UNIVERSITY OF TWENTE.

EFFECTIVENESS OF ACTS OF KINDNESS ON SYMPTOMS OF ANXIETY AND MENTAL WELL-BEING AND THE MEDIATING ROLE OF POSITIVE EMOTIONS AND POSITIVE RELATIONS

Master Thesis (10 credits)

Faculty of Behavioural, Management and Social Sciences

Master Programme Positive Psychology and Technology

Examined by

Dr. M. Sommers-Spijkerman

Dr. M. Postel, Dr. M. Radstaak

Eva Steinbach 1691627
14.8.2019

Abstract

Objective: Anxiety disorders are the most prevalent mental disorders in Europe. One positive psychological exercise, the so-called 'Acts of Kindness' (AoK) seems to have a positive influence on anxiety symptoms and well-being. So far, little is known about the working mechanisms of this intervention. Aim of this study was to examine (1) to what extent Acts of Kindness exercises are effective in improving anxiety symptoms and mental well-being compared to a waitlist control condition and (2) whether the effects were mediated by improvements in positive emotions and/or positive relations.

Method: Within an RCT design, 150 participants were randomly assigned to either the experimental condition (performing acts of kindness, $n = 76$) or to the waitlist control condition ($n = 74$). At pre- and post-test, anxiety symptoms and mental well-being were measured. Positive emotions and positive relations were measured additionally two times during the intervention (at two- and four-weeks). Mixed ANOVA and simple mediation analyses were conducted.

Results: Mixed ANOVA analyses revealed a significant increase of mental well-being and significant decrease of symptoms of anxiety in the experimental group compared to the waitlist condition although the effect sizes were categorized as small. Simple mediation analyses demonstrated that neither positive emotions nor positive relations did mediate these changes.

Conclusion: The present study provides empirical evidence for the effectiveness of AoK. It showed that AoK might be used as a beneficial prevention against the onset of anxiety disorders. Although the effect sizes were small, a beneficial effect on both mental well-being and symptoms of anxiety was shown. A mediating effect of neither positive emotions nor positive relations could be found. Future research should focus on examining possible underlying mediators in more detail to refine and strengthen the used AoK intervention and to enhance its effectiveness.

Introduction

Positive Psychology is the study of the conditions and processes that contribute to the flourishing and optimal functioning of people, groups, and institutions (Gable & Haidt, 2005). Interventions based on positive psychology (PPIs) have the potential to improve well-being and reduce psychological distress in the general population and individuals with clinical disorders like anxiety disorders, the most prevalent mental disorder in Europe (Chakhssi, Kraiss, Sommers-Spijkerman, & Bohlmeijer, 2018; Schotanus-Dijkstra, Drossaert, Pieterse, Boon, Walburg, & Bohlmeijer, 2017). One exercise from this spectrum, the so-called 'Acts of Kindness' (AoK), seemed to have a positive influence on anxiety symptoms and well-being (Alden & Trew, 2013; Trew and Alden 2015). The question remains which working mechanisms lead to this beneficial outcome.

Anxiety Symptoms

Anxiety disorders are the most prevalent mental disorders in Europe. Up to one third (33.7%) of the general population are affected by an anxiety disorder at least once during their lifetime. That leads to around 250 million persons affected in Europe, and 5.75 million in the Netherlands. (Bandelow &Michaelis, 2015). Sufferers experience a high level of distress; their fears are persistent and might accompany them over years or even centuries. Anxiety disorders often lead to avoidant behaviour and have a great impact on patients' day-to-day life. Traditionally, cognitive behavioural therapy (CBT) is a well-known tool to treat anxiety disorders and has been supported by multiple studies (Norton & Price, 2007). However, many patients often receive appropriate therapy only years after symptoms occur, while others are never treated due to false diagnosis, fear of stigma associated with mental disorder and/or shyness and shame, which are typical features of anxiety disorders (Baldwin et al., 2012; Bandelow & Michaelis, 2015; Regier, Narrow, Rae, Manderscheid, Locke, & Goodwin, 1993). In addition, Kearney (2006) and Balázs et al. (2013) stated that people below the diagnostic threshold, thus persons suffering from mild, atypical, or masked anxiety, also suffer from great impairment and high comorbidity. How many people suffer from subthreshold anxiety remains uncertain, since numbers vary between different studies and population groups. Still it can be stated that a great proportion is affected, as numbers vary between 25.6% and 33.8% of the mid-western population (Grenier et al., 2011; Balázs et al., 2013). Hence, although effective treatment exists, it does by far not reach everyone who needs it (Baldwin et al., 2012; Bandelow & Michaelis, 2015; Regier et al.,1993). Therefore, universal prevention and intervention programs are necessary; first, to reduce suffering in an individual with subthreshold symptoms and prevent them from developing an anxiety disorder, and second to reach the high number of undiagnosed cases of anxiety disorders.

In line with the approach "prevention is better than treatment" Dadds et al. (1997) underlined the importance of an effective prevention of anxiety disorders. They stated, that the reduction of anxiety symptoms in a subthreshold group could minimize the onset of the disease. Although several

prevention programs for anxiety are available, meta-analyses revealed only small effect sizes at post-treatment ($d = 0.12\text{-}0.29$) (Fisak, Richard, & Mann, 2011; Teubert & Pinquart, 2011; Zalta, 2011).

Positive psychology and mental well-being

A field that might provide effective preventions against mental disorders, is positive psychology (Seligman, 2002; Keyes, Dhingra, & Simoes, 2010, Powell et al., 2013; Schotanus-Dijkstra, Ten Have, Lamers, de Graaf, & Bohlmeijer, 2016). Positive psychological interventions (PPIs) are aimed on identifying, amplifying, and focussing on positive human strengths (Seligman, 2002) and the increase of mental well-being as buffers against psychopathology (Schotanus-Dijkstra, Drossaert, Pieterse, Boon, Walburg, & Bohlmeijer, 2017; Jeste, Palmer, Rettew, & Boardman, 2015; Duckworth, Steen, & Seligman, 2005). The World Health Organization views mental well-being as a "state in which the individual realizes his or her own abilities, copes with the normal stresses in life, works productively and makes a contribution to his or her community" (WHO, 2004, p. 4). Therefore, it is indicated that not only a reduction in symptoms of anxiety, but also an increase of mental well-being is crucial in the prevention of mental disorders like anxiety (Grant et al., 2013; Schotanus-Dijkstra et al., 2016; Wood & Joseph, 2010). Hence, it is not surprising, that the need of promoting of mental well-being in public mental health is emphasized by a growing number of specialists (Howell, Kern, & Lyubomirsky, 2007; Schotanus-Dijkstra et al., 2016).

Certainly, different PPIs have shown to be effective. For example, a meta-analysis of Bolier et al. (2013) showed that positive psychology interventions can be effective in the enhancement of psychological well-being as well as in reduction of psychopathology. Additionally, in 2017 (a), Schotanus-Dijkstra et al., evaluated a multicomponent intervention with email support in individuals with low or moderate well-being. The participants were recruited in the general Dutch population, also including individuals who showed mild to moderate symptoms of anxiety. The authors concluded that PPIs might be considered as a new mental health promotion strategy with the potential to improve well-being and to decrease anxiety symptoms.

Acts of Kindness

A particular PPI that had a great impact on anxiety disorders (Alden & Trew, 2013) and mental well-being (Buchanan and Bardi 2010; Lyubomirsky et al. 2005), is the Acts of Kindness (AoK) intervention. As its name suggests, the main focus of AoK is to do something kind for someone else. It describes all prosocial behaviour that includes acts with the intent to benefit another human being, for example preparing a meal for others, taking out the trash, babysitting a friend's children or walking the neighbour's dog (Nelson, Layous, Cole, & Lyubomirsky, 2016). Positive effects of AoK include enhanced emotional and psychological well-being, decreased symptoms of depression or anxiety, and increased positive emotions (Sin & Lyubomirsky, 2009; Alden & Trew, 2013; Nelson et al., 2016; Lyubomirsky & Layous, 2013). Indeed, Trew and Alden (2015) compared the effect of three

different exercises, namely (1) AoK; (2) exposure only; and (3) recording life details on undergraduates who scored above average on a scale examining social anxiety symptoms. In this study, the students performed the three interventions during the course of four weeks. It was found that AoK reduced the state-level social anxiety by post-intervention, significantly more than the other two interventions. In line with the findings of Trew and Alden (2015), Kerr, Donovan, and Pepping (2015) also found a beneficial influence of AoK on anxiety. They conducted a self-administered two-weeks kindness intervention, with a clinical sample of 48 adults on a waiting list to receive psychotherapy. The participants, who were asked to perform at least one kind act per day, displayed not only a lower level of anxiety but also greater satisfaction with life, increased optimism and connectedness with others. Likewise, multiple studies showed a beneficial effect of AoK on mental well-being (Kerr et al., 2015; Cohn, Fredrickson, Brown, Mikels, & Conway, 2009; Curry et al., 2018). Although these studies indicate a beneficial effect of AoK on symptom of anxiety and well-being, they merely focused on clinical samples or participants with high anxiety levels. The influence of AoK on subthreshold anxiety stays understudied.

