

# Effectiveness of Two Cognitive Interventions Promoting Happiness with Video-Based Online Instructions

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Published online: 10 December 2014  
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**Abstract** A 3-month experimental online study examined the short-term and 1 month follow-up effects of regularly practicing one of two cognitive interventions on subjective well-being. Participants were 435 self-selected adults (366 female, 69 male, aged 18–63) randomly assigned to one of three conditions: writing about best possible selves in the future ( $n = 135$ ), making gratitude lists ( $n = 150$ ) or writing to-do-lists as a control condition ( $n = 150$ ). The study was fully self-administered and exercise instructions were given in online videos. Repeated-measures MANOVA revealed that both interventions significantly increased subjective well-being in comparison to the control condition. Effect sizes for the different components of subjective well-being ranged from  $r = .09$ –.13 ( $\eta^2 = .01$ –.02) for the 2 months intervention period. These effects were maintained until the 1-month follow-up. Enjoyment and interest regarding the exercise as indicators of perceived person-intervention-fit moderated the effect; participants of the happiness interventions who perceived a better fit showed greater increases in subjective well-being. These findings confirm previous research on these interventions and encourage further studies on online interventions, especially regarding possibilities to increase participants' motivation and reduce dropout attrition.

**Keywords** Subjective wellbeing · Happiness · Gratitude · Best possible selves · Cognitive intervention · Internet-based study

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## 1 Introduction

The US-American Declaration of Independence put the pursuit of happiness as an unalienable human right and built the cornerstone for the development of the American Dream. Two hundred twenty-eight years later Diener and Oishi (2004) asked people around the world about the importance of different values. Happiness was ranked first in America and ranked fourth in Germany. This was in line with the nominations in other countries, leaving no doubt that happiness is among the most important values for all human beings around the globe.

Happy individuals were found to be more likely to have fulfilling relationships, superior work performance, more community involvement, and good health (Lyubomirsky et al. 2005a, b). Consequently, happy people do not only seem to feel better (Diener et al. 1992; Larsen and Ketelaar 1991), but also to be more likely to come across a variety of other good things in life. This is why researchers and practitioners around the globe aim to find ways to increase people's happiness sustainably.

Hedonic treadmill and set point theories negate the possibility of sustainable increases in happiness (e.g. Brickman et al. 1978; Headey and Wearing 1989; Lykken and Tellegen 1996). Due to hedonic adaptation and genetic limitations, sustainable happiness gains are viewed as impossible. In contrast, Norrish and Vella-Brodrick (2008), Lyubomirsky et al. (2005b) as well as Seligman et al. (2005) found evidence for a happiness increasing effect of certain interventions. Still, it remains unclear, if happiness gain can be sustained on the long run.

### 1.1 Definition and Integrative Model of Subjective Well-Being

Diener et al. (1999) conceptualized high subjective well-being (SWB) as consisting of three different components: High life satisfaction (cognitive), frequent positive affect (PA), and infrequent negative affect (NA, affective). PA and NA were shown to be independent of each other, i.e. one can experience positive and negative emotions concurrently (e.g. Schimmack 2008), but only with low to moderate intensity (Diener and Iran-Nejad 1986). Discriminant validities of life satisfaction, PA, and NA were confirmed by Lucas et al. (1996).

Lyubomirsky et al. (2005a, b) proposed an integrative model of SWB consisting of three major factors contributing to well-being: (a) the genetically determined happiness set point, (b) life circumstances, and (c) intentional activities. Twin studies point out that approximately 50 % of the population variation in SWB is due to the genetic set-up (Lykken and Tellegen 1996). Another 8–15 % is influenced by life circumstances (Diener et al. 1999) such as income (Diener et al. 2006), marriage and religiosity (Diener 1984) and 40 % seem to depend on intentional activities (Lyubomirsky et al. 2005a, b). The happiness set point is assumed not to be changeable lastingly. Life circumstances are thought to be difficult to change and even if they do, adaptation to new circumstances seems to be quick so that SWB returns to baseline (Suh et al. 1996). Intentional activities appear to be most promising when it comes to increasing SWB (Lyubomirsky et al. 2005a, b). Sin and Lyubomirsky (2009) conducted a meta-analysis on the effectiveness of intentional activities and reported a mean effect size of  $r = .29$  for changes in well-being. Longer interventions (up to 12 weeks) were associated with greater gains in well-being than short ones (<4 weeks).

## 1.2 Intentional Activities to Increase Happiness

In general, intentional activities can be categorized into behavioral, cognitive and volitional activities (e.g. Lyubomirsky et al. 2005a, b). This study investigated two cognitive interventions: best possible selves (BPS) and gratitude lists.

BPS represent individuals' ideas of what they might and want to become in the future (Markus and Nurius 1986). Writing about BPS was shown to promote clarification and awareness of goals and values and may lead to reorganization of priorities. This process itself can already have positive psychological impacts (Emmons 1986; Omodei and Wearing 1990; Palys and Little 1983). Possibly, while writing about BPS, existing goal conflicts become aware and can be solved subsequently. In line with this idea, individuals who mentally simulated the process of doing well on a test were found to actually perform better (Pham and Taylor 1999).

Visualizing and writing about the BPS were consistently found to be associated with increases in well-being (Smyth 1998). In a 4-day experiment conducted by King (2001) writing about life goals was associated with a significant increase in SWB immediately after the exercise and 3 weeks later. Sheldon and Lyubomirsky (2006) replicated and prolonged the study of King (2001) to a 4 week experimental study and found an immediate increase in PA which, however, could not be sustained until follow-up. In an 8 months longitudinal experiment, Lyubomirsky et al. (2011) did not find a main effect of the BPS exercise on SWB. However, participants who selected themselves into a happiness intervention reported the greatest increases in their happiness post-intervention and at follow-up 6 months later. This underlines the importance of believing in and aiming for an increase in SWB for the intervention to actually be effective.

Also gratitude interventions were consistently found to be effective. Wood et al. (2010) reviewed 12 studies and reported significant increases in SWB. More specifically, listing subjects one is grateful for was found to increase PA and decrease NA (Watkins et al. 2003). In a study of Emmons and McCullough (2003), who instructed participants to engage in the self-guided exercise "counting one's blessings", subjects were asked to write down five things they were grateful for. Those in the gratitude condition reported higher PA than those in the comparison group. The research team did not use a pre-post-design, but based their analysis on post group values. When Martínez-Martí et al. (2010) attempted to replicate these findings in a 2 week pre-post-study with follow-up, they found that differences in PA from pre- to post-intervention were mainly due to a decrease of PA in control condition (where subjects had to write down hassles instead of things they were grateful for) compared to the gratitude condition. This demonstrates the importance of pre-post measurements and a careful construction of the control condition. Sheldon and Lyubomirsky (2006) based their study on the exercise of Emmons and McCullough (2003). Subjects had to write down things in life they are grateful about and explain why they are grateful about these things. They found reduced NA in the gratitude group at post-intervention but no changes in PA. A study with early adolescents indicated that counting blessings is associated with enhanced life satisfaction and decreased NA compared to a hassles or control condition (Froh et al. 2008). In the study of Toepfer et al. (2012) a different gratitude exercise was conducted: Subjects were asked to write letters of gratitude once a week for a period of 3 weeks with the aim to express appreciation to somebody. The authors reported increased happiness and life satisfaction as well as decreased depressive symptoms.

In conclusion, there is clear evidence for the positive effect of BPS and gratitude interventions on SWB. Up to now, most of these interventions were conducted face-to-

face. In daily life, however, many subjects who would benefit from SWB enhancing training do not have the time, flexibility and financial possibilities to participate in those face-to-face interventions. This group of people may benefit from internet interventions.

### 1.3 Internet Interventions

More than 97 % of the inhabitants of Germany between the age of 14 and 39 have access to the internet and use it at least occasionally. From the people older than 65 years still 39 % do (van Eimeren and Frees 2012). The Internet has become a popular method of dissemination for health interventions such as stress management, HIV prevention, problem drinking, mental health, and smoking cessation (Bennett and Glasgow 2009; Ritterband et al. 2003).

