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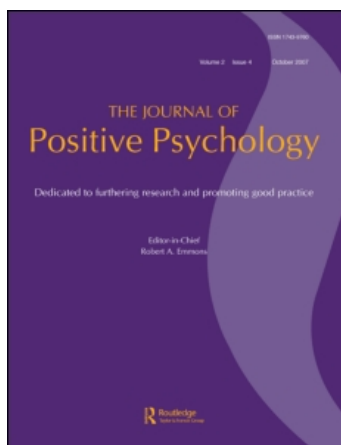
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## Manipulating optimism: Can imagining a best possible self be used to increase positive future expectancies?

Madelon L. Peters<sup>a\*</sup>, Ida K. Flink<sup>b</sup>, Katja Boersma<sup>b</sup> and Steven J. Linton<sup>b</sup>

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This study tested whether a brief manipulation consisting of positive future thinking can temporarily increase optimism. Participants in the positive future thinking condition ( $n = 44$ ) wrote about their best possible self (BPS) for 15 min, followed by 5 min of mental imagery. Participants in the control condition ( $n = 38$ ) wrote about and imagined a typical day in their life. Positive and negative future expectancies and positive and negative affect were measured before and after each manipulation. Compared to the control manipulation, the positive future thinking manipulation led to significantly larger increase in positive affect and positive future expectancies. The increase in positive expectancies was not dependent on the mood effect. The results indicate that imagining a positive future can indeed increase expectancies for a positive future.

**Keywords:** optimism; manipulation; best possible self; positive and negative affect; future expectancies

### Introduction

Optimism is defined as ‘the tendency to believe that one will generally experience good outcomes in life’. In recent years, many papers have been devoted to the positive consequences of optimism. Optimists experience higher positive affect (PA) and well-being (Andersson, 1996; Scheier & Carver, 1992; Wrosch & Scheier, 2003), are more resilient to negative events (Kivimäki et al., 2005), experience better health (Giltay, Kamphuis, Kalmijn, Zitman, & Kromhout, 2006; Scheier & Carver, 1992) and recover faster from surgical procedures (Mahler & Kulik, 2000; Peters et al., 2007; Scheier et al., 1999).

An important next step and a major challenge in the research on optimism would be to develop a manipulation to increase optimism. An effective optimism manipulation would have both scientific and clinical significance. Scientifically, such a manipulation would be critical in demonstrating the causal link between optimism and the positive consequences for health and behaviour. Clinically, an effective manipulation could be of benefit for improving the well-being of people. Earlier, interventions have been developed aimed at targeting optimism defined as explanatory style, i.e. the way one makes attributions on the causes of past events (Seligman, 1990). Indeed, these interventions have been shown to be successful in altering

attributional style (Gillham, Reivich, Jaycox, & Seligman, 1995; Quayle, Dzuirawiec, Roberts, Kane, & Ebsworthy, 2001; Riskind, Sarampote, & Mercier, 1996), but whether these interventions also changed expectations of the future in a more positive direction has not been examined.

The aim of this study was to explore whether it is possible to (temporarily) increase positive expectancies for the future by means of an experimental manipulation. The availability of a brief but effective manipulation to shift future expectancies in a positive direction would be a useful research tool because it allows conclusions on the causal status of optimism and more in particular its cognitive future-oriented component. Dispositional optimism shows relatively strong inverse correlations with neuroticism and trait anxiety, and it has been claimed that the beneficial effects of optimism are attributable to its association with these negative affective traits (Robbins, Spence, & Clark, 1991; Smith, Pope, Rhodewalt, & Poulton, 1989). A manipulation specifically targeting expectancies could rule out this alternative explanation.

In order to accomplish this goal, and consistent with the definition of optimism, we searched for a manipulation that would be able to induce global positive outcome expectancies, i.e. encompassing various life domains. The best possible self (BPS)

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manipulation, which was first introduced by King (2001), seems to meet this requirement. In the original version of this manipulation, participants wrote for 20 min on 4 consecutive days about a future in which they imagine themselves in the best possible condition and circumstances. The BPS manipulation was found effective in increasing PA, well-being and physical health (Austenfeld, Paolo, & Stanton, 2006; Harrist, Carlozzi, McGovern, & Harrist, 2007; King, 2001; Sheldon & Lyubomirsky, 2006). These studies did not specifically assess the potential of the BPS manipulation to induce positive expectancies, although preliminary evidence for an effect on optimism was provided by King (2001). However, as the crucial comparison also involved a traumatic writing condition (i.e. a control condition and a traumatic writing condition were compared to the BPS and a BPS + traumatic writing condition), the net effect of BPS on optimistic cognitions cannot be determined.

