How do positive psychology interventions work? A short-term placebo-controlled humor-based study on the role of the time focus

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Abstract: The past years have seen a growing interest in the study of positive psychology interventions. Meta-analytic ev- idence suggests that they are effective in enhancing happiness and ameliorating depression. However, far less is known on why and how they work. We test two proposed working mechanisms: An attentional shift to the pos- itive, and savoring positive emotions. The proposed mechanisms are tested by manipulating the time focus (past, present, or future) in the instruction of a one-week online humor-based positive intervention (three funny things). A sample of 695 adults was randomly assigned to one of the intervention condition or a placebo control condition. All three variants were effective in enhancing happiness and ameliorating depressive symptoms from pre- to post-intervention compared to the placebo control condition. As expected, the present variant was asso- ciated with both mechanisms, while the past variant was more strongly associated with the savoring mechanism, and the future variant more strongly with the attentional shift mechanism. This initial study provides first sup- port for the potential working mechanisms of effective positive interventions.

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Abstract

The past years have seen a growing interest in the study of positive psychology interventions. Meta-analytic evidence suggests that they are effective in enhancing happiness and ameliorating depression. However, far less is known on why and how they work. We test two proposed working mechanisms: An attentional shift to the positive, and savoring positive emotions. The proposed mechanisms are tested by manipulating the time focus (past, present, or future) in the instruction of a one-week online humor-based positive intervention (*three funny things)*. A sample of 695 adults was randomly assigned to one of the intervention condition or a placebo control condition. All three variants were effective in enhancing happiness and ameliorating depressive symptoms from pre- to post-intervention compared to the placebo control condition. As expected, the present variant was associated with both mechanisms, while the past variant was more strongly associated with the savoring mechanism, and the future variant more strongly with the attentional shift mechanism. This initial study provides first support for the potential working mechanisms of effective positive interventions.

Keywords: attentional shift; depression; happiness; humor; intervention; positive psychology; positive psychology intervention; savoring

Positive psychology aims at studying what makes life most worth living (Seligman & Csikszentmihalyi, 2000). One of its applied areas is the study of strategies, intentional activities, and, more broadly speaking, ways of how people can boost their well-being. Over the past years, a broad range of positive psychology interventions (PPIs) has been developed. They aim at inducing positive emotions, cognitions or behaviors. Two recent meta-analyses suggest that they are effective in enhancing well-being and ameliorating depression (Bolier et al., 2013; Sin & Lyubomirsky, 2009).

Only comparatively few studies exist, which specifically address *how* and *why* PPIs work. The model by Lyubomirsky and Layous (2013) refers to positive emotions, thoughts, behaviors and need satisfaction as mediators and the the person×activity-fit as a moderator of the effectiveness (see e.g., Schueller, 2012; Senf & Liau, 2013). Thompson, and colleagues (2015) argue that this fit is higher if the intervention feels "natural" and if it is pursued because of intrinsic motivation. They found a greater person-activity fit for women than men in a psychology undergraduate's sample across several PPIs. Proyer and colleagues (2015) found that indicators of a person×activity-fit robustly predict well-being and depression 3.5 years after completion of a PPI. Mainly the indicator "early reactivity" contributed to the prediction and it seems as if this initial phase is of crucial importance (see also Wellenzohn et al., 2016). Therefore, this period might be best suited for observing working mechanisms.

Quoidbach, Mikolajczak, and Gross (2015) proposed a process model of emotion regulation as a framework for PPIs. They structure the variety of different PPIs using the emotion regulation-model by Gross (1998) and propose emotion regulation strategies as the theoretical background for possible working mechanisms. These are *situation selection*, *situation modification*, *attentional deployment*, *cognitive change and response modulation*. They conclude that the strongest evidence exists for interventions using attentional deployment, followed by cognitive change, and response modulation (being effective in the short-term), while for situation selection and situation modification more research is needed.

Furthermore, their model is structured by the time (before, during, or after the event) when the emotion regulation strategy is applied. The authors suggest that each proposed working mechanism (i.e., different emotion regulation strategies) can be used in all three periods, but its effectiveness varies depending on which strategy is used in which time frame. One might therefore argue that the focus of a PPI's instruction, aiming at the past, present, or future, is associated with different working mechanisms.