Working mechanism positive emotions

Currently, little is known about the working mechanisms of AoK in relation to symptoms of anxiety and well-being (Kraemer, Wilson, Fairburn & Agras, 2002), and existing studies found partly contradictory results. By examining how and why this intervention works, beneficial characteristics can be strengthened, and the exercises can be further refined and improved to benefit the users even better (MacKinnon & Dwyer, 1993).

One working mechanism that is relatively often discussed in studies concerning AoK is positive emotions. Cohn et al. (2009) named positive emotions as one of the main mediators of AoK on mental well-being and Taylor, Lyumbomirksy, and Stein, 2017 (2017) described a positive affect system as beneficial for generating improvements in mental well-being as well as in reducing impairing anxiety or depression. In 2016, Nelson et al. conducted a six-week longitudinal experiment on doing kindness for others and the world. Within this experiment, for a period of six weeks, 472 participants were asked to perform three acts of kindness per week for either themselves or other. Both conditions were compared afterwards. The results indicated not only higher efficacy of the prosocial than the self-directed behaviour, they also provided evidence for positive emotions being an important mechanism in explaining the relative improvements in psychological flourishing. Certainly, within the study of Nelson et al. (2016), only the mediating effect of positive emotions on mental well-being was examined and not on symptoms of anxiety.

One theoretical framework that may explain the beneficial influence of positive emotions on participants' mental health is named 'broaden-and-build theory of positive emotions' by Fredrickson (2002). According to this theory, positive emotions broaden the scopes of attention and cognition, and, by consequence, initiate upward spirals toward increasing emotional well-being, mental health

(Fredrickson & Joiner, 2002) and build durable biopsychosocial resources that support coping and flourishing (Garland et al., 2010). Thus, this theoretical framework underpins the importance of positive emotions in both, the enhancement of mental well-being, but also in the disruption of the cognitive-emotional mechanisms, that are underlying mental disorders like anxiety. Hence, it is indicated that positive emotions might be an essential working mechanism in PPIs like AoK.

It is necessary to mention that not all studies support the theory that positive emotions are an important mediator in the AoK intervention. To have a mediating role, positive emotions must be first of all enhanced by AoK. In a meta-analysis of 51 different PPIs (Sin & Lyubomirsky, 2009) two unpublished studies were identified, finding that acts of kindness only had a negligible effect on positive emotions. Also, Trew and Alden (2015) did not find the expected effect of AoK on positive emotions within the examined four-week kindness intervention. Hence, both the influence of AoK on positive emotions and the mediating role of this mediator stay unclear and must be examined further.

Working mechanism positive relations

Nelson et al. (2016) described another variable that might be an important working mechanism in the AoK exercise, namely positive relationships. They assumed that doing nice things for others and the resulting experience of positive emotions leads people to be more trusting of others and to form more inclusive social groups. In this way, prosocial behaviour may improve their social relationships.

Positive relations are characterized by feelings of intimacy, affection and empathy between individuals involved and by having an open and warm attitude towards the other person (Westerhof & Keyes, 2010). Experiencing positive relationships is one vital component of psychological well-being (Bohlmeijer & Bosch, 2013), which indicates that a growth in positive relations might foster increases in well-being.

Although the mediating role of positive relations in AoK stays understudied, several studies found a relation between AoK, positive relations and mental well-being and/or symptoms of anxiety. In 2008 Kurtz and Lyubomirsky stated that AoK may help to strengthen social relationships, increase social engagement, and broaden social networks. In the earlier mentioned study of Trew and Alden (2015), a negative relationship between prosocial behaviour (AoK) and anxiety symptoms was found. They assumed that the enhanced positive contact with others throughout AoK predicts more positive relationships which might lead to more positive and fewer negative social events, and thereby minimize symptoms of anxiety in social situation. This indicated that enhanced positive relations were an important mediator in the reduction of symptoms of anxiety, although it was not analysed within the study (Trew & Alden, 2015). This is in line with the finding of Zhou, Zhu, Zhang and Cai (2013) that perceived social support may have a protective effect in preventing perfectionists from experiencing anxiety. One of the few studies, that indeed focusses on the mediating role of positive relations was conducted by Schotanus-Dijkstra et al. (2017 b). The researchers examined the efficacy of an email guided self-help PPI on six core well-being processes, inter alia, positive relations, and the

mediating role of these processes on mental well-being, anxiety and depressive symptoms. They found indications that positive relations and self-compassion, might be key mechanisms in promoting well-being via PPIs. However, Schotanus-Dijkstra and colleagues did not examine the prosocial AoK intervention. Therefore, it remains uncertain whether positive relations mediate beneficial effects of AoK on symptoms of anxiety and mental well-being.

Current study

Building on previous findings, the aim of this study was to examine (1) to what extent Acts of Kindness exercises are effective in improving anxiety symptoms and mental well-being compared to a waitlist control condition and (2) whether the effects are mediated by improvements in positive emotions and/or positive relations.

First, it was hypothesized that participants who performed the AoK exercises showed a greater reduction in anxiety symptoms and greater improvement in mental wellbeing at post treatment, than the participants in the waitlist control condition. Second, it was hypothesized that these changes in anxiety and mental well-being would both be mediated by an increase of positive emotions and positive relations.

Materials and Method

Design

The current study builds further upon the findings of a five-armed RCT, which took place from September 2017 to May 2018 (in total 7.5 months) and included seven measuring points/questionnaires. For this research, the focus lies on three groups: two experimental groups that performed acts of kindness, one with a weekly reflection and another one without, and a wait-list control group. The two experimental groups were merged together since Chi-Square test did not reveal any significant differences in descriptive statistics ($p \geq .52$). Independent t-test also did not reveal any significant differences between the two experimental groups at post-test (T3) with regard to anxiety symptoms ($p = .51$), well-being ($p = .61$), positive emotions ($p = .53$), and positive relations ($p = .74$). After the screening, a baseline questionnaire (T0) was conducted before the intervention. During the six weeks of performing acts of kindness, two short questionnaires to examine the mediation effects were conducted, at two weeks in the intervention (T1) and four weeks in the intervention (T2). After the intervention, a post-test (T3) was conducted. Furthermore, a six-weeks follow-up (T4) and a six-months follow-up (T5) were taken as well. Both follow-up questionnaires (T4 and T5) are not included in this study.

Participants and Procedure

Prior to conducting the trial, ethical approval was obtained from the BMS ethics committee. Respondents were approached via advertisements in regional and national newspapers (Tubantia,

Volkskrant, Gelderlander), an online newsletter (Psychology Magazine) and via Facebook advertisement. Via a website, more information was provided, and an online application was accessible. After filling out the online application ($n = 653$), participants received a link to the screening questionnaire which started with an online informed consent the participants had to agree with, to participate in the study. Participants had to be at least 18 years old and experience a low or moderate level of well-being ("languishers" or "moderately mentally healthy") according to the Mental Health Continuum Short Form (MHC-SF). To be included in the intervention, an internet connection and an e-mailadress was necessary, just as sufficient proficiency of the Dutch language. To exclude participants with serious depressive or anxiety symptoms, respondents with a score higher than 34 on the Center for Epidemiologic Studies Depression Scale (CES-D) and/or score higher than 15 on the Generalized Anxiety Disorder 7 (GAD-7), were excluded.