In order to investigate whether writing about and imagining a positive future has the potential to increase optimistic future thinking, we compared the effects of a single session of BPS exercise with that of a control exercise (writing about and imagining a typical day) on expectancies for positive and negative future outcomes. Although previous studies have usually employed repeated sessions of BPS writing, a single session of BPS writing already proved significant in increasing PA (Sheldon & Lyubomirsky, 2006). In an attempt to maximize the effectiveness of the BPS exercise, we added a 5-min mental imagery component to the original writing exercise. It has repeatedly been shown that mental imagery has stronger effects on emotions and cognition than verbal processing of the same material (Holmes, Lang, & Shah, 2009; Holmes, Mathews, Mackintosh, & Dalgleish, 2008). According to Holmes et al. (2009), people benefit more from mental imagery than from verbal processing of highly positive material because imagery is more absorbing and believable and is less likely to result in unfavourable self-comparison.

An important issue is whether any effects of the BPS manipulation on positive future expectancies are independent from its previously demonstrated mood effects, or whether these are secondary to the changes in positive mood. Therefore, we measured PA and negative affect (NA) prior to and following the manipulation, and we examined whether the effect of the manipulation on future expectancies are mediated by the effects on mood. Finally, we explored whether the effects of the BPS manipulation on expectancies for the future and on mood are moderated by trait optimism, neuroticism or extraversion. Previously, it was found that writing about a BPS was equally effective in reducing health care visits in optimists and pessimists (Harrist et al., 2007). Therefore, we expected that the impact of the BPS manipulation on

expectancies for the future and mood would not be dependent on the participants' *a priori* level of optimism. Neuroticism and extraversion were included as potential moderators for exploratory reasons.

In sum, three hypotheses were tested. First, BPS writing and imagery leads to enhanced positive mood, higher expectancies for positive future outcomes and lower expectancies for negative future outcomes compared to writing and imagining a typical day. Second, the effects of the manipulation on future expectancies are independent of its mood effects. Confirmation of this hypothesis will provide evidence that the BPS might be a true optimism manipulation and not merely a mood induction. Finally, we hypothesized that the effects of the BPS manipulation on future expectancies and mood are not moderated by trait optimism, neuroticism or extraversion.

## Methods

### Participants

The experiment was performed during first- and fourth-year psychology classes at Örebro University. A total of 82 students (51 women and 31 men) participated in the study. Mean age was 29.6 years (range 21–50), 79 students were Swedish nationals and for 77 students Swedish was their first language.

### Manipulation

The manipulation was performed in the classroom (9–19 students per class). The instructor informed students that they were participating in an experiment on the effects of a writing and imagery exercise on their thoughts and feelings. Students from each participating class were randomly assigned to either of the two conditions: the positive future thinking condition (BPS) or the control condition (A typical day). Half of the students remained in their classroom and received one of the manipulations and the other half were moved to a new room and received the alternative manipulation. Both manipulations had the same format: participants were requested to think for 1 min about what to write, then write for 15 min, followed by 5 min of imagery on the story they just wrote. Instructions were given both verbally and in writing. The respective instructions in the BPS and typical day condition were based on Sheldon and Lyubomirsky (2006) and were as follows:

Best possible self:

*The exercise you will do is to think about your best possible self for one minute and then write down your thoughts. 'Think about your best possible self' means that you imagine yourself in the future, after everything has gone as well as it possibly could. You have worked hard and succeeded at accomplishing all the goals of*

*your life. Think of this as the realization of your dreams, and that you have reached your full potential. Thus, you identify the best possible way that things might turn out in your life. Please, start thinking of your best possible self. I will tell you when it is time to start writing down your thoughts.*

A typical day:

*The exercise you will do is to think about a typical day in your life for one minute and then write down your thoughts. 'Think about your typical day' means that you take notice of ordinary details of your day that you usually don't think about. These might include particular classes or meetings you attend to, people you meet, things you do, typical thoughts you have during the day. Think of this as moving through your typical day, hour after hour. Thus, you identify how a typical day looks like for you. Please, start thinking of your typical day. I will tell you when it is time to start writing down your thoughts.*

