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Examining the effects of a six-week gratitude intervention on emotional, social, and psychological well-being – A randomized controlled trial

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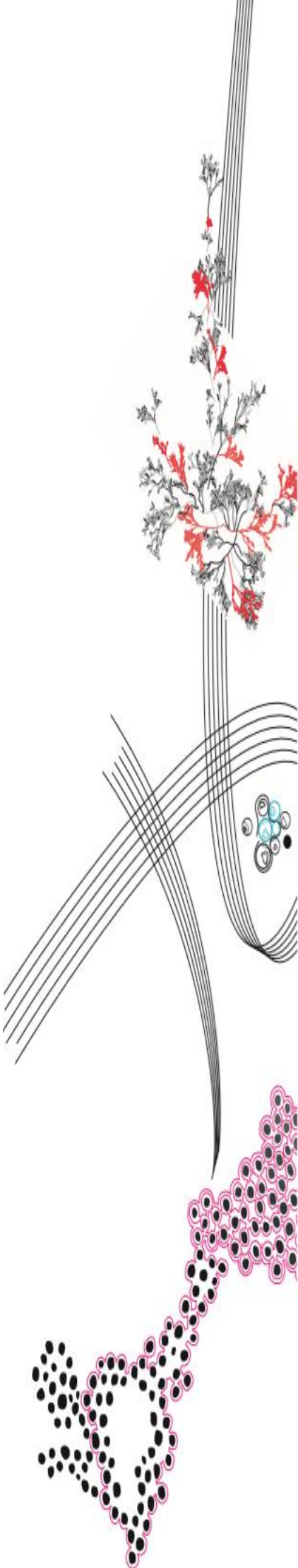
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Abstract

Background: Gratitude-based interventions are proven to improve states of well-being. Despite evidence of the individual and societal benefits of high states in well-being, the effect of gratitude interventions is not investigated in general public samples thus far. This study examined the effectiveness of a six-week gratitude intervention on emotional, psychological, and social well-being. As the mechanisms whereby gratitude relates to well-being are relatively unexplored, prosocial behavior was investigated as possible mediator.

Methods: 118 participants of the Dutch general public were randomly assigned to a gratitude condition ($n = 51$), and a wait-list control condition ($n = 67$). Emotional, psychological, and social well-being were measured with the Mental Health Continuum-Short Form and prosocial behavior with the Theories of Self-Relative-to-Other questionnaire. Questionnaires were obtained at baseline, post-intervention, and at six-week follow-up. The Client-Satisfaction questionnaire was used to determine the satisfaction with the intervention within the gratitude condition.

Results: Repeated measures analyses indicated significant improvements of the gratitude condition in emotional, psychological, and social well-being from baseline to post-intervention, with medium to large effects and significant improvements in psychological and social well-being from baseline to follow-up, with small to medium effects, compared to the waitlist control condition. Improvements in emotional, psychological, and social well-being maintained within the gratitude condition between post-intervention and follow-up. The intervention was rated positive. No mediating effects of prosocial behavior were identified.

Conclusion: Gratitude-based positive psychological interventions are found to be a suitable way to improve emotional, psychological, and social well-being in non-clinical samples. The findings can be generalized for higher educated women, as the sample mainly consisted of participants with these demographic characteristics. Future research should pay attention to that in order to get more generalizable results. Mechanisms responsible for the found effects should be further investigated in order to improve the effectiveness of these interventions.

Keywords: Randomized controlled trial, well-being, gratitude, prosocial behavior, intervention

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Introduction

The World Health Organization (WHO) defines mental health as “a state of well-being in which the individual realizes his or her own abilities, is able to cope with normal stresses of life, works productively, and can make a contribution to his or her community” (WHO, 2004, p. 10). According to the given definition, mental health is no longer purely regarded as the absence of mental illnesses, but rather as the presence of well-being (Keyes, 2007; Keyes & Simoes, 2012). Keyes (2002, 2007) defines well-being on three dimensions: *emotional*, *psychological*, and *social well-being*. Emotional well-being is about the presence of positive affect and satisfaction in life. Psychological well-being is about the perception of one’s personal functioning in life, concerning personal growth, self-acceptance, and having positive relationships. Social well-being further describes one’s perception of functioning well in society. This includes accepting society and having feelings of belonging and giving contribution to it.

Well-being is regarded as an important quality of life which positively influences various aspects of daily functioning (Kansky & Diener, 2017). As such, high levels in all three dimensions are associated with fewer mental and physical health complaints (Keyes, 2002, 2004; Keyes & Simoes, 2012). Individuals with high states in well-being, for example, are more likely to maintain a healthy lifestyle, like diet and exercise, and are more resistant against mental distress (Kansky & Diener, 2017). Accordingly, well-being is negatively correlated to mental illnesses (e.g. depression) (Keyes, 2002), and is regarded as preventive factor for a variety of mental disorders (Seligman, 2002). High levels of well-being at the workplace are associated with fewer sick days, more productivity, and more collaboration between employees, which benefits the overall company revenue (Kansky & Diener, 2017). Thus, besides benefitting domains of healthcare, high states of well-being also benefit workplace organization and economics (see Kansky & Diener, 2017).

The domain of positive psychology develops evidence-based interventions in order to strengthen positive aspects of life, including satisfaction, happiness, and well-being (Slade, 2010). Due to the range of individual and societal benefits, promoting well-being became the main focus of positive psychological research (see Seligman, 2002; Slade, 2010; Wood, Froh, & Geraghty, 2010).

In order to foster well-being, gratitude is seen as a resource (Renshaw & Rock, 2018). Although a large body of literature (McCullough, Emmons, & Tsang, 2002; Renshaw &

Rock, 2018; Drazwowski, Kacmarek, & Kashdan, 2017; Wood, Froh, & Geraghty, 2010) has examined gratitude, it seems difficult to conceptualize it (Renshaw & Rock, 2018). McCullough, Emmons, and Tsang (2002) describe gratitude as an affective trait, which lowers the threshold for recognizing and responding to the benevolence of others and creates discrete emotional experiences. According to that, Fredrickson (2004) states gratitude to be a positive emotion, like joy, interest, or love. Peterson and Seligman (2004) argue that “what marks gratitude is the psychological response to a gift, whatever its nature, and the experience, however briefly, of the transcendent emotions of grace – the sense that we have benefited from the actions of another.” (p. 524). However, according to Wood, Froh, and Geraghty (2010) gratitude does not only concern appreciating beneficial actions of others but also appreciating other aspects of life (see also Emmons & McCullough, 2003). For the aim of this study, gratitude is described as response to obtain a personal benefit, regardless of its source (Furlong, You, Renshaw, O’Malley, & Rebelez, 2013).

