



The Relationship Between Trait Gratitude and Psychological Wellbeing in University Students: The Mediating Role of Affective State and the Moderating Role of State Gratitude

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Abstract

Gratitude is a positive psychological characteristic that is connected to wellbeing. This study aims to examine the relation between trait gratitude and psychological wellbeing (PWB), as well as the mediational role of the affective state in the relationship between these concepts. Moreover, we also investigated whether state gratitude moderates the relation between trait gratitude, affective state, and PWB. Participants were 135 undergraduate students who completed a battery of assessments as part of a standard protocol. A gratitude state induction, based on a brief intervention, was also used. Results showed that all the dimensions of trait gratitude were positively associated with the dimensions of psychological wellbeing. Moreover, the relations between the dimensions of trait gratitude, on the one hand, and psychological wellbeing, on the other hand, were mediated by affective state. State gratitude was not a significant moderator for the relations between trait gratitude and PWB. The theoretical and practical implications of these results are discussed.

Keywords Trait gratitude · State gratitude · Positive affect · Negative affect · Psychological wellbeing

1 Introduction

Psychological wellbeing (PWB) describes the eudaemonic nature of wellbeing (Ryff and Keyes 1995; Ryff and Singer 2006), involving a meaningful life, constructive activity, and personal growth (Wood et al. 2009). It is distinct from hedonistic wellbeing, also called subjective wellbeing (SWB), which involves an emotionally pleasant life, characterized by the experience of positive affect, less negative affect, and satisfaction with life (Diener

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1984). Although related, there is empirical evidence which supports that PWB and SWB are distinct concepts (e.g., Keyes et al. 2002) that have different patterns of correlates (see Ryan and Deci 2001 for review; Waterman 1993). However, over the years, SWB was studied much more often and it has a broader and well-supported literature base, compared to PWB (Kashdan et al. 2008; Linley et al. 2009; Waterman 2008).

Theoretically, a life oriented towards noticing and appreciating the positive aspects may be expected to be strongly related to wellbeing (Wood et al. 2010). Gratitude is considered a quintessential positive psychological trait, involving a life orientation towards the positive aspects in the world (Singh et al. 2014), appreciation, thankfulness, and a sense of wonder (Emmons and Shelton 2002; Froh et al. 2011). Many previous studies have focused on the relation between trait gratitude and SWB, almost neglecting the potential relationship between gratitude and PWB (Lin 2014).

In order to fill a gap in the previous literature in the field, in this study we focused on the relationship between trait gratitude and PWB. Moreover, we analyzed positive and negative affective states as mechanisms that relate trait gratitude to PWB. Also, we assessed the moderator role of state gratitude in the relationship between trait gratitude, affective state, and PWB. Thus, the first aim of our study was to assess whether individual differences in terms of dispositional gratitude are associated with PWB. The second aim of our study was to explore the potential role of affective state as an explaining mechanism for the relation between the above presented variables. This aim relies on the idea suggested by empirical findings that gratitude influences subjective wellbeing indirectly by promoting the experience of positive affect and buffering against negative states (Nelson 2009). However, this assumption was tested only in relation with SWB, not with PWB. Furthermore, since gratitude is considered both a state and a trait, we also induced state gratitude, using a brief intervention based on grateful contemplation. Previous studies showed that individuals with a high level of trait gratitude experience more intense affective states in response to a gratitude-arousing situation (McCullough et al. 2002). Therefore, a third aim of our study was to assess the moderator role of state gratitude in the relation between trait gratitude, affective state, and PWB.

We consider that our study contributes to the existing knowledge in the field in at least three important ways. Firstly, we assessed a less studied relationship between trait gratitude and PWB. If previous studies confirmed the relationship between trait gratitude and SWB, little is known about the implication of gratitude for PWB. Secondly, we explored the mechanism linking gratitude with PWB. By now, the mechanisms relating trait gratitude to PWB have not been systematically explored (Wood et al. 2010). Thirdly, we considered gratitude both a trait and a state in relation with PWB. Although previous studies found that state gratitude, as well as trait gratitude, improves positive affective states, the moderating role of state gratitude in the relationship between trait gratitude and individual wellbeing remains unexplored.

1.1 Trait Gratitude and Psychological Wellbeing

Considered as a life orientation towards noticing and appreciating the positive part of the world (Wood et al. 2010), at dispositional level, gratitude seems to have many benefits. Among the positive outcomes associated with a high level of trait gratitude, we can mention the increased positive affect, energy, enthusiasm, fewer illnesses, better sleep, feeling less lonely, and more connected with others (Emmons and McCullough 2003). Moreover, numerous empirical studies highlighted the contribution of trait gratitude to wellbeing (see

Wood et al. 2010 for a review; Hill and Allemand 2011; Martínez-Martí et al. 2010). However, with few exceptions, previous research has focused on the relationship between trait gratitude and SWB (Lin 2014).

