seem to score higher on extraversion than those respondents who complete the post-test questionnaire. The level of significance shows that between these two groups only for the construct extraversion is a significant difference remarkable ($p < .05$).

In addition to that table 1 show the difference in adherence between respondents who completed the questionnaires and those who does not complete the questionnaires until the end of the intervention. It is noticeable that there is significant difference between those groups. Respondents who don't complete the questionnaires tend to participate on the intervention in average 1,33 days and respondents who fill out the post-test questionnaire tend to have in average an adherence rate of 4,6 days.

Table 1. *Overview of the demographic data’s from all respondents.*

Demographic data	Respondents (not completed post-test)	Respondents (completed post-test)	<i>P</i>		Total
Respondents	78 (42,6 %)	105 (57,4%)	----	----	183 (100%)
Age (SD)	27,68	30,29	.653	F= 27,39	29,17 (12,68)
Gender	78	105	.165	$\chi^2 = 1,930$	183
Male	25 (32,1 %)	24 (22,9%)	----	----	49 (26,8 %)
Female	53 (67,9%)	81 (77,1%)	----	----	134 (73,2 %)
Education	78	105	.164	$\chi^2 = 3,616$	183
Low	2 (2,6 %)	3 (2,9%)	----	----	5 (2,7%)
Average	13 (16,7%)	30 (28,6 %)	----	----	43 (23,5 %)
High	63 (80,8%)	72 (68,6 %)	----	----	135 (73,8%)
Adherence (SD)	1,33 (1,84)	4,6 (1,41)	.000*	F= 185,28	3,21 (2,28)
Pre-testing					
Pos. Affectscore (M)	34,32 (19-49)	32,68 (16-48)	.108	F= 2.61	33, 38 (6,84)
Neg. Affectscore	21,88 (11-36)	20,15 (11-45)	.071	F= 3.29	20,89 (6,43)
Correlation betw. PA & NA	-.236* (p=0.037)	-.049 (p=.620)			
Post-testing					
Pos. Affectscore (M)	-----	33, 29 (11-45)			
Neg. Affectscore	-----	17, 64 (10-42)			
Correlation betw. PA & NA	-----	-.225* (p=.021)			
Constructs					
Neuroticism (M; SD)	2,90 (0,87)	3,07 (1,02)	.243	F= 1,37	
Extraversion	3,85(0,87)	3,39 (1,04)	.002*	F= 9,97	
Openness	3,66 (0,89)	3,67 (0,97)	.937	F= 0.01	
Agreeableness	3,24 (0,77)	3,16 (0,89)	.495	F= 0,47	
Conscientiousness	3,3 (0,87)	3,5 (0,96)	.151	F= 2,08	

*significant at the level of $p < .05$

3.2. Relationship between the five personality constructs and adherence

To measure the adherence rate in combination with the five personality constructs, the Pearson correlation was used. The adherence range goes from 0-6. A higher number means a higher adherence rate. In the first column of Table 2 are the five personality constructs and adherence listed. The level of significance shows that only the construct extraversion is significant for the adherence rate ($p=.047$). Furthermore is de value from the Pearson correlation (-.147). So it is a negative relationship between adherence and the construct extraversion detectable. This means that respondents who score high on the construct extraversion score low on adherence. For the other four constructs is no significance observable ($p>.05$).

Table 2. Average adherence rate on the personality constructs (M) and standard deviation (SD) of the personality constructs in relation to adherence

Construct	N	M	SD	Pearson Correlation	Level of significance
Neuroticism	183	2,81	1,01	.067	.367
Extraversion	183	3,39	1,05	-.147	.047*
Openness	183	3,42	0,98	.032	.667
Agreeableness	183	3,02	0,86	.023	.758
Conscientiousness	183	3,20	0,97	.126	.090

*Correlation is significant at the 0.05 level

3.3. Relationship between the five personality constructs and the PA-scores

In table 3 is the correlation illustrated between the difference score on PA and the personality constructs which were calculated with the Pearson correlation method. It is noticeable that the constructs neuroticism ($p=.016$), extraversion ($p=.002$) and openness ($p=.027$) are significantly related to the effect on the intervention. The Pearson correlation shows a positive correlation between respondents who score high on neuroticism and the difference score on PA. This means that respondents who score high on neuroticism also score high on PA after

the intervention. In contrast to that, for respondents who score high on the other two constructs is a negative correlation detected. For respondents who score high on the constructs extraversion and openness the effect of the intervention is lower.