The time-perspective in positive psychology interventions and mechanisms

An inspection of the effectiveness of the nine tested PPIs in Gander et al.'s (2013) study and a review of comparable studies (e.g., Mongrain & Anselmo-Mathews, 2012; Proyer, Gander et al., 2014; Seligman, Steen, Park, & Peterson, 2005), seems to suggest that interventions addressing the *present* or the *future* in the instruction (e.g., writing about good or funny things, or one's usage of strengths in daily life) were generally more effective in enhancing happiness. As a trend, this also seems true for ameliorating depressive symptoms. Those focusing on past situations or events (e.g., *one door closes another one opens*; Otake et al., 2006) seem to be less effective in comparison. This notion receives further support from a recent placebo-controlled study on humor-based PPIs (Wellenzohn, Proyer, & Ruch, 2016). Interventions directed towards the past (e.g., collecting the funniest things that *ever* happened in ones life), were less effective than those focused on the present (e.g., noting three funny things that happened during the day, or counting funny things during the day). Hence, the hypothesis that the time perspective in the instruction of a PPI plays an important role in enhancing happiness and ameliorating depression by triggering specific working mechanisms is strengthened.

The field of *positive psychotherapy* provides a further perspective on potential working mechanisms. Seligman, Rashid, and Parks (2006) argue that conducting positive interventions could lead to a more positive attentional-focus. Sanchez and colleagues (2014) investigated a related concept in their work on the *positive information-processing bias* and

its relation to positive mood. Research in the latter area suggests that participants who underwent a positive mood induction showed a mood-congruent reaction (e.g.. spent more time looking at positive pictures the better their mood was). Hence, the positive mood induction triggered a shift in the participants' attention (i.e., a positive information-procession bias). Based on the existing literature, we hypothesize that PPIs are associated with a shift in the attention towards a more positive outlook, thereby, facilitating a positive information-processing bias. The attentional shift described in Quoidbach et al. (2015) could be seen as a cognitive change strategy, as it reflects how people perceive a given situation (e.g., appraising a situation as a special moment). Quoidbach et al. (2015) suggest that the effectiveness of the cognitive change strategy in increasing positive emotions in the short-term is strong in the present and future time focus, but modest for the past time focus (i.e., after the event). Therefore, we expect that PPIs focusing on the present and future might be especially effective by having more potential to influence the attention as a momentary construct, compared to interventions directed at the past.

At this point, it needs mentioning that in earlier studies those PPIs focusing on the *past* were also effective to a certain degree (e.g., Gander et al., 2013). Therefore, one might argue that other working mechanisms contribute to their effectiveness (e.g., re-experiencing perceived positive emotions). In line with Lyubomirsky and Layous (2013) and Cohn and colleagues (2009) we hypothesize that *savoring positive emotions* might also contribute to well-being, and furthermore function as the main trigger of increased well-being in interventions focusing on the past. Thus, in comparison with interventions focusing on the *present* and *future*, focusing on the *past* might induce more savoring of positive emotions at that very moment when one is consciously remembering the positive experience. This conscious remembering of the experience might induce positive emotions with a higher intensity than if positive emotions are savored in the very moment, due to the fact that one might be more easily detracted and not consciously focusing on the emotion. Embedded in

Quoidbach et al.'s model (2015), the savoring mechanism might be assigned to the situation selection strategies (e.g., looking at pictures from ones holiday trips), for which the evidence regarding its effectiveness in increasing positive emotions in short-term is rather weak. Overall, we expect that different working mechanisms are more likely to be triggered, depending on the time focus—the *savoring* mechanism by interventions focusing on the past and the *shift in attention* mechanism by interventions focusing on the future, while both mechanisms might be triggered by the present (i.e. the original version of the experimentally varied intervention of the study; see Figure 1).

Insert Figure 1 about here

Aims of the present study and hypotheses

The aim of the present study is to experimentally vary the time-perspective in the instruction of one particular PPI, while the other parts of the instruction are not changed. This comparison allows for an initial estimation of the effects of this variation on the effectiveness of the interventions. Additionally, the proposed working mechanisms are assessed using a subjective rating. We use the *three funny things* intervention (Gander et al., 2013; Proyer, Gander et al., 2014; Wellenzohn et al., 2016) in its original version (i.e., *present* variant) as a starting point, and developed equivalent *past* and *future* variants.

We expect that all three variants are effective in enhancing well-being and ameliorating depressive symptoms after the intervention in comparison with a placebo control condition. Additionally, we expect the original intervention (focus on the present) to be associated with the numerically largest effects by triggering both proposed mechanisms. Furthermore, we expect participants in all three interventions to report a greater shift of attention to a positive focus compared to a placebo control condition (i.e., "early memories"; Seligman, et al., 2005). However, we expect differences among the three conditions: The

future variant will likely elicit a stronger *shift* toward a positive focus compared to the past variant, while the *past* variant likely induces more re-experiences of positive emotions – *savoring* – compared to the future variant.