In contrast with the large number of studies on the individual disposition to gratitude and SWB, few previous studies offer empirical support for the relationship between gratitude and PWB. For example, Kashdan et al. (2006) showed that trait gratitude is related to a full range of PWB variables, including daily self-regard, rewarding social activity, and the pursuit of intrinsically motivating activity. Later, other studies confirmed the potential of trait gratitude to lead to high PWB (Lin 2015; Göcen 2012; Wood et al. 2009). Therefore, gratitude disposition may also be related to a life that is meaningful, not simply hedonistically pleasant. However, although there is theoretical support for the hypothesis that a great gratitude disposition leads to an increased PWB, more research is needed in order to clearly accept this relation. As we mentioned before, PWB and SWB are distinct concepts, with diverse correlates and predictors (see Ryan and Deci 2001 for review), and are not expected to be similarly associated with the same variables. Therefore, we can surmise that the highly accepted relationship between gratitude and SWB is not enough to consider that trait gratitude is also positively associated with PWB.

1.2 The Role of the Affective State

Previous theoretical and empirical studies suggest that the relationship between a disposition towards gratitude and wellbeing is mediated by cognitive-affective changes (Emmons and McCullough 2003; McCullough et al. 2002; Worthington Jr et al. 2007). In line with this assumption, previous research suggests that dispositional gratitude indirectly influences wellbeing by promoting the experience of positive affect and by buffering against negative states and emotions (Nelson 2009). Two theoretical frameworks may help explain the link between trait gratitude and wellbeing through the affective state.

The broaden-and-build theory supports the notion that gratitude is effective in increasing wellbeing as it leads to positive emotions and builds psychological, social, and spiritual resources (Fredrickson 1998, 2000). Additionally, gratitude undoes the adverse effects of negative emotions. Therefore, negative emotions are inhibited in people with high levels of gratitude (Lyubomirsky et al. 2005). This theory may explain why grateful people tend to score higher in positive affective states, such as vitality, optimism, religiousness, spirituality (McCullough et al. 2002), and lower in negative affective states (McCullough et al. 2002; Watkins et al. 2003). Furthermore, the positive affect hypothesis offers more support for the affective state as a mechanism that may account for the relation between gratitude and wellbeing (Wood et al. 2010). Being a positive trait, gratitude is strongly related to the habitual experience of positive affective states.

According to the theoretical frameworks presented above, previous empirical studies found trait gratitude to be positively correlated with positive affect (Froh et al. 2009; McCullough et al. 2002; Thomas and Watkins 2003; Watkins et al. 2003; Wood et al. 2008a, b, 2009), while being negatively linked to negative affect (McCullough et al. 2002; Thomas and Watkins 2003; Watkins et al. 2003). Furthermore, positive affect predisposes individuals to report more meaning in their lives (King et al. 2006), therefore a high level of eudaemonic wellbeing. Moreover, the affective state measuring by PANAS contains items reflecting philosophically eudaemonic emotions such as excitement, enthusiasm, determination, interest, and inspiration (Watson et al. 1988), which may capture an effort towards meaningful goal pursuits, a hallmark of PWB (Deci and Ryan 2000; Disabato et al.

2016). The mediator role of the affective state in the relation between trait gratitude and other outcomes was also highlighted by some previous studies. For example, in one study, positive affect was identified as a mediating variable in the relationship between trait gratitude and depression (Lambert et al. 2012). Another study found that trait gratitude has an effect on SWB through the mechanisms of positive affect (Toussaint and Friedman 2009).

However, there are some gaps concerning the role of the affective state in the relationship between trait gratitude and PWB. First, although there is theoretical support for this mediation, no previous study analyzed the role of affective state in the relation between trait gratitude and PWB. Previous studies on the mediating role of affective state use SWB or depression as dependent variables. As we mentioned before, although related, SWB and PWB may have different associations with the same variables (see Ryan and Deci 2001 for review; Waterman 1993). Therefore, further research is needed in order to understand the mechanisms which links trait gratitude and PWB. Secondly, even if the role of positive affect as a mechanism linking trait gratitude and other outcomes was supported by previous work, it is not fully accepted. For example, two studies suggest that affective states cannot explain why grateful people are more satisfied with life or report higher eudaemonic well-being (Wood et al. 2008a, b, 2009). However, these studies only controlled the affective state, and did not specifically tested its mediation role. Thirdly, even in relation with SWB or other dependent variables, no previous study analyzed the role of negative affect as an explaining mechanism. The presumption that gratitude enhances positive affect does not necessary mean that it decreases negative affect (Eaton et al. 2014; Wood et al. 2008a, b). However, according to the broaden-and-build theory, gratitude undoes the adverse physiological effects of negative emotions, given that negative emotions are incompatible with gratitude (Fredrickson 1998, 2000). This assumption has little empirical support. Moreover, concerning PWB, no previous study analyzed the mediating role of negative affect in its relationship with trait gratitude.

1.3 The Moderating Role of State Gratitude

Gratitude can exist both as a trait and a state (Rash et al. 2011). State gratitude may be considered a positive social emotion when an act of kindness or generosity is freely given by another person (Emmons 2004). Some previous findings suggest that individuals with high levels of trait gratitude experience more intense affective states in response to a gratitude-arousing situation (McCullough et al. 2002). For this reason, assessing how trait and state gratitude interact in determining diverse affective states and further the level of PWB is considered to be an important area of study (Wood et al. 2008a, b).

