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The Best Possible Self Intervention: The moderating effect of age between the BPS future and past intervention and the wellbeing of participants

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Total number of pages: 25

Date of submission: 30th of July 2021

Abstract

Introduction. The Best Possible Self (BPS) future intervention, originally developed by King (2001) is the most famous positive psychological intervention aiming to increase wellbeing. Research recently introduced the BPS intervention focusing on the participant's past experiences. Prior research revealed ambiguities whether the BPS future intervention is more effective for the wellbeing of younger people than elderlies. However, research did not yet explore the effects of age on the relationship between the BPS past intervention and wellbeing.

Aim. The present study aimed to explore the effect of the BPS future and past intervention on wellbeing and whether age moderates the effect.

Methods. Participants were randomly allocated to three conditions, namely a BPS future condition in which participants wrote about their BPS in the future for two weeks (n = 95), a BPS past/future condition in which participants wrote about their BPS in the future for one week and their BPS in the past in the second week (n = 100), and an active control condition in which participants wrote about activities of the last 24 hours (n = 95). The two-week intervention was delivered using a mobile application. All participants had to complete tasks for five minutes per day depending on the condition they were allocated to. The levels of wellbeing were assessed one time before the start of the intervention, two times during the intervention, and one time four weeks after the intervention using the "*Mental Health Continuum Short Form"*.

Results. Outcomes of the RM-ANOVA revealed an increase in the participant's levels of wellbeing throughout the intervention. However, the BPS future and past interventions did not significantly enhance wellbeing compared to an active control condition. Added to that, the Preacher and Hayes (2014) moderation analysis showed that age does not moderate the association between the BPS interventions and wellbeing.

Conclusion. The findings illustrate that thinking about activities of the last 24 hours is as effective for people's wellbeing as the BPS future and past intervention. Furthermore, the effects of the BPS future or past intervention on wellbeing do not differ among age groups. Therefore, the results of this study suggest that the temporal focus of the intervention and the age of participants are not of crucial relevance. However, as the present study displays methodological limitations and differences between prior suggestions and actual results, there is a need for future research on the moderating effect of age.

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Introduction

"Imagine… What would be the best possible version of yourself in the future?" - This question is part of a positive psychological intervention, namely the Best Possible Self intervention (Sheldon & Lyubomirsky, 2006). The area of positive psychology is a newly developed alternative to the traditional field of psychology that addresses the wellbeing of people (Auyeung & Mo, 2019; Magyar-Moe, Owens, & Conoley, 2015). The field originally developed as psychologists disagreed with the expanding concentration of psychology on diseases (Seligman, & Csikszentmihalyi, 2014). As a result, positive psychology aims to increase the strengths and beneficial characteristics of people, instead of addressing the deficiencies (Seligman, & Csikszentmihalyi, 2014). To illustrate, the two positive psychologists Westerhof and Keyes (2010) characterize mental health as the absence of mental illnesses and the presence of mental wellbeing. In practice, this assumption implies that even though people do not experience a mental illness, they might still feel down as they do not use their strengths and qualities correctly (Bolier et al., 2013).

Besides, to use positive psychology in practice, psychologists established divergent interventions, namely the positive psychological interventions (PPIs). These newly developed interventions are not only suited for patients receiving treatment but mainly for the general population (Bolier et al., 2013). Researchers in the area of positive psychology developed a range of PPIs within the last years, such as the gratitude journal (Emmons, McCullough, & Tsang, 2003), doing acts of kindness (Lyubomirsky, Sheldon, & Schkade, 2005), and the Best Possible Self intervention (Sheldon & Lyubomirsky, 2006; Magyar-Moe et al., 2015). One of the main reasons for the increased popularity of these PPIs is the shift from a rather negative focus to positively oriented interventions (Bolier et al., 2013; Magyar-Moe et al., 2015).

The most common and famous PPI in the field of positive psychology is the Best Possible Self (BPS) intervention (Peters, Meevissen, & Hanssen, 2013). The BPS intervention was originally developed by King in 2001. Participants had to write about their BPS for 20 minutes every day for four days (Carrillo, Etchemendy, & Baños, 2020). This exercise challenges people to fantasize and document the best version of themselves in the future (Peters et al., 2013). Imagining the BPS includes the achievement of every life goal (Meevissen, Peters, & Alberts, 2011). Prior research has shown that the imagination of a BPS is beneficial as it enhances the wellbeing and mood of participants (Meevissen et al., 2011; Peters et al., 2013; Carrillo et al., 2020). As a result, the BPS intervention is a frequent subject of research studies and interventions in the area of positive psychology.

Within previous years, researchers explored the effectiveness of the BPS intervention. A wide spectrum of research in the area of positive psychology, ranging from the first study by King (2001) to more recent studies, discovered the effectiveness of the BPS intervention on the enhancement of wellbeing. For instance, King (2001) revealed large effects sizes of the BPS intervention on wellbeing. Additional studies identified a positive impact on psychological constructs that are linked to wellbeing, such as, positive affect or life satisfaction (Magyar-Moe et al., 2015; Peters et al., 2013). A recent meta-analysis using 26 studies and 2909 participants addresses the effects of BPS interventions (Carrillo et al., 2019). Results showed, based on medium to moderate effect sizes, that participants performing the BPS intervention experienced an increase in positive affect and life satisfaction (Carrillo et al., 2019; Peters et al., 2013). Importantly, the enhancement of these psychological constructs induces an increase in the general wellbeing of people (Carrillo et al., 2019; Peters et al., 2013; Loveday et al., 2018).