There is given evidence that gratitude is positively related to all three dimensions of well-being (Watkins, Woodward, Stone, & Kolts, 2003; Emmons & McCullough, 2003; Wood, Joseph, & Maltby, 2009; Ryff, 1989; Ryff & Keyes, 1995). With regard to emotional well-being, feeling gratitude is stated to elicit positive emotions (Diener, 1984; Wood, Froh, & Geraghty, 2010). As such, feeling and expressing gratitude more frequently results in more life satisfaction (see Wood, Froh, & Geraghty, 2010). Gratitude can further increase the likelihood of optimal psychological functioning, by enabling individuals to cope better with stressors in life (Emmons & McCullough, 2003; Fredrickson, 2004; Wood, Joseph, & Linley, 2007). With regard to social well-being, gratitude is stated to link individuals to society (Fredrickson, 2004). Perceiving oneself as the beneficiary of the generosity of others leads to feelings of being affirmed and valued (McCullough, Emmons, & Tsang, 2002), and to strengthened social bonds (Emmons & McCullough, 2003).

A large body of literature investigated the effects of gratitude-based positive psychological interventions (PPIs) on each dimension of well-being. In a review, Wood, Froh and Geraghty (2010) distinguish three types of common PPIs, concerning the expression of gratitude: *Gratitude lists*, *grateful contemplation*, and the *behavioral expression of gratitude*. The gratitude list involves making written lists of things for which one feels grateful. This usually happens in form of a diary, where participants, for example, write down for what they were thankful for during the day. Grateful contemplation is, compared to the grateful listing exercise, less specific and asks participants to think or write about for what or whom they are

grateful in a more general way. The behavioral expression of gratitude focuses on gratitude towards a certain benefactor, for example by writing a letter thanking a person for the gift or benefit which is received (see Wood, Froh & Geraghty, 2010).

Taking these PPIs into account, there is evidence that gratitude can be trained as to improve aspects of well-being. Previous intervention studies with student and community samples found beneficial effects of gratitude exercises on emotional well-being, for example enhanced positive affect and optimism regarding the future (Emmons & McCullough, 2003), improvements in mood, and more satisfaction in life (Watkins et al., 2003; Emmons & McCullough, 2003; Wood, Froh, & Geraghty, 2010). There is less literature about the effects of gratitude exercises on psychological and social well-being, but previous studies indicated that being grateful is positively associated to a range of psychological well-being variables, including personal growth, self-acceptance, positive relations, and the feeling of having a purpose in life (Fredrickson, 2004; Wood, Joseph, & Maltby, 2009). Regarding social well-being, gratitude interventions were found to improve relationship satisfaction (O'Connell, O'Shea, & Gallagher, 2016) and to lead to a strengthened feeling of connectedness to others (Emmons & McCullough, 2003). Taking this into account, practicing gratitude might improve all three dimensions of well-being. Furthermore, given the strong association between gratitude and well-being, a further step would be to examine the mechanisms responsible for why gratitude promotes well-being (Emmons & Mishra, 2011).

One possible mechanism relates to prosocial behavior. Gratitude makes people want to recognize and repay the actions of others (Algoe & Haidt, 2009). Furthermore, instead of simply repaying the benefactor, beneficiaries report motivation to act in others ways which promote relationships, such as spending time with the other (see Algoe & Haidt, 2009; Algoe, 2012). To find an answer on why beneficiaries have this motivation, Fredrickson's (1998, 2000, 2004) *Broaden and Build theory* might give an explanation. According to this theory, gratitude broadens the thought-action repertoire. As such, the motivation of repaying the benefactor does not follow a tit-for-tat fashion by only reciprocating the exact beneficial action. Gratitude broadens individuals' way of thinking by considering a variety of actions that might either benefit the benefactor, others, or both, as reflection of their gratitude (Fredrickson, 2004). Because of that, gratitude is seen as motivator for prosocial behavior (McCullough, Kilpatrick, Emmons, & Larson, 2001; Fredrickson, 2004). Peterson and Stewart (1996) for example found, that being mentored in early adulthood was positively associated with giving contribution to the welfare of others in midlife, assuming gratitude to

be the urge (see also Fredrickson, 2004). McCullough and Emmons (2003) further found, that participants following a gratitude intervention reported having helped someone with a personal problem or provided emotional support, indicating a prosocial motivation due to the gratitude induction. This is in line with Bartlett and DeSteno (2006) who found that following a gratitude intervention improves prosocial behavior. According to the Broaden and build theory, prosocial acts which are motivated by gratitude, help to build up personal resources (Fredrickson, 2004). According to this, prosocial behavior builds up and strengthens social relationships, which become the locus of consequential social support in times of need. Taking this into account, prosocial behavior is proven to promote emotional, psychological, and social well-being (Nelson, Layous, Cole, & Lyumbomirsky, 2016)

Despite evidence that gratitude might benefit emotional, psychological, and social well-being, previous research on the effectiveness of gratitude interventions shows a number of limitations, like small sample sizes (O’Connell, O’Shea, & Gallagher, 2016, 2017), or specific samples (e.g. psychotherapy clients or students only) (Renshaw & Rock, 2018; Wong et al., 2018). This leads to limited generalizability of the findings. Thus far, the effect of gratitude-based PPIs has not been investigated in general public samples. However, the improvements in well-being due to gratitude exercises underline the relevance of an investigation in these samples. Regarding the benefits of high states of well-being for both, the individual and society (Seligman, 2002; Slade, 2010; Wood, Froh, & Geraghty, 2010), more insight in how gratitude interventions promote well-being could be used for prevention of mental illnesses, and the promotion of mental health (Bolier et al., 2013). Furthermore, another limitation of prior studies is that the underlying working mechanisms between gratitude and well-being are largely unknown (see O’Connell, O’Shea, & Gallagher, 2017).