After the screening, 315 participants were excluded, and eligible participants ($n = 445$) were asked to complete the baseline questionnaire ($n = 423$). The 423 participants were then randomly allocated to one of the five research groups, by conducting a stratified randomization procedure, using randomizer. org. Two of the research groups were not included in further analyses ($n = 169$). Therefore, 85 participants were assigned to the two experimental conditions respectively ($n = 170$ in the merged AoK group) and 84 to the waitlist group. Men and women; lower/higher educated; and flourishers/non-flourishers were evenly distributed over the groups. After the beginning of the intervention another 104 participants were excluded of the analyses since they did not fill in all questionnaires. Dropout rates were significantly higher in the experimental group in all measures (T1-T3) ($p \leq .041$). Figure 1 shows the flowchart of the study and the number of participants and dropouts.

In Table 1 the descriptive characteristics of the participants at baseline level are displayed. Most participants were female (90%) with ages ranging from 23-70 years, with a mean age of 51.27. Most participants were Dutch (97.3%), married (53.3%), and lived together with their partner (64%). Furthermore, they were mostly highly educated (70.7%) and in paid employment (69.3%). Independent T-test and Pearson´s chi-squared test revealed no significant differences of the sociodemographic characteristics, anxiety symptoms, well-being, positive emotions, and positive relations between the groups ($p \geq .39$).
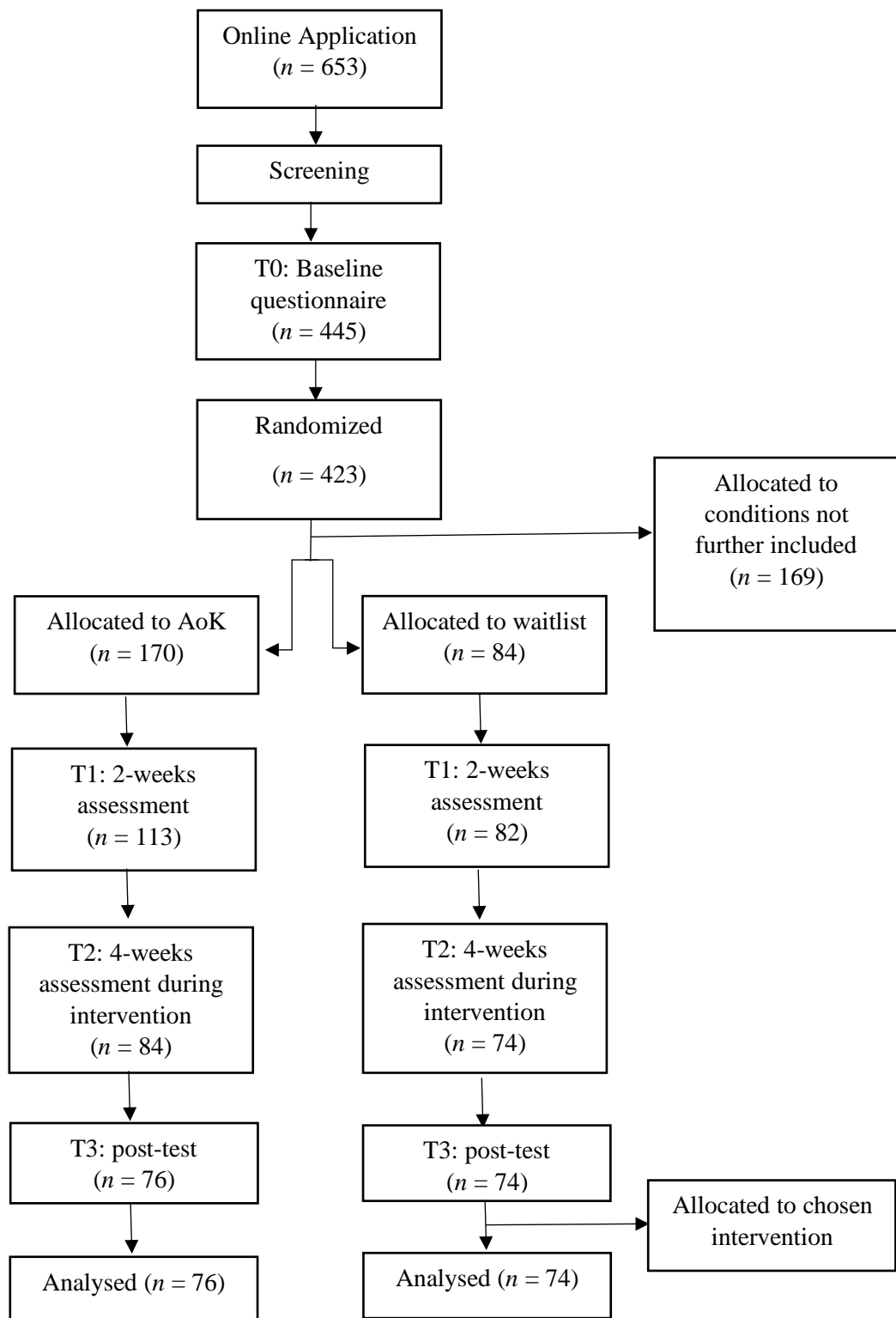
```
                    ┌─────────────────────┐
                    │  Online Application │
                    │     (n = 653)       │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │      Screening      │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │    T0: Baseline     │
                    │    questionnaire    │
                    │     (n = 445)       │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐          ┌─────────────────────┐
                    │     Randomized      │          │    Allocated to     │
                    │                     │─────────▶│   conditions not    │
                    │     (n = 423)       │          │  further included   │
                    └─────────────────────┘          │     (n = 169)       │
                                                      └─────────────────────┘
        ┌────────────────────┐  ┌────────────────────┐
        │  Allocated to AoK  │  │ Allocated to waitlist│
        │     (n = 170)      │  │     (n = 84)        │
        └────────────────────┘  └────────────────────┘
                 │                        │
        ┌────────────────────┐  ┌────────────────────┐
        │   T1: 2-weeks      │  │   T1: 2-weeks      │
        │   assessment       │  │   assessment       │
        │    (n = 113)       │  │    (n = 82)        │
        └────────────────────┘  └────────────────────┘
                 │                        │
        ┌────────────────────┐  ┌────────────────────┐
        │   T2: 4-weeks      │  │   T2: 4-weeks      │
        │ assessment during  │  │ assessment during  │
        │   intervention     │  │   intervention     │
        │    (n = 84)        │  │    (n = 74)        │
        └────────────────────┘  └────────────────────┘
                 │                        │
        ┌────────────────────┐  ┌────────────────────┐          ┌─────────────────────┐
        │   T3: post-test    │  │   T3: post-test    │─────────▶│ Allocated to chosen │
        │    (n = 76)        │  │    (n = 74)        │          │    intervention     │
        └────────────────────┘  └────────────────────┘          └─────────────────────┘
                 │                        │
        ┌────────────────────┐  ┌────────────────────┐
        │ Analysed (n = 76)  │  │ Analysed (n = 74)  │
        └────────────────────┘  └────────────────────┘
```

Figure 1. Flowchart of study and number of participants.

Table 1

Baseline characteristics of participants (n = 150).

	AoK (*n* = 76)	Control (*n* = 74)	Total (*n* = 150)
Gender, *n* (%)			
Female	70 (92.1)	65 (87.8)	135 (90)
Male	6 (7.9)	9 (12.2)	15 (10)
Age			
Mean (*SD*)	51.99 (9.19)	50.35 (9.65)	51.27 (9.57)
Range	27 – 70	23 – 64	23–70
Nationality, *n* (%)			
Dutch	74 (97.4)	72 (97.3)	146 (97.3)
Other	2 (2.6)	2 (2.7)	4 (2.7)
Marital situation, *n* (%)			
Married/registered partnership	41 (54.4)	39 (52.7)	80 (53.3)
Not married (never married, divorced, widowed	35 (45.6)	35 (47.3)	70 (46.7)
Living situation, *n* (%)			
With partner	51 (67.1)	45 (60.81)	96 (64)
Alone	25 (33.9)	29 (39.19)	54 (36)
Educational Level, *n* (%)			
Low	0	3 (4.1)	3 (2)
Middle	10 (17.5)	12 (16.2)	22 (14.7)
High	47 (82.5)	59 (79.7)	106 (70.7)
Work situation, *n* (%)			
Paid employment	51 (67.2)	53 (71.6)	104 (69.3)
No paid employment	24 (31.5)	20 (27.0)	44 (29.3)
Student	1 (1.3)	1 (1.4)	2 (1.3)

Intervention

Acts of Kindness. Participants who were allocated to the two experimental conditions were asked to perform five acts of kindness for others on one day per week, over a period of six weeks. They received weekly e-mail reminders, to reinforce the participants' adherence. The e-mails also

included a definition, description and examples of the AoK, like babysitting a friend's child. The following day both groups were asked to describe in an online happiness journal what they did and for whom. Additionally, the participants in the reflection condition were asked to write down what it meant to them to perform the kind acts to others.