Internet interventions allow participants to access the content at the time and place most convenient to them. They can remain largely anonymous which might reduce the inhibition threshold of participation. Therefore, internet is a possibility to achieve a high reach to the population in need. The training can be offered to a big amount of people without increasing cost and effort in the same proportion. Additionally, the intervention can be tailored to the specific needs of the participants to enhance program engagement and adherence. However, online interventions also have disadvantages. Several members of the population in need of training do not have internet access or the computer and literacy skills required for participation in an online exercise. Some people prefer real face-to-face contact over online mediated contact (Mitchell et al. 2010). For these reasons, internet interventions are still characterized by high attrition up to 40–50 % (Bennett and Glasgow 2009; Eysenbach 2005).

Studies on online interventions to improve SWB are still scarce. Seligman et al. (2005) conducted a random-assigned and placebo-controlled internet study investigating the effect of five different 1-week, self-administered happiness interventions in a large sample ( $n = 411$ ). Happiness was measured at six time points (pre-test, post-test directly after the intervention, 1 week, 1, 3 and 6 months). Three of these five interventions lead to an increase in happiness as compared to the control group, which could be sustained for 1 month. These interventions were the (1) gratitude visit, i.e. participants wrote and delivered a letter of gratitude to someone they were thankful to, (2) three good things, i.e. subjects noted three things that went well in the past week and explained why these things happened, (3) using signature strengths, i.e. subjects received feedback on their five strongest character strengths and used one of them in a new way.

Gander et al. (2013) examined the effectiveness of nine strengths-based positive interventions on well-being in 622 adults in an internet-based randomized placebo-controlled study with five measurement points (pre- and post-test, 1-, 3-, and 6 months follow-up). The aim of the study was to replicate the findings of Seligman et al. (2005) and to test some variants of the interventions. Eight of the nine interventions increased well-being as compared to the placebo control group. While the gratitude visit, the combination of gratitude visit and three good things as well as the 1 week three good things interventions showed significantly enhanced well-being scores, the 2-week three good things intervention only approached significance.

Mitchell et al. (2009) extended the strength intervention of Seligman et al. (2005) to a 3 week internet-based intervention. The authors examined the effectiveness of an internet-based strength intervention in a randomized controlled trial on different measures of well-being at pre-assessment, post-assessment and 3-month follow-up and found positive effects, but only on the cognitive, not on the affective well-being measure.

Parks (2009) evaluated the multi-component intervention “positive psychotherapy”, which combines six positive interventions that have been proven to be effective in the past, such as three good things, using character strengths and gratitude visit. The authors found decreased depression scores, but no increases in subjective well-being. They explained these results by the mixture of applied interventions.

In a randomized waitlist controlled trial by Abbott et al. (2008) a 10-week, multi-component intervention consisting of exercises on emotion regulation, impulse control, optimism, causal analysis, empathy, self-efficacy, and reaching out no increase on subjective well-being, quality of life or work performance was found.

Shapira and Mongrain (2010) found that an online self-compassion and an optimism exercise increased well-being as compared to a placebo control. This effect could be sustained up to 6 months.

It can be concluded that well-being can be enhanced by some but not all of the positive interventions. As the effectiveness of BPS and gratitude interventions were mainly shown in face-to-face studies, the aim of the current research was to test the effectiveness of these interventions in an online format.

#### 1.4 Sustainability of Happiness Increasing Effects of Interventions

There is little evidence on the long-term sustainability of increases in SWB. Sheldon and Lyubomirsky (2006) examined the sustainability of intentionally increased SWB in a pre-post-follow-up design. Their participants reported lower levels of PA and higher levels of NA at the 1 month follow-up compared to post-intervention. These unexpected results were explained by external influences like examinations and the end of the semester term. Another pre-post-follow-up study showed small increases in SWB at the 6 months follow-up compared to baseline, but these changes did not reach significance (Lyubomirsky et al. 2011). Based on these findings it is hypothesized that changes in SWB will be sustained at least to some degree over a period of 1 month.

#### 1.5 Enjoyment and Interest as Indicators of Person-Intervention Fit

Regarding person-intervention-fit, exercises that are consistent with a person’s strengths, virtues, and beliefs were found to result in higher motivation, more effort put into the exercise, and greater gains in SWB (Sheldon and Lyubomirsky 2006). Possible indicators of perceived fit are enjoyment and interest when carrying out an activity. Enjoyment and interest may function self-reinforcing and increase motivation. In line with this claim, self-determination theory proposes that a crucial factor for motivation to persist is whether someone is able to find meaning and value expression in the activity (Deci and Ryan 2000). Consistently, Sheldon and Elliot (1999) showed that identification with the activity and interest in continued practice moderated an intervention’s effectiveness. Therefore, participants who perceive their assigned intervention enjoyable and interesting are hypothesized to show higher increases in SWB than those who perceive it less suitable.

#### 1.6 The Present Study

To sum up, the aim of the study on hand was to replicate the findings of Lyubomirsky et al. (2011) as well as Emmons and McCullough (2003) regarding SWB increasing effect of the

two exercises best possible selves and gratitude lists. In this fully self-administered design a new feature was added by using internet-based instructions in video-format. We assumed that both interventions, best possible selves and gratitude lists, would increase SWB, while the control condition would not. Post-levels of life satisfaction and PA were assumed to be higher than pre-levels, whereas NA was assumed to decrease from pre- to post-level. These positive changes in SWB were expected to persist for 1 month though slightly decreasing. Changes in the three components of SWB were assumed to be moderated by the person-intervention-fit.

## 2 Method

### 2.1 Participants

Seven hundred and forty subjects registered on the website. Of these participants, 666 completed the pre-intervention questionnaire, 458 filled in the post-intervention questionnaire and 322 took part in the follow-up measurement. Dropout Attrition from pre- to post-intervention was  $n = 208$  (31.2 %). Furthermore, 3.5 % were excluded due to non-usage attrition (Fig. 1). Age,  $t(664) = .08$ ,  $p = .94$ , pre-test levels of life satisfaction,  $t(663) = 1.07$ ,  $p = .29$ , PA,  $t(664) = .59$ ,  $p = .55$ , and NA,  $t(664) = -.65$ ,  $p = .51$  as well as the experimental condition,  $\chi^2(2) = 2.11$ ,  $p = .35$  were not significantly different between subjects who dropped out and those who did not. In contrast, there was a significant association between dropout attrition and gender,  $\chi^2(1) = 4.93$ ,  $p = .03$ . For women the odds of staying in the study were 1.58 times higher than for men. Furthermore, the odds of staying in the study were 2.05 times higher for participants enrolled at Fern-Universität in Hagen than for external participants,  $\chi^2(1) = 16.81$ ,  $p < .001$ .

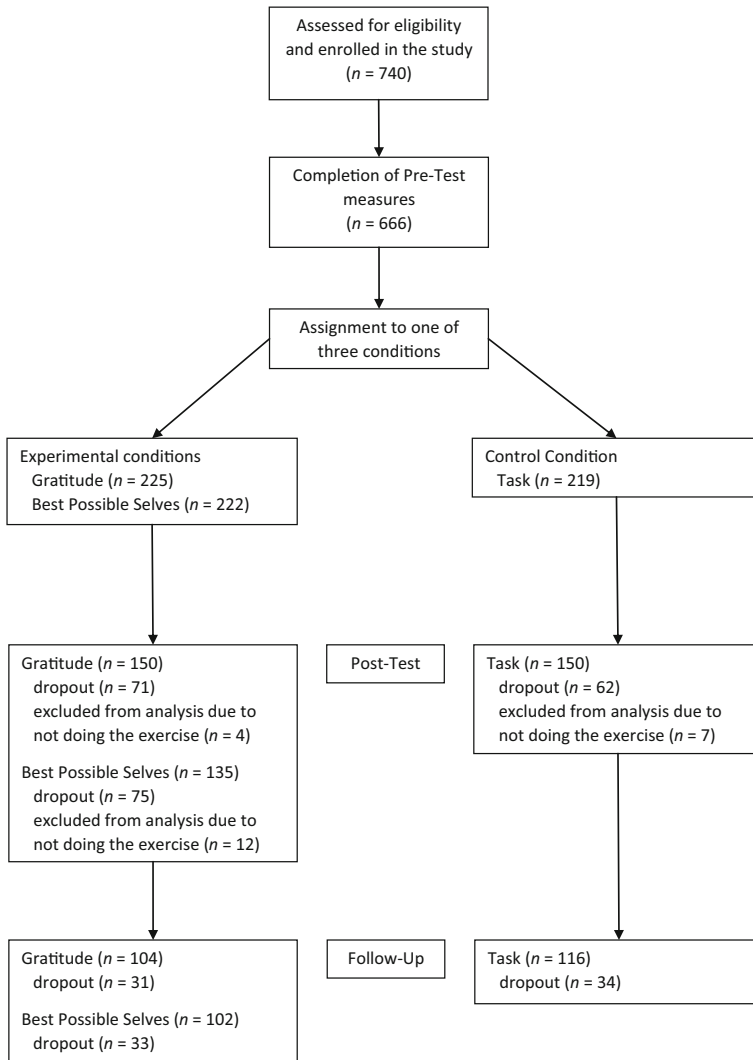
The sample completing the questionnaires at pre- and post-intervention and performing the intervention at least once included 366 women (84.1 %) and 69 men between the ages of 18 and 63 years ( $M = 33.7$ ,  $SD = 9.6$ ). Most of them were students ( $n = 123$ ) or employees ( $n = 190$ ). Table 1 shows a detailed description of the sample's demographics.

