Can Acts of Kindness influence positive relations?

The role of the recipient and the number of performed kind acts

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M.Sc. Thesis

"Positive Psychology and Technology"

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May 2019

Abstract

Background: Positive relations, which are characterized by affection and intimacy, are an essential part of well-being. One intervention that has been proven to positively affect general well-being, is the "acts of kindness" intervention. However, little research has examined effects of performing kind acts on positive relations. The goal of this study was to provide more insight by 1) examining the effects of performing kind acts on positive relations over time, 2) exploring whether other-directed kind acts are more effective than self-directed acts and 3) investigating the potential effect the average number of performed acts has on positive relations.

Method: As part of a randomized controlled trial, 170 participants were randomly assigned to perform either other-directed ($n = 85$) or self-directed ($n = 85$) kind acts. In the six-week-long intervention, participants were asked to perform five kind acts on one day during the week, while reporting on the nature and frequency of performed acts in an online diary. Three moments of measurement were used: a baseline, a post-measurement (i.e., six weeks after baseline) and a follow-up measurement (i.e., three months after baseline). Statistical analyses were conducted, using both estimated (Linear Mixed Model) and observed data (t-tests, multiple regression).

Results: Overall results indicate that the experience of positive relations positively changed over time, regardless of whether the acts were self- or other-directed and regardless from how many acts were performed on a weekly basis. Although positive relations especially increased during the intervention, the effects were still present three months after participating. Comparing both conditions, no significant differences were found in positive relations on all three moments of measurement.

Conclusion: The findings of this study contribute to the knowledge about the effects of kindness interventions, since the study was able to link the performance of kind acts to improvements in positive relations, irrespectively of whether those acts were self- or other-directed. Implications and recommendations for future research are given, e.g. concerning the nature and intensity of performed kind acts and their effect on positive relations, rather than how many kind acts were performed.

Keywords: positive relations, acts of kindness, positive psychology, prosocial behaviour, kindness, positive psychology intervention

Introduction

Within the last years a paradigm change can be observed in clinical psychology from an approach, which is mostly focussed on the deficits and problems an individual experiences, to a more balanced mind-set, considering that mental health is more than just the absence of complaints; it also includes the ability of people to cope with the stresses of daily life and the ability to contribute to society (Bohlmeijer, Bolier, Westerhof & Walburg, 2013; World Health Organization, 2018). The focus of this relatively new field, called "positive psychology", lies rather on improving mental health and potentially preventing mental illness than focussing merely on mental illness and deficits (Seligman & Csikszentmihalyi, 2000; Bohlmeijer et al., 2013; Dellemann, 2013). Consequently, it provides a counterweight to the clinical approach by highlighting the positive aspects of life that make a good life possible with the intention to rather increase one's well-being than focussing on personal deficits (Bohlmeijer et al., 2013).

Approaches that are rooted in positive psychology aim to promote well-being and often focus on the following three different levels: 1) the experience of positive emotions and life satisfaction (emotional well-being), 2) experiencing social acceptance, feelings of belonging and contributing to a community (social well-being) and 3) the ability of self-realization, thus feelings of self-acceptance and leading a meaningful, autonomous life (psychological well-being) (Bohlmeijer et al., 2013; Westerhof & Keyes, 2010).

One important component of psychological well-being is the experience of positive relations, i.e. having intimate, close relationships with others (Bohlmeijer et al., 2013). Although positive relations are vital to well-being, very few studies have focussed on them so far, and in particular, on how the experience of positive relations can be improved using positive psychological interventions (PPI's). This study aims to fill this gap by exploring the effects a specific PPI, namely the "acts of kindness" intervention, has on positive relations.

The acts of kindness intervention and well-being

During the acts of kindness intervention, participants are asked to perform certain behavioural acts towards others out of kindness (Nelson, Layous, Cole & Lyubomirsky, 2016). These conscious kind acts often aim at benefiting or helping others (Lyubomirsky, Sheldon & Schkade, 2005), for instance, opening the door, taking out the trash, babysitting a friend's children or walking the neighbour's dog.

Performing kind acts has been associated with several positive effects which cannot only be witnessed in the general, non-clinical population (e.g. Nelson et al., 2016), but also among target groups dealing with physical (e.g. type 2 diabetes; DuBois, Millstein, Celano, Wexler & Huffman, 2016) or psychological conditions (e.g. patients with social anxiety; Alden & Trew, 2013). Positive effects include enhanced emotional and psychological well-being due to decreasing symptoms of depression or anxiety and increasing positive emotions (Sin & Lyubomirsky, 2009; Alden & Trew,

2013; Nelson et al., 2016; Lyubomirsky & Layous, 2013; Buchanan & Bardi, 2010). Additionally, several studies indicate that performing kind acts also positively influences social well-being and the quality of relationships (Otake, Shimai, Tanaka-Matsumi, Otsui & Fredrickson, 2006). One study found that students who performed three kind acts per week experienced not only a greater life satisfaction and more happiness, but also more popularity among and acceptance by other classmates (Layous, Nelson, Oberle, Schonert-Reichl & Lyubomirsky, 2012). In another study by Alden and Trew (2013), socially anxious individuals reported a greater satisfaction regarding their relationships after performing kind acts towards others compared to the control group. Although several studies hint at the social effects of performing acts of kindness, there is a lack of scientific research on whether the performance of kind acts actively affects the experience of intimate, trusting relationships, which is one of the components of psychological well-being (Bohlmeijer & Bosch, 2013; Ryff, 1989).

Acts of kindness and positive relations

Positive relationships are characterized by feelings of intimacy, affection and empathy between the individuals involved and by having an open and warm attitude towards the other party (Westerhof & Keyes, 2010; Ryff, 1989). These relationships play an important role throughout one's life, for instance, a warm and accepting relationship between child and parent, close friendships with peers, or a trusting and loving romantic relationship during adulthood (Roffey, 2012). They are a vital component of well-being and flourishing (Bohlmeijer & Bosch, 2013; Hone, Jarden, Schofield & Duncan, 2014). Besides serving as a buffer against the negative effects of stress on mental health (Cohen & Wilis, 1985), positive relations can even reduce the risk of mortality (Holt-Lunstad, Smith & Layton, 2010).

Whether and how positive relations are affected by acts of kindness is yet largely unknown. However, research suggests that prosocial behaviour can affect close, interpersonal relationships. For instance, small, thoughtful behavioural acts reportedly predict feelings of gratitude in romantic relationships, which are associated with more relationship maintenance behaviour and more perceived communal strengths (Algoe, Gable & Maisel, 2010; Lambert & Finchman, 2011; Lambert, Clark, Durtschi, Fincham & Graham, 2010). Additionally, Selcuk, Gunaydin, Ong and Almeida (2016) found that the extent to which an individual feels appreciated, understood and cared for by his or her counterpart influences relationship happiness and well-being. Receiving flowers for no particular reason (besides the kind gesture itself) could evoke not only feelings of gratitude towards the significant other but could also lead to feeling more appreciated and loved by the other party, which could positively influence the interpersonal relationship. Similarly, expressing one's sympathy and complementing a friend could also not only evoke feelings of happiness but could also strengthen that friendship. Support for this is also given by Kerr, O'Donovan and Pepping (2015) who found that individuals who perform kind acts towards others report more connectedness with others, which is one essential component of positive relations, compared to those who did not perform kind activities.