Waitlist. The participants in the wait-list control group were told that they could choose one happiness exercise (acts of kindness with reflection, acts of kindness without reflection, gratitude intervention or acts of kindness for oneself) after the collection of some normal fluctuations in their level of happiness. After the six-weeks follow-up questionnaire (T4), they received the chosen happiness exercise.

Measures

Anxiety. The Generalized Anxiety Disorder 7-item (GAD-7) scale was used to measure symptoms of anxiety. It consists of 7 items which inquire symptoms during the past 2 weeks. Each item describes a symptom of anxiety (for example item 1: 'Feeling nervous, anxious, or on edge'). The participant is asked to indicate how often he/she experienced this symptom. Because each of the 7 items is scored from 0 (never) to 3 (almost every day), the GAD-7 scale score ranges from 0 to 21. The reliability of the GAD-7 was rated as excellent in previous studies (Cronbach α = .92) (Spitzer, Kroenke, Williams, & Löwe, 2006) and as acceptable within the current study (α = .78).

Mental wellbeing. The Dutch version of the Mental Health Continuum Short Form (MHC-SF) was used to examine the participants mental wellbeing during the study. The MHC-SF consists of 14 items, which measure positive mental health and three sub-scales of wellbeing. These are emotional wellbeing (3 items), social wellbeing (5 items), and psychological well-being (5 items) (Lamers, Westerhof, Bohlmeijer, ten Klooster & Keyes, 2011; Keyes, 2002). Within these items, the participants are asked to assess how often they experienced a described feeling in the last month (for example 'During the past month, how often did you feel interested in life?') on a six point-scale, ranging from 0 (never) to 5 (almost alway) (Keyes, 2006). This leads to a minimum score of 0 and a maximum score of 70, with higher scores indicating a higher level of mental well-being. Lamers et al. (2011) rated the reliability of the three sub-scales as good, with α = .70 for social wellbeing and α =.83 for both emotional and psychological well-being. The total scale had a good reliability of α = .89 (Lamers et al., 2011), with this study supporting these findings (α = .88).

Positive Emotions. In order to measure positive emotions, a modified Dutch version of the Differential Emotion Scale (mDES) was used. The subscale for positive emotions consists of eight items in total. Every item consists of a group of three words to describe the positive emotional states, considered to be fundamental by Izard (1992). These are amusement, awe, compassion, contentment, hope, interest, joy and love. Participants are asked to rate how intense they experienced each emotion, on a seven-point scale, ranging from 1 (not at all) to 7 (very intense). Within this study the reliability of the subscale was rated as questionable (α = .63).

Positive relations. One subscale of the Positive Mental Health Scale 'Positieve Geestelijke Gezondheid Schaal' (PGGS) was used to examine the participants' positive relations. The Dutch subscale for positive relations consists of nine items. The items include statements, like "I enjoy personal and mutual conversations with family members or friends". Five out of the nine items were formulated in a negative manner and were thus reversed for further analyses. All nine items can be answered on a scale from 1 (strongly disagree) to 6 (strongly agree), which leads to a possible score range from nine to 54, with a higher score indicating a higher level of positive relations. Previous research rated this subscale as moderatly reliable ($\alpha = .77$) (Fens, 2013). Within this study. the reliability was rated as questionable ($\alpha = .66$).

Adherence. Adherence describes the amount to which participants follow the given instructions

(Bissonnette, 2008). The full benefit of an effective intervention will only be achieved if patients adhere to prescribed treatment regimens (Osterberg & Blaschke, 2005). To estimate the effectiveness of the AoK intervention correctly, the compliance of the participants should be included in the analyses. Within the current study, the participants were asked to perform five kind acts a week. Adherence was assessed by asking the participants to indicate how many acts of kindness they performed for others during the last week. Answers could be given on a six-point scale, ranging from 1 (Five activities) to 6 (I did not perform an act of kindness on a single day during the last week). For further analyses, the scores were reversed. Higher mean scores indicate thus more performed acts of kindness. An acceptable adherence rate is typically defined at 80% (Osterberg & Blaschke, 2005; Safren, Duran, Yovel, Perlman, & Sprich, 2007). In this study, a participant is thus considered as adherent when he or she performed four or more acts of kindness on one day every week of the intervention.

Analyses

Analyses were conducted using SPSS version 25.0. The chosen level of significance was $p = .05$. Participants who did not fill in all questionnaires (T0-T3) were not included in this study. With the help of descriptive statistics, an overview of the baseline characteristics was created (sex, age, nationality, marital status, living situation, educational level, working situation). Using chi-squared tests and independent t-tests, baseline characteristics of dropouts and completers were compared. Cronbach´s alpha was calculated to indicate the reliability of the scales used in this study based on the data of baseline and rated according to the following rules of thumb, provided by George and Mallery (2003, p. 231): "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and _ < .5 – Unacceptable".

Adherence was examined by calculating mean scores of performed acts of kindness per week in the experimental condition.

To test if the AoK intervention had a beneficial effect on anxiety symptoms and wellbeing

(first hypothesis), the two experimental conditions and the control condition were compared over time using mixed ANOVAs. Herein, time (T0 and T3 of the GAD-7 and MHC-SF) served as a within subject factor for anxiety and well-being, while group (AoK vs. control condition) served as between-subject factor. Furthermore, time (T0, T1, T2 and T3 of the mDES and PGGS) served as within-subjects factor for positive emotions and positive relations, and group (AoK vs. control condition) served as between-subjects factor. Cohen's *d* between-group effect sizes were calculated per outcome and prospective mediator, if the interaction effect was significant, using this formula:

$$d = \frac{(M_{AoK} - M_{Waitlist})}{\sqrt{\frac{(SD^2{}_{AoK} + SD^2{}_{Waitlist})}{2}}}$$

For interpretation the cut-off scores suggested by Cohen (1988), were used. He defined small, medium, and large effect sizes as $d = .2, .5,$ and $.8$, respectively.