At the end of the intervention period, participants were asked how often they had actually conducted the intervention. Non-attendance was low (between 2.6 and 8.2 %), 12 subjects reported that they had not conducted the exercise in the BPS condition, 4 in the gratitude condition and 7 in the control group. Subjects participated 6 times on average (median = 6.0), which is two times less than instructed in the exercise. Subjects who had not participated in the exercise were excluded from the analyses.

### 2.2 Procedure

The study was conducted in a pre-post-follow-up design with three measurement points. The intervention period between pre- and post-measurement was 8 weeks; the follow-up measurement took place another 4 weeks later. The study was piloted with a sample of  $N = 13$ . This pilot revealed some weaknesses in spelling and wording that were corrected, so that the actual study could be initiated.

Participants were recruited via the virtual laboratory of the FernUniversität in Hagen, Facebook, and flyers which were disseminated in supermarkets, pubs, fitness centers, and universities. Interested subjects were asked to register with their email address on the website [www.gluecksstudie.com](http://www.gluecksstudie.com) which provided information on the study and people in charge. Subjects were randomized automatically into one of the three conditions, i.e. best



**Fig. 1** Flow of participants. *Note* Attrition of participants in the course of the study

possible selves, gratitude or control condition. Subjects in all three conditions were provided with the same information, i.e. that the goal of the study on hand was to increase happiness and that scientifically established exercises would be used. The groups were not aware of their group status, i.e. if they were in the experimental or in the control group.

An email invited them to the first online questionnaire. After providing their informed consent, participants answered questions about demographic information, life satisfaction, PA, and NA. Then they received the link to their online instruction video. In the following 8 weeks they were asked to complete their assigned exercise once a week. After the end of the intervention, participants received an email inviting them to the post-intervention questionnaire which assessed the same measures as pre-intervention. To test the sustainability of the possible changes in SWB a follow-up measurement was conducted another

**Table 1** Demographics of sample divided by experimental group: age, marital status, level of education, children, employment

	<i>n</i>			
	BPS	Gratitude	Tasks	Total
<b>Age</b>				
≤19	4	4	2	10 (2.3 %)
20–29	56	54	52	162 (37.2 %)
30–39	39	45	55	139 (32.0 %)
40–49	30	36	31	97 (22.3 %)
≥50	6	11	10	27 (6.2 %)
<b>Marital status</b>				
Single	42	42	40	124 (28.5 %)
Relationship	56	67	59	182 (41.8 %)
Married	37	41	51	129 (29.7 %)
<b>Level of education</b>				
Secondary school level	8	14	8	30 (6.9 %)
Higher education entrance qualification	69	83	76	228 (52.4 %)
University degree	54	49	60	163 (37.5 %)
PhD	4	4	6	14 (3.2 %)
<b>Children</b>				
0	87	101	102	290 (66.7 %)
1	18	22	11	51 (11.7 %)
2	24	22	22	68 (15.6 %)
≥3	6	5	15	26 (6.0 %)
<b>Employment</b>				
Leading position	3	7	3	13 (3.0 %)
Employee	61	63	66	190 (43.7 %)
Freelancer	13	26	20	59 (13.6 %)
Student	40	33	50	123 (28.3 %)
Unemployed, pensioner, housewife	17	13	10	40 (9.2 %)
Other	1	8	1	10 (2.3 %)
<b>Total</b>	<b>135</b> (31.0 %)	<b>150</b> (34.5 %)	<b>150</b> (34.5 %)	<b>435</b> (100 %)

Sample consisting of participants who completed pre- and post-interventions measures and performed the assigned exercise at least once. Experimental conditions were best possible selves (BPS), gratitude and control condition tasks

4 weeks later. Only after the follow-up measurement participants in the control condition were debriefed and told that the exercise they used was not constructed to enhance subjective well-being. Furthermore, they received access to both of the online interventions of the experimental groups and could participate, if they wished to.

### 2.3 Experimental Conditions

In all three groups participants received online video instructions explaining the exercise and a downloadable exercise sheet. The video instructions were provided by one of the



authors, who has a psychological background and is a certified trainer in stress management. The best possible selves (BPS) exercise was adapted from King (2001), Sheldon and Lyubomirsky (2006), and Lyubomirsky et al. (2011). The BPS exercise was introduced via video instructions as follows: “During the next weeks please imagine what your future life will ideally look like. [...] The email you have received contains one specific life domain for this week. Now write down precisely what your life in this domain would be like in 5 years from now. [...]” Participants received a weekly email including the domain which they would be dealing with in the coming week. The domains were partnership and romantic life, hobbies and personal interests, family, friendship and social relationship, clubs, networks, groups and community involvement, physical and mental health, job and career, free topic.

The gratitude exercise was adapted from Emmons and McCullough (2003) and Sheldon and Lyubomirsky (2006) and introduced by online video instructions as follows: “During the next weeks put your focus on the things in your life you are grateful for. [...] Now think of the last week precisely. What happened in your life you are grateful for? [...] Please compile a list and write down five of these things. [...] Please extend your gratitude list by five additional topics each week ...”.

The task exercise was set up as a control condition. As goals for each week were listed, it built a bridge between goal perspective in the BPS exercise and listing actual circumstances in the gratitude exercise. “During the next weeks put your focus on the important tasks in your life. [...] Now think of the upcoming week precisely. Which tasks lie ahead of you? [...] Please compile a list and write down five of these things. [...] Please extend your list for five further things each week, ...”.

## 2.4 Measures

### 2.4.1 Life Satisfaction

The Satisfaction with Life Scale (SWLS; Diener et al. 1985; Pavot and Diener 1993) consists of five questions which are rated on 7-point Likert-type scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores on this measure indicate greater satisfaction with life. A validation study with the German version of the SWLS found one single factor with high internal consistency ( $\alpha = .92$ ; Glaesmer et al. 2011). In the study at hand Cronbach's  $\alpha$  ranged from  $\alpha = .86$  in pre-test ( $n = 435$ ),  $\alpha = .88$  in post-test ( $n = 435$ ), and  $\alpha = .89$  in follow-up ( $n = 322$ ).

### 2.4.2 Affect

Participants completed a German version of the Scale of Positive and Negative Experience (SPANE; Diener et al. 2009) to evaluate their feelings in the last week. The SPANE consists of 12 items divided into two subscales for positive (PA) and negative (NA) feelings with six items each (e.g. pleasant, happy, unpleasant, sad). Ratings were given on a 5-point Likert-type scale from 1 (*very rarely or never*) to 5 (*very often or always*) indicating how much every feeling had been experienced in the last week. Prior studies have reported Cronbach's  $\alpha = .84$  for PA and  $\alpha = .80$  for NA (Diener et al. 2009). In this study  $\alpha$  coefficients ranged from  $\alpha = .92$  (PA)/.82 (NA) in pre-test ( $n = 435$ ),  $\alpha = .91$  (PA)/.85 (NA) in post-test ( $n = 435$ ) to  $\alpha = .93$  (PA)/.88 (NA) in follow up ( $n = 322$ ).