Thus, there is a full body of research on the BPS future intervention. However, a recent study by Carrillo et al. (2020) was the first known research that introduced the BPS past intervention. In this study, participants were asked to think back, imagine, and document their BPS within their past (Carrillo et al., 2020). Prior research on the potential of imagination indicates that solely imagining positive events is identified to positively affect wellbeing (Holmes, Arntz, & Smucker, 2007). Consequently, the researchers expected that imagining one's BPS in the past is as beneficial for the participant's wellbeing as the BPS future intervention (Carrillo et al., 2020). However, the results of this research could not find meaningful differences between the temporal conditions and the control condition (Carrillo et al., 2020). Carrillo et al. (2020) argued that the task of the control condition to think about activities carried out in the last 24 hours led to a positive image about oneself which consequently caused an increase in levels of wellbeing. As a result, the researchers proposed the need for further research on the temporality of the BPS intervention (Carrillo et al., 2020).

Besides, prior research identified reasons to believe that age affects the relationship between the BPS interventions and wellbeing (Parks & Biswas-Diener, 2013). To start with, Lyubomirsky and Layous (2013) developed a hypothesis based on prior theory suggesting that future-oriented PPIs, such as the BPS future intervention, are more successful for participants at a younger age in comparison to participants at an older age. Reasons for this prediction are, for instance, that younger people still experience more opportunities to reach their goals in the future than older people (Lyubomirsky & Layous; 2013; Meevissen et al., 2011). Based on Lyubomirsky and Layous's theoretical hypothesis (2013), Carrillo et al.

(2019) explored the moderating effect of age on the BPS future intervention. However, in contrast to expectations, the study concluded that the BPS intervention focusing on the future was more beneficial for older participants compared to younger participants (Carrillo et al., 2019). Given that previous research revealed ambiguous results in terms of age and whether the BPS future intervention is more beneficial for older or younger participants, there is a need for future research. Furthermore, previous research did not yet examine the effects of age on the recently developed BPS past intervention (Carrillo et al., 2020). Therefore, further research should explore the effects of age on the BPS future and past intervention.

The current study

To summarize, prior research displayed meaningful positive effects of the BPS intervention on the wellbeing of people (King, 2001; Magyar-Moe et al., 2015; Peters et al., 2013). In addition to the BPS future intervention developed by King (2001), Carrillo et al. (2020) identified the BPS intervention focusing on the past. Despite non-significant results, the BPS past intervention is expected to reveal similar positive effects on wellbeing as the BPS future intervention (Carrillo et al., 2020). Besides, age might be a relevant factor affecting the relationship between the BPS interventions and wellbeing. As prior research revealed ambitious results concerning the effect of age on the BPS future intervention, the present study will investigate this relationship (Carrillo et al., 2019). Since the research on the BPS past intervention is limited, the present study will also explore whether age affects the relationship between the BPS past intervention and wellbeing. These factors will be explored using a mobile application on the participant's smartphones. The importance behind this research is the creation of a BPS intervention that perfectly fits various age groups and works as effectively as possible for these groups. This study makes use of three different conditions, namely a BPS future condition, a BPS past/future condition, and a control condition. The research will answer the following research questions:

1. What is the effect of the BPS future and past intervention on wellbeing compared to a control condition?
2. Does age moderate the effect of the BPS intervention focusing on the future and past on the wellbeing of participants?

Methods

Design

The study design was a four-wave randomized controlled trial with three arms: (1) The Best Possible Self Future intervention, (2) the Best Possible Self Past and Best Possible Self Future intervention, and (3) the active control condition. Participants filled out questionnaires at baseline (T0), one week after the start of the intervention (T1), two weeks after the intervention (T2), and four weeks after the intervention (T3). Approval was given by the Faculty of Behavioural Sciences Ethics Committee at the University of Twente using the registration number BCE16337. The study is registered in the United States National Institute of Health Registration System (NCT03024853).