Mediation analyses (second hypothesis) were conducted in SPSS using the PROCESS macro developed by Hayes (2012). Simple mediation analyses following the regression-based path analysis framework by Preacher and Hayes (2004) were conducted (Figure 2). If both positive relations and positive emotions significantly mediate the effects of the condition on anxiety and/or well-being, multiple mediation analysis is used in which the mediators are simultaneously included to see if one of them is stronger than the other. The *a*-path shows the effect of the condition (X: AoK vs. Waitlist) on the mediator (M: positive emotions or positive relations). This path was calculated by using the cross-product of the relationship between the experimental and the control group and the mediator (M). The coefficient of the mediators was calculated using the mean scores of T1 and T2 on the mDES subscale of positive emotions and the PGGS for positive relations. The *b*-path describes the effect of the mediators on the outcome measures (Y: anxiety symptoms and wellbeing), corrected for T0 scores on mediators and outcome measures. The *c*-path shows the total effect of the two conditions (AoK vs. waitlist) on anxiety symptoms and mental well-being. In addition, the indirect effects of changes in positive emotions and/or positive relations on the T3 scores in the two conditions were calculated (*ab*), while correcting for T0 scores of mediators and outcome measures. Therefore, bias-corrected 95% confidence intervals (CI) were calculated. When the confidence interval does not contain zero, it can be assumed that in 95% of the resamples, the intervention's effect on anxiety symptoms or mental well-being is mediated by the respective mediator variable.
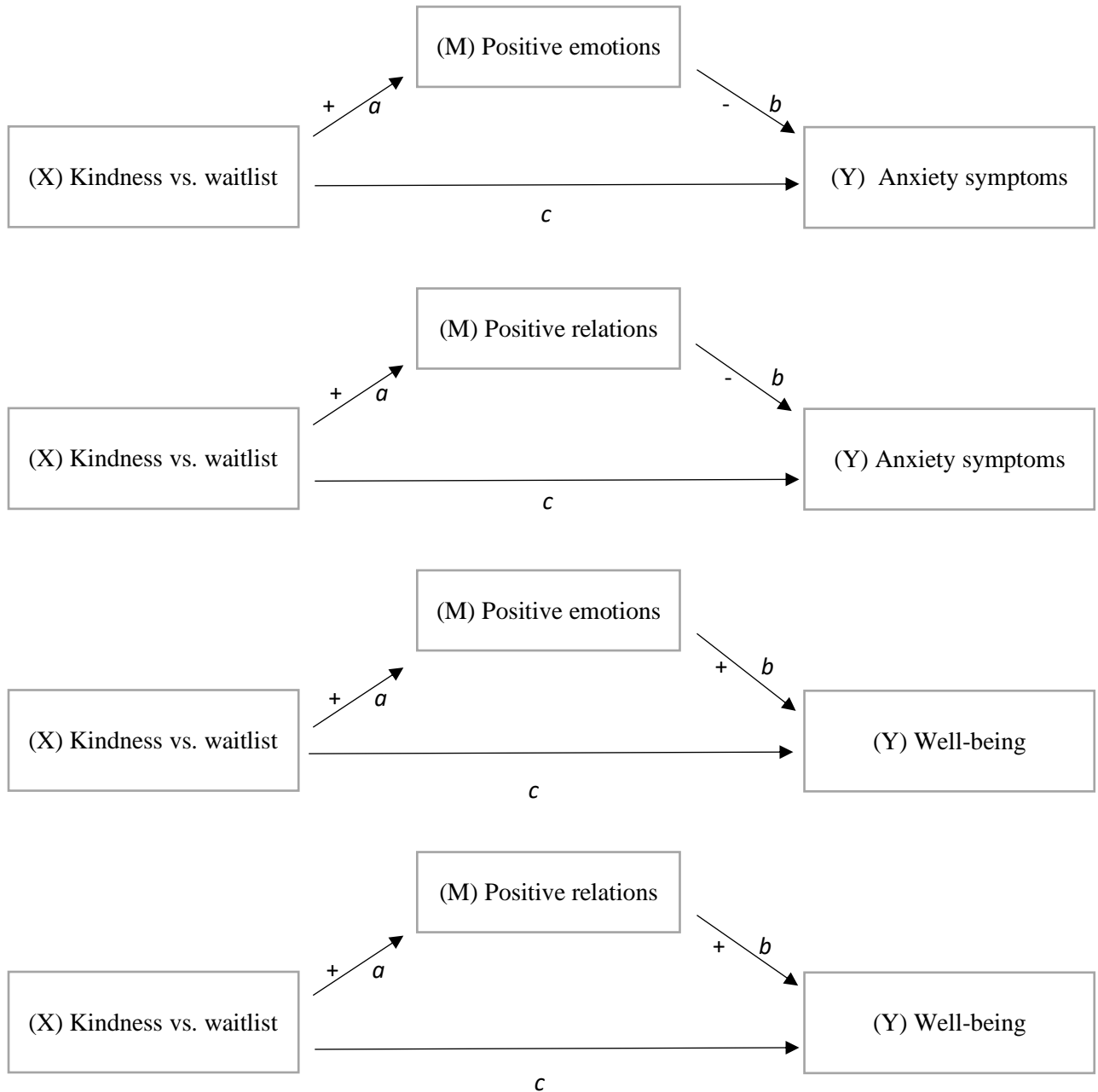
Figure 2. Regression-based path analysis frameworks of the hypothesised effect of AoK versus waitlist control condition on anxiety symptoms and mental well-being mediated by changes in positive emotions and positive relations.

Results

Adherence

The participants performed on average 3.8 acts of kindness per week with decreasing mean scores from week 1 to week 6. The mean scores of performed acts per day varied from 4.52 ($SD =$ 0.94) in week 1; 4.28 ($SD = 0.98$) in week 2; 3.81 ($SD = 1.34$) in week 3; 3.57 ($SD = 1.49$) in week 4; 3.51 ($SD = 1.51$) in week 5; to 3.4 ($SD = 1.58$) in week 6. Therefore, adherence was on average considered as not sufficient, since it was below the required four kind acts per week during the

intervention from week two ongoing. The proportion of adherent individuals also decreased during the intervention. 64 participants (84.3%) conducted four or more acts of kindness in week 1, 54 (71.1%) in week 2, 43 (56.6%) in week 3, 41 (53.9%) in week 4, 31 (40.8%) in week 5 and 27 (35.5%) in week 6. Six participants (7.9%) conducted four or more kind acts every week during the whole six-week intervention.

Effects of AoK on anxiety symptoms, well-being, positive emotions and positive relations

Table 2 displays the results of the mixed ANOVA analyses. It shows that there was a significant time × group interaction effect on anxiety symptoms (GAD-7) ($p = .008$) and well-being (MHC-SF) ($p = .01$) at post-test assessment (T3), indicating that participants in the AoK group reported a stronger decrease in anxiety symptoms, and a stronger increase in well-being, immediately following the intervention. The Cohen's d effect sizes were small, namely .29 for anxiety symptoms and .38 for mental well-being. However, the analyses revealed no significant time × group interaction effects on positive emotions and positive relations ($p \geq .26$), indicating that the groups showed no differences in positive emotions and positive relations during and after the intervention.

Table 2

Means and standard-deviations for outcome and mediation variables and results of Mixed ANOVAs, interaction effects and Cohen's d effect sizes for between-group effects (AoK vs. waitlist) compared to the waitlist control condition.

	AoK ($n = 76$)	Waitlist ($n = 74$)	Time x group		Effect size
	M (SD)	M (SD)	F	p	d (95% CI)
Anxiety Symptoms-GAD-7					
T0 (Baseline)	5.66 (3.52)	6.0 (2.91)			
T3 (6 weeks)	4.67 (3.50)	6.4 (4.37)	2.39	.008**	0.29 (0.11, 0.46)
Mental well-being-MHC-SF					
T0 (Baseline)	38.93 (9.27)	38.94 (9.44)			
T3 (6 weeks)	44.71 (8.96)	39.75 (9.45)	5.96	.01**	0.38 (0.19, 5.92)
Positive emotions-mDES					
T0 (Baseline)	28.96 (6.26)	29.58 (5.77)			
T1 (2 weeks)	30.38 (5.75)	30.43 (6.97)	.43	.51	
T2 (4 weeks)	29.91 (5.66)	30.55 (8.04)	1.23	.26	
T3 (6 weeks)	33.61 (8.53)	33.21 (8.89)	.00	.97	

	AoK (n = 76)	Waitlist (n = 74)	Time x group		Effect size
	M (SD)	M (SD)	F	p	d (95% CI)
Positive relations-PGGS					
T0 (Baseline)	37.83 (6.74)	37.41 (6.47)			
T1 (2 weeks)	39.47 (6.45)	39.32 (6.81)	.35	.55	
T2 (4 weeks)	40.29 (6.29)	39.45 (6.74)	.06	.79	
T3 (6 weeks)	39.96 (6.99)	38.72 (6.79)	.15	.69	

*$p < .05$ **$p \leq .01$.

Table 3

Outcomes of simple mediation models assessing effects of positive emotions (mDES) and positive relations (PGGS) and total effects on changes in well-being (MHC-SF) and anxiety symptoms (GAD-7) compared to the waitlist control condition.

Mediators	c-path	a-path	b-path	Indirect effect	
				ab	95% CI
Anxiety symptoms					
positive emotions	.42*	-.03	-1.5**	.06	-.02, .17
positive relations	.47**	.00	3.07**	.00	-.13, .14
Mental well-being					
positive emotions	-.73**	-.4	6.76**	-.25	-.66, .07
Positive relations	-.97**	.00	9.64**	-.001	-.41, .41

Note. *$p < .05$; ** $p < .01$.