Method

Participants

A total of $N = 955$ adults registered on a research website and provided basic demographic information. Due to not meeting the inclusion criteria (i.e., older than 18 years, not undergoing psychotherapeutic or pharmacological treatment, and no use of illegal drugs, as proposed by the ethical committee) 29 were excluded (see Figure 2).

Insert Figure 2 about here

Of the initial sample, 695 participants (14.2% men) completed the post-measures and conducted the intervention (30 reported that they did not conduct the intervention and 201 did not fill in the post-measures). Thus, the dropout-rate was 24.95%. The final sample with a mean age of 47.5 ($SD = 12.2$) was rather well educated with 39.6% having a university degree, 18.3% having a degree from an applied university, 19.3% having a diploma that allows them to attend university, and 19.3% having completed an apprenticeship, 3.5% having completed public school and one person not having completed public school (i.e., nine years of obligatory school education).

Instruments

The *Authentic Happiness Inventory* (AHI; Seligman, Steen, Park, & Peterson, 2005; in the German version as used by Gander et al., 2013) assesses overall happiness in the past week. The AHI consists of 24 groups of five statements each (e.g., from 1 = “I have sorrow in my life“ to 5 = “My life is filled with joy“). Internal consistency at pretest was $\alpha = .94$.

The *Center for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977; in the German Adaption by Hautzinger & Bailer, 1993) measures the frequency of depressive symptoms in the past week (e.g., "My sleep was restless"). It consists of 20-items using a four-point answer-scale; 0 = "*Rarely or none of the time (Less than 1 day)*" to 3 = "*Most or all of the time (5-7 days)*"; $\alpha = .91$ (at pretest).

After the intervention week, participants were asked whether they had conducted the intervention (yes/no) and, if they had, whether they had done more or less or exactly as instructed. The possible mechanisms were assessed with single items; namely, (1) "Is it easier for you to perceive positive aspects/things in everyday life, due to the intervention?" (subjective changes in the *positive perception* in general); (2) "To which degree did you experience the positive emotions again while conducting the intervention?" (*savoring*); (3) "To which degree did your attention shift to funny things in everyday life, in the sense, that you were better able to perceive these?" (*shift* in the attentional focus); and (4) "What was more effected by the intervention: Savoring emotions or shifting the attention?" (for a comparison of *shift* vs. *savoring*). For item 4, a bipolar-scale with 9 answer options was used from "*savoring positive emotions +++"* over "*0*"*,* as the neutral midpoint, to "*shift of the attentional focus to the positive +++."* For item 1, 2, and 3, a 10-point answer scale was used from 0 (*not at all*) to 9 (*very strong)*. Furthermore, we computed a *difference score* by subtracting the scores in item 3 from item 2 to test what mechanism had been triggered to a higher degree (*relative score*). In this analysis, scores above the mid-point of the scale indicate a relatively higher shift in the attentional focus and at the same time lower savoring of positive emotions—and vice versa for scores below the mid-point of the scale.

Experimental conditions

We modified the "three funny things"-intervention (Gander et al., 2013; i.e., writing down three funny things that happened during the day every evening for about 10 to 15 minutes on seven consecutive days) in a way to focus on (a) the present (original version); (b)

the past; or (c) the future (see Table A in the online supplemental material for the instructions). The humor-based PPI was chosen as it might be especially well-suited to trigger positive emotions as humor elicits amusement (Ruch, 2009). The activity is also useful for testing the proposed shift in the attention (towards humor; see e.g., McGhee, 2010). In short, all participants were asked to neutrally describe their activities of the particular day. In the *present* variant, participants were asked to write about three funny things they had experienced during the day. In the *past* variant, we asked them to think about the day exactly one week ago and describe what they had done on that day, and to note three funny things that had happened that day. In the *future* variant, we asked them to think about and write down their planned activities for the following day. The next day, they were asked to make a tally mark on a tally sheet for each funny thing as soon as it happened (no writing down of the funny things in the evening). The variants were developed to address the proposed working mechanisms (see Figure 1). For the placebo control condition, we used the well-tested *early memories exercise* by Seligman et al. (2005), where the participants had to write about their early childhood memories for about 10 to 15 minutes each evening on seven consecutive days

Procedure

Participants registered for an online positive psychology intervention (hosted by an institution of higher education) by creating a personal password-secured account. They were randomly (by an automated algorithm, based on a Mersenne-Twister) assigned to one of the three intervention conditions (past, present, or future), or the placebo control condition. Participants provided basic demographics and completed baseline questionnaires. They received the assigned intervention, which they conducted for seven consecutive days. After that week, the participants were invited to log-in to the homepage and to fill in the post-measures including the questions about what had changed.