Additional support for the potential influence kind acts might have on positive relations is given by Gable and Gosnell (2011) who examined the positive psychological approach in the context of close relationships. When building positive relations, investing in these interpersonal relationships through intentional behaviour can be helpful. These intentional actions can include showing emotional availability and acceptance, commonly engaging in positive events or in communication that is driven by positivity and interest. This might suggest that investing in a relationship by intentionally performing a kind act could bring benefits to the relationship itself. Examining whether the experience of positive relations can benefit from kind acts is the main goal of the present study.

Other- versus self-directed kind acts

While acts of kindness can be directed towards other individuals, (e.g. paying for a friend's beer or preparing a candlelight dinner for the partner), these kind acts can also be directed towards oneself (e.g. for instance, enjoying a spa after a long day) (Nelson et al., 2016). Examining the different effects of prosocial or self-focused behaviour on well-being has abundantly been subject to numerous studies, generally concluding that acting prosocially is linked to greater happiness, more psychological flourishing and more positive emotions compared to self-focused behaviour (Lyubomirksy, King & Diener, 2005; Dunn, Aknin & Norton, 2008; Aknin et al., 201; Nelson et al., 2016).

However, few studies have examined how self- and other-directed acts differ in regard to the effect they can have on interpersonal relationships. One of these studies is that of Lyubomirsky, Sheldon and Schkade (2005). They found a link between performing kind acts towards others and experiencing positive feelings about oneself and one's ability to help others, due to the potentially positive reactions of others, such as feelings of appreciation and gratitude (Trivers, 1971). Opening the door for a close friend or partner may lead to a positive, affirming reaction by given friend, which could enhance affectionate and appreciative feelings towards each other, compared to kind acts which are only directed towards oneself. Following self-directed kind behaviour, for instance, treating oneself with chocolate pralines after a long day of productive work, this potential positive reaction (e.g. affection, appreciation or gratitude) from the social environment would be absent. Since positive feelings as affection, intimacy and empathy are important characteristics of positive relations (Ryff, 1989), this could indicate that close, interpersonal relationships subsequently benefit more from acts that provoke a positive social reaction (other-directed acts), compared to acts that solely focus on the individual (self-directed acts).

Examining the effects of self- and other-directed kind acts on well-being, Nelson and colleagues (2016) found that performing other-directed behaviour is positively linked to more flourishing and psychological well-being, of which having positive relations with others is an essential core component (Ryff, 1989). Importantly, however, Nelson et al. (2016) used in their analyses only the general concept of psychological well-being, while they did not analyse how performing acts of

kindness affect the six dimensions of psychological well-being individually (see Ryff, 1989). So, although the results of Nelson et al. (2016) indicate that other-directed acts positively influence psychological well-being in general, it cannot definitely be concluded that other-directed acts also affect positive relations. Investigating whether or not positive relations benefit more from prosocial kindness than from self-kindness is another important subject of this study.

Number of performed acts and the experience of positive relations

Although previous study designs differed in regard to the duration of the acts of kindness intervention (e.g. one week in Mongrain, Chin & Shapira, 2011; six weeks in Nelson et al., 2016), as well as the intensity of performed acts (e.g. 5-15 minutes per day in Mongrain, Chin & Shapira, 2011; five kind acts per day in Nelson et al., 2016), no known research has yet investigated how many kind acts should at least be performed for an effect to be present and how the average number of performed acts relates to the experience of positive relations.

Generally, the outcomes of interventions correlate positively with the frequency of program usage (Donkin, Christensen, Naismith, Neal, Hickie & Glozier, 2011), for example, in interventions which targeted depression, tobacco consumption or physical activity (De Graaf, Huibers, Riper, Gerhards & Arntz, 2009; Severson, Gordon, Danaher & Akers, 2008; McKay, King, Eakin, Seeley & Glasgow, 2001). If the usage of an intervention is closely related to the outcomes of given intervention, the actual frequency of performed kind acts might also influence the effects of the acts of kindness intervention on positive relationships. For example, repeatedly greeting fellow students on the way to the lecture might have more impact regarding the evaluation of the relationship of those involved, compared to a one-time occurrence. Therefore, another goal of this study is to examine how far the number of performed kind acts contributes to enhanced positive relations.

Current study

The present study is a substudy, since it uses a subset of data from a greater randomized controlled trial (RCT). This substudy will specifically focus on the acts of kindness intervention and its effect on positive relations on three moments of measurement. Being one of the first studies to do so, this substudy aims to fill in the knowledge gap whether participating in the acts of kindness intervention has a significant effect on the experience of positive relations. Additionally, this substudy aims to investigate how the experience of positive relationships potentially varies over the course of time and whether other-directed acts are potentially more successful in improving one's positive relationships compared to self-directed kind acts. Finally, the relationship between the number of performed kind acts and the extent to which one experiences positive relationships will be investigated.

Method

Design

This substudy used data from a larger randomized and controlled intervention study which aimed at evaluating the effectiveness of two short positive psychology interventions, namely the acts of kindness intervention and a gratitude intervention. The RCT and its research protocol can be found in the Dutch Trial Register under the registration number NTR6786. This substudy specifically focused on the effects the acts of kindness intervention might have on the experience of positive relations.

In the RCT, the participants were randomly assigned to one of five conditions. Two conditions used the acts of kindness intervention directed towards others, either with or without the instruction to reflect on those kind acts. One condition was asked to write a letter of gratitude. Additionaly, the RCT study used two control groups, one with the instruction to perform self-directed kind acts and one waiting group. For this substudy, only the two conditions were used for analyses in order to be able to properly compare both conditions, namely the conditions "acts of kindness directed towards others without reflection" and "self-directed kind acts". The RCT study used six moments of measurement. However, in this substudy, only three moments of measurement were used for statistical analyses to assess the variation in experienced positive relations over time, namely the baseline measurement (T0), the measurement at the end of the six week long intervention (T1) and a follow-up measurement three months after T0 (T2).

Participants

In total, 653 individuals were interested in taking part in the RCT and applied for participation. After the screening questionnaire, 208 individuals were excluded from participation due to not completing the questionnaire or not agreeing to the informed consent ($n = 157$) or due to symptoms of severe depression or anxiety ($n = 51$). After the baseline measurement, a further 22 participants were excluded due to not completing the questionnaire. The remaining participants ($n = 423$) were randomly assigned to one of the five conditions.

