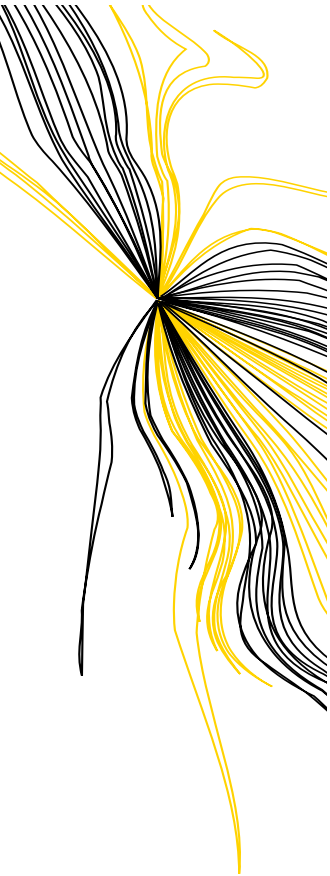


UNIVERSITEIT TWENTE.

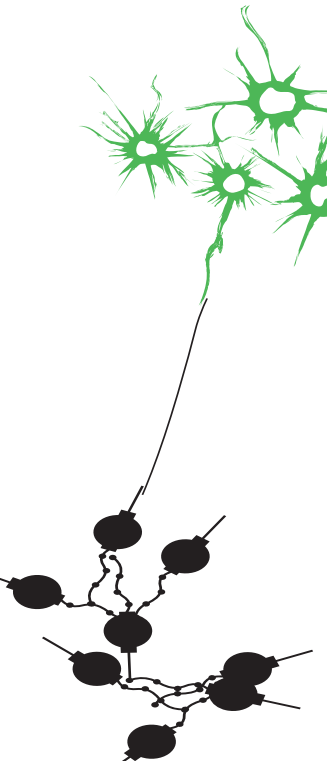
Faculty of Behavioural, Management and Social sciences (BMS)

Efficacy of Acts of Kindness:

The Importance of Emotions in the Prevention of Depressive Symptoms

Masterthesis

Naima Omar, s1546082



1st Supervisor: Marion Sommers-Spijkerman, M.Sc.

2nd Supervisor: Dr. Marijke Schotanus-Dijkstra

Date: 18th of September 2018

Abstract

Background. Previous research suggests that kindness interventions are effective in reducing depressive symptoms, especially in populations with subthreshold symptoms. However, little is known about its working mechanisms. The current study is aimed at examining the effects of an Acts of kindness intervention on subthreshold depressive symptoms and if positive and negative emotions play a mediating role in this context.

Method. The current study used a randomized controlled trial design. 168 participants were allocated to either the Acts of kindness intervention (n =84) or the wait-list control condition (n= 84). The Acts of kindness intervention had a duration of six weeks. In total 5 assessments took place - at baseline, after two, four and six weeks of intervention and six weeks after the intervention. Depressive symptoms was the primary outcome measure (Center for Epidemiologic Studies- Depression Scale) and positive and negative emotions (modified Differential Emotions Scale) the mediating measures.

Results: The results of mixed ANOVAs suggest that AoK led to significantly greater decreases in negative emotions compared to the wait-list control condition but not to significant changes in positive emotions or depressive symptoms. Moreover, mediating effects of positive and negative emotions on the effectiveness of the AoK intervention could be found.

Conclusion: The current study contributes to the growing body of research on kindness interventions, because it is the first to show decreasing effects on negative emotions among people with subthreshold depressive symptoms in the general Dutch population. Future studies may address other possible working mechanisms and replicate the effectiveness of AoK in reducing subthreshold depressive symptoms.

Keywords: Positive psychology, prevention, Acts of kindness, subthreshold depression, positive emotions, negative emotions

Introduction

Depression

One of the most burdensome mental disorders around the world is depression. According to the World Health Organization (WHO, 2017) approximately 322 million people in the world are suffering from depression. As Howarth, Johnson, Klerman and Weismann (1992) state, 50% of cases that developed a first-onset of major depression reported prior depressive symptoms. This makes subthreshold depressive symptoms (symptoms that do not meet the DSM criteria), one of the important risk-factors of developing a major depression. As found in a systematic review of Cuijpers and Smit (2004) the incidence rate ratio of subthreshold depressive symptoms varied between 1.15 and 9.73. With regard to estimates of Cuijpers, de Graaf and Dorssalaer (2004), about 7.5% of the Dutch population was suffering from subthreshold depressive symptoms in 2003.

Symptoms that characterize the presence of depression are feelings of sadness and the loss of interest or pleasure. Moreover, feelings of guilt or low self-worth, disturbed sleep and tiredness, a lack of appetite and concentration are characteristics of depression (WHO, 2017). Depressive symptoms are often long-lasting or recurrent and impair everyday life in a variety of ways (WHO, 2017). As a consequence, depressive symptoms cannot only lead to quality of life decrements but also to an increased risk of developing other mood and anxiety disorders, subsequent physical illnesses and premature death as a result of suicide (Strine, Chapman, Kobau, Balluz, & Mokdad, 2004; van Zoonen et al., 2014). Hence, impairments that are associated with depression can lead to severe problems affecting the whole society due to high healthcare costs, the burden on caregivers and the decrease of work productivity (van Zoonen et al., 2014). In this context, several evidence-based treatment methods, such as cognitive behavioral therapy (CBT) (Cuijpers, Berking, Andersson, Quingley, Kleiboer & Dobson, 2013) or interpersonal therapy (IPT) (Cuijpers, Geraedts, van Oppen, Andersson,

Markowitz, & van Straten, 2011) have been established to counteract the number of individuals, who are diagnosed with depression. However, it was found that a full coverage of common treatments, such as CBT or IPT, can still not elude two thirds of the health care burdens (van Zoonen et al., 2014). This assumption stresses that treating individuals, who already suffer from depression, is not enough to alleviate those burdens. According to Huppert (2004), prevalence rates of depression could be reduced by providing universal prevention methods and thereby shift the mean number of prevalence rates. Therefore, an alternative approach to foster further reduction of depression, is preventing the development of new cases (van Zoonen et al., 2014).

Prevention of depression

Until now, research on the prevention of depression appears to be promising. Especially approaches like IPT- or other CBT- based intervention programs, such as examined in studies of Willemse, Smit, Cuijpers and Tiemens (2004) or Cuijpers, Muñoz, Clarke and Lewinsohn (2009), are found to be effectively reducing depressive symptoms. Although many approaches are easily accessible, the participation in those interventions remains low (Cuijpers, Straten, Warmerdam, & van Roy, 2010). This could be the case, because many interventions primarily focus on counteracting mental disorders (Gable, & Haidt, 2005; Seligman, & Csikszentmihaly, 2000), which are often associated with stigma (Fledderus et al., 2011). As Cuijpers et al. (2010) assume, people with subthreshold depressive symptoms are less inclined to seek help than individuals who already suffer from major depression, which underlines the need for more research on this target group. Conceivably, approaches that are based on frameworks that promote positive mental health instead of focusing on dysfunction, could reduce the restraint of people with subthreshold depressive symptoms to participate in preventive interventions (Fledderus et al., 2011).

Positive psychological interventions

Through the last decade, interventions that are aimed at promoting positive mental health are increasingly getting more attention in the field of psychology (Ivtzan, Lomas, Hefferon, & Worth, 2015). Positive psychology is an approach that contributes to the optimal functioning and well-being of an individual (Gable, & Haidt, 2005). Therefore, positive psychological interventions are directed at cultivating positive feelings, cognitions and behaviors through performing intentional activities (Sin & Lyubomirsky, 2009).