Interventions focusing on increasing state gratitude reveal their potential for improving daily positive emotions (Ouweneel et al. 2014; Watkins 2004). Therefore, as in the case of trait gratitude, cultivating gratitude as a state encourages seeing life in a positive light (Chan 2010; Eaton et al. 2014; Fredrickson et al. 2003; Wood et al. 2008a, b). Three methods of gratitude induction have been identified, based on daily listing the things to be grateful for, grateful contemplation, and behavioral expressions of gratitude (see Wood et al. 2010, for a review). Even a brief gratitude intervention focused on contemplating or remembering past positive experiences, lasting only a few minutes, might be useful for improving the immediate mood (Emmons and McCullough 2003; Watkins et al. 2003; Wood et al. 2010). For example, in one study (Watkins et al. 2003), a 5 min-long intervention was used, where undergraduate students were asked to list activities over the summer that they were grateful for. The results showed that participants who focused on positive

experiences they were grateful for, reported less negative affect, compared to another group of participants who had the task of listing things they wanted to do over the summer, but were unable to. In another study, Watkins et al. (2003) showed that participants in grateful conditions based on thinking about, writing about, or writing a letter to someone to whom they were grateful, reported higher positive affect scores than participants in the control condition. Similar findings have been observed elsewhere, supporting the idea that the participants in the gratitude condition reported significantly higher positive affect and less negative affect directly after the intervention (Koo et al. 2008; Martínez-Martí et al. 2010).

The link between the gratitude intervention and affective state supports the contention that state gratitude, as well as trait gratitude, may promote positive states and may buffer against negative affective states (Fredrickson 1998; Fredrickson et al. 2003; Nelson 2009; Wood et al. 2008a). Grateful thinking fosters the savoring of positive life experiences and situations, increasing positive affect and building positive strengths (Sheldon and Lyubomirsky 2006). Moreover, the practice of gratitude is likely to be incompatible with negative states, and thus may inhibit feelings of envy, bitterness, anger, or greed (McCullough et al. 2002). Despite these theoretical considerations, the results of a recent meta-analysis suggest that gratitude interventions may operate primarily through placebo effects (Davis et al. 2016), confirming that engaging in any regular activities involving self-discipline promotes psychological wellbeing (Lyubomirsky and Layous 2013). However, we can hypothesize that the relationship between trait gratitude and affective states may be stronger if the participants also experience a state of gratitude.

1.4 The Present Study

Previous research has highlighted the fact that trait gratitude is linked to different indicators of SWB (see Wood et al. 2010 for a review; Hill and Allemand 2011). However, fewer studies focused on the relationship between gratitude and PWB. We extend this limited approach in three important ways. First, we addressed the less studied relation between trait gratitude and different dimensions of PWB. Second, the mechanisms linking trait gratitude and PWB were considered. To our knowledge, although the mechanisms linking trait gratitude and SWB were studied, no previous study analyzed the mediators for the relation between trait gratitude and PWB. Third, we considered both gratitude disposition and state gratitude in the same sample. Thus, we analyzed whether the potential of trait gratitude to predict affective state is stronger when a state gratitude is activated. In this context, the first goal of our study was to explore the direct relationship between trait gratitude and psychological wellbeing. According to Ryff and Keyes (1995), PWB was considered in our study as involving six dimensions: self-acceptance (defined by positive evaluations of oneself and one's past life), positive relationships with others (the possession of quality relationships with others), personal growth (a sense of continued development as a person), environmental mastery (a capacity to effectively manage the surrounding world), autonomy (a sense of self-determination, independence, and regulation of behavior from within), and purpose in life (the belief that one's life is meaningful). Given the theoretical framework detailed in the above sections, we expected that trait gratitude would be positively associated with psychological wellbeing (Hypothesis 1).

In order to better understand the up-mentioned interrelation and based on prior findings which suggest that wellbeing could be indirectly influenced by gratitude through the affective state (Emmons and McCullough 2003), we further explored the role that positive and negative affect might play in the relationship between gratitude and PWB.

Trait gratitude was previously found to be positively correlated with positive affect (Froh et al. 2009; Wood et al. 2009), while being negatively linked to negative affect (Thomas and Watkins 2003; Watkins et al. 2003). Also, positive affect is linked to more meaning in life (King et al. 2006), therefore a high level of eudaemonic wellbeing. However, the findings that explain the mechanisms linking trait gratitude and PWB are limited. Given these considerations, the second aim of the present study was to assess the mediating role of both positive and negative affective states, measured by PANAS, within the relationship between trait gratitude and PWB. Considering the existing theoretical framework, we expected that trait gratitude will lead to a high level of positive affective state and a low level of negative affective state, which could further amplify the level of PWB (Hypothesis 2).

Furthermore, in trying to shed more light upon the relationship between gratitude and PWB, we made use of the two different shades of the gratitude concept—state and trait. Given the assumption that state gratitude increases positive affect and inhibits negative affect (Rash et al. 2011), the third aim of the present study was to assess whether the role of affective state as a mediator in the relation between trait gratitude and PWB will be more obvious for the participants with an induced state of gratitude. Considering previous findings, we expected that the relation between trait gratitude and the affective state will be significantly stronger for the participants in the gratitude state condition than for the participants in the control group (Hypothesis 3). Previous findings suggested that brief interventions of grateful contemplation were effective in inducing affect and therefore we used this method for gratitude induction. Moreover, some studies indicated that brief interventions may be more beneficial than long intervention. Due to their longitudinal design, people adapt to different positive events and a process of desensitization occurs. Consequently, these long interventions may have only a minor impact on current affective states (Koo et al. 2008).