Only two conditions were used for the analyses of this substudy, namely the experimental group which performed acts of kindness towards others ("other-directed condition"; $n = 85$) and the active control group which performed kind acts towards themselves ("self-directed condition"; $n = 85$), leaving a total sample of 170 participants for further analyses. Regarding the sociodemographic characteristics of the sample, the great majority of the participants reported to be female, employed and highly educated. Almost half of the participants reported to live with a partner and/or children. The age ranged between 18 and 69 years. There were no significant differences between the two conditions with regard to the sociodemographic characteristics and to the extent to which the participants reported positive relationships at the baseline measurement. A more detailed overview of the sociodemographic characteristics of both groups can be found in Table 1.

Table 1.

Baseline characteristics of both self- and other-directed condition

	Self-directed condition (n = 85)	Other-directed contion (n = 85)	Total (n = 170)	p
Age, *M(SD)*	48.5 (10.6)	47.9 (9.5)	48.2 (10.1)	.121[a]
Gender *n*(%)				1[b]
Male	9 (10.6)	9 (10.6)	18 (10.6)	
Female	76 (89.4)	76 (89.4)	152 (89.4)	
Marital Status, *n*(%)				.357[b]
Married or registered partnership	46 (54.1)	40 (47.1)	86 (50.6)	
Not married	39 (45.9)	45 (52.9)	84 (49,4)	
Living Situation, *n*(%)				.901[b]
Alone	20 (23.5)	24 (28.2)	44 (25.9)	
Together with partner and child(ren)	40 (47.1)	38 (44.7)	78 (45.9)	
Together with partner without child(ren)	12 (14.1)	12 (14.1)	24 (14.1)	
Alone with child(ren)/others	13 (15.3)	11 (12.9)	24 (14.1)	
Highest achieved education, *n*(%)				.850[b]
Low/intermediate	18 (21.2)	17 (20.0)	35 (20.6)	
High	67 (78.8)	68 (80.0)	135 (79.4)	
Work situation, *n*(%)				.148[b]
Employed	61 (71.8)	69 (81.2)	130 (76.5)	
Unemployed/Student	24 (28.2)	16 (18.8)	40 (23.5)	
Experience of positive relationships, *M(SD)*	4.25 (0.7)	4.27 (0.8)	4.26 (0.8)	.850[a]

Note: Group differences per category calculated using the following tests: [a] Independent t-test [b] Pearson Chi-Square; age ranging from 18 to 69 years

Procedure

The participants were recruited using advertisements in several local newspapers, on social media and in the online newsletter of a Dutch psychology magazine. Those who were interested were provided with essential information about the participation in the study. An online informed consent assured the participants anonymity regarding their information and responses and informed them about their rights (terminating participation at any time without justification).

If agreed to the informed consent, the participants were led to a screening questionnaire including questions about their sociodemographic information (e.g. gender, age, working and living situation). Additional questions from the CES-D (Radloff, 1977) and the GAD-7 (Spitzer, Kroenke, Williams & Löwe, 2006) were used to assess symptoms of depression and anxiety. In order to participate in the RCT study, the participants had to be at least 18 years of age and mastered the Dutch

language to understand the instruction and the questionnaires. Participants who reported moderate or severe symptoms of depression or anxiety were excluded from participation.

When the participants met the criteria for inclusion, they were given a link to the baseline questionnaire (T0). This questionnaire measured (among others) the experience of positive relations before the intervention. Afterwards, the randomisation took place. Due to the overrepresentation of women and individuals who were highly educated, a stratified randomisation was applied to assure that gender (male/female), level of education (highly educated/not) and flourishers (yes/no) were evenly distributed across the conditions. Afterwards, the six-week-long intervention started. Although being assigned to different conditions, for all participants (except for the waiting control group), the intervention started and ended on the same day in the autumn of 2017. At the end of the intervention (T1), thus six weeks after T0, the participants were asked to answer the same questionnaire as on T0. Another follow-up measurement (T2) was administered three months after the baseline measurement. The flowchart, shown in Figure 1, visualizes the procedure used in the RCT study. The grey faded elements are additional conditions and measurements from the RCT, however, they were not used during this substudy.
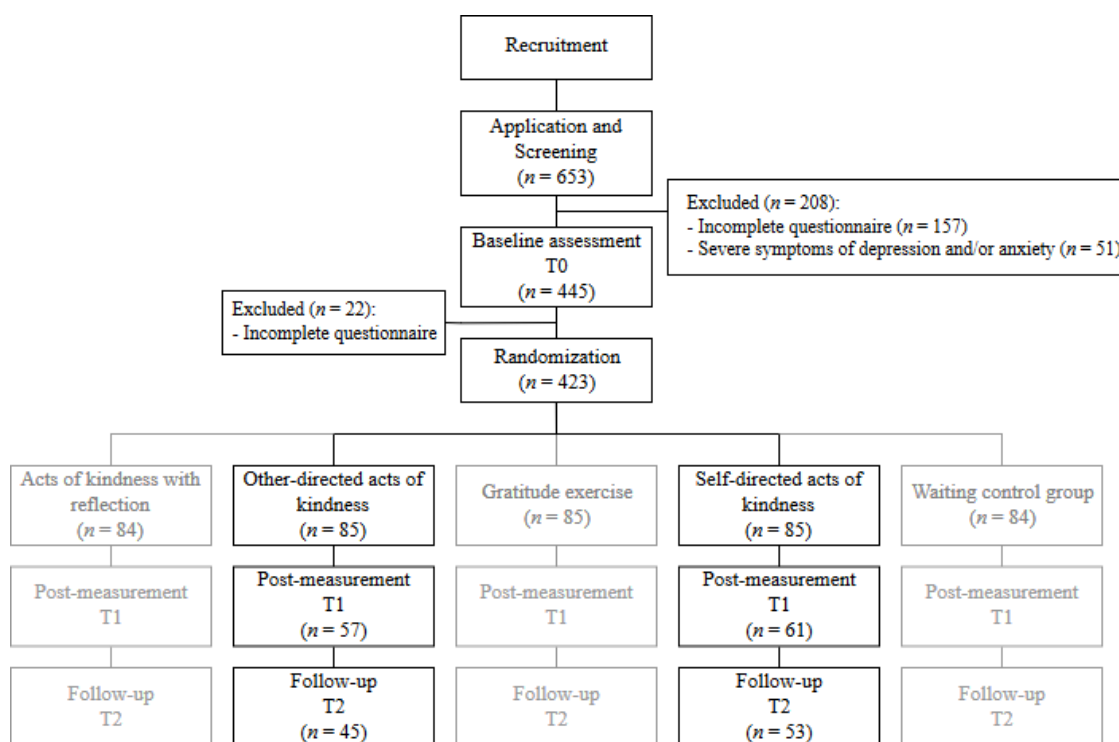

Figure 1. Flowchart of the RCT study.
Note: Measurements T1 and T2 took place respectively six weeks and three months after T0.