Statistical Analyses

In order to test the effectiveness of the interventions, we compared each intervention condition against the placebo control condition using an ANCOVA with the pre-tests as covariate. To analyze the proposed differential influence of the modified time focus, we compared the subjective ratings for the proposed mechanisms for each condition using an ANOVA and subsequently conducted post hoc tests (LSD). All analyses were conducted for (a) the full sample, and (b) a subsample of those participants that indicated conducting the intervention according to the instruction, or doing more.

Results

Preliminary Analyses

Descriptive statistics of the AHI and CES-D at all measurement points are shown in Table B of the online supplementary material. The means numerically changed in the expected direction from pre- to posttest. Participants in the four conditions differed neither in their baseline level of happiness ($F(3, 691) = 0.34$, $p = 0.80$), nor in depressive symptoms, $F(3, 691) = 0.21$, $p = 0.89$. The dropouts were younger ($t(924) = 2.87$, $p < .01$, $d = 0.23$), and more likely men, $\chi^2(1, N = 926) = 3.25$ ($p < .01$), $d = 0.22$. Those dropping out earlier did not differ from the others in their baseline levels of happiness ($t(924) = 1.03$, $p = .30$), nor in depressive symptoms, $t(924) = 1.72$, $p = .09$.

The effectiveness of the interventions

As expected, all intervention conditions were effective in enhancing well-being and ameliorating depressive symptoms compared to the placebo control condition (see Table 1). For happiness, the past variant was most effective (in terms of the effect sizes) followed by the present and the future variant. For depressive symptoms, the present variant yielded the numerically largest effects, followed by the past variant, and a trend for the future variant.

Insert Table 1 about here

The comparison of the interventions led to mixed conclusions: As expected, the present variant yielded the largest effect for depressive symptoms, yet the past variant was slightly more effective for happiness.

Analyses on subjective ratings of proposed mechanisms

There were no group differences between the interventions in the full sample (see Table 2). The only exception was the subjective rating on the "positive perception." As expected, participants in the placebo control condition scored lower than those in the three intervention conditions. The numerical differences between the intervention conditions in the other variables were mostly in the expected direction, but failed to reach statistical significance.

Insert Table 2 about here

When analyzing the subsample, from which participants that did *less* than what was instructed were excluded, the pattern could be better interpreted. There were mean level differences of small to medium effect sizes in the expected direction. Again, the mean scores for *positive perception* were higher in those in the intervention conditions than in participants from the placebo control condition (medium to large effect sizes). Additionally, participants in the present variant demonstrated higher ratings in the positive perception than those in the past or future variants.

Savoring positive emotions was higher in the present compared to the future variant, but contrary to expectation, no difference between the past and the future variant was found. However, an inspection of the mean scores showed a trend in the hypothesized direction (numerically higher in the past than in the future variant). Additionally, ratings for *shifting* the attention to funny things were higher in those pursuing the present compared to the past

variant. As with the savoring variable, no difference between the past and the future variants was found—yet the numerical differences were in the expected direction.

The analysis of the relative variables (i.e., shift vs. savoring and difference score) shows that participants in the future variant demonstrated higher scores than those in the past variant. This may be seen as initial support for the notion that the future variant is more associated with an attentional shift to the positive than the past variant, and that the past variant is more likely to enable savoring of positive emotions than the future variant. Additionally, we also found a small effect for the original (present) intervention in the direction of triggering a stronger shift in the attentional focus in comparison with the past variant.

Discussion

The aim of the present study was to investigate the impact of the time focus in a humor-based positive psychology intervention (PPIs) by varying its instruction towards different time-foci and testing associations with two possible working mechanisms (i.e., *attentional shift to the positive* and *savoring positive emotions*). Overall, in line with recent research on the *three funny things* intervention (Gander et al., 2013; Wellenzohn et al., 2016), the intervention was effective in enhancing happiness and ameliorating depressive symptoms. This was also true for its two variants that were developed for the present study (past and future). Moreover, the three interventions exceeded the placebo control condition in shifting the attentional focus to the positive. This supports the hypothesis, that the attentional shift might be a working mechanism of PPIs.