Participants

In total, 745 participants were assessed for eligibility. People were eligible when they (1) were older than 18 years, (2) owned a smartphone with an internet connection, (3) had a valid email address, (4) exhibited a sufficient level of the Dutch language, and (5) provided informed consent. Furthermore, participants were excluded when (6) experiencing symptoms of a generalized anxiety disorder, which was illustrated by a value higher than 15 on the *"Generalized Anxiety Disorder scale"* (Spitzer, Kroenke, Williams, & Löwe, 2006) or when (7) having symptoms of depression, indicated by a score higher than 34 on the*"Center for Epidemiologic Studies Depression Scale" (n* = 84)(Radloff, 1977). Moreover, participants were excluded when (8) they were flourishing, shown by the "*Mental Health Continuum Short Form"* (*n* = 98)(Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011). Consequently, 563 participants were invited to answer the baseline assessment. Furthermore, participants were excluded when (9) not answering the baseline assessment (*n* = 146), (10) when handing it in incompletely (*n* = 17), and (11) when not downloading the app (*n* = 41). Resulting, 204 participants were excluded and 359 participants were randomly allocated to three temporal conditions, namely control condition, future condition, and past/future condition. Lastly, participants were not included in the analysis (12) when not opening the mobile app. As a consequence, 95 participants were analyzed in the Best Possible Self Future condition, 100 participants were analyzed in the Best Possible Self past/future condition, and 95 participants were analyzed in the control condition. An overview of the inclusion and exclusion of participants in the BPS intervention can be found in the flowchart presented in figure 1.

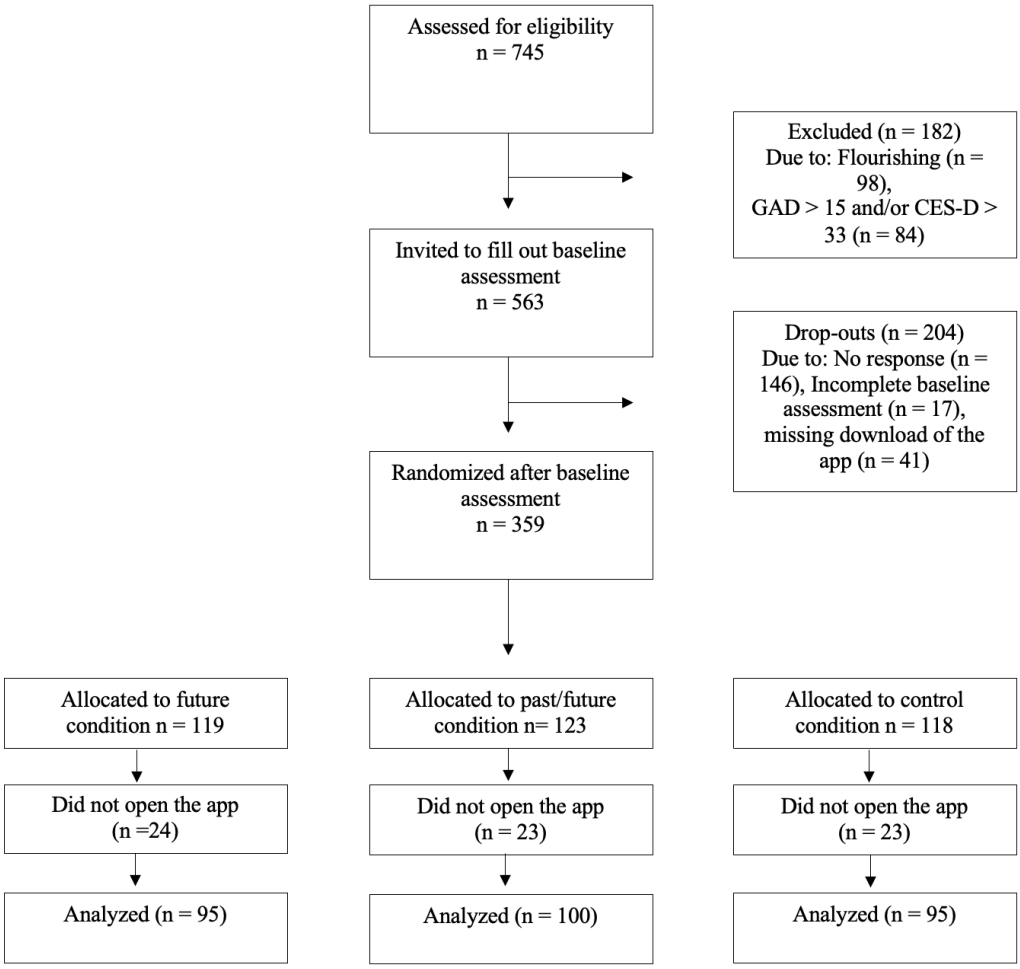

Figure 1. Flowchart of the participants

The demographic information separated into the three temporal conditions can be found in table 1. A convenient sample of N = 290 participants was included in the data set. The mean age of the sample was 46.78 years *(SD* = 10.31) ranging from the youngest participant being 19 years old to the oldest participant being 72 years old. In total, more than 90 percent of the participants were women. The majority had a Dutch nationality, while one participant stated another nationality, namely Swedish. Moreover, the majority was married or in a relationship. The remaining participants were either divorced, widows, or single. In addition, most of the people participating in this intervention were either living alone, with a partner and children, or with a partner but without children. Besides, more than two-thirds of the people completed a moderate level of education, and a quarter of the participants has a higher level of education, such as the university. In addition, the majority of the sample stated that they were employed at the time of the intervention. Lastly, the randomization was successful. No significant differences in any of the demographic variables between the conditions were detected (see Table 1).