The State-Trait-Anxiety-Depression Inventory (STADI; Laux et al. 2013) was used as an additional measure for positive and negative affect. The subscales State Euthymia (EU)

and State Dysthymia (DY) which consist of five items each (e.g. “I’m in a good mood”, “I’m depressed”) were used to compute a depression score (DEP) as affective balance. The Euthymia scale was reverse-scored and entered as a measure of Anhedonia in the depression score together with Dysthymia. In this study Cronbach’s  $\alpha$  for DEP ranged from  $\alpha = .92$  (EU)/.90 (DY) in pre-test ( $n = 435$ ),  $\alpha = .93$  (EU)/.89 (DY) in post-test ( $n = 435$ ) to  $\alpha = .93$  (EU)/.91 (DY) in follow up ( $n = 322$ ).

#### 2.4.3 *Enjoyment and Interest Regarding the Exercise as an Indicator of Person-Intervention-Fit*

At post-intervention participants rated five items regarding enjoyment and interest while performing the exercise that may indicate person-intervention-fit. The items asked for the extent of enjoyment gained by the intervention and the video, whether the assigned exercise was easy for them, their wish to continue as well as their interest in getting to know similar exercises. All five items were answered on a 5-point Likert-type scale with *strongly agree* coded as 1 and *strongly disagree* coded as 5 and summed up for further calculation. Low scores on this composite measure indicate a good perceived fit between person and exercise. Scores ranged from 5 to 23, with a sample mean of  $M$  ( $SD$ ) = 11.6 (3.4) and Cronbach’s  $\alpha = .68$  ( $n = 435$ ).

### 3 Results

#### 3.1 Preliminary Analyses

Missing value analysis revealed three cases with missing data with no systematic pattern and only single variables missing. Therefore, the cases were only taken out from calculations where the missing variable was concerned.

Preliminary analysis showed no significant differences in SWB among the three groups at pre-intervention. A one-factorial multivariate analysis of variance (MANOVA) with group assignment as between-subjects factor with three levels turned out not to be significant for the dependent variables SWLS, PA, NA, and DEP, Pillai’s trace  $V = .03$ ,  $F(8, 908) = 1.526$ ,  $p = .14$ . The intercorrelations between the different dependent variables are shown in Table 2.

#### 3.2 Effectiveness of the Two Interventions

##### 3.2.1 *Preliminary Analyses*

To test the omnibus hypothesis whether the two interventions—best possible selves and gratitude—had an effect on SWB compared to the control group a MANOVA with repeated measures and effect coding of the intervention as between-subjects factor with two levels (1 = BPS and gratitude, 0 = control) was calculated. The dependent variables were SWLS, PA, NA, and DEP at pre-intervention and post-intervention. The assumption of normal distribution was not fulfilled; Kolmogoroff-Smirnoff-Test became significant for almost all dependent variables. The absolute values of kurtosis and excess of all dependent variables were below 1 and visual inspection of the distributions showed that variables are nearly normally distributed. Nevertheless, according to Bortz and Schuster (2010, p. 481)

**Table 2** Mean (SD) score for pre-intervention, post-intervention and follow-up subjective well-being divided by experimental condition

	Experimental condition					
	BPS		Gratitude		Tasks	
	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>
Life satisfaction						
Pre-intervention	22.1 (6.3)	135	22.6 (6.5)	150	23.8 (5.4)	149
Post-intervention	23.4 (6.2)	135	23.8 (6.2)	150	24.0 (5.7)	150
Follow-up	23.4 (6.2)	102	23.8 (6.3)	104	24.4 (5.8)	116
Positive affect						
Pre-intervention	20.1 (4.4)	135	20.5 (4.2)	150	21.1 (4.1)	150
Post-intervention	21.3 (4.1)	135	21.7 (4.3)	150	21.1 (4.2)	150
Follow-up	21.1 (4.5)	102	21.4 (4.2)	104	21.3 (5.0)	116
Negative affect						
Pre-intervention	16.5 (4.6)	135	15.8 (4.4)	150	15.4 (4.2)	150
Post-intervention	15.3 (4.6)	135	15.1 (4.3)	150	15.6 (4.6)	150
Follow-up	15.3 (4.8)	102	14.7 (4.8)	104	15.1 (5.0)	116
Depression						
Pre-intervention	21.7 (6.5)	135	21.0 (6.2)	150	20.1 (5.8)	150
Post-intervention	20.7 (6.5)	135	20.0 (5.7)	150	20.4 (6.2)	150
Follow-up	20.7 (6.4)	102	20.0 (6.0)	104	20.4 (7.1)	116

Experimental conditions were best possible selves (BPS), gratitude and control condition tasks

the calculated MANOVA is robust against violations of the normality assumptions due to the big sample size. Box's Test of equality of covariance matrices was not significant, indicating that the assumption of homogeneity was met,  $M = 40.32$ ,  $F(36, 319,498) = 1.10$ ,  $p = .32$ .

### 3.2.2 Hypothesis Test

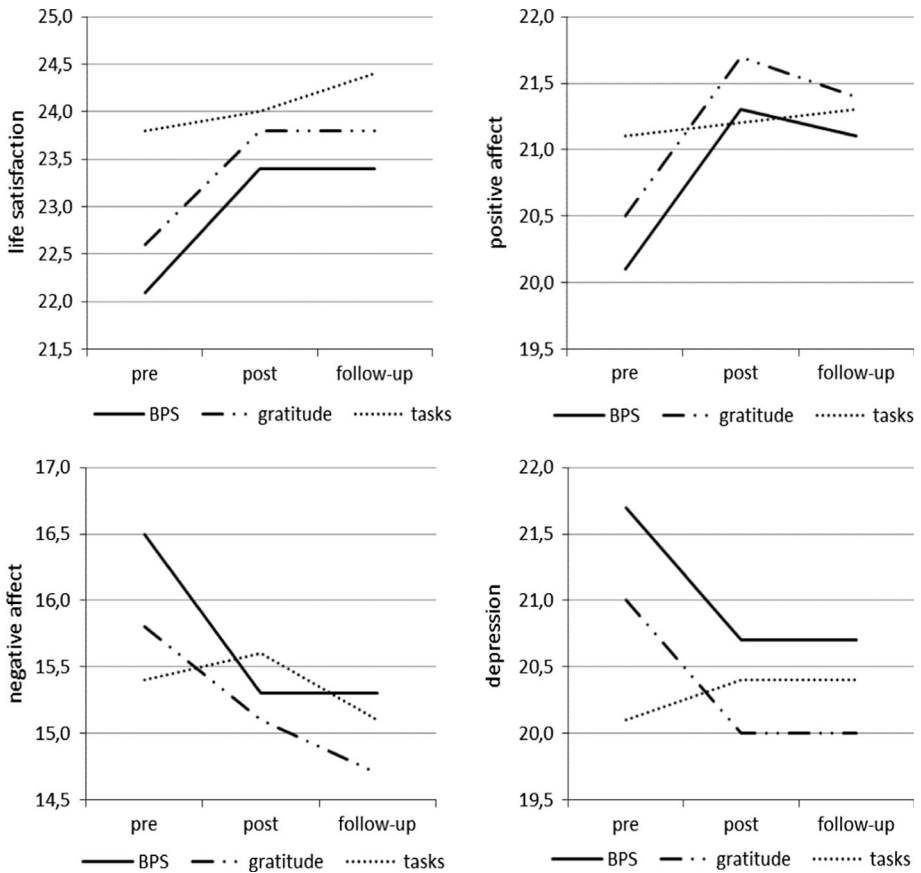
The one-way MANOVA with repeated measures revealed a significant multivariate main effect for time, Pillai's trace  $V = .04$ ,  $F(4, 429) = 4.75$ ,  $p = .001$ ,  $\eta^2 = .04$ . SWB was higher at post-intervention than pre-intervention. The power to detect the effect was .95. The interaction effect between time and group became significant, too, Pillai's trace  $V = .03$ ,  $F(4, 429) = 2.71$ ,  $p = .03$ ,  $\eta^2 = .03$ . The power to detect the effect was .75. Increases in SWB were higher for the two intervention groups compared to controls. Table 3 shows the mean scores of dependent variables as measured prior to, immediately after the intervention and another 4 weeks later, graphically represented in Fig. 2. Figure 3 illustrates the significant interaction effect separated by the four dependent variables.