The hypothesized moderated mediation model is depicted in Fig. 1.

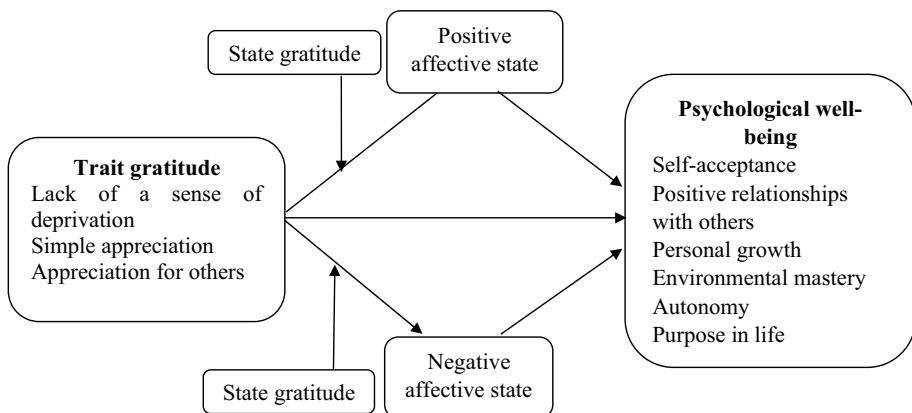


Fig. 1 The hypothesized moderated mediation model

2 Method

2.1 Participants

The participants were recruited from the North-Eastern region of Romania and they were invited to take part in the study in exchange for course credits. The sample consisted of 135 undergraduate students in their first year of study, 75.60% women and 24.40% men. The participants' age ranges from 20 to 35 ($M=21.35$ years, $SD=2.60$). There were no exclusion criteria for the participants based on demographic variables.

2.2 Measures

All questionnaires were translated from English into Romanian using the forward-backward translation design (Hambleton et al. 1999). Minor corrections to the translations were made based on the back-translation process.

2.2.1 Trait Gratitude

The *Gratitude, Resentment, Appreciation Test-Short Form (GRAT-Short Form)* (Thomas and Watkins 2003) was used to measure dispositional gratitude. According to Thomas and Watkins' exploratory factor analysis (EFA), the GRAT-short form has three factors: (a) lack of a sense of deprivation (LOSD; six items), (b) simple appreciation (SA; six items), and (c) appreciating others (AO; four items). Sample items are "I really don't think that I've gotten all the good things that I deserve in life" (reverse scored); "I think it's important to appreciate each day that you are alive"; and "I couldn't have gotten where I am today without the help of many people," for the three factors, respectively. In order to verify the factorial validity of the scale, we used confirmatory factor analysis (CFA). For the model fit we applied the maximum-likelihood estimation and reported the following fit indexes: root mean square error of approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI). The model fit of the data analysis were: $\chi^2(70)=88.36$, $p=.068$; RMSEA=.04, 90% CI: [.00, .07]; CFI=.97; GFI=.92; TLI=.96. These values are in line with the joint fit criteria (Hu and Bentler 1999), therefore the model fit the data in a satisfactory degree. The Alpha Cronbach's for the three scales range from .71 to .89. Previous published studies using this scale showed evidence for its internal consistency, as well as convergent and discriminant validity (Froh et al. 2011).

2.2.2 Psychological Wellbeing

The *Psychological Wellbeing Scale* (Ryff and Keyes 1995) was used. The 18-item scale assesses self-acceptance, the positive relationships with others, personal growth, the purpose in life, environmental mastery, and autonomy. Items are rated on a 1 ("strongly disagree") to 7 ("strongly agree") scale. These scales have been extensively used in previous research, which has shown their independence from the measures of SWB (Keyes et al. 2002; Ryff and Keyes 1995). Moreover, previous research shows that the six factors PWB load onto a single higher-order factor, although they have low intercorrelations with each other (Chen et al. 2013; Keyes et al. 2002; Linley et al. 2009; Ryff and Keyes

1995). Confirmatory factor analysis indicated that the model fit the data adequately: $\chi^2(89) = 111.35$, $p = .055$; RMSEA = .04, 90% CI: [.00, .06]; CFI = .96; TLI = .94. The Alpha Cronbach in our sample ranged from .67 to .82.

2.2.3 Affective State

The *Positive and Negative Affect Scale (PANAS)* (Watson et al. 1988) consists of a 10-item scale for positive affect (PA) and another 10-item scale for negative affect (NA). The participants used a 5-point Likert-type scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*) to indicate how well each of the 20 adjectives described how they feel “in this moment” time frame. Confirmatory factor analysis indicated that the model fit well the data: $\chi^2(134) = 191.53$, $p = .001$; RMSEA = .05, 90% CI: [.03, .07]; CFI = .95; TLI = .94. The Alpha coefficients for the positive and negative scales are .77 and .79 respectively.

2.2.4 State Gratitude

To induce *state gratitude*, the participants were randomly allocated to one of two study conditions. By our task, two requirements for gratitude induction were complied with, based on the assumption that this state results from recognizing that one has obtained a positive outcome, and there is an external source for this positive outcome (Froh et al. 2009; Koo et al. 2008).