Based on the significance level of the constructs agreeableness and conscientiousness there is not a relationship between the constructs and the difference score on PA detectable ($p > .05$).

Table 3. Difference score on PA in relation to the five personality constructs

	N	Pearson correlation	Level of significance
Pos. Affectscore*Neuroticism	105	.235	.016*
Pos. Affectscore*Extraversion	105	-.306	.002*
Pos. Affectscore*Openness	105	-.216	.027*
Pos. Affectscore*Agreeableness	105	-.036	.714
Pos. Affectscore*Conscientiousness	105	-.070	.477

*significant at the level of $p < .05$

Afterwards the Pearson correlation was used to explore, if the relationship between the significant personality constructs neuroticism, extraversion and openness and the PA –score in the pre-test is positive or negative related. Table 4 first shows how the pre-test score on the positive affect schedule is related to these personality constructs. The positive affect score before the intervention is negative related to neuroticism and positive to the other two constructs. Thus, people who score high on neuroticism, score low on the positive affect score before the intervention and people who score high on the personality constructs extraversion and openness tend also to score high on the positive affect schedule before they started with the intervention.

Table 4. Positive Affect scores in relation to the personality constructs in the Pre-test

Construct	N	Pearson Correlation	Level of significance
Neuroticism	105	-.307	.001*
Extraversion	105	.290	.003*

Openness	105	.255	.009*
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*significant at the level of $p < .05$

Table 5 shows the correlation between the positive affect score in the post-test related to the constructs. It is noticeable that none of the three constructs is significantly related to the isolated post-test score in the measuring after the intervention ($p > .05$) correlated with the PA-score for respondents who score high on neuroticism. The isolated post-test score is the value of the PA-score after the intervention, without considering the PA-score in the pre-test.

Table 5. *Positive Affect scores in relation to the personality constructs in the Post-test*

Construct	N	Pearson Correlation	Level of significance
Neuroticism	105	-.054	.586
Extraversion	105	-.032	.747
Openness	105	-.025	.804

*significant at the level of $p < .05$

3.4. Relationship between the five personality constructs and the NA-scores

Table 6 points out the relationship between the difference scores on NA and the five personality constructs. The constructs neuroticism ($p=.013$), extraversion ($p=.015$) and agreeableness ($p=.031$) are significantly related to the difference score on NA value in relation to the negative effect score shown. The difference score on NA is after the intervention positive related to neuroticism and negative related to extraversion and agreeableness. After the positive psychology intervention, respondents who score high on neuroticism tend to score high on the NA –schedule and respondents who score high extraversion and agreeableness, score low on the negative affect schedule. As stated for the relationship between the difference score on PA and the constructs of personality, it is not possible to make a statement about the relationship between openness and conscientiousness because the significance level p is higher than 0.05.

Table 6. *Difference scores on NA in relation to the personality constructs*

	N	Pearson correlation	Level of significance
Neg. Affectscore*Neuroticism	105	.240	.013*
Neg. Affectscore*Extraversion	105	-.238	.015*
Neg. Affectscore*Openness	105	-.125	.203
Neg. Affectscore*Agreeableness	105	-.210	.031*
Neg. Affectscore*Conscientiousness	105	-.133	.175

*significant at the level of $p < .05$

To analyze the relationship further the Pearson correlation is used again. In our intervention the pre-test score on the negative affect schedule for the relevant constructs is negative related to neuroticism and positive related to extraversion. Respondents who score high on neuroticism also tend to score high on the negative affect schedule in the pre-test and respondents who score high on agreeableness, tend to have a low score on the negative affect schedule before the intervention. The score for the construct extraversion is not significant ($p > .05$).