In a couple of meta analyses (Bolier et al., 2013; Sin & Lyumbomirsky, 2009) on the effectiveness of PPIs, it was found that PPIs do not only promote mental well-being but can also decrease depressive symptoms. For instance, Seligman, Rashid and Parks (2006) found that mild to moderate depressive symptoms can be diminished by positive psychological exercises in informal student and clinical settings. However, effect sizes on depressive symptoms revealed small (d = .23), the quality of those studies was limited and a variety of different positive psychological interventions (e.g. gratitude interventions, self-compassion interventions and interventions to promote optimism) was examined. To draw conclusions on which PPIs are effective in the reduction of subthreshold depressive symptoms, more research on specific PPIs is necessary. As Schotanus-Dijkstra et al. (2017) found, especially the exercise 'reinforcing positive relations with others' is one of the most predictive components influencing the effectiveness of such an intervention on mental well-being and depressive symptoms. Because there is little evidence on which positive psychological exercises are responsible for the reduction of depressive symptoms, more precise research on the findings of Schotanus-Dijkstra et al. (2017) about the effectiveness of exercises aimed at reinforcing positive relations with others should be conducted.

Acts of kindness

One intervention that is intended to promote positive relations to others is Acts of Kindness (AoK). On the one hand, acts of kindness can contain self-oriented behaviors (i.e. doing acts of kindness for oneself) and on the other hand, prosocial behavior (i.e. performing kind acts for others) (Ouweneel, Le Blanc, & Schaufeli, 2014). The former for instance refers to buying oneself new clothes or going to the hairdresser (Nelson, Layous, Cole, & Lyubomirsky, 2016). The latter includes small tasks such as taking out the trash for a neighbor as well as bigger tasks such as getting groceries for the elderly or cooking a meal for friends (Ouweneel, Le Blanc, & Schaufeli, 2014).

Until now, a couple of studies have examined possible positive effects of AoK. For instance, AoK was recently found to effectively reduce depressive symptoms among. individuals low on agreeableness (Mongrain, Barnes, Barnhar, & Zalan, 2018). Moreover, Baumeister and Leary (1995) suggest, AoK may increase feelings of relatedness and enhance one's self-confidence (Nelson et al., 2016). Besides, emotional well-being, including life satisfaction, feelings of happiness or optimism (Dunn, Aknin, & Norton, 2008; Buchanan, & Bardi, 2010; Ouweneel, Le Blanc, & Schaufeli, 2014; DuBois et al., 2016) and overall well-being (Lyubomirsky, Sheldon, & Schkade, 2005) were found to increase by means of AoK. Also, positive emotions such as hope, optimism, joy, gratitude and interest were found to increase (Seligman, 2002). With regard to those findings, one may assume that AoK is especially effective in the enhancement of positive emotions, but still little is known about the effectiveness of AoK on subthreshold depressive symptoms in the general Dutch population. What is known until so far is that individuals, who suffer from depressive symptoms, often tend to lack a wide range of positive emotions (WHO, 2017) and experience several negative emotions, which leads to the assumption that both of them play an important role in the reduction of depressive symptoms.

How does AoK work?

There is a few empirical and theoretical evidence indicating that the experience of positive and negative emotions plays a key role in the efficacy of kindness interventions (Fredrickson et al., 2008; Gander, Proyer, & Ruch, 2017; Wellenzohn, Proyer, & Ruch, 2017).

Positive emotions.

Previous literature indicates that depression is characterized by reduced positive affect, including diminished experience of pleasure and interest in daily activities (Nutt et al., 2007). As Nutt et al. (2007) state, positive affect subsumes various positive emotions, including feelings of happiness (joy), interest, energy, enthusiasm or alertness. Because AoK was found to enhance the experience of positive emotions (Nelson et al., 2016), they could act as a possible working mechanism referring to the reduction of depressive symptoms. In particular, positive emotions, such as feelings of relatedness, may bring about an upward shift in positive emotions in general and thereby reduce depressive symptoms (Fredrickson et al., 2008). Someone who feels lonely for example, may experience feelings of relatedness by executing kind acts for others and in turn feel less lonely, which can contribute to a reduction of depressive symptoms. Fava and Ruini (2003) even found that enhancing positive emotions in depressed individuals can prevent them from relapses later on.

The broaden-and-build theory (Fredrickson, 2001) suggests a possible explanation for this mechanism to occur. The theory claims that positive emotions, such as love and trust, contribute to the *broadening* of attention, action and cognition. As a result, long-lasting individual resources that can be facilitating personal success and resilience in a variety of life domains is *build*. Additionally, Lyubomirsky, King and Diener (2005) found that positive emotions can extend broadened coping skills (Fredrickson & Joiner, 2002). Therefore, one could assume that promoting positive emotions by means of executing AoK, could empower

people, who suffer from subthreshold depression, with resilience against severe depression. In other words, the experience of positive emotions seems to buffer against depression. Not only the increase of positive emotions is possibly explanatory for the various positive effects of AoK interventions, but a decrease in negative emotions as well.

Negative emotions.

Because depressive symptoms are also characterized by increased negative affect (Watson, Clark, & Carey, 1988), negative emotions are expected to play a key role in the emergence of depressive symptoms and the effectiveness of AoK referring to depressive symptoms. For instance, negative emotions that are often related to depressive symptoms are feelings of loneliness (Aylaz, Aktürk, Erci, Öztürk, & Aslan, 2012) of guilt and low self-worth (WHO, 2017). It is thus expected, that negative emotions are somehow related to the experience of depressive symptoms. However, research on the effect of AoK on negative emotions is contradicting. According to Nelson et al. (2016), people who engage in prosocial behavior (performing kind acts to others), report fewer negative emotions than people who do not. This finding indicates that participating in an acts of kindness intervention could reduce negative emotions, which in turn could be associated with a decrease in depressive symptoms. However, in a study of Ouweneel et al. (2014) AoK was not found to have effects on negative emotions. Still, there is a lack of empirical evidence on the effectiveness of AoK on negative emotions in populations with subthreshold depressive symptoms, but there is theoretical evidence supporting the assumption that the experience of negative emotions plays a key role in the effectiveness of AoK. A possible explanation for this assumption is known as the undoing-hypothesis (Fredrickson & Levenson, 1998). According to this theory, positive emotions may undo the effects of negative emotions (Fredrickson & Levenson, 1998). Although there is evidence for positive and negative emotions to play a key role in the

efficacy of AoK on depressive symptoms, there is little empirical evidence for working mechanisms of AoK.

The current study

The aim of the current study is to examine the potential of an Acts of kindness intervention on subthreshold depressive symptoms for people with suboptimal well-being that is aimed at increasing mental health by reinforcing positive relations with others, by means of a randomized controlled trial. In addition, the mediating effect of positive and negative emotions on the effects of AoK on subthreshold depressive symptoms was examined.

It was assumed that the AoK intervention group will improve significantly more referring to subthreshold depressive symptoms (primary outcome), positive and negative emotions at post-test assessment and follow-up, compared to the wait-list control group. Moreover, the number of participants that significantly improved on depressive symptoms on an individual level, is expected to be higher in the AoK intervention group than in the wait-list control condition. Lastly, it was expected that the effects of AoK on depressive symptoms are mediated by increased positive emotions and decreased negative emotions during the intervention.

Methods

Design

The study is a randomized controlled trial (RCT) with five conditions in total. There were two experimental conditions referring to the AoK intervention, with reflecting on the exercises as the only difference. The third condition was directed at exercises on gratitude. Condition four and five were control conditions: an active control group and a waiting list control condition. All participants were randomly assigned to one of those conditions. For the

current study, only the AoK condition with reflection and the wait-list control condition were used. The time frame of the whole study was 9 months containing five measure moments that were relevant for this study: The baseline questionnaire before the intervention (T0), two intermediate measures after 2 (T1) and 4 weeks (T2), the post-test assessment six weeks after baseline (T3) and one follow-up measure 6 weeks after the post-test assessment (T4).

Procedure and participants

Prior to the implementation of the study, ethical approval from the ethics commission of the University of Twente was obtained. Participants of the general Dutch population were recruited by placing advertisements in the online newsletter of *Psychologie Magazine* and national newspapers, such as *Volkskrant*, *Telegraaf* and *Metro*. The recruitment message was positively framed as follows: "Do you want to experience more fun and lasting happiness in your life?". Interested people could go to a special website with detailed information about the study and how to sign up for participation. An information letter about the study could be downloaded from the website. After filling in a contact form, potential participants received a link to an online informed consent. After giving informed consent, participants were automatically forwarded to the online screening questionnaire, which was intended to check on the inclusion and exclusion criteria. To meet the inclusion criteria someone had to be at least 18 years old, to have good internet connection and an e-mail account at command. Moreover, it was necessary to be proficient in the Dutch language and willing to spend one day per week with using the intervention. Individuals with high scores on anxiety (>15 on the GAD) and depression (> 34 on the CES-D) at baseline (T0) were excluded as well. Those symptoms were measured by means of the Generalized Anxiety Disorder (GAD-7) and the Center for Epidemiological Studies Depression Scale (CES-D). Individuals, who met the inclusion criteria, were randomly assigned to one of the conditions. To ensure equal groups on gender and educational level, stratified randomization took place. The online

questionnaires had to be completed at home and took about 20 minutes each.