Current study

A randomized controlled trial was conducted to investigate the effectiveness of a six-week gratitude intervention on emotional, psychological, and social well-being in the general Dutch population. This investigation is the first in examining emotional, psychological, and social well-being in one study. Furthermore, this investigation overcomes limitations of previous research by using a general population sample. As such, findings were more generalizable. Because literature over the underlying mechanisms in the effect of gratitude on well-being is extremely limited, prosocial behavior was tested as mediating variable for each dimension of well-being. Based on the theoretical evidence reviewed, the following hypotheses were generated:

- H1:** The six-week gratitude intervention leads to improvements in emotional, psychological, and social well-being, and prosocial behavior, compared to the wait-list control condition, (a) at post-intervention and (b) at six-week follow-up.
- H2:** The effect of the six-week gratitude intervention on emotional, psychological, and social well-being is mediated by changes in prosocial behavior from baseline to post-intervention.

Methods

Design

The present study was a randomized controlled trial (RCT). It was part of a large-scale investigation, examining the effects of different PPIs within the Netherlands, including 5 different conditions: two ‘Acts of Kindness’ (with and without reflection) conditions, a ‘Gratitude’ condition, and two control conditions (active and wait-list control). For the aim of this study, the gratitude and the wait-list control condition were used. The questionnaires were obtained at baseline (T0), at the end of the intervention six weeks later (T1), and at six-week follow-up, thus three months after baseline (T2).

Participants and Procedure

Participants were recruited in the general Dutch public, through advertisements in national newspapers (Volkskrant, Telegraaf, Metro), and an online newsletter of ‘Psychologie Magazine’. Interested people were referred to a website, where they received further information about the study and the registration procedure. After downloading and filling out the contact form, as well as an informed consent, they received a screening questionnaire (age, gender, educational level, CES-D, GAD-7) testing them for eligibility. Participants had to be at least 18 years old, with sufficient Dutch language proficiency. Because both the instructions and questionnaires were received online, a good internet connection and an email address were required. Participants further had to be willing to do a gratitude exercise each day during the six-week intervention. To become excluded from the study, participants had to show indications for serious symptoms of depression or anxiety. As such, participants who obtained a score of 24 or higher on the *Center for Epidemiological Studies Depression Scale*

(CES-D) or a score of 15 or higher on the *Generalized Anxiety Disorder 7* (GAD-7) were excluded. Those who were excluded based on anxiety or depression were advised to seek help from the general practitioner. The criteria for exclusion were not given to the participants, to prevent possible influenced scores at the screening assessment.

The flow of participants is illustrated in Figure 1. When participants were eligible to participate, they received an email with the T0-questionnaire. After a sufficient number of T0 questionnaires were obtained, the participants were randomly assigned (allocation ratio 1:1) to one of the five conditions. Randomization was stratified by gender and level of education (low, medium, high). In total, 653 registrations were received. After exclusion 423 participants remained. They were allocated to either one of the intervention- or one of the control conditions. In total, $n = 85$ participants were assigned to the gratitude and $n = 84$ were assigned to the wait-list control condition.

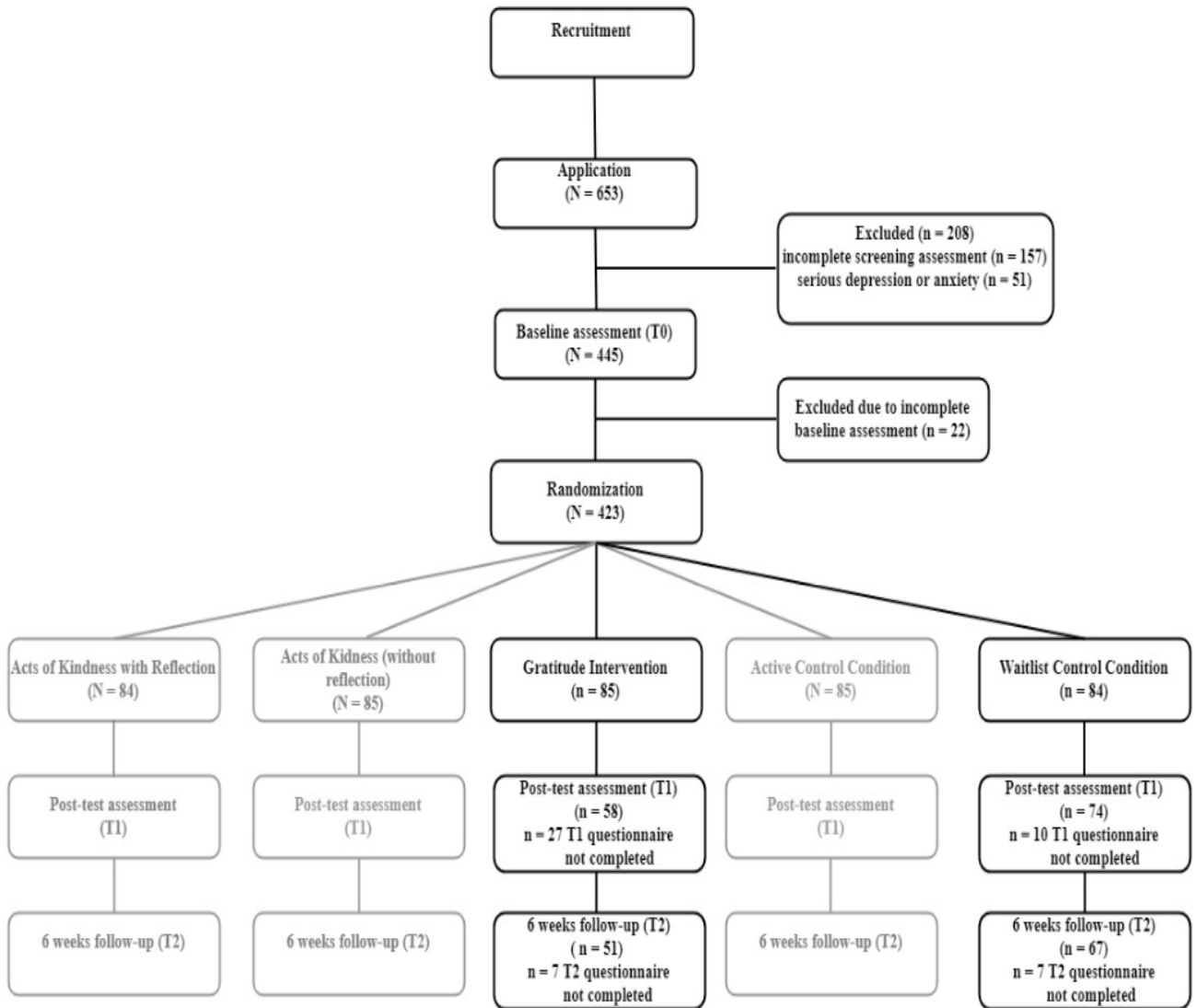


Figure 1. Flow chart of participants.