Simple mediation analyses

The results of the simple mediation analyses are shown in Table 3. The models show that all *c*-paths were significant, which indicates that performing AoK had a beneficial effect on levels of anxiety symptoms and mental well-being in contrast to the waitlist. The results of the *b*-paths were all significant, which indicates that positive emotions and positive relations were both associated with fewer anxiety symptoms and higher well-being. Two results indicated that improvements in anxiety symptoms were not mediated by increases in positive emotions or positive relations. First, the *a*-paths within the mediation models were not significant which means that compared to the waitlist condition, AoK had no significant effect on positive emotions nor on positive relations, which is in line with the

findings of the ANOVA analyses. This is also displayed in the 95% CIs of the indirect effects (*ab*), which did include zero in all four models, indicating that the effects of AoK versus waitlist on well-being and symptoms of anxiety were not significantly mediated through neither positive emotions nor positive relations.

Discussion

The main goal of this study was to examine the effectiveness of AoK on anxiety symptoms and mental well-being and to get insight into the mediating role of positive relations and positive emotions. Therefore, during a 6-week program, participants were asked to perform multiple kind acts on one day every week. In line with the first hypothesis, results demonstrated that the prosocial AoK intervention was superior to a waitlist condition in increasing mental well-being and decreasing symptoms of anxiety, although the effect sizes were small. Contrary to the second hypothesis, positive emotions and positive relations did not mediate these changes.

Discussion of main findings

In accordance with the present results, previous studies have demonstrated that AoK interventions might have a significant positive influence on symptoms of anxiety (Trew & Alden, 2015; Taylor et al., 2017) and mental well-being (Sin & Lyubomirsky, 2009; Alden & Trew, 2013; Nelson et al., 2016; Lyubomirsky & Layous, 2013). This indicated beneficial influence of AoK on the participants' condition, strengthening the promising approach of prosocial behaviour. The cohen's *d* effect sizes of .29 for symptoms of anxiety and 0.38 for mental well-being must be categorized as small (Cohen, 1988). This is in line with a meta-analysis of 27 experimental studies concerning the effect of AoK on well-being. This meta-analysis revealed an overall small-to-medium ($\delta = .28$) effect of kind acts on the well-being of the actor (Curry et al., 2018). This is comparable to the effect sizes of other PPIs on mental well-being. A meta-analysis of 49 independent studies, examined the effects of a variety of positive psychology interventions (e.g. gratitude, mindfulness, positive writing interventions, and AoK) on well-being relative to a range of control conditions. This meta-analysis reported a small average cohen's *d* effect size of .29 on well-being (Sin & Lyubomirsk, 2009). With *d*= .38, the effect size found in the current study is thus slightly above the average indicated for both AoK and PPIs in general. Similar results were found concerning the effect of AoK on anxiety. In the study of Alden and Trew (2013) that focused on kind acts and social anxiety, a cohen's *d* effect size of .28 was found, which is comparable to the effect of AoK on symptoms of anxiety found in the current study. Although our found effect sizes are in line with earlier research, there are indeed positive psychological interventions, that reach higher effect sizes (Seligman et al., 2005). Considering the low adherence of the participants, it might be possible that the potential of the AoK intervention was not fully exploited. As the World Health Organization (2003, p. 13) stated "adherence is an important

modifier of health system effectiveness", they further described that health outcomes and the efficacy of interventions cannot be accurately assessed if adherence rates are insufficient. Since the full benefit of an effective intervention will only be achieved if patients adhere to prescribed treatment regimens (Osterberg & Blaschke, 2005), the effect of the intervention might be reduced by a lack of adherence of the participants. During the course of the intervention, the adherence rate decreased strongly from 84.3% in week 1 to 35.5% in week 6. Additionally, the dropout rates in the experimental group, thus the group that conducted the kind acts, was significantly higher than in the waitlist control group, with several participants stopping with the intervention throughout the six-weeks. This leads to the assumption that conducting the AoK exercise or filling out the attached questionnaires (indicating number of kind acts, describing them and partly reflect on them) might have been inconvenient for the participants.

Another finding of this study is that contrary to the expectations, no mediating effect of positive emotions nor positive relations was found. It was shown, that none of the two variables changed significantly during the intervention, compared to the waitlist control group. Our findings are inconsistent with most previous findings, which link acts of kindness to improvements in positive emotions (Nelson et al., 2016). However, AoK did not increase positive emotions in all previous studies. In a meta-analysis of PPIs (Sin & Lyubomirsky, 2009) two unpublished studies were identified, finding that acts of kindness had a negligible effect on positive emotions. Trew and Alden (2015) also did not find an effect of AoK on positive emotions after the examined four-weeks intervention contradictory to their expectations and the previous work. They introduced a possible explanation for this unexpected finding that might be applicable in the current study as well. They suggested that kind acts may not always lead to positive social interactions but might be malicious in certain interpersonal contexts. If performed acts are not responsive to recipients' needs (for example something that was meant to be nice but not perceived as helpful or friendly) or if these acts occur in the context of serious relationship difficulties, AoK might in this cases lead to a decrease in both, positive emotions and feelings of intimacy and affection (positive relations) (McNulty & Fincham, 2012). In the current study, the description of the AoK exercise did not take the interpersonal context into account. Therefore, it might be possible that the effect of AoK on positive emotions and positive relations might have been impaired by the participants conducting the exercises in a non-beneficial interpersonal context. Another possible explanation for the missing mediating role of positive emotion might be the used measurement. The scale that was used to measure positive emotions (mDES) within this study, only asks for the intensity of the experienced positive emotion, while the frequency of the number of positive emotions is rated as more informative (Chamberlain, 1988). Furthermore, the reliability of the mDES was rated as questionable. Thus, the psychometric quality of the results regarding positive emotions seems uncertain. Additionally, similar to the small effect sizes, the non-significance could also be explained by the lack of adherence. It cannot be ruled out, that the changes

in positive emotions and/or positive relations, might have been significant if the participants would have performed the required number of acts of kindness per week.

Next to the missing mediating effect of positive emotions, no mediating role of positive relations was found either. Although barely studied before, the mediating role of positive relations on the influence of AoK on wellbeing and symptoms of anxiety was indicated in multiple studies (Kurtz & Lyumbomirsky, 2008; Trew & Alden, 2015). It was assumed that due to the prosocial behaviour, social networks might be broadened, and social engagement and relationships might be strengthened and thereby mental well-being enhanced (Kurtz & Lyumbomirsky, 2008). Additionally, a mediating role on symptoms of anxiety due to more personal contact was assumed but not analysed (Trew & Alden, 2015). The findings of the current study do not support these assumptions. This might be explained by a methodological impairment. Based on the baseline results, the reliability of the used scale (PGGS) was rated as questionable. Thus, the presented results might be less accurate and should be interpreted with caution. Furthermore, as well as on positive emotions, the impact of AoK on positive relations might be influenced by the interpersonal context in which the kind act is conducted, Thus if the relationship between the actor and the receiver of the kind act was malicious beforehand or the kind act considered as inappropriate or unpleasant, the AoK might have led to a decrease instead of an increase in positive relations. Lastly, the impact of AoK on positive emotions, and therefore also its mediating effect, might as well be influenced by the insufficient adherence of the participants.

Strengths and Limitations

Notable strengths of this study include the fact that participants were allowed to choose when, how and which kind acts they would like to conduct. This can be rated as an advantage to many other studies, examining AoK, in which the acts were determined beforehand. In the RCT conducted by Nelson et al. (2015) two groups were compared, one performing self-chosen acts of kindness and another one instructed to perform the same acts of kindness every week. Participants who were free to choose their kind acts demonstrated greater improvements and it was shown that well-being improvements were inter alia mediated by feelings of autonomy.

Within this study we were able to replicate earlier findings about the beneficial effect of AoK on symptoms of anxiety and mental well-being, which can be considered another strength of the current study. Especially the effect of the prosocial intervention on non-pathological symptoms of anxiety, has barely been studied before. On the basis of the current results, the effectiveness of the AoK intervention in this special field, could be studied in more depth and affirmed, indicating that AoK is a promising approach in not only enhancing well-being, but also in reducing symptoms of anxiety.

Beside the earlier described methodological impairments of the used scales for positive relations and emotions, other limitations of this study must also be named. First, the self-selected sample that was used in this study, was not representative for the general population. As in many other

studies regarding positive psychology (Curry et al., 2018), well educated women were overrepresented. It is indicated that this group is more attracted to this field of psychological intervention and thus more willing to participate. Therefore, the results cannot be generalized to the general Dutch population.