After a silence period of 1 min, the instructions continued:

*Now, I will ask you to write about your best possible self/a typical day in your life for 15 minutes. The only rule we have about writing is that you write continuously for the entire time. If you run out of things to say, just repeat what you have already written. Don't worry about grammar, spelling or sentence structure. Don't worry about erasing or crossing things out. Just write. The things you write are only for yourself and do not have to be handed in afterwards. If you need to repeat the instructions for the exercise, you can read them at the top of the paper in front of you. I will tell you when it is time to stop writing. Please start writing.*

Finally, after 15 min of writing, the instructions for the imagery part were given:

*Please, finish your sentences. The time for writing is over. Now, I want you to imagine as vividly as possible the things you have been writing about. Think about your best possible self/a typical day in your life for 5 minutes. Imagine your ideal future life/your typical day with as much detail as you can. I will tell you when it is time to stop. Please, start thinking.*

A total of 44 students received the BPS manipulation and 38 students received the typical day manipulation.

## Measures

### Dispositional optimism

The life orientation test (LOT; Scheier & Carver, 1985) was used to measure the level of dispositional optimism of participants. The LOT has eight items (plus four filler items) that are rated on a 5-point scale (disagree–agree). Sample items are 'Every cloud has a silver lining' and 'I'm always optimistic about my future'. Four items are positively phrased

and four items are negatively phrased. A total optimism score can be obtained by summing all items after reversing the scores on the negatively phrased items. Internal consistency of the eight items was  $\alpha = 0.76$  in this sample.

### Extraversion and neuroticism

Two subscales of the Eysenck Personality Questionnaire Revised Short Scale (EPQ-RSS; Eysenck & Eysenck, 1991) were used to measure extraversion and neuroticism. Each subscale has 10 yes/no items. A total score for each of the traits can be obtained by summing all 'yes' answers. In the extraversion subscale, two items are reverse scored, and these items were first recoded. Internal consistency in this sample was  $\alpha = 0.75$  for extraversion and  $\alpha = 0.78$  for neuroticism.

### Affect

Affective state was assessed by the short form of the positive and negative affect schedule (PANAS; MacKinnon et al., 1999). The short PANAS contains five items measuring PA (e.g. excited) and five items measuring NA (e.g. distressed) that are scored on a 5-point scale. The frame of reference was the participant's state 'right now'. An average item score is calculated separately for PA and NA. The short PANAS was administered twice: before the manipulation and after the manipulation. Internal consistency in this sample was  $\alpha = 0.71$  for the negative items and  $\alpha = 0.73$  for the positive items.

### Expectancies for positive and negative future outcomes

We used the subjective probability test (SPT; MacLeod, 1996) to measure positive and negative future expectancies. The SPT consists of 20 statements referring to negative future outcomes (e.g. 'you will have health problems', 'things will not turn out as you had hoped') and 10 statements referring to positive future outcomes (e.g. 'you will be able to cope easily with pressure', 'people will admire you'). Participants are asked to judge the likelihood that they will experience these specific outcomes on a 7-point scale (not at all likely to occur – extremely likely to occur). In a separate study with 254 participants (unpublished results), we found that the positive items and the negative items form two distinct factors, both with an internal consistency of  $\alpha > 0.90$ . Therefore, in the analyses for this study, we used positive future expectancies and negative future expectancies as two separate constructs. Internal consistency in this study was  $\alpha = 0.80$  and  $0.91$  for positive and negative future expectancies, respectively. The SPT was administered



twice, but post-test the order of items was changed. This version proved as internally consistent as the original version ( $\alpha=0.81$  and  $0.91$  for positive and negative future expectancies, respectively).

#### *Quality of imagery and direct optimism questions*

Four self-developed 10-point scales were administered post-manipulation. Two scales were intended as an additional measure of state optimism and related to the future expectancies. These were respectively 'What are your expectations for the coming week?' (it will be a very bad week – it will be an excellent week) and 'How do you feel right now about your future?' (very pessimistic – very optimistic). The other two scales related to the quality of imagery: 'How well could you imagine yourself being in the situation you described in your writing?' (not at all – extremely well) and 'How vivid were the pictures you imagined?' (not vivid at all – very vivid).