Gratitude intervention

The aim of the intervention was to promote emotional, psychological, and social well-being by providing a variety of gratitude-based exercises over the course of six weeks. Each Sunday, participants received another exercise they had to perform at least five days of the upcoming week. The exercises were based on the three common types of gratitude interventions, as discussed previously: *Gratitude lists*, *grateful contemplation*, and the *behavioral expression of gratitude* (Wood, Froh & Geraghty, 2010). Participants were allowed to decide for themselves when and where they wanted to practice the exercises. The estimated time invested by the participants for doing the exercises was around 45-60 minutes per week, thus, 270-360 minutes in total in the course of the 6 weeks intervention. The weekly exercises are summarized in Table 1.

Table 1. *Description of the weekly gratitude exercises*

Week	Exercise
1	List up at least three good things which happened each, or at least five days of the week.
2	Write about an aspect of your daily life each day, while imagining that it would not be present any more.
3	Think about people who did something nice for you in the last weeks or months and write them a letter in which you express your gratitude.
4	Write 15 to 30 minutes each evening about people and aspects of your life for which you feel grateful.
5	Write about difficult events in your life at least five days of the week and reflect on them, in consideration of the attached questions and the gained knowledge of the previous weeks.
6	Remind yourself of your life out of gratefulness. Think about it at least 5 minutes each morning, with the aid of the attached questions. Think about aspects of your day you value and which cannot be taken for granted.

Wait-list Control condition

Participants in the wait-list control condition were told that at first, an impression of their states in well-being is gathered. They obtained the questionnaires at all assessment moments and received the possibility to start with one of the offered PPIs one month after the follow-up (T2). In this way, it was possible to determine whether possible effects in well-being could be attributed to the intervention.

Outcome measures

Mental well-being was measured with the *Mental Health Continuum-Short Form* (MHC-SF; 14 items). It contains subscales for each aspect of mental well-being used for this study, including 3 items about emotional, 6 items about psychological, and 5 items about social well-being (Lamers, Westerhof, Bohlmeijer, Ten Klooster, & Keyes, 2011). Participants had to report the frequency of every feeling in the past 4 weeks on a six-point Likert scale, ranging from '0' ('never') to '5' ('(nearly) always'). Higher scores indicate higher levels of well-being. In the study of Lamers et al. (2011) the questionnaire showed sufficient internal reliability, as well as good convergent and discriminant validity. Cronbach's alpha in the current study showed sufficient internal reliability for emotional ($\alpha = 0.85$), psychological ($\alpha = 0.85$) and social well-being ($\alpha = 0.76$).

To measure prosocial behavior, the *Theories of Self-Relative-to-Other Behavior* questionnaire (TSROB; Gerbasi & Prentice, 2013) was used. For the aim of this study, it was translated in Dutch. The questionnaire consists of 12 items formulated as statements, which

measure the endorsement of different relationships between self- and other- interest. For the aim of this study, only the subscale for prosocial behavior (3 items) was used. Participants had to give answer on how much they agree with the certain statement on a seven-point Likert scale, ranging from '1' ('totally disagree') to 7 ('totally agree'). Higher scores were associated with higher amounts of prosocial behavior. Because Cronbach's alpha on the subscale for prosocial behavior was low ($\alpha = 0.36$), the inter-item correlation was examined (Briggs & Cheek, 1986). Items with a low correlation ($r < 0.2$) were excluded in order to enhance the reliability of the scale (Briggs & Cheek, 1986; Field, 2013). The investigation of the prosocial subscale revealed that the first item correlated low ($r = 0.15$) with item two and negatively ($r = - 0.7$) with item 3. Item two and three showed a suitable correlation ($r = 0.44$). Consequentially, the first item was excluded from the analysis, which resulted in a Cronbach's alpha of $\alpha = 0.61$ for the remaining items.

Participants in the gratitude condition further received the *Client Satisfaction Questionnaire – 8* (CSQ-8; 8 items) (Larsen, Attkisson, Hargreaves, & Nguyen, 1979). The scale was used additionally at post-intervention assessment (T1) to get a picture of the general satisfaction of participants with the intervention. Participants gave answer on each item by using a four-point Likert scale, whereby the lowest degree of satisfaction was indicated by '1' and the highest by '4' (Attkisson & Zwick, 1982). The sum score indicated the degree of satisfaction. Higher scores were associated with being more satisfied with the intervention. The current study found a Cronbach's alpha of $\alpha = 0.94$, which was congruent with the findings of Larsen et al. (1979). For this investigation, two additional items were administered, asking participants for the average amount of time they spent in exercising per week and for giving the intervention an overall grade on a scale from '1' to '10', whereby '10' was the best possible grade.

Data analysis

Analyses were conducted using the statistical program *IBM SPSS Statistics 22* (IBM, 2015). The significance level was set at $p < 0.05$ for all statistical analyses. Listwise deletion was regarded as suitable approach to handle missing data, as an analysis of missing values revealed that the data was missing completely at random ($\chi^2(23) = 18.64, p = 0.72$) (Kang, 2013). First, baseline characteristics of both conditions were analyzed. In order to test whether the randomization of participants led to two comparable groups, independent samples t-test was conducted for the continuous variable of age, and Chi-Square tests for all other demographic variables. Independent samples t-test were further applied to determine possible

baseline differences of the outcome measures. Mean scores of the gratitude condition were compared to those of the wait-list control condition. Insignificant results on both, Chi-Square and independent samples t-tests indicated a successful randomization. Additionally, Chi-Square tests and independent sample t-tests were conducted to compare the baseline characteristics of completers and dropouts, in order to determine whether participants who completed all assessments significantly differed from the non-completers. Insignificant results indicated no differences. Internal reliability of the outcome measures was computed at T0 using Cronbach's alpha coefficient. Because values of Cronbach's alpha below 0.7 could be expected when dealing with psychological constructs (Field, 2013), the cut-off point for reliability was set at $\alpha = .60$.