Furthermore, we hypothesized that the different time-foci trigger different working mechanisms (future variant = shift of focus towards positive cues; past variant = savoring of positive emotions). The findings were mixed. There were no differences (future vs. past) when the endorsement of each proposed mechanisms was assessed directly. However, in the relative variables, where participants needed to decide if the intervention triggered the

attentional shift rather than the savoring of positive emotions or the other way round, we found differences between the two variants in the expected directions. Thus, the future variant contributed more to an attentional shift than the past variant and the past variant contributed more to savoring positive emotions than the future variant. Overall, findings from this initial study support the notion that different time-foci trigger different mechanisms.

The comparison with the original intervention (associated with both proposed mechanisms; see Figure 1) shows that it exceeded each of the other two variants (referring predominantly to just one of the two mechanisms) in triggering the mechanisms. Thus, the future variant was less effective in boosting savoring than the original, and the past variant was less effective in boosting the shift than the original. It needs mentioning, however, that the interventions were still effective, even if one of the mechanisms was less prevalent. The expectation that the original intervention would be most effective in enhancing well-being (triggering both proposed mechanisms) was only partially met—for the amelioration of depressive symptoms, but for happiness the *past* variant showed a numerically slightly higher effect. However, more research will be needed to clearly differentiate among the mechanisms. Furthermore, there might be personality traits moderating the working mechanisms. As extraversion was found to be positively related to amusement (Köhler & Ruch, 1996), more extraverted people might benefit more from the past variant of the three funny things intervention as they might be better suited to remembering funny things or at least savor those memories with greater intensity. Schueller's (2012) study lends support to this notion as he found a savoring-intervention to be more effective for extraverts.

Limitations and Outlook

The way in which we manipulated the time focus in the instruction may be subject to change in future studies. For example, manipulations can be made by not only varying the *instruction*, but also by using different types of activities in the interventions, not just humor-based ones. Future studies could compare PPIs with other contents, as there might be some

contents that are more suitable to either having a past, present or future focus. For example, forgiveness interventions might rather focus on the past, while mindfulness interventions might have a stronger focus on the present and optimism interventions a stronger focus on the future. Comparing interventions based on contents that inherently set different time foci, might lead to clearer differences and, thus, to greater effects. To analyze the working mechanisms in depth, one could construct interventions that have a stronger emphasis on the targeted mechanism. For example, comparing the effectiveness of an intervention that is very potent in inducing savoring of positive emotions with an intervention that is very potent in shifting the attentional focus, and then analyze if they differ in their effects on well-being.

Moreover, adherence to the instructions seems to influence the effects. If the intervention needs to be conducted in exactly the way in which it is instructed to detect differences in the triggered mechanisms, this could be a sign that the impact of the different time-foci on the mechanisms is rather sensitive. Future research should put a stronger emphasis on the adherence (e.g., assessing the writings of the participants during the intervention week). This would also give insights into the way participants conduct the interventions.

Additionally, it needs mentioning that we were not able to control for the perceived intensity of positive/funny experiences and the intensity of memory, nor the involvement in a specific experience, or the importance of length of time lag between actual experience and the memory retrieval (aside from what has been specified in the instructions). Future research is warranted to test whether any of the aforementioned variables has an effect on the findings reported here. Moreover, it would be interesting to use an open answer format in the future to inquire what participants feel is triggered by the activities. This would allow for testing whether participants are aware of the proposed working mechanisms (shift of the attentional focus to the positive and savoring). Finally, one might argue that the dependent variables used in this study only focus on present experiences and that they are suggestive and they also

consist of only one item per mechanism. Therefore, measures such as the *Temporal Satisfaction with Life Scale* (Pavot, Diener, & Suh, 1998) might be used to also assess past and future life satisfaction in a more valid way and, additionally, more longitudinal designs will be helpful to cover for future experiences, as some working mechanisms might develop over time. For example, the attentional focus might be further shifted to the positive. For this, further measurement time points would be needed.

Overall, the present study supports the notion that the most effective way to boost happiness and ameliorate depressive symptoms might be to use an instruction focusing on the *present*. This is in line with Quoidbach et al. (2015) who also reported that there is the strongest evidence for emotion regulation strategies that are applied during the event, thus, in the present. We would further assume that interventions focusing on the present activate more working mechanisms at once than those focusing on a past or future time perspective. Further research is needed to test if other PPIs (e.g., based on other dimensions of humor, see Ruch, 2012) or other contents (e.g., counting kindnesses; Otake et al., 2006) that focus on the present also target the two hypothesized mechanisms. Furthermore, one could also think of other mechanisms such as the situation modification or response modulation (Quoidbach et al., 2015). Thus, there is a need to experimentally vary possible working mechanisms to shed more light on *how* interventions work, and in the long-term, to contribute to an overarching model of working mechanisms for PPIs. Such a model would provide important trigger points that need to be studied in connection to moderating effects of personality. This, on the other hand will contribute to a better understanding of how interventions can be tailored to a person, and how and why different individuals achieve well-being in different ways.