Figure 1 shows the flow-chart of participants. 168 participants took part in the study in total of whom 84 had been assigned to the experimental condition and 84 to the waiting list control condition. In total, 140 participants filled in the two-weeks assessment, 116 of them the four-weeks assessment. Of the remaining participants 114 filled in the post-test assessment and 99 of those filled in follow-up assessment.

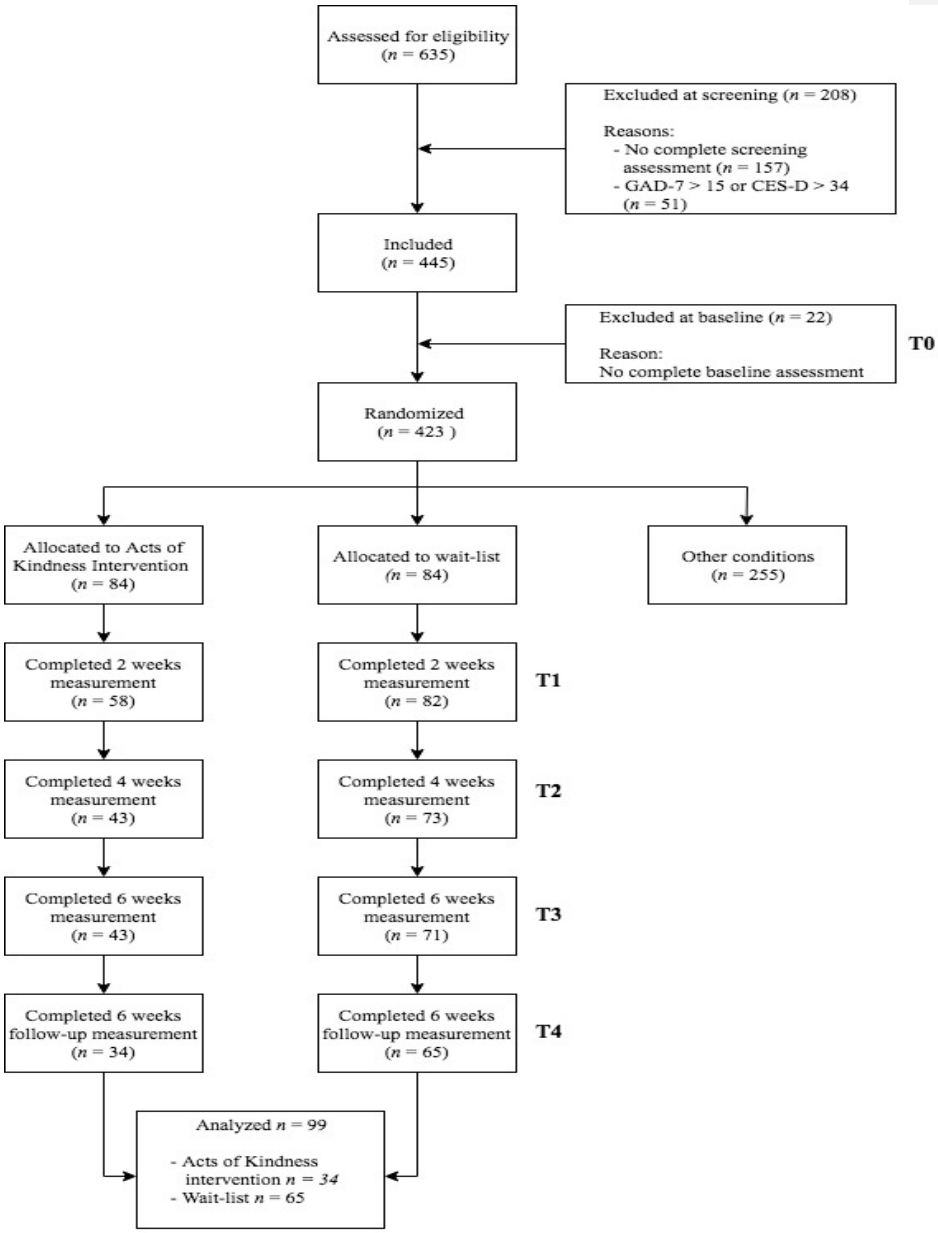


Figure 1. Flow-chart of participants and drop out over time.

Intervention

Intervention group.

During the six weeks of intervention the participants belonging to the experimental group received a weekly e-mail on Sundays containing the instruction to do five acts of kindness on one day of the week. For instance, help someone with certain household tasks, cook a meal for a friend or simply do someone a favor. The participants could choose the time and the place for fulfilling their tasks on their own. Also, they could choose autonomously what they wanted to do. Moreover, the participants were instructed to report what they did in an online diary on the following day (at least on Saturday). The link to the online diary was included in the instruction e-mail.

Wait-list control group.

The wait-list control condition did not receive any instruction. They were just told that their normal fluctuations in emotions had to be measured and that they could choose one of the three interventions after completing the follow-up assessment.

Measures

Depressive symptoms.

To measure depressive symptoms of the participants the 20-item Center for Epidemiological Studies Depression (CES-D) (Radloff, 1977) was used. participants had to rate how often they experience certain feelings or behaved in a certain way on a 4-point Likert-Scale. The item-scores ranged from 0 "rarely or none of the time (less than 1 day)" to 3 "all of the time (5-7 days)". Examples of items are "I felt lonely" or "My sleep was restless". On a total range from 0 to 60, higher scores indicate more depressive symptoms. In a study of van Dam and Earleywine (2011), the psychometric analyses showed a high internal consistency ($\alpha = 0.93$).

In the current study Cronbach's alpha was found to range from α = .86 to α = .94 referring to the three assessments (T0, T3 and T4).

Positive and negative emotions. Positive and negative emotions were measured by means of the modified Differential Emotions Scale (mDES) (Schaefer, Nils, Sanchez, & Philippot, 2010). Positive and negative emotions are measured by 8 items each. Participants had to indicate to what extent they experienced several emotions at that moment, on a 7-point Likert Scale with scores ranging from 1 "not at all" to 7 "very intense". An example of an item referring to positive emotions is "interested, concentrated, alert". An item indicating negative emotions is "fearful, anxious, afraid". On a total range from 8 to 56, higher scores on one of the two subscales, display the experience of more positive/ negative emotions. Referring to the English version of the questionnaire, analyses on the internal consistency display an α = .86 for positive emotions and an α= .82 for negative emotions (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). In the current study a good internal consistency was found for positive emotions at T3 (α = .856) and T4 (α = .884), whereas the questionnaire displayed a weak internal consistency between T0 and T2 (range from α = .591 to α = .645). For negative emotions Cronbach's alpha ranged from α = .70 to α = .91.

Drop-out and adherence. Only the data of completers was used for the analyses. Participants were defined as drop-outs in case they displayed incomplete data on one or more of the examined assessments after the baseline survey, which was completed by all participants (T1-T4).

As the WHO (2014, p.3) states, adherence can be referred to as "the extent to which a person's behavior […] corresponds with agreed recommendations from a health care provider". The instruction in the current study was to execute five kind acts during each intervention week. In the current study, adherence was calculated per week. Performing five kind acts per week was considered to be adherent behavior, whereas performing less than five

kind acts per week was deemed non-adherent. To measure the adherence of participants the item "How many kind acts did you perform for others yesterday?" was used. Participants could respond on a 6-point Likert scale ranging from 1= five times to 6 = not at all.