Acts of kindness intervention

Participants in both conditions were provided with instructions. Those who were randomized to the other-directed condition were instructed to perform five acts of kindness towards others on one single day during the week. The other person could be aware or unaware of the kind act, and all kind acts

could be directed towards different people. They were provided with examples, for instance, cooking for friends or family, opening a door for someone or visiting a family member.

Those in the self-directed condition were asked to perform five acts of kindness directed towards themselves on one single day during the week. Self-directed kind acts could be either little things such as enjoying a delicious pastry or buying one's favourite magazine or bigger things, such as spending time in the spa. For both conditions, the acts of kindness should have been performed before Friday each week, since the participants received new instructions on Saturday. All participants from both conditions were instructed to report on the nature and the frequency of the performed kind acts in an online diary.

Measurement instruments

Positive relations. The extent to which participants experience positive relations in their life was measured using the subscale "Positive relations with others" from the Dutch version of the Psychological Well-Being Scales (Ryff & Keyes, 1995; Van Dierendonck, 2011). The subscale consisted of nine items, and the participants were asked to indicate their agreement on a scale from 1 ("strongly disagree") to 6 ("strongly agree"). The items included statements, for example, as "I enjoy personal and mutual conversations with family members or friends". Five out of the nine items were formulated in a negative manner. For further analyses, those negative items were reversed. A high score on this scale indicated the ability to form and maintain close and trusting relationships, being capable of empathetic and affectionate feelings and intimacy. A low score indicated the experience of feelings of social isolation and difficulties regarding interpersonal relationships and being warm, open and empathetic towards others (Ryff, 1989). Previous research reported good psychometric qualities of this subscale (Van Dierendock, 2011). In this study, the internal consistency of the positive relationships scale was calculated using Cronbach's alpha. During the baseline measurement, the internal consistency of the total sample was good, $\alpha = .82$. For the statistical analyses, the mean scores were calculated of the three moments of measurement on the subscale "positive relations with others".

Average number of kind acts. The number of performed acts of kindness was assessed by asking the participants to report how many kind acts they performed during the last week in an online diary. For this, one item was used, namely "How many acts of kindness have you performed for others?". The participants had the choice between six answers: "Five activities", "four activities", "three activities", "two activities", "one activity" or "I did not perform an act of kindness on a single day during the last week". Afterwards, they were asked to report what they did and for whom. In the other-directed condition, answers included, for instance, buying coffee or baking a cake for colleages, suprising the significant other with flowers or making a luxurious breakfast for the family. Answers in the self-directed condition were, for example, spending money on new clothes or a new hairstyle, taking a relaxing bath, going for a hike or treating oneself with a piece of chocolate cake. For further

analyses, the average number of kind acts was used in order to get an idea how many kind acts have been performed during a week. Due to the high percentage of missing values, the average number of kind acts was calculated by dividing the sum of all reported kind acts during the week by the number of valid measurements.

Statistical analyses

For the statistical analyses of this substudy, the software SPSS 25 was used. The cutoff score for statistical significance was set at a *p*-value of < .05. The baseline demographic information of the participants were examined and compared using an independent t-test for the age between both intervention groups, and a Chi-Square test for the marital status, their living and working situations and their highest achieved education. This also provided insight whether the randomization was successful. Furthermore, due to skewed distribution, a Mann Whitney U Test for independent samples was used to examine the difference between the two conditions in regard to the average number performed kind acts per week.

Due to these high percentages of missing values (Appendix A), two Linear Mixed Models (LMM) were used to investigate the three main issues: the effect of the acts of kindness intervention on positive relations over time, whether self- or other-directed kind acts are more effective and the relationship between the number of performed acts and positive relations. A LMM was preferred to a Repeated Measures ANOVA, because the latter is unable to take potential missing values into account (Krueger & Tian, 2004). Moreover, a LMM takes account of the data's nested nature. The covariance structure "compound symmetry" was used for the repeated measurement data, due to the stable correlations between the three moments of measurement of positive relations. Pearson's correlations between the scores on positive relations can be found in Appendix B.

The first LMM included time (T0, T1, T2), condition (self- vs. other-directed acts) and their interaction effect as fixed effects, while the experience of positive relationships over time was the outcome measure. Afterwards, the average number of performed kind acts was added to the second model as a covariate in order to investigate its effects on the effectiveness of the acts of kindness intervention in regard to positive relationships.

Afterwards, additional statistical tests were conducted to obtain more in-depth information on how positive relations changed over time, the differences between the conditions on each moment of measurement and whether the average number of acts might serve as a predictor, rather than a fixed effect, for the changes in positive relations. The statistical tests were chosen based on the normality of the data, which was examined using the Shapiro-Wilk test. More information about the normality of the different scores can be found in Appendix C. While the LMM used the estimated data, these post hoc analyses used mainly the observed data, without taking missing values into account. For the

evaluation of the effect sizes obtained during the post hoc analyses, Cohen's d was used. An effect was considered to be small if Cohen's $d = 0.2$, medium if $d = 0.5$ and large if $d = 0.8$ (Cohen, 1988).

Due to the normality of the scores of positive relations on all moments of measurement, multiple t-tests for paired samples were conducted to investigate the overall changes of positive relations over time. For these tests, several new variables were created. The overall change of positive relations (Δ) was calculated by subtracting the mean score on T0 from the mean score on T2. Similarly, the differences of experienced positive relations (Δ) during and after the intervention were calculated by subtracting the mean score on T0 from the mean score on T1 (during the intervention) and the mean score on T1 from the mean score on T2 (after the intervention). Additionally, three t-test for independent samples were conducted to analyse whether the two conditions differed in positive relations on each measurement separately. Finally, a multiple regression analyses was used to analyse whether the average number of performed acts is potentially a predictor for the changes in positive relations between T0 and T2. Additionally, since having decent positive relations on T0 could also be a predictor for the changes in positive relations over time, this variable was added to the regression analyses as potential predictor.

Results

Primary analyses: Linear Mixed Models

Two Linear Mixed Models were used to investigate the potential effect of performed kind acts in general, as well as the effect of self- versus other-directed acts on the experience of positive relations. In the first model, a significant effect of time was found on positive relations. However, there were no statistically significant effects found of condition and of the interaction effect (Table 2). When adding the average number of performed kind acts as a covariate, the second model found the same effects as model 1: a significant effect of time were found on the experience of positive relationships, whereas the effects of condition and the interaction effect were also found to be not statistically significant. Additionally, there was no significant effect found of the average number of performed kind acts on the experience of positive relationships (Table 2).

The results of both models indicate that the experience of positive relationships changed over the course of time, regardless whether one performed kind acts towards others or towards oneself and regardless from the average number of performed acts. A more detailed overview of the effects, as well as the information criteria for both models can be found in Table 2.