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Table 1
ANCOVA for Happiness and Depression After the Intervention Controlled for the Pre-Test-Scores Compared to the Placebo Control Group.

		ANCOVA		
	N	*df*	*F*	η^2
Happiness				
Present (original)	180	1, 343	12.16***	.03
Future variant	189	1, 352	5.74**	.02
Past variant	160	1, 323	13.64***	.04
Depressive Symptoms				
Present (original)	180	1, 343	8.97**	.03
Future variant	189	1, 352	2.15†	.01
Past variant	160	1, 323	6.14**	.02

Note. Happiness = Authentic Happiness Inventory, Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; η^2 = Partial eta squared.
†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$; †$p < .10$ (one-tailed).

Table 2

Means and Standard Deviations for the Ratings on the Proposed Mechanisms for the Full Sample and a Subsample of Participants Conducting the Activity as Instructed

	Present, original (1)		Future variant (2)		Past variant (3)		PCC (4)		ANOVA	Post hoc
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*df; F*	
Positive perception	5.33	2.12	5.11	2.29	5.19	2.22	3.40	2.33	3, 691; 27.64***	1, 2, 3 > 4***; *d* = 0.87, 0.74, 0.79
Savoring	5.21	2.01	4.78	2.09	5.01	2.28	–	–	2, 526; 1.93†	
Shift	5.63	2.10	5.31	2.28	5.34	2.20	–	–	2, 526; 1.21	
Difference Score	0.42	1.72	0.53	2.13	0.33	2.20	–	–	2, 526; 0.42	
Savoring vs. shift	5.84	2.11	5.98	2.17	5.78	2.18	–	–	2, 526; 0.41	
Subsample										
Positive perception	5.83	1.99	5.31	2.33	4.96	2.46	3.54	2.32	3, 308; 16.80***	1, 2, 3 > 4**; *d* = 1.05, 0.76, 0.60 1 > 3*; *d* = 0.40 1 > 2†; *d* = 0.24
Savoring	5.53	2.06	5.05	2.16	5.51	2.32	–	–	2, 209; 1.23	1 > 2†; *d* = 0.23
Shift	6.03	1.96	5.58	2.36	5.43	2.11	–	–	2, 209; 1.38	1 > 3†; *d* = 0.30
Difference Score	0.49	1.46	0.54	2.20	-0.08	2.19	–	–	2, 209; 1.80†	2 > 3*; *d* = 0.28 1 > 3†; *d* = 0.32
Savoring vs. shift	5.91	2.17	6.12	2.23	5.58	2.26	–	–	2, 209; 0.94	2 > 3†; *d* = 0.24

Note. Original (present) $n = 180$ ($n = 75$ in the subsample); Future variant $n = 189$ ($n = 84$ in the subsample); Past variant $n = 160$ ($n = 53$ in the subsample); PCC $n = 166$ ($n = 100$ in the subsample). Savoring = The degree to which one experienced the felt emotion again; Shift = To which degree the attentional focus shifted to funny things in daily life (i.e. noticing funny things easier); Difference Score = Difference score for the shift variable minus the savoring variable; Savoring vs. shift = What the activity caused more: Re-experiencing the emotions or shifting the attentional focus; Pos. perception = Positive perception. A dash = no data was assessed. *d* = Cohen's *d*. †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$; †$p < .10$ (one-tailed)