Data analyses

The data was analyzed with the statistical program SPSS 25.0 using two-tailed tests with a significance level of $p < 0.05$. Before listwise deletion was used, a Little's MCAR test was conducted to check if the missing values are completely at random. After that, χ^2-tests and independent *t*-tests were conducted to examine significant differences between completers and drop-outs in demographics and outcome measures at baseline. Also, χ^2-tests and independent t-tests were done to examine significant differences in demographics and outcome measures at baseline between the AoK condition and the wait-list control condition. Moreover, Pearson correlation coefficients (*r*) were calculated to examine the strength of the relationships between positive emotions, negative emotions and depressive symptoms at baseline. Correlation coefficients with an absolute value of .10, .30 and .50 respectively represent a small, medium and large effect (Cohen, 1988).

To test if depressive symptoms, positive and negative emotions significantly improved in the experimental group in comparison to the wait-list control group, mixed ANOVAs were conducted. For depressive symptoms a mixed ANOVA with time (T0, T3 and T4 measures of the CES-D) as within-subjects factor and group (AoK or wait-list control) as between-subjects factor was conducted. For positive and negative emotions, two separate mixed ANOVAs with time (T0, T1, T2, T3 and T4 measures of the mDES) as within-subjects factor and group (AoK or wait-list control) as between-subjects factor were conducted. To report the effect sizes Partial Eta Squared (η^2) was used, with .01 indicating a small effect size, .06 a medium effect size and .14 a large effect size (Cohen, 1988).

In addition to the examination of improvement on depressive symptoms between groups, the individual improvement of participants on depressive symptoms was calculated. Participants were considered to have improved as they reported a decrease in depressive symptoms of one standard deviation or more. By calculating the change score between T3 and T0 and its standard deviation (*SD*) a cut-off score was created. The resulting cut-off score between improvement of more than one *SD* and improvement of less than one *SD* was 8.63. A new variable was computed, which was aimed at distinguishing those two groups. By means of a χ^2-test it was examined if the percentage of individual improvers was higher in the AoK condition or the wait-list control condition.

To examine if positive and negative emotions have a mediating impact on the effect of AoK on depressive symptoms, two single mediation analyses were conducted using the SPPS tool PROCESS (Hayes, 2012, 2013). The independent variable was the condition and the dependent variable was depressive symptoms at T3, because this assessment was assumed to capture the effect of the intervention best. Positive emotions served as a mediator in the first single mediation analysis, whereas negative emotions was considered as a mediator in the second single mediation analysis. For each mediator, a mean score of the two in-between assessments ((T1+T2)/2) was calculated. Moreover, baseline measures (T0 CES-D, T0 mDes) were included as covariates in the analyses. The following steps were conducted (see Figure 2 & 3): First, it was tested if there was a significant effect of the intervention condition (independent variable) on depressive symptoms (dependent variable) (c-path). Secondly, it was calculated if there was a significant effect of the condition on each of the mediator variables (positive and negative emotions) (a-path). Thirdly, it was determined if there was a relation between the mediators and depressive symptoms (b-path). In case all of those paths were significant, it was examined if there was an insignificant or reduced relationship between the condition and depressive symptoms when the mediator was included (c'-path).

Lastly, the indirect effect of the intervention condition on depressive symptoms was calculated (a-path * b-path). All mediation analyses were based on 1000 bootstrapping samples. If the 95% bias-corrected confidence interval (CI) of the indirect effect of condition on depressive symptoms did not include zero, the mediation was deemed significant.

Finally, a multiple mediation analysis was conducted to check the individual effects of the mediators while controlling for the other. Positive and negative emotions were thus considered as mediators simultaneously. Again, the independent variable was the intervention condition and the dependent variable was depressive symptoms at post-test.

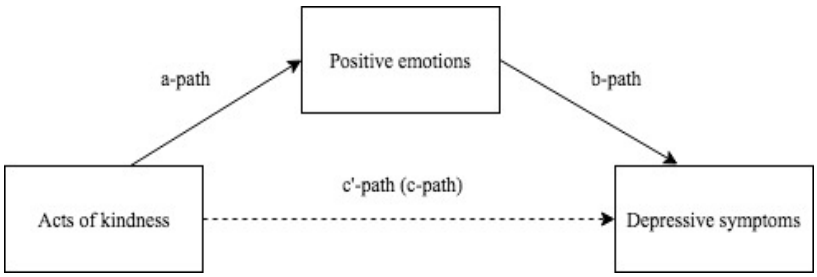


Figure 2. Model of the mediating relationship between AoK, depressive symptoms and positive emotions

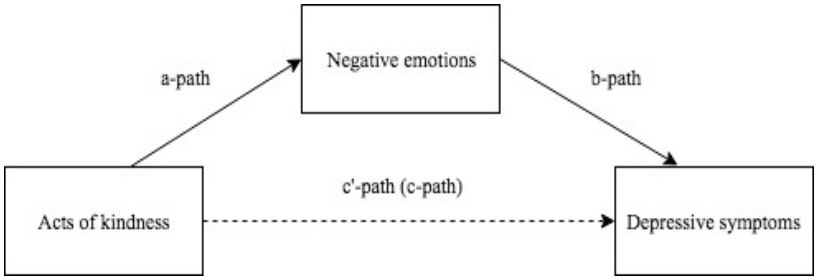


Figure 3. Model of the mediating relationship between AoK, depressive symptoms and negative emotions

Results

Baseline characteristics of the study population

The baseline characteristics of the included participants are displayed in Table 1. The participants were between 23 and 70 years old with a mean age of 51.11 years (*SD* = 9.29*)*. The majority of the participants (88.9%) was female and participants were predominantly higher educated (75.8%). About 96% participants reported to be Dutch and 71.1% were living with others. Moreover, the majority of the sample was employed (54%). Regarding the demographics and baseline measures no significant differences between the intervention group and the wait-list group were found (*p*-values ≥ .211).

Table 1
Baseline Characteristics of Study Participants (n= 99).

	AoK (n = 34)	**WL** (n = 65)	**Total** (n = 99)	p^a
Age, *M* (*SD*)	52.32 (9.20)	50.48 (9.31)	51.11 (9.26)	.349
Gender, *n (%)*				.881
Female	30 (88.2)	58 (89.2)	88 (88.9)	
Male	4 (11.8)	7 (10.8)	11 (11.1)	
Education, *n (%)*				.708
Low	2 (5.9)	3 (4.6)	5 (5.1)	
Intermediate	7 (20.6)	12 (18.5)	19 (19.2)	
High	25 (73.5)	50 (76.9)	75 (75.8)	
Marital status, *n (%)*				.397
Married	20 (58.8)	33 (50.8)	53 (53.5)	
Not married	14 (41.2)	32 (49.2)	46 (46.5)	
Nationality, *n (%)*				.470
Dutch	33 (97.1)	63 (96.9)	96 (97.0)	
Other	1 (2.9)	2 (3.1)	3 (3.0)	
Living situation, *n (%)*				.772
Alone	9 (26.5)	19 (29.2)	28 (28.3)	
With others	25 (73.5)	46 (70.8)	71 (71.7)	
Employment status, *n (%)*				.103
Paid employed	16 (47.1)	38 (58.5)	54 (54.5)	

Unemployed/ unable to work/ retired/student/ homemaker/ other	18 (52.9)	27 (41.5)	45 (45.5)

Note. AoK= intervention group, WL =wait-list control group; [a]p-values of the independent t-tests and χ 2 -tests testing baseline differences between AoK and WL

Drop-out and adherence

All 168 participants (100%) that were considered in the analyses completed the baseline assessment. In total 140 (83%) participants completed the 2-weeks assessment, 116 (69%) the 4-weeks assessment and 114 (68%) finished the post-assessment. The follow-up assessment (T4) was completed by 99 participants (59%). Thus, the drop-out between baseline and follow-up was 69 participants (41%). Missing values appeared to be completely at random ($p < .630$). There were no significant differences in demographics and outcome measures at baseline between completers ($n = 99$) and drop-outs ($n = 69$), except age was found to be significantly lower ($t(166) = -3.19$, $p = .002$) among drop-outs ($M = 46.65$, $SD = 8.37$) in comparison to completers ($M = 51.11$, $SD = 9.26$).