Table 7. *Negative Affectscore in relation to the personality constructs in the Pre-test*

Construct	N	Pearson Correlation	Level of significance
Neuroticism	105	.414	.000*
Extraversion	105	-.160	.102
Agreeableness	105	-.192	.049*

*significant at the level of $p < .05$

As stated earlier for the isolated PA-score in the post-test, it is also for NA-score in the post-test no significant correlation detectable. The level of significance is for each of the five constructs in relation to the above $p > .05$.

Table 8. *Negative Affect scores in relation to the personality constructs in the Post-test*

Construct	N	Pearson Correlation	Level of significance
Neuroticism	105	.171	.081
Extraversion	105	.084	.395
Agreeableness	105	.023	.818

*significant at the level of $p < .05$

4. Discussion

The Big Five personality constructs and adherence

The purpose of this study was first to investigate the relationship of the Big Five constructs to adherence. The results show that out of the five personality constructs only the construct extraversion is significantly related to the adherence rate of participants in our intervention. The Pearson correlation shows a significant negative relationship between these two constructs and indicates that respondents who scored high on extraversion tend to spend fewer days on the intervention. As stated earlier in the introduction there are different findings about the relationship between the personality constructs and adherence. On the one hand some researchers come to the conclusion that non-adherence is only related to neuroticism (Jerant et al., 2010), and on the other hand other researchers who find in their study that extraversion, conscientiousness and neuroticism are related to adherence (Courneya & Hellsten, 1997). The result of this intervention is however is barely supported by the findings of Courneya & Hellsten (1997). They also find a relationship between extraversion and adherence, but the relationship between those two constructs in their intervention is slightly positive. They also state that conscientiousness is positive related to adherence and neuroticism is negative related to adherence but this is not consistent with the results from our intervention ($p > .05$). The different result could be related to the exercises the participants do during the intervention. In the intervention of Courneya and Hellsten, the exercises are about exercise behavior in the field of fitness/ physical health .In our intervention the focus is on mental health. In addition to that the effect of the intervention is explored, and not the exercise itself.

The negative relationship between the construct extraversion and adherence could also be related to the level of challenge that participants who score high on extraversion experience. It is important that the goal of an exercise should have the right level of challenge (Slade, 2010). This means that the goal should not be very straightforward to achieve because it would then become unexciting, and it should not be very complicated because it could lead to anxiety. According to McCrae and Costa (1992) a facet of extraversion is excitement seeking. Maybe respondents who decide to not take further part in the intervention are bored of the chosen exercise because it does not seem challenging enough for them. Another possible explanation could be that during the intervention period external influences have an impact on some of these respondents. Extravert people tend to engage more in social situations and

interpersonal interaction and who are active (Vazifehdoost et al., 2013; McCrae & Costa, 1992). Maybe the extravert respondents were more occupied with other things (e.g. problems at school, work, having a relationship, doing activities, bereavement in the family, etc.) and that they therefore decide not to participate further on the intervention.

The Big Five personality constructs and effectiveness on positive emotions

The second major research issue in this intervention is to explore, if there is a relationship between the Big Five personality constructs and the effect on positive emotions. Through the Pearson correlation it was shown that there is a significant relationship between the personality constructs neuroticism, extraversion and openness and the difference score in PA after completing the intervention ($p < .05$).

Noticeable is that the effect of the intervention for respondents who score on neuroticism is positive related to the difference score on PA. Respondents who score high on the construct neuroticism score higher on PA than before the intervention. This finding could be explained through the “broaden and built theory” from Fredrickson (2001). In the intervention the participants choose one of the four positive psychology exercises. This exercise could help respondents, who score high on neuroticism to broaden the awareness or to view things from a new point of view, and that they focus less on negative aspects of events. It is possible that respondents, who score high on the other personality constructs already use better coping strategies to negative life events and that for them the change in view and learning other strategies is not as influential as for respondents, who score high on neuroticism. By choosing the optimism exercise, respondents who score high on neuroticism, are instructed to write three good things down each day from daily occurring, and refer it to as stable, global and internal factors. Respondents who scored high on neuroticism who might only prefer positive events to external factors before the intervention, are now asked to see things from another point of view. This could strengthen their self-confidence, for example the respondent is praised by the director and does not think that he is praised because the director was in a good mood, but rather that he is praised because he did a good job. This change in point of view could have lead to an increase in positive emotions in the post-test. This shows that the positive psychology exercises in this intervention could be especially helpful to improve well-being for people who score high on neuroticism and it is useful to integrate these exercises in future strategies concerning well-being.