Table 2.

Found effects and information criteria of both Linear Mixed Models for positive relations

	Model 1		Model 2	
	F	*p*	*F*	*p*
Intercept	5965.99	< .001	797.91	< .001
Condition	0.03	.855	0.00	.979
Time	26.14	< .001	26.81	< .001
Condition * Time	0.46	.630	0.37	.692
Average performed kind acts	-	-	0.86	.355
	Model 1		Model 2	
Schwarz's Bayesian Criterion	636.61		603.63	
Restricted Log Likelihood	624.72		591.84	
Akaike's Information Criterion	628.72		595.84	

Post hoc analyses

Effect of the acts of kindness intervention on positive relations over time

Both models showed a significant effect of time on the experience of positive relationships. To examine the changes of positive relations over the course of time in more detail, several t-tests were conducted using the data of the total sample.

A t-test for paired samples revealed that there was a significant difference between the time interval T0 and T1 (during the intervention) and the interval between T1 and T2 (after the intervention) regarding the experience of positive relations, $t(94) = 4,30$, $p < .001$; $M = 0.32$; $SD = 0.74$. The mean scores showed that the experience of positive relationships significantly increased during the intervention ($M = 0.26$, $SD = 0.48$). Moreover, this trend remained relatively stable after the intervention ($M = -0.07$, $SD = 0.37$). According to Cohen (1988), the effect in this analysis ($d = 0.45$) can be considered a medium effect. In order to visualize the changes in positive relations over time, the estimated marginal means of both conditions on the three moments of measurement are represented in Figure 2.

A further t-test for paired samples showed that the effects of the intervention on positive relationships were still present three months after the baseline measurement. A significant difference in the experience of positive relationships between T0 and T2 was found, $t(99) = -4.28$, $p < .001$; $M = -0.18$, $SD = 0.43$. The effect size ($d = 0.47$) was close to Cohen's (1988) convention for a medium effect ($d = 0.5$).

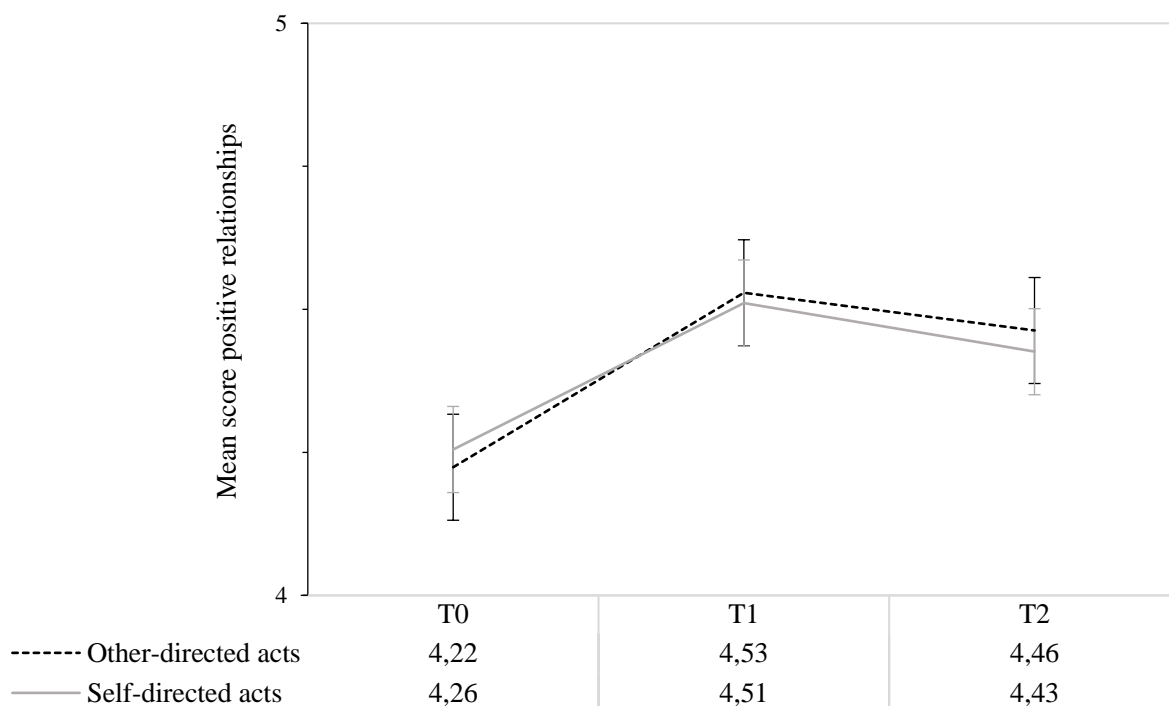|	T0	T1	T2
------- Other-directed acts	4,22	4,53	4,46
—— Self-directed acts	4,26	4,51	4,43

Figure 2. Differences in positive relationships in both conditions per measurement (Error bars are the 95% Wald CI; estimated marginal means per condition and per measurement)

Effectiveness of other- vs. self-directed kind acts on positive relationships

Both LMMs found no significant effect of the type of kind act, thus either self- or other-directed, on positive relations in general. To examine how both conditions differ in positive relations on each moment of measurement individually, three t-tests for independent samples were conducted.

The results from these t-tests confirmed that there are no significant differences in positive relations between both conditions on the baseline measurement, $t(168) = -0.19$, $p = .850$, on the post-measurement, $t(116) = -0.19$, $p = .847$, and on the follow-up measurement, $t(98) = 0.04$, $p = .970$. Very small Cohen's d effect size values (T0: $d = 0.03$; T1: $d = 0.17$; T2: $d = 0.01$) for the differences between the conditions indicate that the sort of kind acts, thus either self- or other-directed acts, has almost no to very little effect on the experience of positive relations over time.

Average number of performed acts and positive relationships

In LMM, the average number of performed acts had no significant effect on the experience of positive relations. To examine whether the average number of performed acts might act as a predictor, rather than as a covariate, for the differences in positive relations, a multiple regression analyses was conducted.

The multiple regression analysis revealed that the average number of performed acts did not predict the differences in positive relations between T0 and T2 and neither did the experience of positive relations during the baseline measurement, $F(2, 96) = 1.79$, $p = .172$, $R^2 = .04$ (Table 3).

Table 3.

Summary of multiple regression analyses Δ positive relations between T0 and T2

Variable	B	SE (B)	β	t	p
Average number of performed acts	-0.04	0.06	-0.07	-0.69	.489
Positive relations on T0	-0.10	0.06	-0.18	-1.82	.072

Participants in general performed on average two kind acts per week, $M = 1.99$, $SD = 0.81$, thus substantially fewer kind acts than instructed. No statistically significant differences were found between the two conditions, $U = 3017.5$, $p = .846$. In both conditions, the scores on the average number of performed acts were rightly skewed, deviating significantly from a normal distribution. This indicates that participants in both conditions reported rather few performed kind acts per week in both conditions.