The adherence of participants appeared to be moderate, ranging from 33.3 % to 76.5%, with its maximum in the first intervention week. The average number of performed kind acts per week varied between 3.3 and 4.62. From week one to six, participants performed on average 4.62 ($SD = 0.78$), 4.0 ($SD = 1.28$), 3.86 ($SD = 1.21$), 3.74 ($SD = 1.42$), 3.3 ($SD = 1.68$) and 3.53 ($SD = 1.66$) kind acts. The number of performed kind acts per week is displayed in Table 2.

Table 2
Frequency of Performing AoK per Intervention Week

	Frequency performing AoK (%)					
	No AoK	1 AoK	2 AoK	3 AoK	4 AoK	5 AoK
Week 1 (n = 34)	-	-	1 (2.9)	3 (8.8)	4 (11.8)	26 (76.5)
Week 2 (n = 34)	-	3 (8.8)	2 (5.9)	3 (8.8)	10 (29.4)	16 (47.1)
Week 3 (n = 28)	-	2 (7.1)	2 (7.1)	4 (14.3)	10 (35.7)	10 (35.7)
Week 4 (n = 34)	1 (2.9)	3 (8.8)	2 (5.9)	5 (14.7)	10 (29.4)	13 (38.2)
Week 5 (n = 30)	3 (10.0)	2 (6.7)	4 (13.3)	5 (16.7)	6 (20.0)	10 (33.3)
Week 6 (n = 34)	2 (5.9)	2 (5.9)	7 (20.6)	4 (11.8)	3 (8.8)	16 (47.1)

Effects on depressive symptoms, positive and negative emotions

First of all, the bivariate correlations between positive emotions, negative emotions and depressive symptoms were calculated. The only correlation that was found to be significant was between negative emotions and depressive symptoms (r = .31, p = .002), which is considered a weak positive correlation. No significant correlations between positive emotions and depressive symptoms (r = -.10, p = .324) or negative emotions and positive emotions (r = .173, p = .087) were found.

With regard to the results of the mixed measures ANOVA on depressive symptoms, a significant main effect of time was found (F(1,97) = 4.281, p =.017). This finding suggests that depressive symptoms decreased significantly from baseline to post-test (toets) and to follow-up (toets). However, no significant main effect of the condition on depressive

Kommentiert [ON(SM1]: Values missing, checken ob das noch stimmt was da steht

symptoms could be found ($F(1,97) = 0.01$, $p = .928$), meaning that depression scores of the AoK group did not significantly differ from depression scores of the wait-list control group. Moreover, there was no significant Time x Group interaction effect on depressive symptoms (Table 3). That is, participants in the AoK group did not significantly improve more on depressive symptoms after six weeks of intervention or follow-up than participants in the wait-list control group.

The results of the mixed ANOVAs regarding positive emotions and negative emotions revealed a significant main effect of time on positive emotions ($F(1,97) = 13.32$, $p = .000$) and negative emotions ($F(1,97) = 8.64$, $p = .000$). The findings indicate that positive emotions significantly increased from baseline to the two in-between measures, to post-test (...toets) and to the follow-up (toets). Also, negative emotions significantly decreased from baseline to the two in-between measures, to post-test and to follow-up (toets). Moreover, no significant main effect of condition on positive emotions ($F(1,97) = 1.96$, $p = .165$) or on negative emotions ($F(1,97) = 2.74$, $p = .101$) could be found, meaning that scores on positive and negative emotions of the AoK group did not significantly differ from those of the wait-list control group. As displayed in Table 3 there was no significant time x group interaction effect on positive emotions, indicating that participants in the AoK group did not significantly improve more on positive emotions than participants in the wait-list control group over time (T0- T4). However, a significant time x group interaction effect on negative emotions was found (Table 3), suggesting that participants in the intervention condition reported a stronger decrease in negative emotions than the wait-list condition over time (T0-T4). Negative emotions significantly decreased from baseline to the post-test and the improvement remained until follow-up, as there were no significant differences between T3 and T4 ($F(1,97) = 0.22$, $p = .623$). Figure 4 displays the development of reported negative emotions at each measure moment across the two conditions.

Table 3

Means and standard deviations for depressive symptoms, positive and negative emotions and outcomes of mixed ANOVAs.

		AoK (*n=34)*		WL (*n=65*)				
		M	*SD*	*M*	SD	*F* [a]	*p*	η^2
CES-D [b]	T0	19.53	6.70	18.09	8.52	1.44	.241	.015
	T1	-	-	-	-			
	T2	-	-	-	-			
	T3	15.79	11.44	17.37	10.26			
	T4	16.71	12.26	16.06	11.04			
mDES positive	T0	28.62	6.36	28.86	6.32	1.08	.367	.011
	T1	30.56	6.36	28.65	6.15			
	T2	30.91	6.41	29.26	6.50			
	T3	34.85	8.21	31.66	8.33			
	T4	34.18	8.84	32.60	9.40			
mDES negative	T0	23.88	8.89	22.28	9.43	3.98	.004	.039
	T1	17.00	7.89	22.15	9.04			
	T2	16.44	8.68	21.40	8.45			
	T3	16.62	8.72	18.82	8.38			
	T4	17.85	10.37	18.40	8.92			

Note. a = Interaction effect (time × group). When the assumption of sphericity is violated, Huynh-Feldt results are reported, AoK = Acts of kindness intervention group, WL= wait-list control group, CES-D= depressive symptoms, $mDES_{pos}$= positive emotions, $mDES_{neg}$= negative emotions; b=The CES-D was measured at screening, shortly before baseline; T0 = baseline assessment, T1 = assessment after two weeks of intervention, T2 =assessment after four weeks of intervention, T3 = post-test assessment after six weeks of intervention, T4 = follow-up measurement six weeks after post-test assessment.

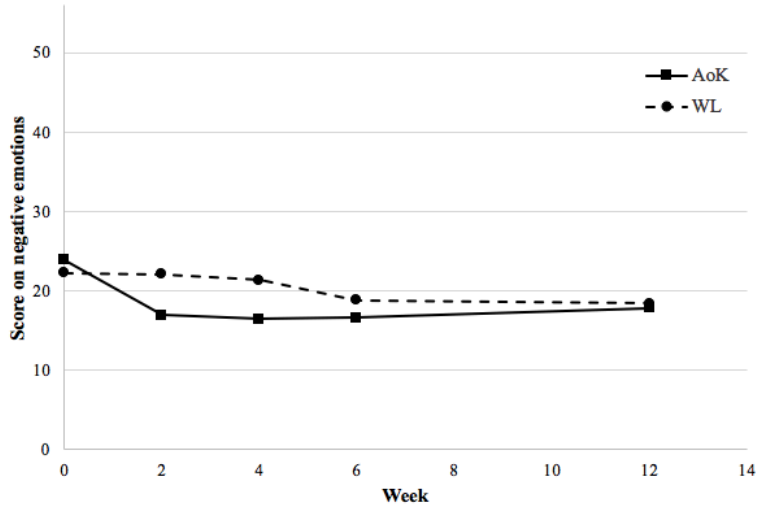


Figure 4. Development of negative emotions over time
Note. AoK = Acts of kindness intervention group, WL= wait-list control group.

Effects on depressive symptoms on an individual level

Considering a cut-off score of one standard deviation (8.63), it was found that 77 participants showed improvements on depressive symptoms between baseline and post-test. Individual improvement was found in 25 participants of the AoK condition, which is 73.5% of the whole AoK group, and 52 of the wait-list control condition, which is 80% of that group. The χ^2-test revealed, that there was no significant difference between the two groups on individual improvement in depressive symptoms at post-test $\chi^2(1, N = 99) = 0.541$, $p = .462$.

Positive and negative emotions as mediators

Two simple mediation analyses were conducted to analyze the unique contribution of positive and negative emotions on the efficacy of AoK. Table 4 shows the unstandardized

regression coefficients on the change of depressive symptoms. There was no significant effect of condition on depressive symptoms (path c), but an effect of condition on positive and negative emotions (path a) was found. Moreover, positive and negative emotions had a significant effect on depressive symptoms, controlling for the condition (path b). The bootstrap results of the indirect effects did not contain zero in any model. In other words, positive and negative emotions uniquely mediated the effect of condition on depressive symptoms.