On the other hand, the results of this intervention also show an unexpected result because instead of a positive correlation, the analysis show that the difference scores on PA after the intervention was a negative correlation to extraversion.

A possible explanation for this finding could be that extravert respondents who decide to complete the intervention have already before the intervention a high PA-score and it could have been more difficult to increase this level of positive emotion than the level of positive emotions for respondents who score high on neuroticism. Extravert respondents are described to be occupied with interpersonal interaction, to be social and to have a tendency to experience positive emotions (Vazifehdoost et al., 2012). Even before the intervention respondents who score high on extraversion engage more in social situation and subsequently have a greater possibility to experience a high amount of positive emotions (Lamers et al., 2012). Therefore the positive psychology exercise does not effect them so much in experiencing more positive emotions. For example, extravert people are described to be social and in the case that they usually do five or more nice things for others. The exercise “positivity” is not going to change the amount of experienced positive emotions that much. Maybe those respondents do not feel an increase in the experienced positive emotions and state in the post-test questionnaire a lower score on PA because as excitement seeking respondents (McCrae & Costa, 1992) they expected something different that significantly increase their perceived amount of positive emotions.

The results also show a negative relationship between the construct openness to experience and the difference score on PA. Maybe it was as for extravert respondents difficult to increase the amount of positive emotions for respondents, who score high on the construct openness to experience. However, it is difficult to say exactly which factor is related to the negative relationship in this context. A general explanation for the negative relationship could be that external influences change the scores respondents stated in the post-test questionnaire.

The Big Five personality constructs and PA in the pre-test and post-test

The Pearson correlation for the construct neuroticism shows that it is negative correlated with the positive affect score in the pre-test. Respondents scoring high on this construct tend to score low on PA before the intervention. Due to the literature research in the introduction this is no surprising result. This could be related to the neurotic cascade that neurotic people tend to be more sensitive when it comes to negative life events and interpret these events in a more negative way and spill these negative emotions over to other unrelated areas (Lamers et al.,

2012). The sensitivity could also influence the amount of positive emotions when respondents focus more on the negative emotions.

In addition, results show that the pre-test score on positive affect ahead of the intervention is positive related to extraversion and openness to experience. This is in common with previous research. People who are extravert seem to experience in social situations a higher amount of positive emotions than neurotic people and experience (Lamers et al., 2012). The expected result before the intervention was that the results will show a positive correlation between the construct extraversion and the PA-score in the pre-test and also a positive correlation between the construct extraversion and the effect score in PA after the intervention.

The Big Five personality constructs and NA

The results of this study show a positive correlation between neuroticism and the difference score on NA. Respondents who score high on neuroticism also score high on negative emotions after participating on the intervention. This is not an unexpected result. The respondents who score high on neuroticism could have experience the process of the neurotic cascade. They are more sensitive to life events and interpret them often in a more negative way. Due to poor emotional regulation these negative emotions spill over from one live area to another (Lamers et al., 2012). This process could lead to a poorer mental health and a higher amount of negative emotions.

Furthermore, the results show a negative correlation between agreeableness and the difference score on NA. Respondents who score high on agreeableness tend to score low on negative emotions post participation in the intervention. The results also show a negative correlation between extraversion and the difference score on NA. A possible explanation could be the undoing hypothesis. This hypothesis states that through positive emotions it is possible to reduce or undo the aftereffects of negative emotions (Fredrickson, 2001). As described earlier extravert respondents tend to engage more in positive life events and experience a higher level of positive emotions than people who are neurotic (Vazifehdoost et al., 2012). The experienced positive emotions through the positive psychology exercise could have help extravert respondents to reduce the aftereffects of negative emotions and to have a lower amount of negative emotions in the post-test.