Discussion

The goal of the present substudy was to investigate whether performing acts of kindness has the potential to enhance positive relationships, whether participants who performed other-directed kind acts reported more positive relationships than those who performed self-directed kind acts, and lastly, the potential relationship between the number of performed acts per week and experiencing close, positive relations. In summary, the results indicate that performing acts of kindness positively influence the experience of positive relations over time, however, the fact whether those acts were other- or self-directed did not matter. Neither did the average number of performed kind acts predict the participants' experience of positive relationships.

Discussion of the main findings

Past research has already shown that PPI's in general can have a positive influence on psychological well-being, including positive relations (Alden & Trew, 2013). The outcomes of this study indicate that this might also be the case for the acts of kindness intervention, indicating that performing kind acts can positively influence the experience of positive relations over time. One potential explanation for these findings might be the positive effect of repetitive and kind behaviour might have on the perception and opinions others potentially have about the prosocial actor. For instance, while opening the door once could be seen as a singular and kind gesture, opening the door for others on a regular basis could be considered to be a sign of benevolence or sympathy. Being perceived as a kind, sympathetic person might go hand in hand with experiencing more appreciation and acceptance by others. The finding by Layous et al. (2015) that prosocial behaviour is associated with more popularity and acceptance by peers supports that notion. This positive perception by others could also make it more appealing to have a closer relationship with given prosocial actor, potentially affecting the relationship quality and explaining possibly why the experience of positive relations increased with

time during this acts of kindness intervention. Additionally, the results indicate that the experience of positive relations particularly improved during the intervention. Although the experience of positive relations did not significantly increase in the time after the intervention, the participants reported three months after the baseline measurement still more positive relations than prior to their participation. This suggests that the acts of kindness intervention potentially had an enduring effect on the participants' lives up until three months after participating. Whether and how this trend continues in the long-term, e.g. one year after the intervention, is unknown. Considering the long-term effect of PPI's in general, Rijavec (2016) argues that the continuation of activity and effort are crucial to the longitudinal efficacy of the intervention, suggesting that the effect (e.g. on positive relations) gradually disappears with time, when not continuing with the activity (e.g. performing kind acts).

When investigating whether self- or other-directed kind acts had more impact on the experience of positive relationships, this substudy surprisingly found no significant differences when the recipient of the kind act was either oneself or another. These findings are contradictory to those of other studies, since other-directed acts of kindness are said to have a greater impact on well-being than self-directed kind acts (Nelson et al., 2016; Dunn, Aknin & Norton, 2018; Aknin et al., 2015). However, there are two potential explanations why this substudy was not able to replicate these findings. One possible explanation concerns the concept of self-compassion. Neff and Davidson (2016) define self-compassion as a kind and accepting attitude towards oneself and one's inadequacies and difficulties, but also add that self-compassion entails caring for one own personal and emotional needs. This, in turn, leads to more emotional resources being available to meet the physical or emotional needs of others (Neff & Davidson, 2016). This suggests that fulfilling one's own emotional needs, for instance, by visiting the spa after a long day of work, might in turn positively contribute to one's social relationships by being able to spend more resources on the needs of the partner, which might potentially improve one's positive relations. Research also suggests that self-compassion is closely linked to interpersonal relationships, since self-compassionate individuals are reportedly more accepting and emotionally connected towards their partners and provide more social support and trust, which is beneficial for close, interpersonal relationships (Neff & Beretvas, 2013; Neff & Davidson, 2016).

The second potential explanation why not only other-directed but also self-directed kind acts can increase one's positive relations is potentially given by Lyubomirsky and Layous (2013) who explored the reasons how and why small activities can boost general well-being. They argue that people who perform positive behaviour also tend to perceive other parts of their life as more positive. This could imply that performing a kind act in itself can help people to feel more positive about their life and thus also about their social relationships, independently whether those acts are self- or other-directed.

Surprisingly, the average number of kind acts the participants performed during the week did not significantly affect the experience of positive relations. Neither was the average number of performed acts correlated with the changes in positive relations over time. Former research, however, suggested that the frequency of usage positively correlates with the outcomes of interventions (Donkin et al., 2011). In regard to the acts of kindness intervention, this could have meant that individuals who performed more kind acts would possibly also experience more positive relations than individuals who performed less acts. Based on the results of this substudy, this does not seem to be the case.

One explanation might concern the nature of the data concerning the number of performed acts, since the participants generally performed very few kind acts. The normality histogram and the fact that the participants performed on average only two kind acts per week confirmed that there were not many participants who actually performed five kind acts per week, as instructed. This lack of variance could have resulted possibly in a distortion in the data which made it very difficult to detect an effect or a correlation. Since no significant correlation was found between the average number of performed kind acts and positive relations, no further efforts were made to find an ideal dosage of kind acts, which should be performed in order to achieve an improvement in positive relations. However, the results of this substudy still indicate that the experience of positive relations benefitted from this behaviour, even though the participants performed relatively few kind acts per week. The positive effects that arise from performing only two kind acts per week are likely to outweigh the potential costs (timely or financial), since the effects already occurred during the intervention and were still present at the follow-up measurement. This knowledge could not only help regarding individuals who actively want to improve their experience of positive relations, but also be of benefit in the clinical context. Alden and Trew (2013) already revealed the positive effects of performing kind acts has on the relationship satisfaction of individuals with social anxiety disorder. Although this does not mean that acting kindly can be a substitute for professional, psychological treatment, individuals waiting for treatment could actively influence their well-being by performing small, cost-efficient acts while benefitting from them on a short-term basis.

Limitations, strengths and implications

A strong characteristic of this substudy is the fact that Linear Mixed Models were used to account for missing values during this longitudinal intervention. By using this rather advanced statistical method, it was assured that the missing values were taken into account by predicting missing values. The Repeated Measures ANOVA requires a complete dataset when not making use of imputation (Krueger & Tian, 2004). By not excluding participants who did not completely fill in the questionnaires and by applying the "intention-to-treat"-principle, the results should be more accurate and reliable. However, one should bare in mind that predicting missing values could also lead to an overestimation of the effects. Refering to the present substudy, not filling in a questionnaire might indicate that given participant also performed fewer or none kind acts than potentially estimated by the LMM. Efforts

were made to minimize this potential problem by using additional post hoc tests which used the actual observed data, rather than estimated data. Post hoc analyses supported and added to the findings of the LMM, showing the same effects while also giving a more detailed insight, for instance, into the exact differences between the conditions on each moment of measurement separatly.