Table 4
Simple mediation of the effects of the AoK intervention versus wait-list control on depressive symptoms mediated by positive and negative emotions and controlled for baseline levels of outcome and mediator.

Mediators	*a*	*b*	Total effect *c*	Direct effect *c'*	Indirect effect *a x b* (95% CI)[a]
Depressive symptoms					
$mDES_{pos}$	-2.15*	-0.41*	1.90	1.90	0.87 (0.03; 2.49)
$mDES_{neg}$	5.73***	0.41**	0.55	0.55	2.36 (1.06; 4.28)

Note. [a] Bias corrected bootstrap results for the indirect effect, number of resamples is 1.000, $mDES_{pos}$= positive emotions, $mDES_{neg}$= negative emotions
*$p<.05$, **$p<.01$, ***$p = .001$

In a multiple mediation analysis, positive and negative emotion were simultaneously entered in the regression model (Figure 5). The a-path of negative emotions remained significant whereas the a-path for positive emotions was marginal significant ($p = .052$). Moreover, there was no significant effect of condition on depressive symptoms (c-path), whereas a significant effect of positive emotions and negative emotions on depressive symptoms could be found

(b-paths). The BC 95% CIs of the indirect effects revealed that negative emotions (*ab* = 2.26, 95% CI= 0.91 to 3.99) and positive emotions (*ab* = 0.92, 95% CI = 0.02 to 2.56) turned out to be significant mediators.

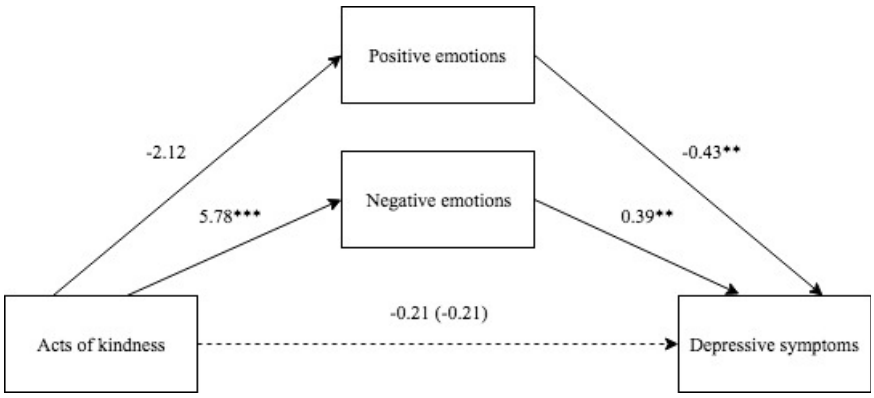


Figure 5. Multiple mediation of positive and negative emotions as mediators of the AoK group versus wait-list control group on mental depressive symptoms, controlled for baseline levels of mediators and depressive symptoms. Total effect (c-path) is given in parentheses.
Note. *$p < .05$, ** $p < .01$, *** $p = .001$

Discussion

Summary of findings

The current study was aimed at examining the efficacy of an Acts of Kindness self-help intervention in terms of subthreshold depressive symptoms compared to a wait-list control group. Moreover, it was investigated whether positive and negative emotions play a mediating role in this context. Findings demonstrated that the AoK intervention led to improvements in negative emotions over the course of the intervention compared to the wait-list control group. Furthermore, mediating effects of positive and negative emotions on depressive symptoms could be found. Contrary to our expectations, AoK was not effective in

reducing depressive symptoms and increasing positive emotions. However, as predicted, the current findings showed that AoK is effective in reducing negative emotions. The hypothesis that the effects of AoK on depressive symptoms are mediated by increased positive emotions and decreased negative emotions was accepted.

Effects of AoK

Referring to previous research, the current study does not support the assumption that AoK can reduce subthreshold depressive symptoms as indicated by Bolier et al. (2013) and Sin and Lyumbomirsky (2009). This can have various reasons. Firstly, the current study is probably not comparable to other PPIs contained in those meta-analyses. The PPIs that were found to be effective in reducing depressive symptoms focused addressed other components such as self-compassion, optimism, gratitude or positive thinking and not on reinforcing positive relations with others. The working mechanisms could thus be different and probably not be applicable in the current study. Secondly, the meta-analyses referred to self-administered interventions as well as to group training and individual therapy. Sin and Lyubomirsky (2009) for instance, found that self-administered PPIs were less effective than group-administered PPIs or individual therapy. This could explain why the intervention AoK, which is a self-administered intervention, was not as effective as expected in reducing depressive symptoms. Moreover, the adherence in self-administered intervention is crucial to make actual effects visible. As McDonald, Garg and Haynes (2002) state non-adherence rigorously reduces treatment outcomes in any treat. If participants had been more adherent, more reliable conclusions could be drawn on the actual effects of AoK. However, the intervention may have asked to much from participants, which in turn lead to low adherence. Compared to a study on AoK, which was found to effectively reducing depressive symptoms (Mongrain et al., 2018), the current intervention took twice as long, with a duration of six weeks. As the findings showed, the number of kind acts performed decreased per intervention

week. Perhaps, participants got bored by performing the same exercise for six weeks and experienced lessened positive effects. One could assume that AoK has more effect on depressive symptoms if executed for a shorter period of time. Moreover, the samples that were used differed from each other. Whereas Mongrain et al. (2018) focused on people with low levels of agreeableness, the current study was directed at people with subthreshold symptoms in general. One may assume that AoK is more effective for people with personality traits that are related to low levels of agreeableness.

Another unexpected finding is that positive emotions did not improve more in the AoK group than in the wait-list control condition. Positive emotions are often viewed as the opposite of negative emotions. On the basis of that, one could assume, that reducing the experience of negative emotions would bring along an increase of positive emotions. However, previous research suggests that positive and negative emotions are two distinct constructs (Watson & Tellegen, 1985), which is why effects on negative emotions but not on positive emotions could have been found. The current study supports this assumption as there was no correlation between the positive and negative emotions. Compared to other studies in which AoK revealed to be effective in the enhancement of positive emotions (Nelson et al., 2016; Ouweneel et al., 2014), the current study was targeted at a different sample. Quweneel et al. (2014) found that positive emotions can be increased by means of AoK among students, with a mean age of 20.88. On average, participants of the current study were about 30 years older, which is a considerable difference between the two studies. Also, Nelson et al. (2016) considered a sample that was about 20 years younger. One could assume that AoK is possibly more effective among younger people. In the current study younger people did more frequently drop out than older people. This could be due to the fact that younger people were less motivated to complete the intervention, which could be due to the fact that the intervention took too long or the instructions did not suit them well. Several interventions

that were found to be effectively increasing positive emotions took less than six weeks (Ouweneel et al., 2014; Nelson et al., 2016). However, further research is needed to draw conclusions on possible age differences between age groups referring to AoK. Another reason for the current findings could be the group to whom kind acts were performed. As Anik, Aknin, Norton, Dunn and Quoidbach (2013) claim, prosocial purchase was more effective in increasing positive emotions, when directed to important others compared to distant acquaintances. Mongrain (2018) supports this assumption as participants were instructed to direct kind acts to others that have an important presence in participants life as well. The current study however did not give instructions about to whom kind acts should be directed at, which is why no conclusions about this assumption can be drawn. The positive feelings that participants experience through AoK could be more intense as they are directed at important others. If participants directed their kind acts at important others as well as distant acquaintances the effects of AoK on positive emotions could have been weakened.

Another assumption that can be made through the findings on time and group effects is that the found changes in positive emotions and depressive symptoms over time did not occur based on the AoK intervention. There was no difference in improvement between the AoK group and the wait-list control condition, which is why other factors than the group participants were assigned to could be responsible for the changes over time. Therefore, it cannot be assumed that aspects of the intervention influenced the development of those constructs, but probably just the fact that participants had the feeling they did something to feel better could be responsible for the found effect over time.