Participants' satisfaction with the intervention was measured with the CSQ-8 and its two additional items. To get an impression of how satisfied the participants were with following the intervention both, the mean of the original eight-item scale, and the descriptives of the additional items were analyzed. Due to the scale range of four, a score of $M > 2.50$ was interpreted as positive.

Effects of the intervention on emotional well-being, psychological well-being, social well-being, and prosocial behavior were examined using *GLM repeated measures* (mixed ANOVA). To determine the main effects of the intervention, a 3 (time) \times 2 (group) design was used, analyzing the mean scores of the outcome measures (T0, T1, and T2) as within-subject variable, and the conditions (gratitude and wait-list control) as between-subject variable. Within-subject contrasts were analyzed to determine the effects from T0 to T1 per outcome measure. In order to test whether the intervention significantly improved the outcome measures at T2, a 2 (time) \times 2 (group) model was used. Thereby, mean scores of the outcome measures (T0 and T2) were set as within-subject variable and the conditions as between-subject variable. Effects on the outcome measures from T0 to T2 were determined by using within-subject contrasts. To determine whether improvements in the outcome measures maintained between T1 and T2, paired sample t-tests were conducted for the mean scores of the gratitude condition. Effect sizes were measured with partial eta squared (η_p^2) and set at $\eta_p^2 > .01$, $\eta_p^2 > .06$, and $\eta_p^2 > .14$ for small, medium, and large effects, respectively (Cohen, 1988; Bakerman, 2005).

To test whether prosocial behavior mediated the effect of gratitude intervention on well-being, simple mediation analysis was conducted using the *PROCESS* macro for SPSS (model 4) (Hayes, 2012). Because this study was interested in the value of change in prosocial

behavior due to the intervention, the difference score from T0 to T1 was implemented as mediating variable for analyses. Figure 2 illustrates the path model as analyzed with mediation analysis. The independent variable X is the intervention condition, the mediating variable M is the change in prosocial behavior between baseline and post-intervention, and the dependent variable Y is emotional, psychological, or social well-being at post-intervention assessment (T1). Simple mediation analyses were conducted for each dependent variable separately. The total effect of the intervention on emotional, psychological, and social well-being is described by the c-path. The a-path is described as the effect of the intervention on prosocial behavior and the b-path as the effect of prosocial behavior on emotional, psychological, and social well-being, respectively. The direct effect of the intervention is described by the c'-path. The mediation effect of prosocial behavior is described as indirect effect of the intervention on well-being, and is computed by combining the a- and b-paths of a certain model ($a*b$) (Hayes, 2012). Because the total effect (c-path) is computed as the sum of c' and the combined effect of a and b ($a*b$), the direct effect (c') should decrease in cases of significant indirect effects of prosocial behavior (Hayes, 2012). Analyses were conducted using bootstrap significance tests with a bias-corrected and accelerated (BCa) 95% confidence interval (CI) and with a resample procedure of 5000 bootstrap samples (O'Connell, O'Shea & Gallagher, 2017). Mediation was only significant if any confidence interval for the indirect effect did not include zero (Hayes, 2012).

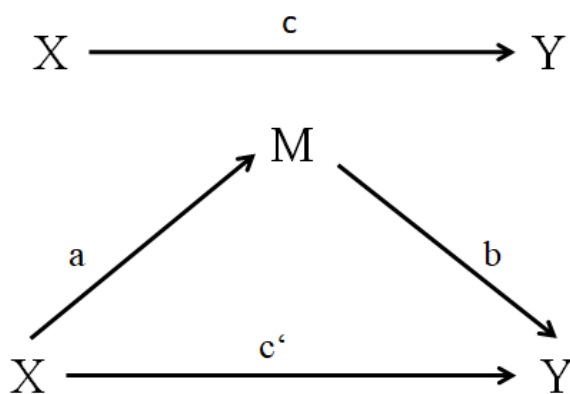


Figure 2. Simple mediation model as described by Hayes (2012), considering T0-T1 changes in prosocial behavior (M) as mediator of the effect of the intervention (X) on emotional, psychological and social well-being (T1) respectively.

Results

Study population, randomization, and dropout

Baseline characteristics of the study population ($N = 169$) were summarized in Table 2. The majority of the sample population consisted of higher educated ($n = 132$, 78.1%) females (152, 89.9%), having a Dutch nationality ($n = 162$, 95.8%). The mean age of participants was 48.67 years ($SD = 9.42$, range: 23-64). Chi-Square analyses and independent samples t-test revealed that the gratitude condition and the wait-list control condition did not significantly differ with regard to the demographic variables ($p > 0.28$), indicating a successful randomization. With regard to the outcome measures independent sample t-test found a significant difference between the conditions in psychological well-being ($t(167) = -2.10$, $p < 0.05$), indicating a higher mean score in the wait-list control condition for this dimension at T0, compared to the gratitude condition. Regarding the dropouts, 51 participants of the gratitude condition (60%) and 67 participants of the wait-list control condition (79.8%) completed all assessments. As such, 34 participants of the gratitude intervention (40.0%) and 17 participants of the wait-list control condition (20.2%) were excluded for further analyses. Considering the differences between completers and dropouts, Chi-Square analyses revealed no significant differences between the two groups ($p \geq 0.10$). Independent samples t-tests further found no significant differences between completers and dropouts with regard to the outcome measures ($p \geq 0.08$). However, there was significant difference in age ($t(167) = 3.61$, $p < 0.001$). With a mean age of 44.80 ($SD = 10.45$) the non-completers were 5.54 years younger than the completers of the study ($M = 50.34$, $SD = 8.45$).

Table 2. Baseline characteristics of the intervention condition, wait-list control condition, and the total sample.