Gratitude Group ($N = 69$, $M_{\text{age}} = 21.15$, $SD = 2.12$, 76.8% women). The participants received the “gratitude exercise”. Specifically, individuals were given the following instructions (adopted from the study of Emmons and McCullough 2003): “There are many things in our lives, both large and small, that we might be grateful for. Think back over the past two weeks of holiday, and write down the things that you are grateful or thankful for. Please remember people to whom, or items or moments for which you were grateful these past weeks, and sustain the feelings of gratitude associated with these people, items, or moments. Please use the space provided below to perform your task”.

Control Group ($N = 66$, $M_{\text{age}} = 21.56$, $SD = 3.02$, 74.2% women). The participants received the placebo control exercise. Specifically, the following instructions were given to the participants: “There are many things or activities that we do every day. What are some of the activities that you completed in the past two weeks? Please use the space provided below and write down three things that you did in this period”

2.3 Procedure

The study was approved by the Research Ethics Committee of Al. I. Cuza University. The study took place in the first week after the winter vacation. The participants were invited to a laboratory where they filled in the informed consent form and provided demographic information. Before starting the study, the participants were informed that their participation is voluntary and that they could withdraw from the study at any point. The participants’ data was collected in the university. The survey took place in groups of 20–25 students, on a regular school day, in the presence of an experienced research assistant, and lasted for about 30 min. All the participants completed PANAS, then they were randomly allocated to one of the two study conditions, the Gratitude Group or the Control Group, by an experimenter blind to the purpose of the study. They were given 10 min to complete the task: 5 min to reflect and 5 min to write down their experiences, according to the

instructions provided. For each condition, after experiencing a grateful or common experience, the participants were asked to fill in the PANAS, the GRAT-Short Form, and the PWB scale once again. All the participants appeared to be complying with the procedure, therefore no participants were excluded on the basis of non-compliance. Finally, the participants were debriefed and the experimenter thanked them for their involvement.

2.4 Overview of the Statistical Analyses

Preliminary analyses were conducted in order to compare the positive and the negative affective state before and after the intervention. The independent samples *t* test comparing the participants' means from the two conditions on positive and negative affective states were also computed, as well as the correlations between the study's variables. Further, descriptive statistics and the associations for all analyzed variables in the study are reported. Finally, the main effects of trait gratitude dimensions on psychological wellbeing and the moderated mediation model were tested simultaneously.

3 Results

3.1 Preliminary Analysis

In order to assess the changes in affective states after gratitude intervention, a paired sample *t* test was conducted, with positive affective state and negative affective state as the within-subject factors. The results showed a significant decrease in the negative affective state from pre- to post-test for both the participants from the experimental condition (pre-test: $M=20.28$, $SD=8.96$; post-test: $M=17.13$, $SD=8.11$; $t_{(68)}=5.09$; $p<.001$) and the control condition (pre-test: $M=22.19$, $SD=8.32$; post-test: $M=20.06$, $SD=8.48$; $t_{(65)}=4.95$; $p<.001$). There were no significant differences concerning the positive affective state measured before and after the intervention, neither in the experimental group, not in the control condition. We also conducted an independent sample *t* test comparing the participants' means on positive and negative affective states, from the two conditions, measured post-test. The results showed no significant differences between the groups concerning the positive affective state ($t_{(133)}=.02$, $p=.984$), but the participants from the experimental group ($M=17.13$, $SD=8.11$) reported less negative affect compared to the participants from the control condition ($M=20.06$, $SD=8.48$; $t_{(133)}=-2.05$, $p=.042$). Regarding all the dimensions of PWB, there were no significant differences between the participants from the control condition and the participants from the experimental condition (all $p>.050$). Further, there were not significant gender differences in PWB, $t(132)=-.34$, $p=.734$, or in all the dimensions of PWB, all $p>.050$. Therefore, we conducted the main analyses without controlling for participants' gender.

3.2 Descriptive Statistics and Correlational Analyses

The means, standard deviations, and correlations of all variables are displayed in Table 1. All the dimensions of trait gratitude correlated with the dimensions of psychological wellbeing in the expected directions. Specifically, the lack of sense of deprivation is positively associated with self-acceptance ($r=.59$, $p<.001$), positive relationships with others ($r=.46$, $p<.001$), personal growth ($r=.20$, $p=.018$), environmental mastery ($r=.41$,

Table 1 Descriptive statistics, reliability estimates and correlations among study variables

	1	2	3	4	5	6	7	8	9	10	11
<i>Trait gratitude</i>											
1. LSD											
2. SA	.25**	1									
3. AO	.37***	.61***	1								
<i>Affective state</i>											
4. PA	.30***	.38***	.37***	1							
5. NA	-.51***	-.31***	-.37***	-.17†	1						
<i>Psychological well-being</i>											
6. SAC	.59***	.36***	.49***	.51***	-.52***	1					
7. PR	.46***	.25**	.43***	.21*	-.40***	.57***	1				
8. PG	.20*	.19*	.28**	.29**	-.30***	.45***	.35***	1			
9. EM	.41***	.07	.13	.26**	-.26**	.46***	.36***	.29**	1		
10. AUT	.30***	.01	.04	.29**	-.23**	.48***	.28**	.35***	.41***	1	
11. PL	-.06	.05	.08	.04	.04	.10	.06	.08	.33***	.11	1
M	19.32	29.97	19.13	31.17	18.56	15.60	15.59	17.51	13.52	15.52	12.21
SD	4.78	4.15	2.80	7.23	8.39	3.55	3.41	2.28	2.67	3.25	2.31