Table 1

Demographic statistics separated in conditions (N = 290)

	Control condition		Future condition		Past/Future condition		Total		Chi-Square
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*sig.*
Gender									.50
Female	88	92.5	85	89.5	94	94	267	92.1	
Male	7	7.4	10	10.5	6	6	23	7.9	
Nationality									.39
Dutch	95	100.0	95	100.0	99	99.0	289	99.7	
Other	0	0.0	0	0.0	1	1.0	1	0.3	
Marital status									.51
Married or in partnership	47	49.5	47	49.5	41	41.0	135	46.55	
Divorced	21	22.1	16	16.8	20	20.0	57	19.66	
Other (widowed, single)	27	28.5	32	33.7	39	39.0	98	33.79	
Living situation									.33
Single household	17	17.9	28	29.5	25	25.0	70	24.14	
With partner and children	30	31.6	35	36.8	29	29.0	94	32.41	
With partner (no children)	29	30.5	21	22.1	29	29.0	79	27.24	
Alone with children	18	18.9	10	10.5	13	13.0	41	14.14	
With others (parents etc.)	1	1.1	1	1.1	4	4.0	6	2.06	
Educational level									.95
Lower education (elementary school, LBO)	1	1.1	1	1.1	1	1.0	3	1.03	

Moderate education VMBO, MAVO, secondary school, high school)	71	74.8	70	73.7	72	72.0	166	73.45	
Higher education (university)	21	22.1	23	24.2	26	26.0	70	24.14	
Other	2	2.1	1	1.1	1	1.0	4	1.38	
Occupation									.16
Employed	69	72.6	66	69.5	58	58.0	193	66.55	
Self-employed	15	15.8	14	14.7	10	10.0	39	13.45	
Not working (unemployed, retired, student, volunteer)	8	8.5	14	14.9	29	29.0	51	17.59	
Other	3	3.2	1	1.1	3	3.0	7	2.41	
	Mean	*SD*	*Mean*	*SD*	*Mean*	SD	*Total Mean*	*SD*	*ANOVA sig.*
Age	47.36	10.19	46.92	9.93	46.1	10.32	46.78	10.31	.96

Note. $p > .05$

Procedure

The recruitment of participants from the general population was completed using an advertisement containing the following message: “Do you want to grow your confidence? Soon we will start with a study in which you will boost your confidence, happiness, and satisfaction with life through exercises presented on a mobile application for a two-week period”. In addition, the advertisement contained a link referring possible participants to the research web page that presented detailed information on the study purpose. The web page also contained an explanation of the procedure of how to sign up for the study and an online screening questionnaire that had to be completed.

Participants that met the inclusion criteria of the screening questionnaires, received an email entailing the invitation to the research study and a link to the first questionnaire. The baseline questionnaire was composed of the first questionnaire and the screening

questionnaires. After filling in the first questionnaire, participants were instructed to download the mobile application, called TIIM. All participants that downloaded the application were randomly allocated to the three conditions, namely (1) The Best Possible Self Future intervention, (2) the Best Self Past and Best Possible Self Future intervention, and (3) the control condition. To ensure equal randomization to the three groups, the randomization generator on the website www.random.org was adopted. To maximize the participation of people and the chance of participants to finish the interventions, frequent reminders were sent via email. Added to that, (1) a 100 euros gift card, (2) five 50 euros gift cards, and (3) twenty 10 euros gift cards for an online store were randomly distributed among all participants that completed the whole intervention.

Intervention and Application

After opening the app on the first day, the intervention guide Dan was introduced and explained his teaching role and the purpose of the intervention, in particular, the use of imagination to improve wellbeing. A picture of the guide Dan can be found in figure 2. Dan described the procedure of the intervention, specifically, the duration of two weeks that contained exercises on imagination every day for approximately five to ten minutes. To introduce the term imagination, a practice exercise, in which participants had to visualize a lemon, its surface, and the taste was presented. Afterwards, further imagination exercises were offered based on the three different conditions. Despite the conditions, all participants had to find a quiet spot, sit straight, close their eyes, and pay attention to their breathing. Importantly, Dan emphasized that it is not possible to be always focused. This process is completely natural and gets easier with practice. In the end, Dan highlighted the great collaboration of the participants and displayed their progress during the intervention.

Figure 2. The guide Dan

Best Possible Future Self. This condition entails the visualization of oneself in the future including every life goal that was achieved (King 2001; Meevissen et al. 2011; Sheldon and Lyubomirsky 2006). The exercises in this condition contained an imagination of the Best Possible Future Self concerning various areas such as personal strengths, social relationships, professional achievements, and leisure time. These differences between the exercises were included to add variation in the two-week intervention (Meevissen et al., 2011).

Best Possible Past Self/Best Possible Future Self. With regard to the first week, participants had to think back and imagine a time in their past when they were the best version of themselves, including various goals that were achieved at that time (Carrillo et al., 2020). Concerning the second week, these participants have to switch and visualize the best version of themselves in the future.

Control condition. This condition had the task to imagine the divergent activities they completed within the past 24 hours, focusing on the morning, afternoon, evening, or all activities separately (Carrillo et al., 2020; Enrique et al., 2017; Meevissen et al., 2011; Sheldon and Lyubomirsky 2006).

Materials

Screening.