Some Limitations

There are some limitation in the study which should been mentioned. During the first days of the intervention it was observable that the instructions were sometimes misinterpreted. These participants thought they have to fill out the daily evaluation questionnaire only at the 7th day of the intervention, and not daily. Some participants send a message to us and ask when they have to fill out the questionnaires. We specified the instructions afterwards so that the misunderstanding was clarified and send an E-Mail to the respondents, who already have administered for the intervention. However, it is possible that not each of participants who administered on the first days of intervention also notice our mail.

Another aspect that could be important for the evaluation of the results are that the results rely on self-reported questionnaires and that personal circumstances of the individual participant could have been influential on the results. It is not possible to know to what extent personal circumstances could have been influential on the results of the PANAS, and it is therefore not possible to consider these in the results. Participants had the possibility to write an e-mail if they want to ask or say something about the intervention, but it is unrealistic to expect that participants will actually use this way to write about any personal circumstance that influence them during the one week intervention. Maybe it could be helpful for participants, if there is an extra question included in the questionnaire. A question should asked if they are influenced by any circumstances. In the case they affirm this question an additional field should be included on the questionnaire, where the participants can choose to write what kind of personal circumstances he/she is troubled with. Through this way the participant does not have to take any further actions like writing an e-mail.

In addition to the aspect of personal circumstances, the adherence rate should be considered in the interpretation of the results of the PANAS-score after the intervention. Nearly 42 % of the respondents did not take part on the post intervention and could not be included in the measuring of the affect score of the PANAS-score after the intervention.

4.1. Conclusion

In conclusion, due to the basis of the results of this intervention, it could be suggested that positive psychology exercises could be especially helpful for people who score high on neuroticism. The positive relationship between the construct neuroticism and the PA-score let

see that positive psychology could be helpful to increase positive emotions. Neuroticism is often associated as a measure of negative emotion. If you are high in Neuroticism, by definition you are more likely to experience negative emotion than the average population. The results show that it does not mean that those participants are incapable of experiencing positive emotion. The results may show that Positive Psychology exercises could actually be an effective coping method for participants who score high on neuroticism to enhance their emotional well-being which could be influential on their general well-being.

Furthermore, this study shows that the effect of this intervention is lower for respondents, who score high on extraversion. It is the only construct in this intervention that significantly correlates with adherence. It is therefore important to study further the possible reasons behind this finding (for example what are possible factors that contribute to this results according to the respondent). Furthermore the intervention shows that all five constructs are significantly related to the pre-test score on the positive affect schedule. So, the Big Five personality constructs seems to be related to the experienced positive emotions before the actual intervention.

The participation rate on this intervention shows that people are interested in the topic of positive psychology and the results of this intervention could be a good starting point for future interventions and studies. On the other hand, to get a deeper insight in adherence, researchers in future interventions could send questionnaires to those respondents who don't participate till the end of the intervention and ask about the reasons and motives that lead to the point to stop with the intervention. The information gathered through this questionnaire could be helpful to adjust future interventions to the needs of the participants. It is also possible to use the answers of the questionnaires to investigate further the negative relationship between the construct extraversion and to look if people who score high on extraversion tend to have a special reason in common why they behave non-adherent.

Due to a limited time period for this study it is for example not possible to conduct interviews with respondents who score high on extraversion and low on positive affect after the intervention to get to know more information about possible variables which could have been influencing the results (for example a bereavement in the family, stress at work/school). This would have been an opportunity to get a more detailed feedback report or future studies could try to increase the time period to one month or longer to see if the results change if respondents perform the positive psychology exercise over a longer time.