One limitation of the current subanalysis concerns the lack of a control group. Therefore, the possibility that a pure effect of time is accountable for the changes in positive relationships cannot be excluded. Naturally occurring fluctuations could have influenced the changes in positive relationships over time, rather than the performance of kind behaviour. Although this substudy lacked a control group, Kaffke (2018) included a waitlist control group in her study about the acts of kindness intervention and its effects on mental well-being, including positive relations. Participants in both the other-directed and the self-directed condition reported more positive relations at post-measurement, compared to the waitlist control group, which makes it likely that a pure effect of time is not entirely accountable for the effects of the acts of kindness intervention on positive relations. However, in contrast to the present study, it should be noted that the statistical design used by Kaffke (2018) did not take into account the serious percentage of missing values, resulting in significantly different group sizes of the three conditions on the moments of measurement. Future research investigating the effects of acts of kindness on positive relations should include a control group, while also using analyses that consider missing values, for instance the Linear Mixed Model, since missing data is almost inevitable when conducting a six-week-long study. By using an advanced statistical design and adding a waitlist control group to the model, the results would be more valid and convincing.

The fact that the self-selected sample used is not representative for the general population is another limitation of this study, since the sample mostly consisted of highly-educated women. Other studies have shown that this is often the case with samples used in PPI studies (e.g. Curry et al., 2017). The participation in this study occurred on a voluntarily basis which potentially might indicate that women with a higher education are more attracted to this type of intervention and more willing to participate than men or individuals with a lower educational background. One should, therefore, be cautious when generalizing the results of this study to the broader population.

As implied earlier, another weakness of this study is that there was not a lot of variance among the number of kind acts the participants performed during this six-week-long study. Analysing the normality of the reports on the performed kind acts has shown that many participants reported on average only two kind acts per week and that few participants performed three or more kind acts per week. Possibly, this might have had negative effects on the effect sizes. In order to find the ideal dosage of kind acts to achieve an effect, a greater variance among the number of performed acts is necessary. One potential explanation why the participants tended to perform fewer kind acts than instructed might have been due to the strict instruction to perform five kind acts on one singular day. Although research indicates that performing kind acts on one day is more effective than spreading the

kind acts over the course of a week (Lyubomirsky, Sheldon & Schkade, 2005), participants might have felt restricted to perform more kind acts due to the instructions to do it on one day. By giving the participants the free choice regarding the time, frequency and nature of performing a kind act, they would potentially feel less restricted and more willing to perform kind activities more often and for a longer time (Lyubomirsky & Layous, 2013). Generally, gaining insight into the motivations and potential restrictions experienced by the participants might help adapting the design of future studies, so that the participants feel more encouraged to perform more kind acts, ensuring a greater variance of performed acts. The underlying factors and motivations of the participants to perform only two kind acts per week could be, for instance, explored by means of (semi-) structured interviews among participants.

Recommendations for future research

Although the results of this substudy represent a contribution to the scientific knowledge about the acts of kindness intervention, more research is needed to fully understand the underlying working mechanisms that make this intervention successful. Results show that performing acts of kindness can be a useful tool to improve the positive relations of the actor. However, it is yet unknown whether the recipient of a kind act and his or her relationship towards the actor plays an important role in the improvement of positive relations. Being kind towards a close family member, friend or romantic partner might have different effects on the experience of positive relationships due to the intimate and close relationship between both parties. In comparison to performing a kind act towards a randomly strange person, acting kindly towards individuals one feels more connected to might have a greater effect due to an increased relationship satisfaction. More research is needed to test whether acts towards strangers bear the same effect as kind acts towards, for example, a close friend.

Similarly, this substudy focused mainly on the executing side of a kind act, thus the actor. It did not consider the receiving end of kind behaviour. No known study has yet shifted the focus towards the receiving party and the possible effects of acts of kindness on the experience of positive relations. It might be interesting to know whether engaging in the acts of kindness intervention might also have potential benefits for more parties than just the participant, for example the social environment of the actor. Future research could administer questionnaires or (semi-) structured interviews among the social environment (e.g. close friends, partners or colleagues) before and after the intervention to gain information whether the experience of positive relations also changed in the environment close to the social actor.

Furthermore, another potential subject of interest for future research may concern the nature of the behavioural acts that have been performed by the participants. Although research suggests that an intervention's outcomes generally correlate positively with the frequency of usage (Donkin et al., 2011), this study found no significant correlation between the average number of performed acts and

the experience of positive relations. Maybe the nature and intensity of a kind act is more relevant than the frequency of performing kind behaviour. Helping someone moving heavy furniture and packing boxes for an entire weekend might have a greater effect on the relationship between the parties involved, compared to a small, ordinary act, for example, opening the door for someone. Future research could examine how the nature and intensity of a kind act is linked to the outcome of an intervention. Shedding light on which behaviour has the most impact on one's close relationships can help those engaging in acts of kindness to get the most out of this intervention. For example, if it turns out that small acts affect positive relations as much as larger acts, participants could be advised to spend their time with opening doors or complementing others, rather than putting their energy into larger, more complicated acts.

Another potential focus of interest concerns the stability of the found effects of the acts of kindness intervention. Although this study found that the effect of performing kind acts can last up to three months after the participation, future research should investigate whether these effects are still present at follow-up measurements unveiling the long-time effects of this six-week-long intervention. Knowing about the longevity of these effects might be interesting for the clinical sector, since performing as few as two kind acts per week affords a small effort, compared to the potential benefits that can arise from this behaviour, even months after the participating in the acts of kindness intervention.

Conclusion

Based on the results of previous studies, it can be concluded that the acts of kindness intervention is a useful tool to improve one's psychological well-being, as well as, a greater life satisfaction (Cohn et al., 2014; Buchanan & Bardi, 2010). However, this substudy was one of the first studies to examine the effect performing kind acts has on positive relations in specific. The outcomes contribute to the scientific knowledge that the acts of kindness intervention can also be used to effectively improve the experience of positive relations. Performing a few kind acts per week appears to be beneficial for one's positive relations, even three months after participating. And although other research suggests that acting kindly towards others is more effective than performing self-directed kind acts, this substudy was not able to replicate these findings. Additionally, it could not be confirmed that the average number of performed kind acts predicts the changes in positive relations over time.

The famous German writer Johann Wolfgang von Goethe reportedly described kindness to be the "golden chain by which society is bound together", hinting at the social aspect of kindness. The results of this substudy suggest however that being kind towards oneself should not be understated, that self-kindness can be likewise important to one's (psychological) well-being as kindness towards others.

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Appendix

A. Missing values

During the six-week-long intervention, the percentage of missing values regarding the online reports on how many acts were performed varied between almost 12% in week 2, to almost 43% in week 5. The percentage of missings values increased each week, up until week 5, when it decreased to almost 29%. Similarly, the percentage of missing values on T0, T1 and T2 about positive relations increased with time. While everyone completed the baseline questionnaire, only 69.4% and 58.8% completed the post-measurement questionnaire and the follow-up questionnaire, respectively.