N = 135

LSD lack of a sense of deprivation, SA simple appreciation, AO appreciation for others, PA positive affective state, NA negative affective state, SAC self-acceptance, PR positive relationships with others, PG personal growth, EM environmental mastery, AUT autonomy; PL purpose in life

† $p = .054$, * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed)

$p < .001$), and autonomy ($r = .30, p < .001$). Simple appreciation and appreciating others are positively associated with self-acceptance ($r = .36, p < .001$; $r = .49, p < .001$, respectively), positive relationships with others ($r = .25, p = .003$; $r = .43, p < .001$, respectively), and personal growth ($r = .19, p = .030$; $r = .28, p = .001$, respectively). Based on Cohen's (2013) criteria for magnitude of effect sizes, the above relations are medium to high.

3.3 Testing for moderated mediation

In order to test the hypothesized moderated mediation model, we used the PROCESS custom dialog for IBM SPSS (Hayes 2013). This solution allows building bootstrap-based confidence intervals in order to test the statistical significance of mediation effects in a nonparametric and less biased way (Preacher and Hayes 2004). In the present study we used 5000 resamples in order to estimate 95% confidence intervals.

To test the hypothesized moderated mediation model, we used a composite score for PWB. As expected, the lack of a sense of deprivation predicted PWB in a positive manner (total effect: $b = .94, p < .001$). This dimension of trait gratitude also positively predicted the positive affective state ($b = .45, p = .021$) and negatively predicted the negative affective state ($b = -.95, p < .001$). Furthermore, the positive affective state positively predicted PWB ($b = .56, p < .001$), while the negative affective state negatively predicted PWB ($b = -.41, p < .001$). Table 2 displays the complete results of the

Table 2 Results for the regression models used for testing the moderated multiple mediation

	Coefficient	SE	<i>t</i>	<i>p</i>
<i>Positive affective state as outcome (M)</i>				
Lack of a sense of deprivation	.45	.19	2.33	.021
Simple appreciation	.56	.20	2.76	.006
Appreciation for others	.84	.27	3.04	.002
State gratitude	-6.97	8.27	-.84	.401
Interaction 1	.04	.26	.16	.868
Interaction 2	.22	.28	.79	.427
Interaction 3	.32	.42	.76	.445
<i>Negative affective state as outcome (M)</i>				
Lack of a sense of deprivation	-.95	.19	-4.85	<.001
Simple appreciation	-.69	.24	-2.83	.005
Appreciation for others	-1.23	.31	-3.85	<.001
State gratitude	-3.29	5.28	-.62	.534
Interaction 1	.02	.26	.09	.924
Interaction 2	.21	.33	.62	.536
Interaction 3	.39	.49	.80	.422
<i>PWB as outcome (DV)</i>				
Lack of a sense of deprivation	.94	.19	4.82	<.001
Simple appreciation	.08	.22	.36	.714
Appreciation for others	.74	.32	2.28	.023

Interaction 1=product between lack of a sense of deprivation and state gratitude; interaction 2=product between simple appreciation and state gratitude; interaction 3=product between appreciation for others and state gratitude

Table 3 Mediation and moderated mediation effects between Lack of a sense of deprivation and PWB

	Coefficient	Standard error	Confidence interval 95%	
			Lower limit	Upper limit
<i>Multiple mediation</i>				
Positive affective state	.26 ^a	.08	.12	.48
Negative affective state	.39 ^a	.10	.20	.62
<i>Moderated multiple mediation</i>				
Positive affective state	.02 ^b	.16	– .29	.34
Negative affective state	– .01 ^b	.12	– .25	.22

Boldface highlights significant mediation effects

^aIndirect effect of lack of a sense of deprivation on PWB for each proposed mediator

^bIndex of moderated mediation for each mediator

Table 4 Mediation and moderated mediation effects between simple appreciation and PWB

	Coefficient	Standard error	Confidence interval 95%	
			Lower limit	Upper limit
<i>Multiple mediation</i>				
Positive affective state	.44 ^a	.13	.22	.74
Negative affective state	.41 ^a	.11	.20	.66
<i>Moderated multiple mediation</i>				
Positive affective state	.15 ^b	.21	– .55	.28
Negative affective state	– .13 ^b	.20	– .26	.59

Boldface highlights significant mediation effects

^aIndirect effect of simple appreciation on PWB for each proposed mediator

^bIndex of moderated mediation for each mediator

multiple regressions testing these effects. The positive relation between the lack of a sense of deprivation and PWB was mediated by positive and negative affective states (see upper side of Table 3).

Simple appreciation did not predict PWB (total effect: $b = .08$, $p = .714$). However, this dimension of trait gratitude positively predicted the positive affective state ($b = .56$, $p = .006$) and negatively predicted the negative affective state ($b = -.69$, $p = .005$). Both the positive and the negative affective state predicted PWB. The relation between simple appreciation and PWB was mediated by both positive and negative affective states (see upper side of Table 4).

Regarding the last dimension of trait gratitude, appreciating others, the results indicated that it predicted PWB (total effect: $b = .74$, $p = .023$). Further, appreciating others positively predicted affective state ($b = .84$, $p = .002$) and negatively predicted the negative affective state ($b = -1.23$, $p < .001$). Moreover, the positive and the negative affective state mediated the relation between appreciating others and PWB (see upper side of Table 5).