Generalized Anxiety Disorder. The 7-item *"Generalized Anxiety Disorder scale"* (GAD-7) by Spitzer et al. (2006) was used to assess the anxiety of participants to further evaluate the in- or exclusion. The questions could be answered on a 4-point Likert scale, that ranges from 0 (*Not at all*) to 3 (*Nearly every day*). An item of the GAD-7 is, for instance, *"Over the past 2 weeks how often have you been bothered by feeling nervous, anxious, or on edge?".* After calculating the total score of the 7 items, a score between 0 and 4 identified minimal anxiety, a score between 5 and 9 indicated mild anxiety, a score between 10 and 14 indicated moderate anxiety, and a score between 15 and 21 indicated severe anxiety. This study uses the total score higher than 15 (GAD-7 > 15) as a cut-off score as suggested by Spitzer et al. (2006). Consequently, every participant with a total score higher than 15 was excluded from the study. The study by Spitzer et al. (2006) identified an excellent internal consistency of the GAD-7 ($\alpha = 0.92$). This study detected an acceptable internal consistency of the GAD-7 ($\alpha = 0.76$).

Depression. The 20-item *"Center for Epidemiologic Studies Depression Scale"* (CES-D) by Radloff (1977) was used to examine the level of depression and to decide on the inclusion or exclusion of participants. The questionnaire contains a 4-point Likert scale,

ranging from 0 *(Rarely or none of the times)* to 3 *(Most or all of the time).* An example item of the CES-D is *"I felt that everything I did was an effort"*. To interpret the scale, the total score was calculated. The total score ranges between 0 and 60, with higher scores illustrating a higher level of depression. This study uses a cut-off score of 34, as proposed by Radloff (1977). As a result, participants with a higher total score were excluded from the study. Furthermore, other studies found psychometric properties ranging from questionable to excellent. The Cronbach's alpha was located between α = 0.63 and α = 0.93 (Devins et al., 1988). This study identified a good internal consistency of the CES-D (α = 0.81).

Screening and Primary Outcome.

Wellbeing. The 14-item "*Mental Health Continuum Short Form"* (MHC-SF) was used to screen the participant's wellbeing beforehand in order to decide on inclusion or exclusion and to assess their level of wellbeing at four moments in time, specifically once at baseline (T0), one week after the start of the intervention (T1), two weeks after the intervention (T2), and four weeks after the intervention (T3). (Keyes, 2009). With regard to the exclusion criteria, participants that were identified as *"flourishing"* before the start of the intervention based on the MHC-SF were excluded from the study. The items were answered on a 6-point Likert scale, ranging from 1 (*Never*) to 6 (*Every day*). The researchers categorized the questionnaire into three subscales: Item 1 to item 3 measure "*emotional wellbeing",* item 4 to item 8 measure *"social wellbeing"*, and item 9 to item 14 measure *"psychological wellbeing"*. Firstly, an example question for the category *"emotional wellbeing"* is: *"During the past month, how often did you feel happy?"* (Keyes, 2009). In addition, an illustration of a question concerning the classification *"social wellbeing"* is: *"During the past month, how often did you feel that you had something important to contribute to society?"* (Keyes, 2009). Lastly, the item *"During the past month, how often did you feel confident to think or express your own ideas and opinions"* is an example of the category *"psychological wellbeing"* (Keyes, 2009). The MHC-SF was analyzed by calculating the mean scores of the three subscales and the complete scale separately. To explain, higher mean scores indicate high wellbeing, while lower mean scores visualize little wellbeing. Moreover, the MHC-SF shows an excellent internal consistency (α = 0.91) in other studies (Luijten, Kuppens, van de Bongardt, & Nieboer, 2019). This study identified good to excellent internal consistencies of the MHC-SF concerning the 4 different assessments (α = 0.83, α = 0.9, α = 0.91, α = 0.92).

Data Analysis

The analysis of the data set was conducted using SPSS for macOS (version 27). The missing values of the sample were imputed using SPSS. The variables examined in this study were the conditions of the BPS intervention (control, future, and past/future) as the independent variable, the wellbeing of participants per measurement moment (T0, T1, T2, T3) as the dependent variable, and age as the moderating variable.

Descriptive Statistics. The Shapiro-Wilk test was used to determine the normality of the construct wellbeing. A value higher than $p > .05$ indicated normality. Furthermore, total mean values and standard deviations for the construct wellbeing based on the MHC-SF were calculated per condition (control, future, and past/future) and measurement moment (T0, T1, T2, T3) separately.

Main Analyses. To test the first research question and assess valid changes in the participant's level of wellbeing concerning the four assessments in time (T0, T1, T2, T3), a 3x4 RM-ANOVA was used. The three conditions (control, future, and past/future) were identified as between-factor, and the times of the assessments of wellbeing (T0, T1, T2, T3) were identified as within-factor. A value lower than $p < .05$ indicated statistical significance. In case of statistical significance, a Bonferroni adjustment post-hoc analysis was computed to obtain more detailed information on the differences. To test the second research question and assess the moderating effect of the variable age, the Preacher and Hayes moderation analysis was conducted (Hayes & Preacher, 2014). The future (coded 0) and past condition (coded 1), excluding the control condition, were used as the independent variable. The level of wellbeing was the dependent variable. The analysis was separately conducted for the level of wellbeing after 2 weeks (T2) and after 4 weeks (T3). The variable age was inserted as the moderating variable. The moderation was identified as significant when $p < .05$. Lastly, the Bootstrapping method entailing 5000 iterations was used to assess the significance of the moderation effect and main effects of the conditions and age on wellbeing. The effects were significant when the confidence interval did not contain zero.