#### *Procedure*

All testing took place in the classroom. The students sat on their own, next to each other. The experimenter introduced the exercise and handed out the questionnaires. The questionnaires were completed in the following order: PANAS, EPQ-RSS, LOT and SPT. Next, the instructions appropriate for the conditions were given by the experimenter, first verbally and then in writing. A blank sheet of paper was provided for the writing part. During the exercise, students were not allowed to speak or leave the room. The experimenter remained present during the entire procedure. After the allotted time for writing and imagery had passed, the experimenter signalled the students to finish. Next, another set of questionnaires was provided, consisting of the PANAS, SPT and the four visual analogue scales (VASs). After finishing with the questionnaires, students were free to leave, and could take their stories with them. No remuneration was given for participation.

## **Results**

### *Baseline descriptives*

Table 1 shows the mean scores of the participants on the various questionnaires at baseline and their intercorrelations. In accordance with previous findings (McLeod, 1996 and our own unpublished data), participants rated the probability of positive outcomes higher than the probability of negative outcomes. Attesting to their independence, expectancies for positive future outcomes and expectancies for negative future outcomes appeared to be unrelated. Dispositional optimism and – to a lesser extent – extraversion were significantly correlated with expectancies for positive future outcomes but not to expectancies for negative outcomes. There was no significant association of either type of expectancy with neuroticism or current mood.

Unexpectedly, there was a significant positive correlation between PA and NA. There were no baseline differences between the conditions on any of the measures.

### *Effects of the manipulation*

We first examined the subjective assessment of the quality of imagination by participants. Most individuals could very well imagine the situation (mean: 7.8, SD: 1.8) and reported to have experienced vivid images (mean: 7.9, SD: 1.9). There were no significant differences in quality of imagination or vividness between the two conditions.

The effects of the manipulation on changes in PA, NA, expectancies for positive outcomes (SPT-pos) and expectancies for negative outcomes (SPT-neg) were tested with  $2 \times 2$  (condition  $\times$  time) analysis of variances (ANOVAs) for repeated measures, using SPSS 15.0. Two participants (one in the BPS condition, other in the control condition) did not provide a PANAS score post-manipulation, and one participant (BPS condition) did not provide an SPT score, leaving 80 and 81 participants for the analyses of affect and state optimism, respectively. Results are displayed in Table 2. A significant condition  $\times$  time interaction was

Table 1. Descriptive data and intercorrelations between questionnaires.

		Mean (SD)	Range	EPQ-E	EPQ-N	PA	NA	SPT-pos	SPT-neg
1	LOT	31.4 (4.8)	15–40	0.14	–0.34*	–0.14	–0.02	0.58*	–0.19
2	EPQ-E	8.35 (2.75)	0–12		–0.00	0.12	0.01	0.35*	0.09
3	EPQ-N	3.65 (2.84)	0–10			0.05	0.21	–0.20	0.18
4	PA	2.53 (0.71)	1.0–4.4				0.31*	–0.06	0.02
5	NA	1.49 (0.54)	1.0–3.8					–0.17	0.07
6	SPT-pos	5.45 (0.69)	3.2–7.0						0.07
7	SPT-neg	3.10 (0.95)	1.1–6.7						

Note: \*denotes Significance at  $p < 0.05$ .

found for PA. PA significantly increased after the BPS manipulation ( $t = -6.92$ ,  $p < 0.001$ ) but not after the control manipulation ( $t = 0.18$ ,  $p = 0.86$ ). For NA, only the main effect of time was significant: there was a slight but significant decrease in NA after both manipulations ( $t = 3.06$ ,  $p = 0.004$  in the BPS condition;  $t = 2.31$ ,  $p = 0.027$  in the control condition).

For both SPT-pos and SPT-neg, the condition  $\times$  time interaction effects were significant (Table 2). Expectancies for positive outcomes significantly increased after the BPS manipulation ( $t = -3.01$ ,  $p = 0.004$ ) and remained unchanged after the control manipulation ( $t = 0.81$ ,  $p = 0.43$ ). Expectancies for negative outcomes significantly decreased after both the BPS ( $t = 6.08$ ,  $p < 0.001$ ) and the control manipulation ( $t = 6.80$ ,  $p < 0.001$ ), but the increase was larger in the BPS condition.

*T*-tests for independent groups were used to test whether there were differences between the conditions on the two self-constructed post-manipulation questions intended to measure state optimism. A significant difference neither for expectancies for the coming week (mean BPS: 7.6; mean control: 7.7) nor for the future in general (mean BPS: 8.3; mean control: 8.1) was found. The expectation for the future in general did correlate moderately with dispositional optimism ( $r = 0.23$ ,  $p = 0.039$ ).