	GI (n = 85)	WCL (n = 84)	Total (n = 169)
Age, years			
Mean (SD)	47.68 (9.45)	49.76 (9.34)	48.67 (9.42)
Range	23-64	23-64	23-64
Gender, n (%)			
Male	8 (9.4)	9 (10.7)	17 (10.1)
Female	77 (90.6)	75 (89.3)	152 (89.9)
Education, n (%)			
Low	2 (2.4)	4 (4.8)	6 (3.6)
Intermediate	17 (20.0)	14 (16.7)	31 (18.3)
High	66 (77.6)	66 (78.6)	132 (78.1)
Nationality, n (%)			
Dutch	81 (95.3)	81 (96.4)	162 (95.8)
Others	4 (4.7)	3 (3.6)	7 (4.2)
Profession, n (%)			
Paid work	58 (68.2)	62 (73.8)	120 (71.0)
Unpaid work, unemployed, incapable to work	27 (31.8)	22 (26.2)	49 (29.0)
Marital status, n (%)			
Married or registered partnership	46 (54.1)	46 (54.8)	92 (54.4)
Not married, divorced, widowed	39 (45.9)	38 (45.2)	77 (45.6)
Living situation, n (%)			
Alone	14 (16.5)	21 (25.0)	35 (20.7)
Not alone (e.g. with partner, children or family)	71 (83.5)	63 (75.0)	134 (79.3)
Emotional well-being, M (SD)	2.84 (0.85)	2.88 (0.85)	2.86 (0.84)
Psychological well-being, M (SD)	2.62 (0.80)	2.88 (0.76)	2.77 (0.79)
Social well-being, M (SD)	2.47 (0.76)	2.53 (0.72)	2.51 (0.74)
Prosocial behavior, M (SD)	4.96 (0.97)	4.59 (1.32)	4.83 (1.20)

Notes: GI Gratitude intervention condition, WCL Wait-list control condition, SD Standard deviation

Satisfaction with the intervention

Participants in the gratitude condition rated the intervention positive ($M = 2.99$, $SD = 0.62$). 15 participants (29.4%) reported having invested at least one to two hours a week for the exercises. 22 participants (43.1%) invested 30 – 60 minutes per week in practicing, and 14 participants (27.5%) spent less than 30 minutes in exercising. 40 participants (78.4%) gave the intervention a grade of seven or higher. The lowest given grade was four and was given by one participant (2.0%). The mean grade of the intervention was 7.30 ($SD = 1.52$).

Intervention effects

Results of the GLM repeated measures are displayed in Table 3. They indicated that the gratitude condition had stronger increases in emotional, psychological, and social well-being, compared to the wait-list control condition, at T1 and at T2. There was a significant main effect of time \times Group interaction ($F(8, 109) = 4.93, p < 0.001, \eta_p^2 = 0.27$). From T0 to T1, significant Time \times Group interaction effects were found for emotional, psychological, and social well-being ($p < 0.001$), but not for prosocial behavior ($p = 0.55$). Effect sizes for all significant interaction effects were medium to large ($\eta_p^2 = 0.10$ to 0.20). From T0 to T2, significant Time \times Group interactions were found for psychological and social well-being ($p \leq 0.02$) with small to medium effect sizes ($\eta_p^2 = 0.05$ to 0.11). The interaction effect for emotional well-being from T0 to T2 was marginally significant ($p = 0.08$). However, paired-sample t-tests revealed insignificant results for emotional ($t(50) = 1.612, p = 0.11$), psychological ($t(50) = 0.58, p = 0.57$), and social well-being ($t(50) = 1.34, p = 0.19$), indicating that the improvements in these outcome measures within the gratitude condition were maintained between T1 and T2. The insignificant interaction effects on prosocial behavior (T0-T1 and T0-T2) indicated no changes in this outcome at any assessment.

Table 3. GLM repeated measures results with estimated means and effects of the intervention on emotional, social, and psychological well-being, and prosocial behavior (T0, T1, T2) based on within-subject contrasts, including standard deviations, and effect sizes

Outcome	Measurement	GI ($n = 51$)	WLC ($n = 67$)	Time \times Group		
		M (SD)	M (SD)	F	p	η_p^2
Emotional well-being	T0	2.84 (0.85)	2.88 (0.85)			
	T1	3.32 (0.80)	2.95 (0.84)	13.23	< 0.001	0.10
	T2	3.18 (0.73)	2.98 (0.87)	3.04	0.08	0.03
Psychological well-being	T0	2.62 (0.80)	2.88 (0.76)			
	T1	3.25 (0.84)	2.91 (0.76)	29.63	< 0.001	0.20
	T2	3.21 (0.73)	2.96 (0.75)	17.96	<0.001	0.11
Social well-being	T0	2.47 (0.76)	2.53 (0.72)			
	T1	2.99 (0.72)	2.57 (0.71)	23.50	< 0.001	0.17
	T2	2.88 (0.74)	2.67 (0.67)	5.80	0.02	0.05
Prosocial behavior	T0	4.96 (0.97)	4.59 (1.32)			
	T1	5.12 (0.97)	4.85 (1.02)	0.36	0.55	0.003
	T2	5.14 (1.04)	4.64 (1.18)	0.48	0.49	0.004

Notes: GI Gratitude intervention condition, WCL Wait-list control condition, SD Standard deviation, η_p^2 effect size partial eta squared

Mediation analyses

Table 4 represents the results of the mediation analyses. Results revealed significant effects of the intervention on emotional, psychological, and social well-being ($p < 0.01$) (c-path). This effect remained constant in consideration of the mediating variable (c'-path). With regard to that, analysis found no significant a-paths for any outcome measure, indicating that the intervention did not lead to changes in prosocial behavior ($p \geq 0.32$). Furthermore, prosocial behavior did not lead to changes in emotional, psychological, or social well-being, as all b-paths showed to be insignificant, too ($p \geq 0.19$). Mediation effect of prosocial behavior was not found for any outcome measure, as all 95% BCa confidence intervals for indirect effects did include zero (Table 4).

Table 4. Results of simple mediation analyses assessing the indirect effect of the gratitude intervention on emotional, psychological, and social well-being (T0-T1).