Results

Descriptive Statistics

Normality testing. Results of the Shapiro-Wilk normality test showed a normal distribution of the construct wellbeing concerning all four moments of the assessment: T0 (W = .99, p = .64), T1 (W = .94, p = .14), T2 (W = .98, p = .12), T3 (W = .99, p = .88).

Wellbeing. An overview of all measurement moments can be found in table 2.

Table 2

Distribution of the wellbeing of participants separated into the three conditions (control condition, future condition, past/future condition) concerning four measurement points (T0, T1, T2, T3)

MHC-SF	T0	T1	T2	T3
	Total mean scores *(SD)*			
Control	33.58 *(9.11)*	52.40 *(10.67)*	56.12 *(8.55)*	55.62 *(7.62)*
Future	34.61 *(7.86)*	52.78 *(10.40)*	56.31 *(9.26)*	56.69 *(8.35)*
Past/Future	35.00 *(8.48)*	52.14 *(9.37)*	54.33 *(9.32)*	55.66 *(8.75)*

Note. Control condition (n = 95), Future condition (n = 95), Past/Future condition (n = 100)

Main Analyses

Results of the RM-ANOVA revealed a significant main effect of time on wellbeing $F(3,861) = 757.69$, $p < .001$, $\eta^2_p = .73$. The Bonferroni adjusted post-hoc analysis displayed significant differences ($p < .05$) between the following assessment points of wellbeing: T0 and T1, T0 and T2, T0 and T3, T1 and T2, T1 and T3. The difference between the participant's wellbeing at the assessment points T2 and T3 was not significant ($p = 1$). Furthermore, between-factor effects revealed no significant main effect for the conditions $F(2,287) = 0.35$, $p = 0.70$, $\eta^2_p = .002$. In addition, the interaction between time and condition was not significant as well, $F(6,861) = 1.17$, $p = .32$ (figure 3).

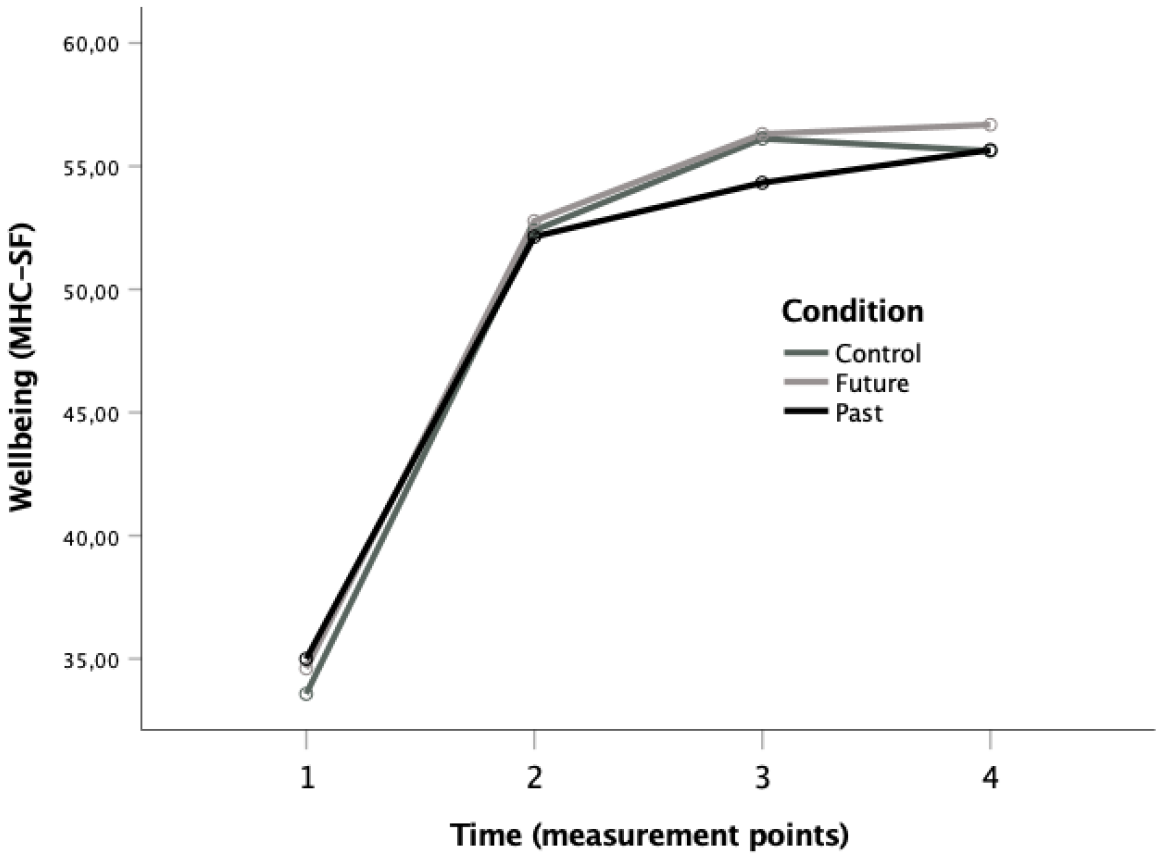

Figure 3. Non-significant interaction effect between the measurements of wellbeing (T0, T1, T2, T3) and the conditions of the BPS intervention