Contrary to our expectations, state gratitude did not significantly condition the relation between any dimensions of trait gratitude and PWB (see lower side of Tables 3, 4, and 5).

Table 5 Mediation and moderated mediation effects between appreciation for others and PWB

	Coefficient	Standard error	Confidence interval 95%	
			Lower limit	Upper limit
<i>Multiple mediation</i>				
Positive affective state	.57 ^a	.16	.30	.94
Negative affective state	.66 ^a	.14	.39	.98
<i>Moderated multiple mediation</i>				
Positive affective state	.20 ^b	.27	− .38	.70
Negative affective state	− .23 ^b	.26	− .77	.25

Boldface highlights significant mediation effects

^aIndirect effect of appreciation of others on PWB for each proposed mediator

^bIndex of moderated mediation for each mediator

Overall, the results supported our hypothesized mediation model (see Fig. 2), revealing that the relations between trait gratitude dimensions and PWB are mediated by positive and negative affective states. However, the results did not support our moderation hypothesis.

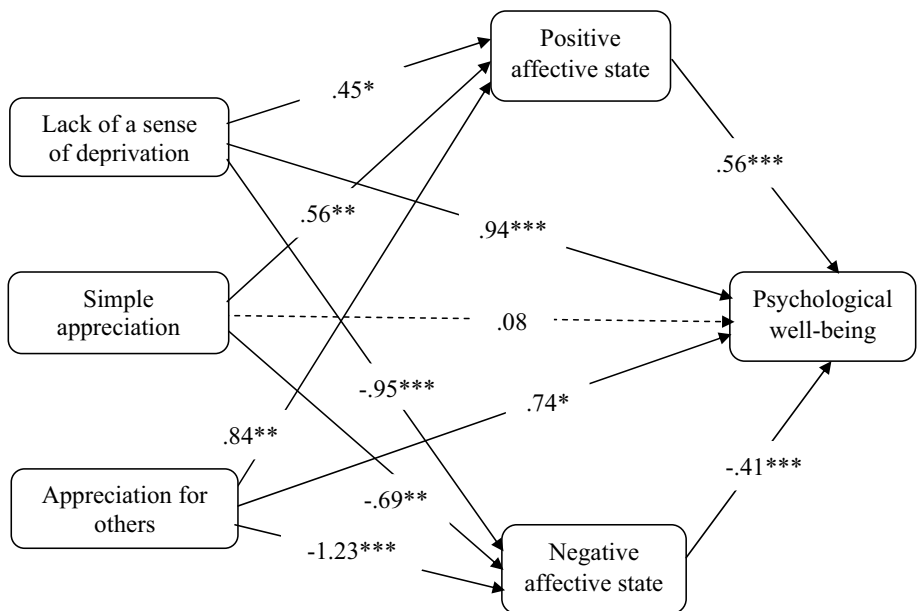


Fig. 2 Structural equation model and path analysis of the determinants of psychological well-being (N=135). Unstandardized path coefficients are reported. For readability, the non-significant moderating effects of state gratitude were not included in the figure. The nonsignificant path is indicated with dotted lines. * $p < .05$; ** $p < .01$; *** $p < .001$

4 Discussion

The present study investigated the relationship between trait gratitude and both affective state and psychological wellbeing (PWB). Also, we explored whether the positive or negative affective state mediates the relation between trait gratitude and PWB. Finally, we examined the moderating role of state gratitude in its relationship with trait gratitude, affective state, and PWB.

Our results showed that the lack of sense of deprivation is positively associated with all the dimensions of psychological wellbeing, while simple appreciation and appreciation of others are positively associated with self-acceptance, positive relationships with others, and personal growth. Therefore, our study provides further empirical support to the assumption that a high level of trait gratitude is positively associated with a high level of PWB. Although these relations were less studied before, our results are in accordance with previous findings on the relation between these two concepts (Lin 2015; Göcen 2012; Kashdan et al. 2006; Wood et al. 2009). The lack of a sense of deprivation seems to be an important dimension of trait gratitude, which is strongly related with the dimensions of PWB. Moreover, it is also associated with environmental mastery, a dimension of PWB that did not show significant associations with the other two dimensions of trait gratitude. This is not a surprising finding given that the lack of a sense of deprivation implies feelings of appreciation towards the nature and the environment. It is the only dimension of trait gratitude that did not involve the appreciation of other people or a comparison with others. It only implies a sense of gratitude for each day of one's life, for the nature, and for simple things in life. According to our study, these feelings account more for the variance of PWB. Based on these results, we can suppose that interventions aimed to improve PWB, through grateful contemplation, should be more effective if they focus on every day experiences, simple things, and not on other people.

Furthermore, our results showed that the relationships between all the three dimensions of trait gratitude and PWB are mediated by both positive affective state and negative affective state. Specifically, in line with Fredrickson's (1998, 2000) broaden-and-build theory, our results showed that trait gratitude determines a low level of negative affective state and a high level of positive affective state, which further have a positive influence on PWB. The role of the positive affective state as an explaining mechanism was previously highlighted in the relation between trait gratitude and SWB (Toussaint and Friedman 2009). Based on previous results and on the current study, we can suppose that the relation between gratitude and both SWB and PWB could be explained by similar mechanisms.