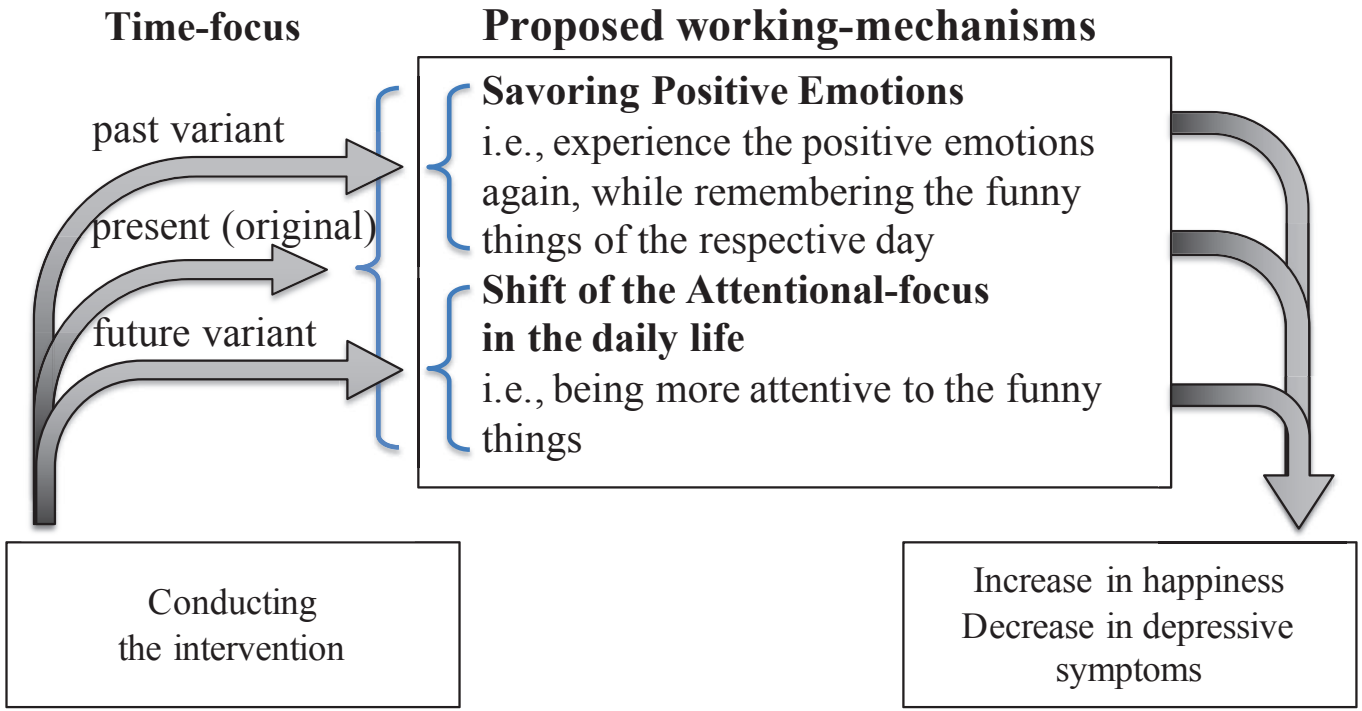

Figure 1. Scheme of the proposed mechanisms involved.