Table 4.

Missing values, mean and standard deviation on how many kind acts performed over the course of six weeks

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Valid n(%)	150 (88.2)	125 (73.5)	113 (66.5)	111 (65.3)	97 (57.1)	121 (71.2)
Missing n(%)	20 (11.8)	45 (26.5)	57 (33.5)	59 (34.7)	73 (42.9)	49 (28.8)
M (SD)	1.79 (1)	1.94 (1.17)	1.8 (1.25)	1.89 (1.23)	2.06 (1.27)	1.92 (1.44)

Table 5.

Missing values, mean and standard deviation on three moments of measurement on subscale "positive relations"

|	Baseline (T0)	After intervention (T1)	Follow-up (T2)
Valid n(%)	170 (100)	118 (69.4)	100 (58.8)
Missing n(%)	0 (0)	52 (30.6)	70 (41.2)
M (SD)	4.26 (0.76)	4.57 (0.76)	4.46 0.79)

B. Pearson's correlations

Table 6.

Descriptive information and Pearson correlations between the tree times of measurement of positive relationships, performed kind acts and the differences of positive relations between T0 and T2

Measure	*M*	*SD*	1	2	3	4	5
1. Positive relations T0	4.26	0.76	-				
2. Positive relations T1	4.57	0.76	.80**	-			
3. Positive relations T2	4.45	0.79	.85**	.89**	-		
4. Average number of AOK	1.99	0.81	-.06	-.13	-.12	-	
5. Δ Positive relations T0 T2	0.18	0.43	-.19	.24*	.36 **	-.05	-

Note: *p-value $p < .05$; **p-value $p < .001$; observed data used
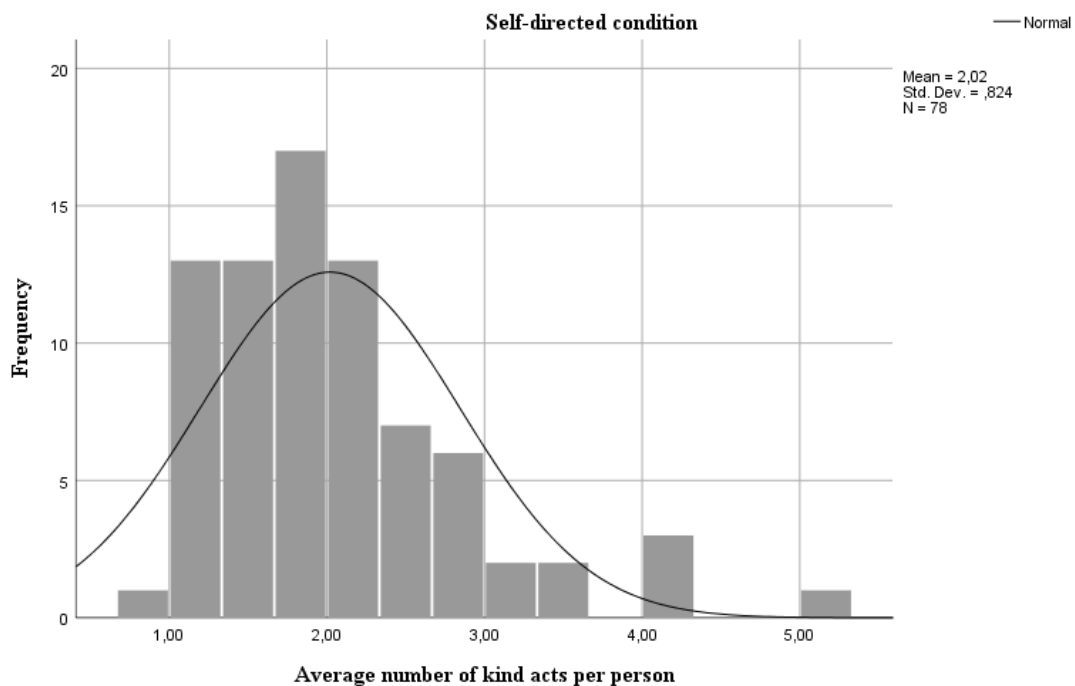
C. Normality tests and histograms

Other-directed condition
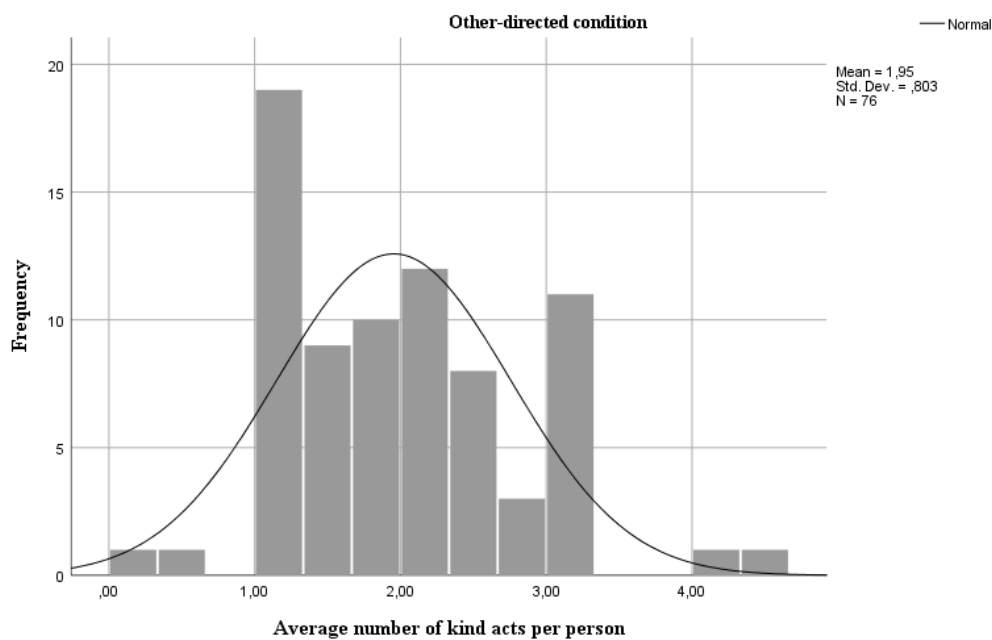
Tests of normality: Average number of performed kind acts per week

	Kolmogorov-Smirnov			Shapiro-Wilk	
Statistic	df	Sig.	Statistic	df	Sig.
.095	76	.083	.962	76	.023

	Statistic	Std. Error
Skewness	.391	.276
Kurtosis	.171	.545

Self-directed condition

Tests of normality: average number of performed kind acts

Kolmogorov-Smirnov			Shapiro-Wilk		
Statistic	df	Sig.	Statistic	df	Sig.
.121	78	.007	.924	78	.000

	Statistic	Std. Error
Skewness	1.070	.272
Kurtosis	1.590	.538