### Mediation effects

Next we examined whether the effects of the manipulation on expectancies for positive and negative outcomes were mediated by the change in PA. We used hierarchical regression analyses with either SPT-pos or SPT-neg as the dependent variable and condition as the independent variable in the first step, and added the pre- to post-manipulation change in PA in the second step. This analysis indicated that the increase in SPT-pos after the BPS manipulation

was not mediated by the increase in PA. The pre- to post-manipulation change in PA was unrelated to the change in SPT-pos ( $\beta = -0.03$ ) and the magnitude of the condition effect did not decrease after controlling for the change in PA (step 1, for condition  $\beta = 0.27$ ,  $p = 0.013$ ; step 2  $\beta = 0.31$ ,  $p = 0.019$ ). In contrast, the decrease in SPT-neg appeared to be mediated by the change in PA after the BPS manipulation. The pre- to post-manipulation change in PA was significantly associated with the change in SPT-neg ( $\beta = -0.27$ ,  $p = -0.03$ ), and the  $\beta$  of the condition effect decreased from 0.26 ( $p = 0.018$ ) in the first step to 0.12 ( $p = 0.354$ ) after controlling for the change in PA. The Sobel test ( $p = 0.045$ ) indicated that the indirect effect of condition on the decrease in SPT-neg is effectuated through the change in PA.

### Moderation effects

In order to test whether the effects of the manipulation were moderated by baseline dispositional optimism, neuroticism or extraversion, we conducted a hierarchical regression analyses with the trait characteristic (optimism, neuroticism or extraversion) and condition as independent variables in the first step, their interaction in the second step and the pre- to post-manipulation changes in PA, SPT-pos and SPT-neg as dependent variables. For each dependent variable, three regression models were specified, i.e. for each of the trait characteristics separately.

The effect of the manipulation on PA was not moderated by any of the trait characteristics, i.e. the interaction terms did not reach significance. This means that the effectiveness of the BPS manipulation to increase PA did not depend on the baseline level of optimism, neuroticism or extraversion of participants. The change in SPT-pos was not moderated by any of the trait variables; however, we did find a main effect of trait optimism on the pre- to post-manipulation

Table 2. Pre- and post-manipulation scores for PA, NA and expectancies for positive and negative outcomes.

	BPS condition Mean (SD)	Control condition Mean (SD)	Significant effects	Effect size $\eta^2$
PA				
Pre-intervention	2.51 (0.74)	2.55 (0.72)	Time effect $F(1, 78) = 25.2$ , $p < 0.001$	0.19
Post-intervention	3.46 (0.74)	2.52 (0.93)	Time $\times$ group effect $F(1, 78) = 27.6$ , $p < 0.001$	0.21
NA				
Pre-intervention	1.48 (0.46)	1.50 (0.63)	Time effect $F(1, 78) = 14.1$ , $p < 0.001$	0.15
Post-intervention	1.25 (0.33)	1.29 (0.36)		
Positive expectancies				
Pre-intervention	5.49 (0.71)	5.40 (0.68)	Time $\times$ group effect $F(1, 79) = 6.41$ , $p = 0.013$	0.07
Post-intervention	5.71 (0.67)	5.33 (0.68)		
Negative expectancies				
Pre-intervention	3.22 (1.05)	2.96 (0.83)	Time effect $F(1, 79) = 65.5$ , $p < 0.001$	0.45
Post-intervention	2.59 (0.90)	2.62 (0.79)	Time $\times$ group effect $F(1, 78) = 5.82$ , $P = 0.018$	0.04

change in SPT-pos. The higher the level of baseline optimism the lesser the increase in expectancies for positive outcomes, after both manipulations. This may be attributed to a ceiling effect: high optimists started out with high scores on SPT-pos to begin with, leaving little room for increases. The change in SPT-neg after the manipulation was moderated by neuroticism. Participants high in neuroticism profited more from the BPS manipulation than participants low in neuroticism (Figure 1).

Finally, we examined whether the manipulation effect on any of the outcome variables was moderated by the quality and vividness of imagery. This appeared not to be the case.