The outcomes of the moderation analysis with well-being at T2 as dependent variable and the two conditions of the BPS intervention as independent variable identified that the variable age is not a significant moderator (b = -.09, *s.e.* = .13, p = .50, *Cl* [-.31, .14]). The main effect of the conditions on wellbeing T2 (b = 2.36, *s.e.* = 6.13, p = .70, *Cl* [-7.75, 12.23]) and the main effect of age on wellbeing T2 were not significant as well (b = -.36, *s.e.* = .33, p = .28, *Cl* [-.23, .93].

Furthermore, the results of the moderation analysis with well-being at T3 as dependent variable and the two conditions of the BPS intervention as independent variable showed no significant moderation of age (b = -.06, *s.e.* = .12, p = .60, *Cl* [-.26, .14]). The main effect of the conditions on wellbeing T3 (b = 1.96, *s.e.* = 5.67, p = .73, *Cl* [-7.29, 11.60]) and the main effect of age on wellbeing T3 were not significant as well (b = .25, *s.e.* = .31, p = .42, *Cl* [-.24, .77]).

Discussion

The study aimed to explore whether there is an effect of the BPS future and past intervention on the participant's wellbeing and whether age moderates this effect. The study discovered that the wellbeing of participants increased throughout the intervention. However, the enhancement of wellbeing did not differ between the two experimental conditions and the control condition. Furthermore, age did not moderate the association between the BPS past and future intervention and wellbeing.

The effect of the BPS future and past intervention on wellbeing

With regard to the first research question, it was expected that the BPS future and past intervention would increase the wellbeing of people (Magyar-Moe et al., 2015; Peters et al., 2013; Carrillo et al., 2019). The present study could confirm this effect partially. The findings show that the BPS future and past interventions were effective for the enhancement of wellbeing. Nevertheless, the control condition, whose participants had the task to imagine activities they carried out in the last 24 hours, seemed to be equally effective to increase levels of wellbeing. These findings are in line with the study by Carrillo et al. (2020), which could not identify significant differences between the temporal conditions of the BPS intervention and the active control condition.

One reason why the present study found similar increases in wellbeing among the experimental and control conditions might have been the inclusion of an active control condition, which was not common in past research. Outcomes show that the exercise of the control condition, specifically thinking about activities carried out within the last 24 hours, caused the same increase in wellbeing as the two BPS interventions. This improvement in wellbeing, similar to Carrillo et al. (2020), can be explained using the results of Strack, Schwarz, & Gschneidinger (1985). These researchers highlighted that people tend to evaluate activities and events as rather positive than negative when thinking back, which consequently increases levels wellbeing (Strack, et al., 1985). Furthermore, all conditions in the present research were equally informed about the study purpose. Boot, Simons, Stothart, and Stutts (2013) emphasized the importance of matching the expectations of all three conditions to prevent a placebo effect and ensure the quality of results. In contrast, previous research, such as the study by Peters et al. (2013) and King (2001), which revealed a significant increase in levels of wellbeing in the BPS intervention compared to a control condition, did not provide information to any group (Peters et al., 2013; King, 2001). Accordingly, the provided knowledge to the participants of the present research about the study purpose before the start

of the intervention could have caused an increase in the participant's levels of wellbeing. Added to that, the BPS intervention was delivered using a mobile application on the participant's smartphones. Contrasting, previous BPS interventions mainly used paper and pencil experiments, laboratory experiments, or online studies (King, 2001; Peters et al., 2013; Auyeung & Mo, 2019). Despite advantages, previous research identified low adherence rates as a crucial limitation of mobile applications (Linardon & Fuller-Tyszkiewicz, 2020).

Concerning future research, this research showed that solely thoughts about activities carried out within the last 24 hours have the potential to cause an increase in the participant's levels of wellbeing. Therefore, in order to uncover differences in wellbeing between experimental and control conditions, future research might use a passive control condition that will not receive any task. Added to that, in contrast to prior studies that did not provide information to their control condition and discovered significant differences, the present research provided information to all conditions and did not find differences between the experimental and control conditions (Peters et al., 2013; King, 2001). Accordingly, future research might not present information to the control condition to prevent expectations. This might reveal differences in wellbeing between the BPS future and past intervention compared to a control condition. Besides, the delivery of BPS interventions via mobile applications is still uncommon. Future research should elaborate on how mobile-based BPS interventions can be adjusted to increase the adherence of participants.