To test whether SWB increased more in the two intervention groups than in the control group, planned contrasts were calculated for all dependent variables (Field 2009; Bortz and Schuster 2010; Rosenthal et al. 2000). A first contrast compared the BPS ( $\lambda_1 = 1$ ) and

**Table 3** Correlations between dependent variables for pre-intervention, post-intervention and follow-up

	Pre				Post				Follow-up			
	SWLS	PA	NA	DEP	SWLS	PA	NA	DEP	SWLS	PA	NA	DEP
	PA	.60*										
NA	-.45*	-.60*										
DEP	-.61*	-.80*	.73*									
Post												
SWLS	.77*	.51*	-.41*	-.54*								
PA	.47*	.52*	-.34*	-.46*	.65*							
NA	-.37*	-.29*	.46*	.37*	-.55*	-.64*						
DEP	.45*	-.44*	.41*	.49*	-.66*	-.81*	.76*					
Follow-up												
SWLS	.77*	.52*	-.40*	-.50*	.84*	.57*	-.51*	-.57*				
PA	.48*	.48*	-.33*	-.41*	.55*	.61*	-.45*	-.56*	.67*			
NA	-.32*	-.24*	.43*	.31*	-.40*	-.43*	.61*	.49*	-.54*	-.71*		
DEP	-.42*	-.38*	.36*	.42*	-.52*	.55*	.60*	.59*	-.68*	-.87*	.79*	

\*  $p < .01$

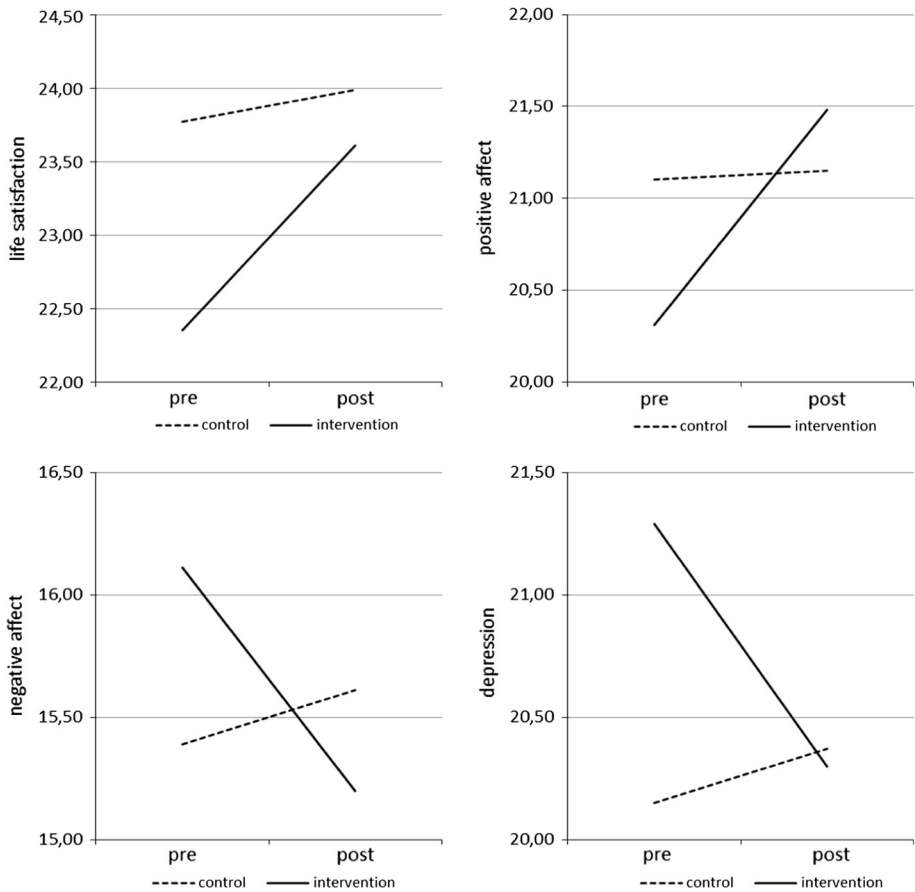


**Fig. 2** Levels of subjective well-being at pre-, post-intervention and follow-up. *Note* Development of the dependent variables SWLS, PA, NA and DEP from pre- to post-intervention and follow-up

gratitude ( $\lambda_2 = 1$ ) groups with the control group ( $\lambda_3 = -2$ ) and became significant. In the two intervention groups SWB showed a higher increase than in the control group. SWLS,  $F(1, 432) = 5.31, p = .011$  (1-tailed),  $r = .11, \eta^2 = .01$ , and PA,  $F(1, 432) = 7.78, p = .003$  (1-tailed),  $r = .13, \eta^2 = .02$ , increased significantly, while NA,  $F(1, 432) = 6.17, p = .007$  (1-tailed),  $r = .12, \eta^2 = .01$ , and DEP,  $F(1, 432) = 3.69, p = .046$  (1-tailed),  $r = .09, \eta^2 = .01$ , decreased significantly in the two intervention groups as compared to the control group.

A second orthogonal contrast using the weights  $\lambda = (1, -1, 0)$  compared the two conditions BPS and gratitude with each other. No significant differences in the dependent variables were found, SWLS  $F(1, 431) = .03, p = .427$  (1-tailed), PA  $F(1, 431) < .01, p = .463$  (1-tailed), NA  $F(1, 431) = .38, p = .268$  (1-tailed), and DEP  $F(1, 431) < .01, p = .482$  (1-tailed). Due to the lack of differences, these two groups were merged for all further analyses using the effect coding mentioned above.

Controlling for frequency of performing the exercise did not change any of the results.



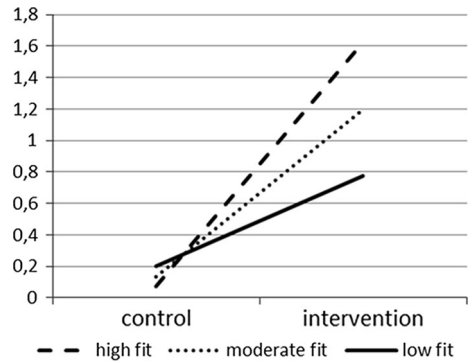
**Fig. 3** Interaction effect of time and group in MANOVA. *Note* Interaction effect of time (pre- and post-intervention) and group (intervention/control), separated for the four dependent variables SWLS, PA, NA and DEP

### 3.3 Moderating Effect of Enjoyment and Interest as Indicators of Person-Intervention-Fit

#### 3.3.1 Preliminary Analyses

The hypothesis was tested in a hierarchical regression framework comparing the combined intervention group with the control group as predictor. The intervention was coded as interventions (=1) and control (=0). The moderator, i.e. the enjoyment and interest score that was used as an indicator of person-intervention fit, was centered prior to calculations in order to strike multicollinearity (Cohen et al. 2003). Difference scores of the dependent variables were used as criterion variables; i.e. pre-intervention scores of SWLS, PA, NA, and DEP were subtracted from post-intervention scores.

**Fig. 4** Moderating effect of person-exercise-fit on changes in positive affect. *Note* Changes in PA from pre- to post-intervention for high (+.5 SD), moderate (mean) and low (-.5 SD) levels of perceived person-exercise-fit



### 3.3.2 Hypothesis Test

In a moderated hierarchical regression the product term of the person-intervention-fit measure and intervention (yes/no)  $R^2$  changed significantly only for PA (SWLS  $\Delta R^2 < .01$ ,  $\beta = -.04$ ,  $p = .59$ ; PA  $\Delta R^2 = .01$ ,  $\beta = -.17$ ,  $p = .017$ ; NA  $\Delta R^2 = .01$ ,  $\beta = .12$ ,  $p = .11$ ; DEP  $\Delta R^2 = .01$ ,  $\beta = .11$ ,  $p = .14$ ) and the beta weight was significant, which indicates a moderator effect (Baron and Kenny 1986). The effect size was very small with  $f^2 = .014$ . Simple slopes for the association between perceived fit and PA were tested for low (-.5 SD below the mean), moderate (mean), and high (+.5 SD above the mean) levels of perceived fit (Aiken and West 1991; for Syntax O'Connor 1998). Two of the three simple slope tests revealed a significant positive association between PA and treatment group: treatment group was more strongly related to PA for high levels of fit ( $\beta = .18$ ,  $SE = .05$ ,  $p = .001$ ) than for moderate ( $\beta = .12$ ,  $SE = .05$ ,  $p = .009$ ) or lower levels ( $\beta = .07$ ,  $SE = .05$ ,  $p = .20$ ). Figure 4 plots the simple slopes for the interaction. Participants who perceived their exercise more suitable to them showed bigger increases in PA at post-intervention.