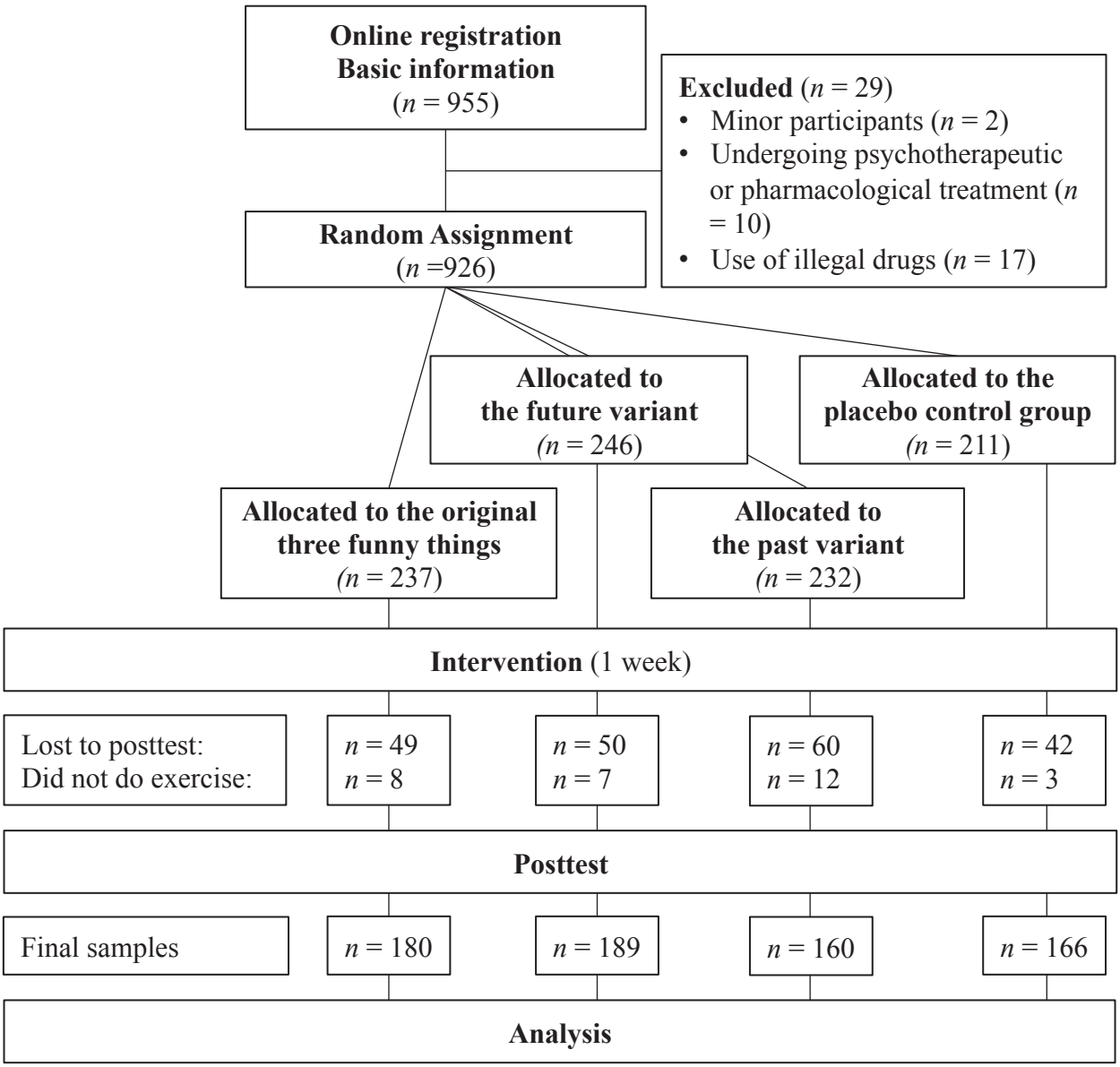

Figure 2. Flowchart of participants.

Electronic supplementary material

Table A

Description of Intervention Variants (translated from German by the authors).

Intervention	Summary	Detailed instruction (paraphrased form the German instructions)
Original (present) Three funny things by Gander et al. (2013)	Every evening, participants had to describe the day in a neutral way, write down the three funniest things they had experienced and describe their feelings during each of these experiences.	For one week starting today, please take 15 minutes every evening before you go to bed to complete the following two parts of your exercise: 1. Think about what happened today and let the day pass before your inner eye. To support your memory, look at your day planner, your mobile phone and/or your computer. Describe today's events in a few keywords as neutrally and objectively as possible 2. Take time to note down the three funniest things you heard, saw, did or experienced today. Think about the things you found really funny today and describe how they made you feel.
Future variant Three funny things	Every evening, participants had to describe the following day in a neutral way. The following day, they had to make a note of every funny thing they experienced.	The exercise takes one week and consists of two parts: Part 1 has to be done in the evenings while part 2 helps you focus on the funny things that happen during your day. 1. Please take 15 minutes every evening before you go to bed: Think about what is going to happen the next day. To support your memory, look at your day planner, your mobile phone and/or your computer. Describe the following day's events in a few keywords as neutrally and objectively as possible 2. During the day, make a note of each funny thing that happens to you: Carry a list and a pen with you and make a note every time you hear, see, do, or experience something funny. In the evening, add up the total amount of funny things that happened during that day.
Past variant Three funny things	Every evening, participants had to describe the day exactly one week ago in a neutral way, write down the three funniest things they had experienced on that day of the previous week and describe their feelings during each of these experiences.	For one week starting today, please take 15 minutes every evening before you go to bed to complete the following two parts of your exercise: 1. Think back on the day exactly one week ago today. Think about what happened on that day and let it pass before your inner eye. To support your memory, look at your day planner, your mobile phone and/or your computer. Describe the events of that day in keywords as neutrally and objectively as possible 2. Take your time to note down the three funniest things you heard, saw, did, or experienced on that day the previous week. Think about the things you found really funny and describe how they made you feel.

Table B

Means and Standard Deviations of the Four Groups at the Pre and Post Intervention for Happiness and Depressive Symptoms.

		Pre		Post	
	N	*M*	*SD*	*M*	*SD*
Happiness					
Present (original)	180	3.02	0.60	3.14	0.57
Future variant	189	3.08	0.54	3.15	0.54
Past variant	160	3.06	0.57	3.18	0.57
PCC	166	3.07	0.58	3.07	0.60
Depressive Symptoms					
Present (original)	180	0.63	0.47	0.51	0.40
Future variant	189	0.64	0.44	0.57	0.42
Past variant	160	0.65	0.48	0.54	0.41
PCC	166	0.61	0.43	0.60	0.41

Note. Happiness = Authentic Happiness Inventory, Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; PCC = Placebo control condition: Early memories.