## Discussion

This study tested a BPS writing and imagery exercise as a means to increase optimistic future thinking. The effectiveness of this manipulation was compared to a control manipulation, writing about and imagining a typical day. The BPS manipulation effectively influenced mood and, importantly, also expectancies for the future. PA was significantly higher after the BPS manipulation than after the control manipulation and expectancies for the future became more positive (i.e. expectancies for positive outcomes and expectancies for negative outcomes). The effects of the BPS manipulation on positive future expectancies appeared to be independent from its effects on positive mood. In addition, the BPS manipulation appeared to be equally effective for participants scoring high or low on dispositional optimism and extraversion. However, high neurotic participants seemed to have profited

most from the BPS manipulation, as demonstrated by a greater reduction in negative future thinking.

One of the challenges we faced when designing this study was to find an instrument that would allow us to measure expectations for the future pre- and post-manipulation, and that would be sensitive to temporary changes. Existing optimism instruments, such as the LOT measure stable expectancies (e.g. with statements containing phrases like ‘in general...’ or ‘I always...’) cannot be expected to be sensitive to the effects of a short manipulation. On the other hand, the instrument does have to be global, encompassing various life domains, and refer to outcomes in the future that have a certain degree of uncertainty. Moreover, to distinguish optimism from self-efficacy, the future outcomes referred to should be at least partly devoid of voluntary control by the respondent. The SPT seemed to meet these requirements. It assesses how probable participants judge the occurrence of a wide range of future outcomes, both positive and negative, and encompassing various life domains (health, social relations and career). The results of this study indicated that especially expectancies for positive future outcomes are related to dispositional optimism as measured with the LOT. Moreover, in another (unpublished) study in which we administered the SPT and the LOT to 245 participants, we found substantial correlations between both positive and negative future expectancies and dispositional optimism, i.e. Pearson  $r=0.74$  for positive expectancies and  $r=-0.58$  for negative expectancies. Therefore, we propose that the SPT – and especially the positive items – can indeed be considered an appropriate instrument to measure optimistic future thinking.

The fact that BPS manipulation did not only affect PA but also future expectancies as measured by the SPT suggests that it is more than a mood manipulation, and may indeed be considered as a manipulation to induce optimism. Moreover, the expectancy effects appeared to be independent from the mood effects, i.e. the increase in expectancies for positive outcomes after the BPS manipulation remained significant after controlling for the increase in PA. The decrease in expectancies for negative outcomes on the other hand did appear to depend on the increase in positive mood. This finding, together with the facts that (1) the largest decrease in expectancies of negative outcomes was due to a time effect and (2) the BPS effect on negative expectancies only occurred in high neurotic individuals suggests that different underlying mechanisms may be responsible for the change in positive versus negative expectancies. Especially, expectancies for positive outcomes may reflect an optimistic thinking style. This is consistent with the finding that at baseline, only expectancies for positive outcomes and not negative outcomes were related to dispositional optimism.

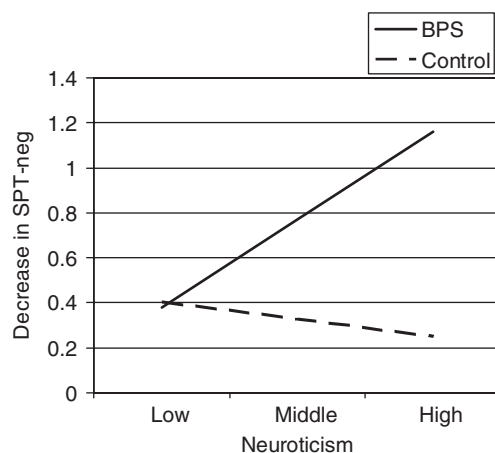


Figure 1. Neuroticism  $\times$  condition interaction on prediction of decrease in expectancies for negative outcomes (SPT-neg). Participants with high neuroticism benefited more from the BPS manipulation than participants with low neuroticism ( $\Delta$ SPT-neg =  $0.38 + 0.078 \times$  neuroticism;  $p=0.023$ ). Neuroticism did not moderate the effect of the control condition ( $\Delta$ SPT-neg =  $0.40 - 0.015 \times$  neuroticism;  $p=0.045$ ).



We did not find a difference between the conditions on our two direct optimism questions. It may be proposed that because these two questions were only administered post-manipulation, the *a priori* variation between participants in their expectancies masked eventual changes induced by the manipulation. Indeed, the question ‘how do you feel right now about your future?’ correlated moderately with baseline LOT (Pearson  $r=0.23$ ,  $p=0.036$ ). Administering these direct questions pre- and post-manipulation possibly would have increased the sensitivity.