Consistent with previous research (Nelson et al., 2016), negative emotions reduced more in the AoK group than in the wait-list control group. This finding supports the assumption of Nelson et al. (2016) that focusing on the needs of others seems to lead to the

experience of less negative emotions such as anxiety, guilt or sadness. This leads to the assumption, that AoK can contribute to the reduction of negative emotions.

What is striking about the current findings on the effects of AoK is that depressive symptoms did not turn out to decrease more in the AoK group, whereas negative emotions did.

If depressive symptoms are assumed to be characterized by negative emotions (Forbes, Williamson, Ryan, & Dahl, 2004) one would expect them be affected in the same way. This could be due to the fact that negative emotions still represent a different construct than depressive symptoms (Danhauer et al., 2013). According to Danhauer et al. (2013) negative emotions and depression are related yet independent constructs. The found small correlation between negative emotions and depressive symptoms supports this assumption.

Individual improvement on depressive symptoms

Another unexpected finding is that the AoK group did not contain more individual improvers on depressive symptoms than the wait-list control group. This supports the assumption that Aok was not more effective in reducing depressive symptoms, than performing no kind acts at all. Probably no differences between those two groups were found, because simply the willingness to engage in an intervention to feel better seems to have an effect. As Gallin and Ognibene (2012) state, people who are assigned to a wait-list control condition are somehow not untreated, because they were still contacted, randomized and had to fill in questionnaires. In turn, this could lead to some kind of placebo-effect, which is similar to small effects of an intervention.

The role of positive and negative emotions

In accordance with our predictions, positive and negative emotions emerged as possible mechanisms of change for effects of AoK on depressive symptoms. More precisely

the efficacy of the intervention on depressive symptoms was uniquely mediated by positive and negative emotions. A tenable assumption seems to be that both process measures statistically mediated the efficacy of AoK on depressive symptoms, but that negative emotions mattered most. On the one hand, this finding is contradicting to previous research on positive and negative emotions as working mechanisms of AoK, as Nelson et al. (2016) found that increases in positive emotions, but not decreases in negative emotions were explanatory for the effects of AoK. However, Nelson et al. (2016) examined well-being instead of depressive symptoms as an outcome measure. Probably negative emotions do not play a mediating role in increasing well-being, but in reducing depressive symptoms. This could also be attributed to found correlations between those variables, which however revealed to be small. On the other hand, the current study supports the assumption that positive and negative emotions play a mentionable role in the efficacy of AoK (Nelson et al., 2016). Further research is needed to examine in which context positive and negative emotions can be explanatory for the effects of AoK.

A contradicting finding within the current study is, that no effect of AoK on positive emotions was found by means of the mixed ANOVA analyses, whereas an effect of AoK on positive emotions was found in the mediation analyses. One possible explanation for these findings is that different measure moments were used for the two analyses. For the mediation analyses a mean score of the two in-between measures was used, whereas for the ANOVAS each measure was considered separately. If the actual effect of AoK was relatively small, this could have led to changes in outcomes, which in turn were responsible for the contradicting findings. Based on the current study, one should thus suspend judgement on the effects of AoK on positive emotions and future research is needed to draw conclusions about

Strengths and limitations

First of all, the current study is one of the first to examine the working mechanisms of positive and negative emotions in the efficacy of Acts of kindness in a population with subthreshold depressive symptoms. Moreover, participants were autonomous in, when, how and which kind acts they wanted to perform. Compared to other studies, they were thus completely free in their decisions and actions. The performed actions that were performed can thus be seen as equal to those that could be performed in everyday life. According to Nelson et al. (2015) freely chosen AoK are more effective compared to AoK that are determined somehow.

On the opposite, the current study contains several weaknesses that have to be considered. First of all, the representativeness of the current study population should be questioned. The current sample turned out to mainly contain higher educated females. This diminishes the generalizability for males and other educational levels. Moreover, people with moderate and severe levels of depression were excluded from the intervention, which makes it difficult to assign the findings to clinical populations as well. Therefore, it cannot be assumed that the found effect on negative emotions can be expected in other populations, too. Also, the use of a wait-list control condition can be considered a weak point of the current study. As Gallin and Ognibene (2012) state, especially individuals with mild mental disorders often get better with time alone, without any treatment. If participants of the wait-list control condition improved on their own with time, this could have contributed to the findings that AoK was not effective in reducing subthreshold depressive symptoms. Furthermore, the adherence of participants fluctuated from one week to the other. Even if the adherence was relatively high in the first week, the adherence in the other weeks varied between 29.4 % and 47.1%. This could distort the findings to low efficacy of the intervention. Moreover, the low adherence indicates that the design of the study was not feasible for participants. Probably the

duration of the intervention was too long or five kind acts per week was too much. Besides, the internal consistency of measures on positive emotions varied greatly. The reliability at baseline, at T1 and at T2 turned out to be remarkably lower than at the other measurement moments. This could lead to data containing measuring errors. Especially, the findings with regard to positive emotions should be questioned, because possible errors could have caused a measurement bias undermining possible effects of the intervention on positive emotions. Finally, the items of the mDes questionnaire ask for the experienced moment at that specific moment of filling in the questionnaire. This probably does not equal the emotions that are experienced over the whole period of intervention and therefore leads to biased measure outcomes as well.

Practical implications and recommendations for future research

To eliminate the limitations of the current study in future research the following implications should be considered. First of all, future research on this topic should make use of other recruitment methods than the newspaper and magazines to gather a more representative sample. By making use of more modern communication channels such as Facebook or Instagram, also males and lower educated people could be approached. This would enhance the chance that the sample gets more representative for the overall population.

A second implication for future research could be to apply strategies that reinforce the adherence of participants. For instance, persuasive strategies such as ‘dialogue support’ of the Persuasive System Design Model (PSD; Oinas-Kukkonen & Harjumaa, 2008) can enhance the adherence of participants. For example, persuasive techniques such as ‘reward’ and ‘praise’ messages, as someone has inserted five kind acts per week, could be applied next to e-mail reminders. Additionally, participants could feel more committed to being adherent if they were supervised by a specialist once per week and were guided somehow. As Gellatly et al. (2007) found in their meta-analysis, self-help interventions are especially effective in

the management of depressive symptoms as there is additional contact with a therapist (i.e. guided self-help) and cognitive behavioral therapy techniques were applied. Future research should therefore examine if participants are more adherent if they received more guidance and if Aok appears to be more effective in reducing depressive symptoms.

Thirdly, other exercise instructions could be tested in future studies. For example, the instructions could be less frequent per week (e.g. three kind acts), it could be examined if it there are differences in the effect of AoK on depressive symptoms, when kind acts are directed at important others or

Lastly, future studies on the effectiveness of Act of kindness on subthreshold depressive symptoms should further explore the working mechanisms that could be explanatory for the success of similar studies. For example, one could examine specific positive emotions that are frequently found to be mediating the effects of kindness interventions. One positive emotion that is assumed to play a key role in those contexts is optimism (Carver, Scheier, & Segerstrom, 2010). As a depression is also characterized by feelings of low self-worth (WHO, 2017), it would be interesting to examine if people with subthreshold depressive symptoms benefit more from kind acts for themselves instead of for others. Being kind to oneself could loosen the hold that low self-worth has gained and by that reinforce an upwards spiral of positive emotions in turn. Moreover, it would be interesting to examine possible age differences and referring to the efficacy of AoK on depressive symptoms. Also, the underlying working mechanisms in general keep underexamined and outline an important approach to improve the design of future PPIs in the domain of depression prevention.

Conclusion

In sum, the current study gave new insights into the effectiveness of an AoK intervention on subthreshold depressive symptoms and the mediating role of positive and negative emotions.

Moreover, it reveals several aspects that could be examined in more detail to improve the interventions effectiveness and display its actual potential. After all, being kind to others is good - good for you.

Literature

Aylaz, R., Aktürk, Ü., Erci, B., Öztürk, H., & Aslan, H. (2012). Relationship between depression and loneliness in elderly and examination of influential factors. *Archives of gerontology and geriatrics*, *55*(3), 548-554.

Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC public health, 13*(1), 119. doi:10.1186/1471-2458-13-119

Buchanan, K. E., & Bardi, A. (2010). Acts of kindness and acts of novelty affect life ' satisfaction. *The Journal of social psychology*, *150*(3), 235-237.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). USA: Lawrence Erlbaum Associates.