Mediator	Outcome	<i>a</i>	<i>b</i>	Total effect <i>c</i>	Direct effect <i>c'</i>	Indirect effect <i>a*b</i> (95% BCa CI)
Prosocial behavior						
	Emotional well-being	-0.16	-0.01	0.33**	0.33**	0.002 (-0.02, 0.03)
	Psychological well-being	-0.18	0.01	0.47***	0.47***	< 0.001 (-0.03, 0.02)
	Social well-being	-0.17	-0.06	0.47***	0.46***	0.01 (-0.01, 0.04)

Notes: *a*, *b*, *c*, *c'* path coefficients as given by unstandardized beta values, BCa CI Bias corrected bootstrap confidence interval for indirect effect, number of resamples is 5,000, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Discussion

The aim of the current study was to investigate the effects of a six-week gratitude intervention on emotional, psychological, and social well-being in a general Dutch population sample, and possible mediating effects of prosocial behavior. In line with hypotheses 1(a) and 1(b), it was found that participants who followed the gratitude intervention significantly improved in emotional, social, and psychological well-being, after six weeks, and further significantly improved in psychological and social well-being after 12 weeks. Although the effect in emotional well-being from T0 to T2 was marginally significant, it was further found that improvements in emotional, psychological, and social well-being maintained within the gratitude condition between post-intervention and follow-up. The intervention did not find any mediating effects of prosocial behavior.

Following the gratitude intervention led to significant improvements in emotional well-being, as compared to the wait-list control condition from baseline to post-intervention. This is in line with O'Connell, O'Shea, and Gallagher (2017) who found that following a gratitude intervention significantly improved life-satisfaction. The aim of the current study was to let participants consciously deal with gratitude. As such, it is possible that during the six weeks of the intervention, participants focused more on their positive emotions (see Diener, 1984; Houben, Van Den Noortgate, & Kuppens, 2015) and positive experiences (Wood, Froh, & Gergahty, 2010), which led to improvements in emotional well-being at post-intervention.

With regard to psychological well-being, the current study found significant improvements from baseline to post-intervention, as compared to the wait-list control condition. Grateful individuals tend to use more positive coping strategies when dealing with problematic situations (Wood, Joseph, & Linley, 2007). According to that, positive reinterpretation is stated to be a strategy which promotes personal growth (see Wood, Froh, & Geraghty, 2010). The current intervention asked participants, among other things, to think about difficulties in their life in consideration of their positive aspects, for example what they learned from these situations, or whether they changed positively due to the experienced difficulties. In this way participants may have accepted and positively reinterpreted the certain events, which led to improvements in their psychological well-being at post-intervention (see Updegraff & Taylor, 2000; Wood, Joseph, & Linley, 2007).

Following the gratitude intervention further significantly improved social well-being from baseline to post-intervention, as compared to the wait-list control condition. This is conform with findings of previous investigations, which found that following a gratitude intervention led to improved relationship satisfaction (O'Connell, O'Shea, & Gallagher, 2016) and connectedness to others (Emmons & McCullough, 2003). Participants of the current intervention were asked to actively think about and express their gratitude towards their benefactors. Feeling and expressing gratitude towards a certain benefactor prompts individuals to find new positive qualities in that person, or reminds them of their known positive qualities (Algoe, Haidt, & Gable, 2008; Algoe, 2012; O'Connell, O'Shea & Gallagher, 2017). This leads to strengthened feelings of closeness and connection between benefactor and beneficiary (O'Connell, O'Shea, & Gallagher, 2017), improves the perception of social support (McCullough, Emmons, & Tsang, 2002), and promotes the quality of social relationships (O'Connell, O'Shea, & Gallagher, 2016). Following the intervention may have

stimulated participants to express their gratitude more often, which led to improvements in social well-being at post-intervention.

With regard to the significant improvements in all dimensions of well-being from baseline to post-intervention, it can further be stated that the intervention significantly improved psychological and social well-being from baseline to follow-up, as compared with the wait-list control condition. The effect on emotional well-being was marginally significant. However, between post-intervention and follow-up, the mean score in emotional well-being within the gratitude condition showed a small decrease, while the wait-list control condition showed a small increase. The approximation of both groups could explain the insignificant interaction effect in emotional well-being from baseline to post-intervention. Nonetheless, paired sample t-tests indicated that the improvements in all dimensions of well-being were maintained between post-intervention and follow-up within the gratitude intervention.

However, effect sizes for emotional, psychological, and social well-being at follow-up were smaller than the effect sizes at post-intervention. This is in line with Wong et al. (2018) who stated that the effects of gratitude-based PPIs gradually accrue over time. It is possible that after the intervention, thus between post-intervention and follow-up, participants no longer actively dealt with gratitude. According to that, participants may have experienced positive emotions less frequently, which led to a decreased effect in emotional well-being at follow-up. With regard to psychological well-being, participants were specifically asked to positively reinterpret difficult events of their life during the intervention, while individuals usually avoid thinking about those events to not get in contact with unpleasant feelings associated with these experiences (Hayes, Wilson Gifford, Follette, & Strohsal, 1996). Participants might be relapsed into these patterns after the intervention, which would explain the decreased effects in psychological well-being at follow-up. By no longer actively dealing with gratitude, participants further might have expressed their gratitude towards their benefactors less frequently after the intervention, which led to a decreased effect in social well-being at follow-up. Taking these explanations into account, it can be stated that, in order to prevent decreased effects at follow-up, gratitude should be practiced beyond the time of the intervention (see Wood, Froh, & Geraghty, 2010).

Against the formulated hypothesis, the current study did not find any mediating effects with regard to prosocial behavior. Neither did the intervention lead to improvements in prosocial behavior, nor did prosocial behavior mediate any effects of the intervention on well-being. However, it is evident that following gratitude-based interventions improves prosocial

behavior (Emmons & McCullough, 2003; Bartlett & DeSteno, 2006). Fredrickson (2004) describes gratitude to be the urge for prosocial behavior. According to her Broaden and Build theory (Fredrickson 1998, 2000, 2004) grateful individuals tend to creatively consider a wide range of prosocial actions as reflection of their gratitude. Moreover, literature found prosocial behavior to improve well-being (Nelson et al., 2016). According to that, why did the current study find no effects with regard to prosocial behavior? A possible reason could be that behaving prosocially towards others is costly to oneself (Bartlett & DeSteno, 2006; DeWall, Lambert, Pond, Kashdan, & Finsham, 2012). Despite evidence that focusing on others improves well-being, Cialdini and Kenrick (1976) argue that there are also many people who prioritize their own needs and feelings as a way to feel good (see also Nelson et al. 2016). As such, prosocial behavior might not have been used by participants to express their gratitude.