References:

- Bannink, F.P. (2009). *Positieve Psychologie in de Praktijk (Positive Psychology in Practice)*. Amsterdam: Hogrefe.
- Bolier, L., Haverman, Westerhof, G.J., Riper, H., Smit, F., Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health*, 13(119), 1-20. Retrieved from <http://www.biomedcentral.com/1471-2458/13/119>
- Buchnan, K. & Bardi, A. (2010). Acts of kindness and acts of novelty affect life satisfaction. *Journal of Social Psychology*, 150(3), 235-237.
- Carver, C.S., Scheier, M.F. & Segerstrom, S.C. (2010). Optimism. *Clinical psychology review*, 30(7), 879-889. doi:0.1016/j.cpr.2010.01.006
- Chida, Y. & Steptoe, A. (2008). Positive psychological well-being and mortality: a quantitative review of prospective observational studies. *Psychosomatic Medicine*, 70(7), 741-756. doi:0.1097/PSY.0b013e31818105ba
- Cloninger, C.R. & Zohar, A.H. (2011). Personality and the perception of health and happiness. *Journal of Affective Disorders*, 128, 24-32. doi:10.1016/j.jad.2010.06.012
- Courneya, K.S. & Hellsten, L.A.M. (1998). Personality correlates of exercise behavior, motives, barriers and preferences: An application of the Five factor model. *Personality and Individual Differences*, 24(5), 625-633.
- Donkin, L., Christensen, H., Naismith, S.L., Neal, B., Hicki, I.B. & Glozier, N. (2011). A Systematic Review of the Impact of Adherence on the Effectiveness of e-Therapies. *Journal of Medical Internet Research*, 13(3), e52. doi:10.2196/jmir.1772
- Emilsson, M., Berndtsson, I., Lötvall, J., Millqvist, E., Lundgren, J., Johansson, A. & Brink, E. (2011). The influence of personality traits and beliefs about medicines on adherence to asthma treatment. *Primary Care Respiratory Journal*, 20(2), 141-147. doi:10.4104/pcrj.2011.00005
- Eysenbach, G. (2001). What is e-health? *Journal of Medical Internet Research*, 3(2), e20.

doi:10.2196/jmir.3.2.e20

- Fredrickson, B. L., & Levenson, R.W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition and Emotion*, 12, 191-220.
- Fredrickson, B.L. (2001). The Role of Positive Emotions in Positive Psychology: The Broaden-and Build Theory of Positive Emotions. *American Psychologist*, 56(3), 218-226. Retrieved from 10.1037//0003-066X.56.3.218
- Fredrickson, B.L. & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, 13(2), 172-175.
- Fredrickson, B.L. & Losada, M.F. (2005). Positive Affect and the Complex Dynamics of Human Flourishing. *American Psychologist*, 60(7), 678-686. doi:10.1037/0003-066X.60.7.678
- Garcia, D. (2011). Two models of personality and well-being among adolescents. *Personality And Individual Differences*, 50, 1208-1212. doi:10.1016/j.paid.2011.02.009
- Gomez V., Krings F., Bangerter A. & Grob A. (2009). The influence of personality and life events on subjective well-being across the life span. *Journal of Research of Personality*, 43, 345-354.
- Grahm, A.L., Cha, S., Papandonatos, G.D., Cobb, N.K., Mushro, A., Fang, Y., Niaura, R.S. & Abrams, D.B. (2013). Improving adherence to web-based cessation programs: a randomized controlled trial study protocol. *Trials*, 14(1), 1-15. doi:10.1186/1745-6215-14-48
- Griffiths, F., Lindenmeyer, A., Powell, J., Lowe, P. & Thorogood, M. (2006). Why Are Health Care Interventions Delivered Over the Internet? A Systematic Review of the Published Literature. *Journal of Medical Internet Research*, 8(2). doi:10.2196/jmir.8.2.e10
- Jerant, A., Chapman, B., Duberstein, P., Robbins, J., & Franks, P. (2010). Personality and medication non-adherence among older adults enrolled in a six-year trial. *British Journal of Health Psychology*, 16, 151-169.
- Kelders, S.M., Kok, R.N., Ossebaard, H.C. & Gemert-Pijnen, J.E.W.C. (2011). Persuasive system design does matter: a systematic review of adherence to web-based