Contrary to our expectations, state gratitude was not identified as a significant moderator for the relation among trait gratitude, affective state, and PWB. A possible explanation for these results could be that in our study, the participants did not get the chance to observe the changes that occur as a response to gratitude induction. A recent meta-analysis suggests that the interventions based on increasing gratitude should be effective in samples that have difficulties in regulating emotions (Davis et al. 2016). Previous studies sustain the fact that grateful contemplation has the potential to induce an immediate positive mood among dysphoric individuals (Koo et al. 2008). Another explanation could rely on the fact that the intervention was not strong or long enough to produce an effect. Having people reflect on previous experiences for about several minutes may be insufficient to produce immediate post-test changes in affective states. As our results showed, there were no significant differences in the positive affective state, at post-test, between the participants from the experimental group and those from the

control condition. The nonsignificant differences in the positive affective state between the participants from the two conditions could be explained by the fact that the display of the grateful state may not be comfortable to everyone (Emmons and McCullough 2003) because it implies that someone feels aware of one's dependence on others for personal positive experiences. However, the gratitude intervention proved to have a significant effect on the level of negative affective state reported by the participants at post-test. Although all the participants reported a decrease in the negative affective state from pre-test to post-test, the participants from the gratitude state condition reported less negative affect at post-test, compared to the participants from the control condition. Similar findings were previously reported. For example, Froh et al. (2008) found, in a sample of early adolescents, that a gratitude intervention based on counting blessings leads to a decreased negative affect, without being related to an increased positive affect. However, contradictory results were also reported. Froh et al. (2009) reported that a gratitude mood lead to an increase in subjective well-being, but was unrelated to negative affect. Therefore, giving this inconsistent pattern of results, future studies are needed in order to better understand the relations between state gratitude and proximal outcomes.

Despite the fact that state gratitude did not moderate the relation between trait gratitude and the affective state, two possible implications emerge from these results. Firstly, all the interventions based on contemplation of previous experiences may be effective in reducing the negative affective state. Secondly, the effect of these interventions may be less evident for the positive affective state and more specific for the negative affective state. This is not surprising, given the fact that positive and negative affective states are independent dimensions and a person can have high levels of one and low levels of the other at the same time (Watson et al. 1988). The strong effect of state gratitude interventions on the negative affective state may suggest that these interventions may be more efficient if they are conducted with persons with emotional disorders. However, when accepting these interpretations of our findings, we should consider an important source of bias. We cannot be sure that the participants from the control condition did not reflect on the positive experiences that they were grateful for, just like the participants from the experimental condition. The task they received, to think of several things that they did recently, did not exclude this possibility. However, although we cannot have control over the participants' thoughts, the fact that the participants from the experimental condition reported less negative affective state post-test, compared to the control condition, provides some evidence for the fact that specific instructions related to the grateful contemplation are more effective than a simple reflection on past experiences.

When interpreting these results, several limitations should also be noted. Firstly, the cross-sectional design of our study did not allow us to draw any conclusions regarding the causality of the relationships between trait gratitude, affective state, and psychological wellbeing. Taking into consideration that trait gratitude and PWB are features built and nurtured through experience and in time, additional longitudinal experimental research is required in order to clarify the causal relations between the above-mentioned concepts. A gratitude intervention might boost SWB and, in time, this increase could further lead to a growth in PWB. Secondly, the sample consisted only of undergraduate students, therefore the results cannot be generalized in clinical settings. Given the potential that grateful interventions have for increasing positive emotions, as previous studies showed, assessing this potential in clinical samples should have more important implications for clinical practice and psychotherapy. Thirdly, our sample was mainly composed of women, therefore the generalizability of these results is limited. Considering the differences between men and

women with regards to gratitude in general (Lin 2015), future research on gratitude and PWB, in a sample comprised of both men and women, is required.

Despite these limitations, several strengths should also be noted. Firstly, in addition to previous research findings, the results sustain the relationship between trait gratitude and PWB. Particularly, our findings show that gratitude as a trait has a significant influence not only on the hedonistic wellbeing of the individual, but also on a more profound and philosophical area of one's state of mind, psychological wellbeing. Cultivating gratitude enhances the meaning of life, by increasing the chance of perceived personal growth, positive interpersonal relationships, autonomy, self-acceptance, and environmental mastery. Secondly, the mediating role of the affective state brings further clarification on the possible mechanisms through which trait gratitude influences profound aspects of life such as PWB. Our findings could imply that the activation of trait gratitude influences several positive changes in the affective state of the person, therefore boosting the levels of PWB. This facet of knowledge contributes to a better understanding of the psychological mechanisms used for a better comprehension of happiness psychology. Thirdly, our results suggest caution in supporting the role of brief interventions based on gratitude contemplation in improving PWB.

In conclusion, our study provides evidence supporting the potential of trait gratitude in determining not only a hedonistic wellbeing, as was accepted before, but also a meaningful life. Moreover, both the positive affective state and the negative affective state proved to play an important role as explaining mechanisms for the relationship between trait gratitude and PWB. Because of the scarcity of research on the link between trait gratitude and PWB, the results reported in the present study bring important contributions that enhance understanding and support further research in this specific area of study.

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