The moderating effect of the variable age

Concerning the second research question, it was expected that age moderates the association between the BPS future and past intervention and wellbeing (Meevissen et al., 2011; Sixsmith et al., 2014). However, despite expectations, this study could not confirm any effect. A possible explanation could be the original relationship between a person's age and the subjective wellbeing. However, previous research, specifically psychologists and economists, are still divided over the relationship between age and wellbeing (Frijters & Beatton, 2012). On the one hand, economic researchers reported a U-shaped relationship between age and wellbeing in which people at a younger age and people at an older age are on average happier (Frey & Stutzer, 2010; Schwandt, 2013). The lowest levels of happiness were reported around the age of 40 for women and around the age of 43 for men. The increase in happiness after these low points is explainable with the acceptance and adjustments of people to their state of being (Frey & Stutzer, 2010). On the other hand, psychological research either identified no relationship between age and wellbeing or only small decreases in wellbeing

over time (Cantril, 1965; Dear, K., Henderson & Korten, 2002). Similar to the sample used by the economists, the present sample covers the lowest point of the U-shaped relationship, specifically 40 years for women and 43 years for men (Frey & Stutzer, 2010). According to the economists, the inclusion of these low points hampers the identification of a linear relationship using the Hayes and Preacher moderation analysis (Hayes & Preacher, 2014). As a consequence, the missing effect of age as a moderator in the present study might be accountable to this U-shaped relationship between age and wellbeing as hypothesized by economists.

Prior research provided assumptions to believe that age is a relevant moderator between the BPS interventions and the wellbeing of participants (Meevissen et al., 2011; Sixsmith et al., 2014). Accordingly, future research should examine whether age might be a significant moderator when taking other factors into account, such as the "life history" of participants. With regard to the elderly, Sixsmith et al. (2014) revealed a relationship between the life history and the wellbeing of people. Consequently, thinking back to past experiences might be more effective concerning levels of wellbeing for elderlies having positive experiences to look back on, but less effective for people having negative experiences (Sixsmith et al., 2014). Concerning younger people, research has shown that negative life events make people less optimistic about their future (Robinson-Whelen, Kim, MacCallum, & Kiecolt-Glaser, 1997). As a result, people that experienced negative live events in their past might be rather pessimistic about their future and might not benefit from a BPS future intervention. Therefore, the life history and optimism of people should be taken into account in future research.

Strengths and limitations

The present study shows some strengths. To begin with, the study included an active control group that received an exercise composed of the documentation of all activities approached within the last 24 hours. Boot et al. (2013) emphasized that active control groups are an advantage in experimental research as they ensure that the outcomes do not emerge from a placebo effect (Boot et al., 2013). Besides, considering that the BPS intervention was delivered via a mobile application, people could download the application on their smartphones. This procedure seems to be convenient and time-saving for the participants as they do not have to attend in-person meetings.

Despite these strengths, there are limitations important to consider in future research. One limitation of the present study is the missing representation of specific groups in the

present sample, which hampers the generalization of the outcomes. First of all, the sample lacks the representation of participants with lower levels of educations. Meevissen et al. (2011) highlighted that well-educated participants get more possibilities in their lives to reach their goals. Therefore, imagining one's BPS self the future might be easier for people that are well educated (Meevissen, et al., 2011). Furthermore, the sample does not include an equal amount of both genders, but a majority of female participants. Mann and Liu-Thompkins (2019) highlighted that female and male participants possess divergent capacities concerning the activity "imagination". Research has shown that women use the technique more frequently and profit from it more quickly than men (Mann & Liu-Thompkins, 2019). Future research should analyze reasons why men and people with lower educations feel less addressed and find ways to adjust the intervention to approach these groups. Lastly, the past condition was not a pure BPS past intervention. Next to one week of a BPS past intervention, the past condition contained a second week of a BPS future intervention. As a consequence, there are some similarities between the structure of the future and past conditions that could explain the missing differences in the levels of wellbeing.

Conclusion and Practical Implications

To conclude, the present study explored the effects of the BPS future and past intervention on wellbeing and whether age moderates this association. The study revealed the effectiveness of the BPS future and past intervention for the enhancement of wellbeing. Nevertheless, due to the increased levels of wellbeing assessed in the control condition, one can conclude that thinking about activities approached within the last 24 hours is equally effective. In addition, the present study found that age does not moderate the association between the BPS interventions and wellbeing. However, the present study displays methodological limitations and deficiencies between prior suggestions and results. Consequently, there is a need for future research on the moderating effect of age between the BPS interventions and wellbeing. Despite, the findings are of interest to the field of positive psychology, as the outcomes can be used to adjust and individualize BPS interventions in the future. Similar to Carrillo et al. (2020), the results of the present study indicate that the BPS future and past interventions are equally effective for the enhancement of wellbeing. This newly gained knowledge about temporality does not only provide more opportunities for the creation of BPS interventions for the general population but also facilitates the intervention for people dealing with trauma in their past (Carrillo et al., 2020). All in all, participants

would have the opportunity to decide themselves, solely based on their preferences, which BPS intervention they would like to participate in.

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