### 3.4 Sustainability of Increases in Subjective Well-Being Over Time

To test whether the observed changes in SWB at the second measurement point were sustained at the 1 month follow-up, a MANOVA with repeated measures and intervention (yes/no) as between-subjects factor was calculated. Dependent variables were SWLS, PA, NA, and DEP at post-intervention and follow-up. Again, the assumption of multivariate normal distribution was violated, but the MANOVA was nevertheless carried out as it is robust against violations of the normality assumptions when the sample size is sufficient (Bortz and Schuster 2010, p. 481). Box's Test of equality of covariance matrices was non-significant indicating that the assumption of homogeneity was met,  $M = 38.33$ ,  $F(36, 202,976) = 1.03$ ,  $p = .41$ . The one-way MANOVA with repeated measures contrasting post-intervention versus follow-up and intervention versus control did not become significant for the main effect of time, Pillai's trace  $V = .01$ ,  $F(4, 328) = 1.06$ ,  $p = .38$ . Power to detect the effect was .24, after applying a Bonferroni adjustment of  $\alpha$  and reducing it to .025. The interaction effect did not become significant either, Pillai's trace  $V = .01$ ,  $F(4, 328) = .57$ ,  $p = .68$ . Thus, the interventions' SWB enhancing effect was preserved until the 1-month follow-up and hypothesis 4 could be confirmed.

## 4 Discussion

The study on hand examined the effectiveness of two cognitive interventions in increasing SWB. Results showed that both interventions, i.e. writing about best possible selves and making gratitude lists, were equally effective in increasing SWB compared to the control condition. Significant effect sizes for changes from pre- to post-intervention were small and ranged from  $r = .09$  to  $.13$  for the different components of SWB. The effect size for the moderating role of enjoyment and interest as indicators of person-intervention-fit were even smaller which is in part attributable to the reliability of the interaction term that is always low when uncorrelated predictor and moderator variables are aggregated. The results of the follow-up measurement showed that the improvements in SWB could be maintained for 4 weeks. The perceived fit between person and assigned exercise significantly moderated the interventions' effects.

### 4.1 Relevance of the Established Effects

The effect sizes of the interventions are comparable to a study of Lyubomirsky et al. (2011) in which effect sizes around  $r = .10$  for a best possible selves exercise and a different gratitude exercise were reported and to Emmons and McCullough (2003) who reported an effect size of  $r = .11$ . Sin and Lyubomirsky (2009) reported a mean effect size of  $r = .29$  for changes in SWB in their meta-analysis in which they considered diverse interventions and intervention formats, including online interventions. This indicates that bigger effect sizes might be possible even for online interventions, although self-administered intervention formats were reported to have the lowest effect sizes. Furthermore, Sin and Lyubomirsky (2009) reported that self-selection moderates the effectiveness of the interventions. Allowing subjects to self-select their intervention as well as providing subjects with more personalized instructions and feedback in a virtual classroom or online platform, might increase the effectiveness of the interventions.

Though the identified effect sizes were small, the effect can be of importance. Prentice and Miller (1992) defines importance as a function of how minor the manipulation of the independent variable is and how resistant a dependent variable is to change. As the intervention was cost-effective, unlikely to produce harm and merely took 15 min per week, it can be considered a minimal manipulation. Given the relative heritability of SWB, the dependent variable may be particularly resistant to change. Additionally, the population was nonclinical. Thus, the effect of the two interventions can still be considered as meaningful.

### 4.2 Enjoyment and Interest Regarding the Exercise as an Indicator of Person-Intervention-Fit

More reported enjoyment and interest in the intervention on the used composite measure resulted in greater gains in SWB over time in both intervention groups. This finding is in line with previous research (Senf and Liao 2013; Sheldon and Lyubomirsky 2006) and with self-determination theory (Deci and Ryan 2000). It emphasizes the need for more research on which exercise fits which kind of personality best.



### 4.3 Effectiveness of Online Studies

The study on hand is the first internet based study using online video instructions. As the online video format was effective and most participants evaluated the format suitable for the exercise, online intervention programs might be an efficient way to deliver SWB increasing techniques to a big amount of people. In addition, the pre-post-follow-up design with a big sample size provided information that enriches the happiness interventions literature. A longitudinal research design is necessary to keep track of the development of SWB and to observe lasting effects. While in other studies changes in SWB could not be sustained until follow-up (e.g. Lyubomirsky et al. 2011; Sheldon and Lyubomirsky 2006) the study on hand found maintained effectiveness at least after 1 month.

### 4.4 Limitations of the Study

There are some noteworthy limitations to this study. First, effect sizes for the interventions were small. In order to increase effects, the exercise should be carefully matched with participants' personalities. Although the participants were initially motivated to increase their happiness, dropout was high, indicating that the person-intervention-fit was absent for part of the participants. Techniques to increase motivation and compliance could be used in future studies. Second, sampling bias might have occurred as most participants were students enrolled at the FernUniversität in Hagen. This population might be more diverse compared to universities with regular attendance but can still have different characteristics than a non-student sample. The study was only available to individuals with computer and internet access. Some of the participants reported difficulties with their internet connection. Future studies should secure that even people with slow internet connection are able to watch a video properly. Third, the use of self-report measures and the awareness that this was a study on happiness may have triggered socially desirable responding (Fastame and Penna 2013; Fleming 2012). A challenge for well-being researchers is to develop improved behavior-based, domain-specific assessment tools including physiological and behavioral measures.

### 4.5 Implications for Future Research

Future research should focus on how interventions offers might become more attractive to male participants and attrition might be reduced. It should be investigated how different instruction formats influence program adherence and attrition. Advanced multimedia elements, more videos or more direct ways to interact such as discussion forums or live contact in a virtual meeting room might increase participants' commitment and the intervention effects (Mayer 2003). Furthermore, the combination of different exercises could be tested in order to analyze whether interaction effects occur, as proposed by Fordyce (1977, 1983), and already proven effective by Schueller and Parks (2012) as well as by Gander et al. (2013). However, Gander et al. did not report an incremental increase of happiness due to the combination of two interventions (*gratitude visit* and *three good things*) as compared to pursuing a single intervention only. The authors argue that the time lag between learning two different interventions might be of importance and should probably not be too short. Future studies should investigate even longer term effects than the 1-month interval until follow-up in the study on hand. Last, future research might focus on potential mediators to receive a deeper understanding of the underlying mechanisms (Lyubomirsky and Layout 2013).

## 5 Concluding Remark

To the best of our knowledge, this is the first study that uses internet-based intervention formats including video instructions to increase SWB. Our results show that these internet-based happiness promoting interventions have a direct effect on SWB which can be sustained over a 1 month follow-period, especially when the person-intervention fit is high.