Secondly, as described before, the insufficient adherence of the participants might have had an impact in the found significances and the effect sizes. In connection with the high dropout rate in the experimental condition compared to other AoK interventions (Nelson et al., 2016), a certain inconvenience of the exercise might be assumed, which might be explained by the necessity to perform all five kind acts on one singular day. Although Lyumbomisky et al. (2005) stated that performing multiple kind acts on one day might be more effective than spreading them over the course of a week, the small proportion of 7.9% of full adherence, might also weaken the effectiveness of the intervention.

Another limitation of this study is that participants who did not fill in all questionnaires were not taken into account, instead of applying the "intention-to-treat"-principle. Thereby the results of the current research should be considered as less accurate and reliable (Gupta, 2011).

Future research

This research has raised many questions in need of further investigation as well as it implies some practical implications. Although this study already contributed new insights in the working mechanisms of the AoK intervention, it stays uncertain how its effect on anxiety and wellbeing is mediated. Additional work is needed to replicate and build on these initial findings and analyse the impact of other working mechanisms. Within this study only two possible mediating variables were examined. A variety of other possible mediators like negative emotions (Lyubomirsky & Layous, 2013; Nelson et al., 2016), autonomy or need-satisfaction (Nelson et al., 2015) should be considered as well. To be able to further refine and strengthen the used AoK intervention and to enhance its effectiveness, it is indispensable to examine underlying mediators in more detail and include multiple possible mediators in the analysis. Sommers-Spijkerman et al., (2018) recommended to use studies, designed to measure both mediators and outcomes at multiple intervals over the course of the intervention: Thereby a more detailed insight into the existence and course of change processes as well as their interplay might be examined.

Within this study individuals suffering from more severe symptoms of anxiety were excluded. As described in the introduction, there are many people who suffer from anxiety disorders and do not receive the required help, due to a missing diagnosis or the reluctance to seek help. Based on earlier findings with clinical samples (Kerr et al., 2014) or samples that showed increased symptoms of anxiety (Alden & Trew, 2013), it is indicated that AoK might also be supportive for individuals that suffer from anxiety symptoms above the diagnostic threshold. Therefore, it is necessary to replicate

our findings within an RCT, examining a group that does not only include healthy participants, but also such that show pathological symptoms of anxiety.

Another suggestion for further research is based on the insufficient adherence rate. Although we found a significant effect of AoK on both well-being and anxiety symptoms, it was assumed that the effect sizes as well as the significance of the studied variables (positive emotions and positive relations) might have been negatively influenced by the number of performed acts. Based on these findings, research is recommended to first examine some aspects in AoK interventions in more depth to possibly refine and improve the intervention afterwards. First, the underlying factors of motivations (for example the importance of autonomy and flexibility) of performing AoK should be studied in more detail to adjust the framework and instructions of the exercise, in order to enhance the participants adherence. To do so qualitative research, for example in form of a focus group among participants could give deeper insight in perceptions, opinions, beliefs, and attitudes of the group (Rabiee, 2004). Secondly, in connection with that also the most suitable number of kind acts should also be analysed. To our knowledge, no known research has yet investigated how many kind acts should be performed per day to reach the highest effect on anxiety symptoms or well-being, while still reaching an acceptable adherence rate. Furthermore, as assumed by Alden and Trew (2015), and McNulty and Fincham (2012), the interpersonal context between the actor and the perceiver of the kind act should be taken into account. Therefore, it is indicated that not only the number but also the quality and/or nature of the kind act should be considered and further investigated. The efficacy of AoK exercises could be examined in an RCT study design, focussing on the interpersonal context and its influence on the most beneficial number of kind acts. Thereby more precise instructions and special reflections focused on the relationship to the perceiver might be used.

Practical implications

As described by Dadds et al. (1997) the reduction of non-pathological anxiety symptoms can prevent individuals from developing an actual anxiety disorder. The results of the current study thus indicate that performing AoK is beneficial in reducing symptoms of anxiety and increasing mental well-being. Therefore, the acts of kindness intervention might be used as a preventive intervention of anxiety disorders. Accordingly, it might be incorporated in existing anxiety prevention programs. In addition, an intervention, that does not only prevent anxiety disorders, but also support people who already suffer from it, would be beneficial to even more individuals, for example people already in treatment, on a waitlist to receive therapy (Kerr et al., 2014), or in follow-up care.

A low to moderate level of mental well-being is not only found in people with symptoms of anxiety, but also with people suffering from other disorders, like eating disorders, addictions and mood disorders (Fava, Rafanelli, Cazzaro, Conti, & Grandi, 1998, DiBartolo, P. M., & Shaffer, 2002; Kumcagiz, & Gündüz, 2016). As kindness towards others increases the levels of mental well-being,

the AoK intervention could be integrated into treatment programs of other disorders associated with lower levels of well-being.

Conclusion

The present study provides empirical evidence for the effectiveness of AoK. Although the effect sizes were small, it was shown that the prosocial intervention had a beneficial effect on both outcomes, mental well-being and symptoms of anxiety. Contrary to our expectations a mediating effect of neither positive emotions nor positive relations was found. Future research should focus on examining possible underlying mediators in more detail and on increasing adherence of participants to refine and strengthen the used AoK intervention and to enhance its effectiveness. It is assumed that AoK might serve as a beneficial preventive intervention against the onset of anxiety disorders.

References

Alden, L. E., & Trew, J. L. (2013). If it makes you happy: Engaging in kind acts increases positive affect in socially anxious individuals. *Emotion*, *13*(1), 64.

Balázs, J., Miklósi, M., Keresztény, Á., Hoven, C. W., Carli, V., Wasserman, C., ... & Cotter, P. (2013). Adolescent subthreshold-depression and anxiety: Psychopathology, functional impairment and increased suicide risk. *Journal of child psychology and psychiatry*, *54*(6), 670-677.

Baldwin, D. S., Allgulander, C., Bandelow, B., Ferre, F., & Pallanti, S. (2012). An international survey of reported prescribing practice in the treatment of patients with generalised anxiety disorder. *The World Journal of Biological Psychiatry*, *13*(7), 510-516.

Bandelow, B., & Michaelis, S. (2015). Epidemiology of anxiety disorders in the 21st century. *Dialogues in clinical neuroscience*, *17*(3), 327.

Bissonnette, J. M. (2008). Adherence: a concept analysis. *Journal of Advanced Nursing, 63*(6), 634-643. doi: 10.1111/j.1365-2648.2008.04745.x

Bohlmeijer, E. & Bosch, Z. (2013). Positieve relaties. In *Handboek positieve psychologie* (pp. 229-242). Amsterdam: Boom.

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.

Chakhssi, F., Kraiss, J. T., Sommers-Spijkerman, M., & Bohlmeijer, E. T. (2018). The effect of positive psychology interventions on well-being and distress in clinical samples with psychiatric or somatic disorders: A systematic review and meta-analysis. *BMC psychiatry*, *18*(1), 211.

Chamberlain, K. (1988). On the Structure of Subjective Well-being. *Social Indicators Research, 20*, 581-604.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Routledge.

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.

Curry, O. S., Rowland, L. A., Van Lissa, C. J., Zlotowitz, S., McAlaney, J., & Whitehouse, H. (2018). Happy to help? A systematic review and meta-analysis of the effects of performing acts of

kindness on the well-being of the actor. *Journal of Experimental Social Psychology*, *76*, 320-329.

Dadds, M. R., Spence, S. H., Holland, D. E., Barrett, P. M., & Laurens, K. R. (1997). Prevention and early intervention for anxiety disorders: a controlled trial. *Journal of Consulting and Clinical Psychology*, *65*(4), 627.

DiBartolo, P. M., & Shaffer, C. (2002). A comparison of female college athletes and nonathletes: Eating disorder symptomatology and psychological well-being. *Journal of Sport and Exercise Psychology*, *24*(1), 33-41.

Duckworth, L. A., Steen, T. A., & Seligman, M. E. (2005). Positive psychology in clinical practice. *Annual Review of Clinical Psychogy.*, *1*, 629-651.

Fava, G. A., Rafanelli, C., Cazzaro, M., Conti, S., & Grandi, S. (1998). Well-being therapy. A novel psychotherapeutic approach for residual symptoms of affective disorders. *Psychological medicine*, *28*(2), 475-480.