The finding that compared to the control manipulation, the BPS manipulation led to a larger increase in PA but not to a larger decrease in NA is consistent with the previous literature. Sheldon and Lyubomirsky (2006) compared the effects of a BPS condition, a gratitude condition (writing and thinking about the things you are grateful for) and a control condition on PA and NA. Similar to this study, the BPS and the gratitude exercises increased PA more than the control exercise whereas all three exercises decreased NA. Burton and King (2004) also found that post-manipulation PA was significantly higher after writing about intense positive experiences compared to control writing, whereas there were no changes in NA.

Why should thinking about a positive future lead to changes in optimism? According to the expectancy – value model of motivation as formulated by Carver and Scheier (2001) – progress towards a goal determines affect and confidence of a good outcome. The higher the rate of progress towards a goal, the more PA an individual will experience and the higher his/her optimistic outcome assessment. Mental simulation of a positive scenario is proposed to have the same effect as actual behaviour and therefore may similarly lead to increased levels of confidence for success (Carver & Scheier, 2001). These results support the idea. Moreover, they also suggest that the impact of goal progress on outcome expectancies is relatively independent from the affective changes it generates. Thus, even though affect and expectancy are both shifted into a more positive direction, the change in one of them does not necessarily mediate the change in the other.

It should be stressed that we have only looked at the immediate effects of the BPS manipulation. This study was meant as an initial exploration whether BPS writing supplemented with a 5-min mental imagery component would be able to increase optimistic thinking. Now that we have found evidence that this manipulation may indeed shift expectancies for the future into a more positive direction, we are currently examining whether repeated BPS imagery, practised in daily life, can lead to more enduring changes in optimism. It is important to note here that our endeavour to develop an optimism manipulation is primarily motivated by its scientific relevance, in that it will allow studying the mechanisms of optimism more thoroughly.

The availability of a simple but effective manipulation that can (temporarily) increase optimistic thinking provides researchers with a tool that allows studying the causal effect of optimism on a range of outcomes (e.g. behavioural outcomes, such as persistence or flexibility of behaviour, physiological outcomes, such as stress reactivity or recovery).

Whether it is feasible to lastingly change dispositional optimism is open to debate. Optimism is thought to be at least partly genetically determined and further shaped by early childhood experiences (Carver & Scheier, 2005). It can be proposed that for a more lasting effect, one would need to experience actual positive outcomes instead of only imagining a positive scenario because the former would entail actual reinforcement and thereby learning. It should also be noted that some have cautioned against the potential risk of increasing optimism (Norem & Chang, 2001). Trying to increase optimism in people who are already unrealistically optimistic could have deleterious effects on outcome (e.g. increasing risk-taking behaviour).

Several limitations of this study should be mentioned. Although the effect of the BPS manipulation on PA was quite large ( $\eta^2=0.21$  for the time  $\times$  condition interaction;  $\eta^2 > 0.14$  are considered large), its effect on positive expectancies was only moderate ( $\eta^2=0.07$ ). Future research should examine whether the effects on expectancy can be enhanced when the manipulation is extended, i.e. instead of a single writing and imagery session, repeated sessions are offered. If the BPS visualization systematically targets different life domains, people may come to see themselves as globally successful persons (cf. Riskind et al., 1996).

Another limitation is that we measured optimism by means of a set of specific future expectancies (i.e. with the SPT). There may be some similarities between the content of the BPS visualization and the expectancies measured by this instrument. Future studies could use a more global measure of optimism. Moreover, we only used direct and explicit measures of affect and expectancies, and therefore we cannot rule out that demand or expectations played a role. We tried to control for that by giving the same instructions in both conditions, with a similar suggestion that writing and imagery could influence thoughts and feelings. Nevertheless, due to the nature of the manipulation, the BPS may have led to stronger expectations of change. It would be interesting to use more indirect assessment methods, e.g. an implicit measure of optimism or behavioural or physiological correlates of optimism.

In conclusion, this study provides evidence for the efficacy of a BPS manipulation to temporarily enhance optimism. In addition to a more positive mood, a BPS manipulation changed the expectancies of participants for the future in a more positive direction.

These results are encouraging and we are currently examining longer term effects and the effects of a BPS manipulation on indirect measures of optimism. The BPS manipulation may be a suitable tool to study the causal relations between optimism and psychological and physical health.

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