## References

- Abbott, J., Klein, B., & Ciechomski, L. (2008). Best practices in online therapy. *Journal of Technology in Human Services*, 26, 360–375. doi:[10.1080/15228830802097257](https://doi.org/10.1080/15228830802097257).
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182. doi:[10.1037/0022-3514.51.6.1173](https://doi.org/10.1037/0022-3514.51.6.1173).
- Bennett, G. G., & Glasgow, R. E. (2009). The delivery of public health interventions via the Internet: Actualizing their potential. *Annual Review of Public Health*, 30, 273–292. doi:[10.1146/annurev.publhealth.031308.100235](https://doi.org/10.1146/annurev.publhealth.031308.100235).
- Bortz, J., & Schuster, C. (2010). *Statistik für Human- und Sozialwissenschaftler* (7th ed.). Berlin: Springer.
- Brickman, P., Coates, D., & Janoff-Bulman, R. (1978). Lottery winners and accident victims: Is happiness relative? *Journal of Personality and Social Psychology*, 36, 917–927. doi:[10.1037/0022-3514.36.8.917](https://doi.org/10.1037/0022-3514.36.8.917).
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.
- Deci, E. L., & Ryan, R. M. (2000). The ‘what’ and ‘why’ of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227–268. doi:[10.1207/S15327965PLI1104\\_01](https://doi.org/10.1207/S15327965PLI1104_01).
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95, 542–575. doi:[10.1037/0033-2909.103.2.193](https://doi.org/10.1037/0033-2909.103.2.193).
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49, 71–75. doi:[10.1207/s15327752jpa4901\\_13](https://doi.org/10.1207/s15327752jpa4901_13).
- Diener, E., & Iran-Nejad, A. (1986). The relationship in experience between various types of affect. *Journal of Personality and Social Psychology*, 50, 1031–1038. doi:[10.1037/0022-3514.50.5.1031](https://doi.org/10.1037/0022-3514.50.5.1031).
- Diener, E., Lucas, R. E., & Scollon, C. N. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist*, 61, 305–314. doi:[10.1037/0003-066X.61.4.305](https://doi.org/10.1037/0003-066X.61.4.305).
- Diener, E., & Oishi, S. (2004). Are Scandinavians happier than Asians? Issues in comparing nations on subjective well-being. In F. Columbus (Ed.), *Asian economic and political issues* (pp. 1–25). New York, NY: Nova Science.
- Diener, E., Sandvik, E., Pavot, W., & Fujita, F. (1992). Extraversion and subjective well-being in a U.S. national probability sample. *Journal of Research in Personality*, 26, 205–215. doi:[10.1016/0092-6566\(92\)90039-7](https://doi.org/10.1016/0092-6566(92)90039-7).
- Diener, E., Smith, H., & Fujita, F. (1995). The personality structure of affect. *Journal of Personality and Social Psychology*, 69, 130–141. doi:[10.1037/0022-3514.69.1.130](https://doi.org/10.1037/0022-3514.69.1.130).
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125, 276–302. doi:[10.1037/0033-2909.125.2.276](https://doi.org/10.1037/0033-2909.125.2.276).
- Diener, E., Wirtz, D., Biswas-Diener, R., Tov, W., Kim-Prieto, C., Choi, D.-W., et al. (2009). New measures of well-being. In E. Diener (Ed.), *Assessing well-being: The collected works of Ed Diener* (pp. 247–266). New York, NY: Springer.
- Emmons, R. A. (1986). Personal strivings: An approach to personality and subjective well-being. *Journal of Personality and Social Psychology*, 51, 1058–1068. doi:[10.1037/0022-3514.51.5.1058](https://doi.org/10.1037/0022-3514.51.5.1058).
- Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology*, 84, 377–389. doi:[10.1037/0022-3514.84.2.377](https://doi.org/10.1037/0022-3514.84.2.377).
- Eysenbach, G. (2005). The law of attrition. *Journal of Medical Internet Research*, 7, e11. doi:[10.2196/jmir.7.1.e11](https://doi.org/10.2196/jmir.7.1.e11).

- Fastame, M. C., & Penna, M. P. (2013). Does social desirability confound the assessment of self-reported measures of well-being and metacognitive efficiency in young and older adults? *Clinical Gerontology: The Journal of Aging and Mental Health*, *36*, 95–112. doi:[10.1037/t00741-000](https://doi.org/10.1037/t00741-000).
- Field, A. P. (2009). *Discovering statistics using SPSS* (3rd ed.). London: Sage.
- Fleming, P. (2012). Social desirability, not what it seems: A review of the implications for self-reports. *The International Journal of Educational and Psychological Assessment*, *11*, 3–22. doi:[10.1037/t08059-000](https://doi.org/10.1037/t08059-000).
- Fordyce, M. W. (1977). Development of a program to increase personal happiness. *Journal of Counseling Psychology*, *24*, 511–521. doi:[10.1037/0022-0167.24.6.511](https://doi.org/10.1037/0022-0167.24.6.511).
- Fordyce, M. W. (1983). A program to increase happiness: Further studies. *Journal of Counseling Psychology*, *30*, 483–498. doi:[10.1037/0022-0167.30.4.483](https://doi.org/10.1037/0022-0167.30.4.483).
- Froh, J. J., Sefick, W. J., & Emmons, R. A. (2008). Counting blessings in early adolescents: An experimental study of gratitude and subjective well-being. *Journal of School Psychology*, *46*, 213–233. doi:[10.1016/j.jsp.2007.03.005](https://doi.org/10.1016/j.jsp.2007.03.005).
- Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2013). Strength-based positive interventions: Further evidence for their potential in enhancing well-being and alleviating depression. *Journal of Happiness Studies*, *14*, 1241–1259. doi:[10.1007/s10902-012-9380-0](https://doi.org/10.1007/s10902-012-9380-0).
- Glaesmer, H., Grande, G., Braehler, E., & Roth, M. (2011). The German version of the satisfaction with life scale (SWLS). Psychometric properties, validity, and population-based norms. *European Journal of Psychological Assessment*, *27*, 127–132. doi:[10.1027/1015-5759/a000058](https://doi.org/10.1027/1015-5759/a000058).
- Headey, B., & Wearing, A. J. (1989). Personality, life events, and subjective well-being: Toward a dynamic equilibrium model. *Journal of Personality and Social Psychology*, *57*, 731–739. doi:[10.1037/0022-3514.57.4.731](https://doi.org/10.1037/0022-3514.57.4.731).
- Heaven, P. C. (1989). Extraversion, neuroticism and satisfaction with life among adolescents. *Personality and Individual Differences*, *10*, 489–492. doi:[10.1016/0191-8869\(89\)90029-9](https://doi.org/10.1016/0191-8869(89)90029-9).
- Kashdan, T. B., Biswas-Diener, R., & King, L. A. (2008). Reconsidering happiness: The costs of distinguishing between hedonics and eudaimonia. *The Journal of Positive Psychology*, *3*, 219–233. doi:[10.1080/17439760802303044](https://doi.org/10.1080/17439760802303044).
- King, L. A. (2001). The health benefits of writing about life goals. *Personality and Social Psychology Bulletin*, *27*, 798–807. doi:[10.1177/0146167201277003](https://doi.org/10.1177/0146167201277003).
- Larsen, R. J., & Ketelaar, T. (1991). Personality and susceptibility to positive and negative emotional states. *Journal of Personality and Social Psychology*, *61*, 132–140. doi:[10.1037/0022-3514.61.1.132](https://doi.org/10.1037/0022-3514.61.1.132).
- Laux, L., Hock, M., Bergner-Köther, R., Hodapp, V., & Renner, K.-H. (2013). *Das state-trait-angst-depressions-inventar (STADI)*. Göttingen: Hogrefe.
- Lucas, R. E., Diener, E., & Suh, E. (1996). Discriminant validity of well-being measures. *Journal of Personality and Social Psychology*, *71*, 616–628. doi:[10.1037/0022-3514.71.3.616](https://doi.org/10.1037/0022-3514.71.3.616).
- Lykken, D., & Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science*, *7*, 186–189. doi:[10.1111/j.1467-9280.1996.tb00355.x](https://doi.org/10.1111/j.1467-9280.1996.tb00355.x).
- Lyubomirsky, S., & Della Porta, M. D. (2010). Boosting happiness, buttressing resilience: Results from cognitive and behavioral interventions. In J. W. Reich, A. J. Zautra, & J. S. Hall (Eds.), *Handbook of adult resilience* (pp. 450–464). New York, NY: Guilford Press.
- Lyubomirsky, S., & Layous, K. (2013). How do simple positive activities increase well-being? *Current Directions in Psychological Science*, *22*, 57–62. doi:[10.1177/0963721412469809](https://doi.org/10.1177/0963721412469809).
- Lyubomirsky, S., King, L., & Diener, E. (2005a). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, *131*, 803–855. doi:[10.1037/0033-2909.131.6.803](https://doi.org/10.1037/0033-2909.131.6.803).
- Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005b). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology*, *9*, 111–131. doi:[10.1037/1089-2680.9.2.111](https://doi.org/10.1037/1089-2680.9.2.111).
- Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., & Sheldon, K. M. (2011). Becoming happier takes both a will and a proper way: An experimental longitudinal intervention to boost well-being. *Emotion*, *11*, 391–402. doi:[10.1037/t01588-000](https://doi.org/10.1037/t01588-000).
- Macan, T. H., Shahani, C., Dipboye, R. L., & Phillips, A. P. (1990). College students' time management: Correlations with academic performance and stress. *Journal of Educational Psychology*, *82*, 760–768. doi:[10.1037/0022-0663.82.4.760](https://doi.org/10.1037/0022-0663.82.4.760).
- Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, *41*, 954–969. doi:[10.1037/0003-066X.41.9.954](https://doi.org/10.1037/0003-066X.41.9.954).
- Martínez-Martí, M. L., Avia, M. D., & Hernández-Lloreda, M. J. (2010). The effects of counting blessings on subjective well-being: A gratitude intervention in a Spanish sample. *The Spanish Journal of Psychology*, *13*, 886–896.
- Mayer, R. E. (2003). The promise of multimedia learning: Using the same instructional design methods across different media. *Learning and Instruction*, *13*, 125–139. doi:[10.1016/S0959-4752\(02\)00016-6](https://doi.org/10.1016/S0959-4752(02)00016-6).