However, non-significant findings with regard to prosocial behavior may also be due to the measurement instrument. In order to measure prosocial behavior, the prosocial behavior subscale of the *Theories of Self-Relative-to-Other Behavior* questionnaire (Gerbasí & Prentice, 2013) was used, which consisted of three items. Even if small scales are generally good, too small scales with too few items can limit the use of the findings (Morgado, Meireles, Neves, Amaral & Ferreira, 2017). Due to low inter-item correlation, the subscale for prosocial behavior was shortened to an amount of two items. Although reliability increased with exclusion, it is possible that the two items did not measure the fully construct of prosocial behavior (see Morgado et al., 2017). As such, the two items as used in this study asked participants for their prosocial behavior in general and concerned the benefits of everyone (“I am concerned with overall best interest for everyone.”; “I would be happy to give up a little of something that I wanted if it meant that everyone is better off in the long run.”; Gerbasí & Prentice, 2013), while other intervention studies asked for the daily prosocial experiences of their participants and whether they had helped someone at all (Emmons & McCullough, 2003). In this way, each daily prosocial action could have been reported, without asking for general views on prosocial actions which benefit everyone. Although it is possible that prosocial behavior does not mediate the effects of gratitude on well-being at all, the discussed reasons would at least explain the non-significant results with regard to prosocial behavior.

Strengths & Limitations

The current study was the first in investigating the effects of a brief gratitude intervention on all dimensions of mental well-being. Additionally, it was one of the first in investigating any

working mechanisms underlying these effects (O’Connell, O’Shea, & Gallagher, 2017). A further strength of the study was its RCT design, as it demonstrated the effects of the intervention in comparison with a wait-list control condition (American Psychology Association, 2006).

Despite these strengths, the current study also showed a number of limitations which should be taken into account. First, the wait-list control condition showed higher baseline scores in psychological well-being as compared to the gratitude condition. Thus, there was less space for improvements and the effects as found in psychological well-being could have been overestimated. Secondly, the study was interested in the effects of the gratitude intervention within a general Dutch population sample. The actual sample largely consisted of higher educated females. Accordingly, the findings can only be generalized to these demographic characteristics and not to the general population. Thirdly, all outcome measures were measured at the beginning of and after the intervention and at follow-up. It is indicated that gratitude exercises differ in their efficacy (Seligman, Steen, Park, & Peterson, 2005). Taking this into account, it would be suitable to also implement measurements during the intervention period, to determine the temporary effects of the intervention and to identify more and less effective exercises. Fourth, although the improvements in emotional, psychological, and social well-being were maintained six weeks after the intervention, it is unclear how long the effects will sustain. As such, longer follow-ups would be suitable to determine the sustainability of gratitude-based interventions.

Future research

Following the six-week gratitude intervention significantly improved emotional, psychological, and social well-being. As such, grateful individuals experience more positive emotions and satisfaction in life, experience more personal growth and positive relations, as well as they have a strengthened feeling of closeness to others and society. Regarding these effects of gratitude on well-being, a further step would be to identify the mechanisms whereby gratitude relates to well-being (Wood, Froh, & Geraghty, 2010). Identifying the underlying mechanisms of the effect of gratitude interventions on well-being will help to get a more refined understanding of how emotional, psychological, and social well-being are influenced (Song & Lim, 2015). According to that, the mechanisms responsible for the effectiveness of these interventions on well-being remains extremely limited (O’Connell, O’Shea, & Gallagher, 2017). The current study found no mediating effect of prosocial behavior. However, the insignificant results could be explained by the limitations of the used scale.

Gratitude motivates individuals to behave prosocially in order to reflect their gratitude (Fredrickson, 2004). Furthermore, individuals who act prosocially may feel greater joy, contentment, and love, which improves their well-being (Nelson et al., 2016). Taking this into account, experimental studies found gratitude to improve prosocial behavior (Emmons & McCullough, 2003; Bartlett & DeSteno, 2006), as well as prosocial behavior is evident to improve well-being (Nelson et al., 2016). Thus, although the current study did not find any mediating effects, future research should still regard prosocial behavior as a potential mechanism in the effect of gratitude on well-being.

Furthermore, the research sample as used for this study mainly consisted of higher educated females. Although this is very common in positive psychological interventions (see Fledderus, Bohlmeijer, Pieterse, & Schreus, 2011), future research should pay attention to that when considering generalizing the results to a greater population. Along with that, the interpretation and use of gratitude might depend on demographic characteristics (Froh, Sefick, & Emmons, 2008; Titova, Wagstaff, & Parks, 2017). Emmons and McCullough (2003) argue that the way in which gratitude is understood and practiced could depend on gender. Froh, Sefick, and Emmons (2008) found, that females are more thankful than males, and especially grateful for family and friends, while males were more grateful with regard to material objects. Regarding that females are generally more thankful, male participants might have been benefitted more from this intervention. However, gratitude can also be associated with indebtedness (Emmons & McCullough, 2003; Titova, Wagstaff, & Parks, 2017). Is this the case, being grateful could have adverse effects on well-being (Titova, Wagstaff, & Parks, 2017). Furthermore, with regard to the dropouts of the study, participants who did not complete all assessments were younger than the completers. Taking this into account, future investigations could implement qualitative research methods in order to get a better understanding of different perspectives in gratitude and how younger participants keep motivated in following gratitude-based interventions (Flick, 2009; Ludden, van Rompay, Kelders, & van Gemert-Pijnen, 2015).

Gratitude-based interventions are found to enhance states of well-being and have the potential to prevent mental disorders (Seligman, 2002), and to improve workplace organization and company revenue (Kandky & Diener, 2017). Taking these implications into account, new insight in how gratitude works will help to optimize positive psychological interventions in order to promote well-being in general population samples. Implementing these interventions then would benefit both, public health services (Ludden et al., 2015;

Kansky & Diener, 2017) and economics (Kansky & Diener, 2017). Although the current findings may only be generalizable for populations consisting of higher educated women, they give indications for the effectiveness of gratitude-based interventions in non-clinical samples.

Conclusion

The current study found evidence that following the six-week gratitude-based PPI has the potential to improve emotional, psychological, and social well-being, and to maintain these improvements up to six weeks within a general population sample. The findings give indications for the usefulness of gratitude-based interventions in non-clinical samples. However, it can be claimed that in order to benefit longer from the effects of such interventions, gratitude has to be practiced over a longer period of time.

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