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: positive emotions increase life satisfaction by building resilience. *Emotion, 9*(3), 361.

Cuijpers, P., Berking, M., Andersson, G., Quigley, L., Kleiboer, A., & Dobson, K. S. (2013). A meta-analysis of cognitive-behavioural therapy for adult depression, alone and in comparison with other treatments. *The Canadian Journal of Psychiatry*, *58*(7), 376-385.

Cuijpers, P., Geraedts, A. S., van Oppen, P., Andersson, G., Markowitz, J. C., & van Straten, A. (2011). Interpersonal psychotherapy for depression: a meta-analysis. *American Journal of Psychiatry*, *168*(6), 581-592.

Danhauer, S. C., Legault, C., Bandos, H., Kidwell, K., Costantino, J., Vaughan, L., ... & Naylor, C. (2013). Positive and negative affect, depression, and cognitive processes in the Cognition in the Study of Tamoxifen and Raloxifene (Co-STAR) Trial. *Aging, Neuropsychology, and Cognition*, *20*(5), 532-552.

Donaldson, S. I., Csikszentmihalyi, M., & Nakamura, J. (Eds.). (2011). *Applied positive psychology: Improving everyday life, health, schools, work, and society*. Routledge.

DuBois, C. M., Millstein, R. A., Celano, C. M., Wexler, D. J., & Huffman, J. C. (2016). Feasibility and Acceptability of a Positive Psychological Intervention for Patients With Type 2 Diabetes. *The Primary Care Companion for CNS Disorders, 18*(3). doi:10.4088/PCC.15m01902

Dunn, E. W., Aknin, L. B., & Norton, M. I. (2008). Spending money on others promotes happiness. *Science, 319*, 1687-1688.

Fava, G.A., & Ruini, C. (2003). Development and characteristics of a well-being enhancing psychotherapeutic strategy: Well-being therapy. J*ournal of Behavior Therapy and Experimental Psychiatry, 34, 45–63.*

Forbes, E. E., Williamson, D. E., Ryan, N. D., & Dahl, R. E. (2004). Positive and negative affect in depression: Influence of sex and puberty. *Annals of the New York Academy of Sciences*, *1021*(1), 341-347.

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.

Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition & emotion*, *12*(2), 191.

Fredrickson, B.L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science, 13, 172–175.*

Gable, S. L., & Haidt, J. (2005). What (and why) is positive psychology?. *Review of general psychology*, *9*(2), 103.

Gallin, J. I., & Ognibene, F. P. (Eds.). (2012). *Principles and practice of clinical research*. Academic Press.

Gellatly, J., Bower, P., Hennessy, S., Richards, D., Gilbody, S., & Lovell, K. (2007). What makes self-help interventions effective in the management of depressive symptoms? Meta-analysis and meta-regression. *Psychological medicine*, *37*(9), 1217-1228.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling. Retrieved on May 25th, 2018 from http://www.afhayes.com/public/process2012.pdf

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis. A regression-based approach.* New York: Guilford Press.

Ivtzan, I., Lomas, T., Hefferon, K., & Worth, P. (2015). *Second wave positive psychology: Embracing the dark side of life*. Routledge.

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success?. *Psychological bulletin*, *131*(6), 803.

Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology, 9*, 111-131.

McDonald, H. P., Garg, A. X., & Haynes, R. B. (2002). Interventions to enhance patient adherence to medication prescriptions: scientific review. *Jama*, *288*(22), 2868-2879.

Mongrain, M., Barnes, C., Barnhart, R., & Zalan, L. B. (2018). Acts of kindness reduce depression in individuals low on agreeableness. *Translational Issues in Psychological Science, 4*(3), 323-334.

Nelson, S. K., Della Porta, M. D., Jacobs Bao, K., Lee, H. C., Choi, I., & Lyubomirsky, S. (2015). 'It's up to you': Experimentally manipulated autonomy support for prosocial behavior improves well-being in two cultures over six weeks. *The Journal of Positive Psychology, 10*(5), 463-476. doi: 10.1080/17439760.2014.983959

Nelson, S. K., Layous, K., Cole, S. W., & Lyubomirsky, S. (2016). Do unto others or treat yourself? The effects of prosocial and self-focused behavior on psychological flourishing. *Emotion, 16*(6), 850-861. doi: 10.1037/emo0000178

Nutt, D., Demyttenaere, K., Janka, Z., Aarre, T., Bourin, M., Canonico, P. L., Carrasco, J. L., & Stahl, S. (2007). The other face of depression, reduced positive affect: the role of catecholamines in causation and cure. *Journal of Psychopharmacology*, *21*(5), 461-471.

Oinas-Kukkonen, H., & Harjumaa, M. (2008). Towards deeper understanding of persuasion in software and information systems. *In Advances in Computer-Human Interaction, 2008 First International Conference on (200-205)*. IEEE. doi: 10.1109/ACHI.2008.31

Ouweneel, E., Le Blanc, P. M., & Schaufeli, W. B. (2014). On being grateful and kind: Results of two randomized controlled trials on study-related emotions and academic engagement. *The Journal of psychology*, *148*(1), 37-60. doi:10.1080/00223980.2012.742854

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied psychological measurement, 1*(3), 385-401.

Schaefer, A., Nils, F., Sanchez, X., & Philippot, P. (2010). Assessing the effectiveness of a large database of emotion-eliciting films: A new tool for emotion researchers. *Cognition and Emotion, 24*(7), 1153-1172.

Schotanus-Dijkstra, M., Drossaert, C. H., Pieterse, M. E., Boon, B., Walburg, J. A., & Bohlmeijer, E. T. (2017). An early intervention to promote well-being and flourishing and reduce anxiety and depression: A randomized controlled trial. *Internet Interventions, 9,* 15-24. doi: 10.1016/j.invent.2017.04.002

Seligman, M. E. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. Simon and Schuster.

Seligman, M. E., & Csikszentmihalyi, M. (2000). *Positive psychology: An introduction (Vol. 55, No. 1, p. 5). American Psychological Association.*

Seligman, M. E., Rashid, T., & Parks, A. C. (2006). Positive psychotherapy. *American psychologist*, *61*(8), 774.

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.

Strine, T. W., Chapman, D. P., Kobau, R., Balluz, L., & Mokdad, A. H. (2004). Depression, anxiety, and physical impairments and quality of life in the US noninstitutionalized population. *Psychiatric Services*, *55*(12), 1408-1413.

Van Daele, T., Hermans, D., van den Bergh, O., & Van Audenhove, C. (2014). De meerwaarde van gezondheidspromotie en preventie binnen de GGZ. *Tijdschrift Klinische Psychologie, 44*(2), 120-129.

Van Dam, N. T., & Earleywine, M. (2011). Validation of the Center for Epidemiologic Studies Depression Scale—Revised (CESD-R): Pragmatic depression assessment in the general population. *Psychiatry research*, *186*(1), 128-132.

Van Zoonen, K., Buntrock, C., Ebert, D. D., Smit, F., Reynolds III, C. F., Beekman, A. T., & Cuijpers, P. (2014). Preventing the onset of major depressive disorder: a meta-analytic review of psychological interventions. *International journal of epidemiology*, *43*(2), 318-329.

Watson, D., Clark, L. A., & Carey, G. (1988). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of abnormal psychology*, *97*(3), 346.

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological bulletin*, *98*(2), 219.

Willemse, G. R., Smit, F., Cuijpers, P., & Tiemens, B. G. (2004). Minimal-contact psychotherapy for sub-threshold depression in primary care: randomised trial. *The British journal of psychiatry*, *185*(5), 416-421.

World Health Organization. (2014). Adherence to long-term therapies: Evidence for action. Geneva: WHO; 2003.

World Health Organization. (2017). *Depression and Other Common Mental: Disorders Global Health Estimates.* Retrieved on 29th April 2018, from http://apps.who.int/iris/bitstream/handle/10665/254610/WHO-MSD-MER-2017.2-eng.pdf;jsessionid=5087829B1B30935F006017D5C1B5AE36?sequence=1