- Mayring, P. (1991). *Psychologie des Glücks [Psychology of happiness]*. Stuttgart: Kohlhammer.
- McCullough, M. E., Emmons, R. A., & Tsang, J.-A. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82, 112–127. doi:[10.1037/0022-3514.82.1.112](https://doi.org/10.1037/0022-3514.82.1.112).
- Mitchell, J., Stanimirovic, R., Klein, B., & Vella-Brodrick, D. (2009). A randomised controlled trial of a self-guided internet intervention promoting well-being. *Computers in Human Behavior*, 25, 749–760. doi:[10.1016/j.chb.2009.02.003](https://doi.org/10.1016/j.chb.2009.02.003).
- Mitchell, J., Vella-Brodrick, D., & Klein, B. (2010). Positive psychology and the internet: A mental health opportunity. *E-Journal of Applied Psychology*, 6, 30–41.
- Norrish, J. M., & Vella-Brodrick, D. A. (2008). Is the study of happiness a worthy scientific pursuit? *Social Indicators Research*, 87, 393–407. doi:[10.1007/s11205-007-9147-x](https://doi.org/10.1007/s11205-007-9147-x).
- O'Connor, B. P. (1998). SIMPLE: All-in-one programs for exploring interactions in moderated multiple regression. *Educational and Psychological Measurement*, 58, 836–840. doi:[10.1177/0013164498058005009](https://doi.org/10.1177/0013164498058005009).
- Omodei, M. M., & Wearing, A. J. (1990). Need satisfaction and involvement in personal projects: Toward an integrative model of subjective well-being. *Journal of Personality and Social Psychology*, 59, 762–769. doi:[10.1037/0022-3514.59.4.762](https://doi.org/10.1037/0022-3514.59.4.762).
- Palys, T. S., & Little, B. R. (1983). Perceived life satisfaction and the organization of personal project systems. *Journal of Personality and Social Psychology*, 44, 1221–1230. doi:[10.1037/0022-3514.44.6.1221](https://doi.org/10.1037/0022-3514.44.6.1221).
- Parks, A. C. (2009). *Positive psychotherapy: Building a model of empirically supported self-help*. Unpublished Doctoral Thesis, University of Pennsylvania, Pennsylvania.
- Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment*, 5, 164–172. doi:[10.1037/1040-3590.5.2.164](https://doi.org/10.1037/1040-3590.5.2.164).
- Pham, L. B., & Taylor, S. E. (1999). From thought to action: Effects of process- versus outcome-based mental simulations on performance. *Personality and Social Psychology Bulletin*, 25, 250–260. doi:[10.1177/0146167299025002010](https://doi.org/10.1177/0146167299025002010).
- Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological Bulletin*, 112, 160–164. doi:[10.1037/0033-2909.112.1.160](https://doi.org/10.1037/0033-2909.112.1.160).
- Ritterband, L. M., Gonder-Frederick, L. A., Cox, D. J., Clifton, A. D., West, R. W., & Borowitz, S. M. (2003). Internet interventions: In review, in use, and into the future. *Professional Psychology: Research and Practice*, 34, 527–534. doi:[10.1037/0735-7028.34.5.527](https://doi.org/10.1037/0735-7028.34.5.527).
- Rosenthal, R., Rosnow, R. L., & Rubin, D. B. (2000). *Contrasts and effect sizes in behavioral research: A correlational approach*. Cambridge: Cambridge University Press.
- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52, 141–166. doi:[10.1146/annurev.psych.52.1.141](https://doi.org/10.1146/annurev.psych.52.1.141).
- Sansone, R. A., & Sansone, L. A. (2010). Gratitude and well being: The benefits of appreciation. *Psychiatry*, 71(1), 18–21.
- Sarason, I. G., Johnson, J. H., & Siegel, J. M. (1978). Assessing the impact of life changes: Development of the life experiences survey. *Journal of Consulting and Clinical Psychology*, 46, 932–946. doi:[10.1037/0022-006X.46.5.932](https://doi.org/10.1037/0022-006X.46.5.932).
- Schimmack, U. (2008). The structure of subjective well-being. In M. Eid & R. J. Larsen (Eds.), *The science of subjective well-being* (pp. 97–123). New York, NY: Guilford Press.
- Schueller, S. M., & Parks, A. C. (2012). Disseminating self-help: Positive psychology exercises in an online trial. *Journal of Medical Internet Research*, 14(3), 8–18. doi:[10.1037/t02942-000](https://doi.org/10.1037/t02942-000).
- Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, 60, 410–421. doi:[10.1037/t03521-000](https://doi.org/10.1037/t03521-000).
- Senf, K., & Liau, A. K. (2013). The effects of positive interventions on happiness and depressive symptoms, with an examination of personality as a moderator. *Journal of Happiness Studies*, 14, 591–612. doi:[10.1037/t12353-000](https://doi.org/10.1037/t12353-000).
- Shapira, L. H., & Mongrain, M. (2010). The benefits of self-compassion and optimism exercises for individuals vulnerable to depression. *Journal of Positive Psychology*, 5, 377–389.
- Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology*, 76, 482–497. doi:[10.1037/0022-3514.76.3.482](https://doi.org/10.1037/0022-3514.76.3.482).
- Sheldon, K. M., & Lyubomirsky, S. (2006). How to increase and sustain positive emotion: The effects of expressing gratitude and visualizing best possible selves. *The Journal of Positive Psychology*, 1, 73–82. doi:[10.1037/t06070-000](https://doi.org/10.1037/t06070-000).

- Sin, N., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology, 65*, 467–487. doi:[10.1002/jclp.20593](https://doi.org/10.1002/jclp.20593).
- Smyth, J. M. (1998). Written emotional expression: Effect sizes, outcome types, and moderating variables. *Journal of Consulting and Clinical Psychology, 66*, 174–184. doi:[10.1037/0022-006X.66.1.174](https://doi.org/10.1037/0022-006X.66.1.174).
- Suh, E., Diener, E., & Fujita, F. (1996). Events and subjective well-being: Only recent events matter. *Journal of Personality and Social Psychology, 70*, 1091–1102. doi:[10.1037/0022-3514.70.5.1091](https://doi.org/10.1037/0022-3514.70.5.1091).
- Toepfer, S. M., Cichy, K., & Peters, P. (2012). Letters of gratitude: Further evidence for author benefits. *Journal of Happiness Studies, 13*, 187–201. doi:[10.1037/t01588-000](https://doi.org/10.1037/t01588-000).
- van Eimeren, B., & Frees, B. (2012). 76 Prozent der Deutschen online—neue Nutzungssituationen durch mobile Endgeräte [76% of the Germans online—new usage situation through mobile end device]. *Media Perspektiven, (7–8)*, 362–379. Retrieved from [http://www.media-perspektiven.de/uploads/tx\\_mppublications/0708-2012\\_Eimeren\\_Frees\\_01.pdf](http://www.media-perspektiven.de/uploads/tx_mppublications/0708-2012_Eimeren_Frees_01.pdf).
- Watkins, P. C., Woodward, K., Stone, T., & Kolts, R. L. (2003). Gratitude and happiness: development of a measure of gratitude, and relationships with subjective well-being. *Social Behavior & Personality: An International Journal, 31*, 431–452. doi:[10.2224/sbp.2003.31.5.431](https://doi.org/10.2224/sbp.2003.31.5.431).
- Wood, A. M., Froh, J. J., & Geraghty, A. W. A. (2010). Gratitude and well-being: A review and theoretical integration. *Clinical Psychology Review, 30*, 890–905. doi:[10.1016/j.cpr.2010.03.005](https://doi.org/10.1016/j.cpr.2010.03.005).