- interventions. *Journal of Medical Internet Research*, 13(3), e52.
doi:10.2196/jmir.1772
- Keyes, C. L. M. (1998). Social well-being. *Social Psychology Quarterly*, 61, 121–140.
- Krohne, H. W., Egloff, B., Kohlmann, C.W. & Tausch, A. (1996). Untersuchung mit einer deutschen Form der Positive and Negative Affect Schedule (PANAS). *Diagnostica*, 42, 139-156.
- Lamers, S.M.A, Westerhof, G.J., Kovács, V. & Bohlmeijer, E.T. (2012). Differential relationships in the association of the Big Five personality traits with positive mental health and psychopathology. *Journal of Research in Personality*, 46, 517-524.
Retrieved from <http://dx.doi.org/10.1016/j.jrp.2012.05.012>
- Lyubomirsky, S., King, L. & Diener, E. (2005). The Benefits of Frequent Positive Affect: Does Happiness Lead to Success? *Psychological Bulletin*, 131(6), 803-855.
doi:10.1037/0033-2909.131.6.803
- McCrae, R.R. & Costa, P.T. (1992). Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) manual. Odessa, FL: Psychological Assessment Resources.
- McNulty, J.K. & Fincham, F.D. (2012). Beyond positive psychology? Toward a contextual view of psychological processes and well-being. *American Psychologist*, 67(2), 101-110. doi:10.1037/a0024572
- Park, N., Peterson, C., Seligman, M.E.P., Steen, T.A., (2005). Positive Psychology Progress: Empirical Validation of Interventions. *American Psychologist*, 60(5), 410-421.
doi:10.1037/0003-066X.60.5.410
- Parks, A., Schueller, S.M., (2012). Disseminating Self-Help: Positive Psychology Exercises in an Online Trial. *Journal of Medical Internet Research*, 14(3), 1-11.
doi:10.2196/jmir.1850
- Quevedo, R.J.M. & Abella, M.C. (2011). Well-being and personality: Facet-level analyses. *Personality and Individual Differences*, 50, 206-211. doi:10.1016/j.paid.2010.09.030
- Rammstedt, B., Kemper, C.J., Klein, M.C., Beierlein, C., Kovaleva, A. (2012). Eine kurze Skala zur Messung der fünf Dimensionen der Persönlichkeit: Big-Five-Inventory-10 (BFI-10). Retrieved from

http://www.gesis.org/uploads/media/BFI10_Workingpaper.pdf

- 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, 1069-1081
- Seligman, M.E.P. & Csikszentmihalyi, M. (2000). Positive Psychology: An Introduction. *American Psychological Association*, 55(1), 5-14. doi:10.1037//0003-066X.55.1.5
- Seligmann, M.E.P, Steen, T.A., Park, N. & Peterson, C. (2005). Positive Psychology Progress. *American Psychologist*, 60(5), 410-421. doi:10.1037/0003-066X.60.5.410
- Sin, N.L. & Lyubomirsky, S. (2009). Enhancing Well-Being and Alleviating Depressive Symptoms With Positive Psychology Interventions: A Practice-Friendly Meta-Analysis. *Journal of clinical Psychology*, 65(5), 467-487. doi:10.1002/jclp.20593
- Slade, M. (2010). Mental illness and well-being: the central importance of positive psychology and recovery approaches. *BMC Health Services Research*, 10:26. doi:10.1186/1472-6963-10-26
- Soto, C.P., John, O.P., Gosling, S.D. & Potter (2011). Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample. *Journal of personality and social psychology*, 100(2), 330-348. doi: 10.1037/a0021717
- Steel, P., Schmidt, J. & Shultz, J. (2008). Refining the Relationship Between Personality and Subjective Well-Being. *Psychological Bulletin*, 134(1), 138-161. Retrieved from DOI: 10.1037/0033 2909.134.1.138
- Vazifehdoost, H., Akbari, M. & Charsted, P. (2012). The Role of Psychological Traits in Market Mavensim Using Big Five Model. *International Journal Management Business Research*, 2(3), 243- 252.
- Weiting, N.G. (2009). Clarifying the relation between neuroticism and positive emotions. *Personality and Individual Differences*, 47, 69-72. doi:10.1016/j.paid.2009.01.049