Fens, H. (2013). *"In je kracht blijven", een onderzoek naar de effecten van de welbevinden therapie als groepstraining bij mensen met angst-of stemmingsklachten in remissie* (Master's thesis, University of Twente).

Fisak, B. J., Jr., Richard, D., & Mann, A. (2011). The prevention of child and adolescent anxiety: A meta-analytic review. *Prevention Science, 12(3),* 255-268.

Fredrickson, B. L. (2013). Positive Emotions Broaden and Build. *Advances in Experimental Social Psychology*, 47, 1-53. doi:10.1016/b978-0-12-407236-7.00001-2

Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological science*, *13*(2), 172-175.

Gable, S. L., & Haidt, J. (2005). What (and why) is positive psychology?. *Review of general psychology*, *9*(2), 103-110.

Garland, E. L., Fredrickson, B., Kring, A. M., Johnson, D. P., Meyer, P. S., & Penn, D. L. (2010). Upward spirals of positive emotions counter downward spirals of negativity: Insights from the broaden-and-build theory and affective neuroscience on the treatment of emotion dysfunctions and deficits in psychopathology. *Clinical psychology review*, *30*(7), 849-864.

George, D. & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston: Allyn & Bacon.

Grant, F., Guille, C., & Sen, S. (2013). Well-being and the risk of depression under stress. *PLoS one*, *8*(7), 114-129.

Grenier, S., Préville, M., Boyer, R., O'Connor, K., Béland, S. G., Potvin, O., & Brassard, J. (2011). The impact of DSM-IV symptom and clinical significance criteria on the prevalence estimates of subthreshold and threshold anxiety in the older adult population. *The American Journal of Geriatric Psychiatry*, *19*(4), 316-326.

Gupta, S. K. (2011). Intention-to-treat concept: a review. *Perspectives in clinical research*, *2*(3), 109.

Jeste, D. V., Palmer, B. W., Rettew, D. C., & Boardman, S. (2015). Positive psychiatry: its time has come. *The Journal of clinical psychiatry*, *76*(6), 675.

Kearney, C. (2006). *Social anxiety and social phobia in youth: Characteristics, assessment, and psychological treatment*. Springer Science & Business Media.

Kerr, S. L., O'Donovan, A., & Pepping, C. A. (2015). Can gratitude and kindness interventions enhance well-being in a clinical sample?. *Journal of Happiness Studies*, *16*(1), 17-36.

Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of health and social behaviour, 43(2)*, 207-222.

Keyes, C.L.M. (2006). Mental health in adolescence: Is America's youth flourishing? *American Journal of Orthopsychiatry, 76 (3)*, 395–402.

Keyes, C. L.M., Dhingra, S. S., & Simoes, E. J. (2010). Change in level of positive mental health as a predictor of future risk of mental illness. *American journal of public health*, *100*(12), 2366-2371.

Kraemer, H. C., Wilson, G. T., Fairburn, C. G., & Agras, W. S. (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of general psychiatry*, *59*(10), 877-883.

Kumcagiz, H., & Gündüz, Y. (2016). Relationship between Psychological Well-Being and Smartphone Addiction of University Students. *International Journal of Higher Education*, *5*(4), 144-156.

Kurtz, J. L., & Lyubomirsky, S. (2008). Towards a durable happiness. *The positive psychology perspective series*, *4*, 21-36.

Lamers, S.M.A., Westerhof, G.J., Bohlmeijer, E.T., ten Klooster, P.M., & Keyes, C.L.M. (2011). Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHCSF). *Journal of Clinical Psychology, 67(1)*, 99-110.

Lyubomirsky, S. & Layous, K. (2013). How do simple positive activities increase well-being? *Current Directions in Psychological Science, 22(1),* 57–62

Lyubomirsky, S., Sheldon, K. & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology, 9(2),* 111-131. doi: 10.1037/1089-2680.9.2.111

McNulty, J. K., & Fincham, F. D. (2012). Beyond positive psychology? Toward a contextual view of psychological processes and well-being. *American Psychologist, 67*, 101–110. doi:10.1037/a0024572.

MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediated effects in prevention studies. *Evaluation review*, *17*(2), 144-158.

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 behaviour improves well-being in two cultures over six weeks. *The Journal of Positive Psychology, 10,* 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.

Norton, P. J., & Price, E. C. (2007). A meta-analytic review of adult cognitive-behavioral treatment outcome across the anxiety disorders. *The Journal of nervous and mental disease*, *195*(6), 521-531.

Osterberg, L., & Blaschke, T. (2005). Adherence to medication. *New England journal of medicine*, *353*(5), 487-497.

Powell, J., Hamborg, T., Stallard, N., Burls, A., McSorley, J., Bennett, K., ... & Christensen, H. (2013). Effectiveness of a web-based cognitive-behavioral tool to improve mental well-being in the general population: randomized controlled trial. *Journal of medical Internet research*, *15*(1).

Rabiee, F. (2004). Focus-group interview and data analysis. *Proceedings of the nutrition society*, *63*(4), 655-660.

Regier, D. A., Narrow, W. E., Rae, D. S., Manderscheid, R. W., Locke, B. Z., & Goodwin, F. K. (1993). The de facto US mental and addictive disorders service system: Epidemiologic Catchment Area prospective 1-year prevalence rates of disorders and services. *Archives of general psychiatry*, *50*(2), 85-94.

Resnick, B. (2018). The relationship between resilience and motivation. In *Resilience in Aging* (pp. 221-244). Springer, Cham.

Safren, S. A., Duran, P., Yovel, I., Perlman, C. A., & Sprich, S. (2007). Medication adherence in psychopharmacologically treated adults with ADHD. *Journal of attention disorders*, *10*(3), 257-260.

Schotanus-Dijkstra, M., Ten Have, M., Lamers, S. M., de Graaf, R., & Bohlmeijer, E. T. (2016). The longitudinal relationship between flourishing mental health and incident mood, anxiety and substance use disorders. *The European Journal of Public Health*, *27*(3), 563-568.

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

Schotanus-Dijkstra, M., Pieterse, M. E., Drossaert, C. H., Walburg, J. A., & Bohlmeijer, E. T. (2017) b Possible mechanisms in a multicomponent email guided positive psychology intervention to improve mental well-being, anxiety and depression: A multiple mediation model. *The Journal of Positive Psychology*, *14*(2), 141-155.

Seligman, M. E. (2002). Positive psychology, positive prevention, and positive therapy. *Handbook of positive psychology* (pp. 3-12). New York: Oxford University Press.

Seligman, M. E., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: empirical validation of interventions. *American psychologist*, *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.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine*, *166*(10), 1092-1097.

Sommers-Spijkerman, M., Trompetter, H., Schreurs, K., & Bohlmeijer, E. (2018). Pathways to improving mental health in compassion-focused therapy: Self-reassurance, self-criticism and affect as mediators of change. *Frontiers in psychology*, *9*, 2442.

Taylor, C. T., Lyubomirsky, S., & Stein, M. B. (2017). Upregulating the positive affect system in anxiety and depression: Outcomes of a positive activity intervention. *Depression and anxiety*, *34*(3), 267-280.

Teubert, D., & Pinquart, M. (2011). A meta-analytic review on the prevention of symptoms of anxiety in children and adolescents. *Journal of Anxiety Disorders*, 25(8), 1046-1059.

Trew, J. L., & Alden, L. E. (2015). Kindness reduces avoidance goals in socially anxious individuals. *Motivation and emotion*, *39*(6), 892-907.

Westerhof, G. J., & Keyes, C. L. (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of adult development*, *17*(2), 110-119.

World Health Organization. (2004). *Promoting mental health: Concepts, emerging evidence, practice: Summary report.*

Wood, A. M., & Joseph, S. (2010). The absence of positive psychological (eudemonic) well-being as a risk factor for depression: A ten-year cohort study. *Journal of affective disorders*, *122*(3), 213-217.

World Health Organization. (2003). *Adherence to long-term therapies: evidence for action.*

Zhou, X., Zhu, H., Zhang, B., & Cai, T. (2013). Perceived social support as moderator of perfectionism, depression, and anxiety in college students. *Social Behavior and Personality: an international journal*, *41*(7), 1141-1152.