



# The Role of ‘Peace of Mind’ and ‘Meaningfulness’ as Psychological Concepts in Explaining Subjective Well-being

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## Abstract

**Background** Although extensive research has been conducted to explain what contributes to subjective wellbeing, still a substantial part of its variance remains unexplained. This study investigated whether psychological concepts ‘peace of mind’ and ‘meaningfulness’ contribute to SWB beyond the basic and psychological needs while using several needs theories as a theoretical basis and thereby hypothesizing that both concepts are actionable and help enhance SWB.

**Methods** The cross-sectional data (N=3770) of the Belgian National happiness study (2018) were used. Three components of SWB (life satisfaction, positive and negative affect) were identified as predicted variables and used in threefold stepwise forward regression analyses.

**Results** As expected both basic and psychological needs explained a considerable part of the three SWB components. However, including meaningfulness and peace of mind in the last step of the models resulted in a substantially higher total variance that was explained in these components (i.e. 56.7% for life satisfaction, 37.2% for positive affect, and 56.1% for negative affect). More specific, in the final models: basic needs, feelings of autonomy and relatedness, peace of mind and meaningfulness were significantly associated with the life satisfaction component. For the positive affect component: psychological needs, peace of mind, and meaningfulness were the significantly associated factors. Finally, the negative affect component was most significantly associated with basic needs, psychological needs, and peace of mind, while meaningfulness did not play a significant role in explaining negative affect.

**Discussion** This study reconfirms the value of several needs theories in explaining the components of SWB and the role of universal needs. The final steps of the models also indicate that different needs contribute independently to the different SWB components. This is the first study demonstrating that ‘meaningfulness’ and ‘peace of mind’ contribute substantially to SWB beyond the typical basic and psychological needs.

**Keywords** Life satisfaction · Positive and negative affect · Subjective well-being · Happiness · Peace of mind · Meaningfulness

## 1 Background

Over the last 50 years there has been a growing interest in the subjective well-being of individuals and nations in several research fields ranging from scientific and public policy environments to popular writing (Ngamaba, 2017; Diener et al., 2018). As such, subjective well-being (considered as the scientific counterpart of happiness) has increasingly being used alongside objective economic data to investigate social progress and prosperity, to evaluate public policy, and to predict outcomes in individuals and societies (Diener et al., 2006; Ngamaba, 2017; Vik & Carlquist, 2018). Indeed it is known that ‘happy people’ live longer and healthier lives, have more rewarding and stable relationships, are more productive, are more resilient against negative life events, donate more for charity, and are more likely to help others (Lyubomirsky et al., 2005; Diener & Chan, 2011; Diener et al., 2018).

According to Ed Diener’s definition (1984) subjective well-being (SWB) contains both life satisfaction and an affective dimension. As such, high subjective well-being can be defined as a reflection of positive emotions and thoughts about life in terms of frequent positive affect and infrequent negative affect and a sense of high satisfaction with life as a whole (Diener, 1984; Diener & Chan, 2011).

Early research into explaining what contributes to subjective well-being mainly aimed to answer research questions, such as what universal physiological/basic needs (such as: living conditions, health, income) are correlated with subjective well-being (Diener et al., 1999). These basic needs strongly correspond to the lowest levels of Maslow’s needs hierarchy which depicts a five stage motivational theory whereby lower hierarchical needs must be satisfied before satisfaction of higher hierarchical needs can be accomplished (Maslow, 1943). As such, based on this approach, Wilson already concluded in 1967 that happy people were well-paid, young, educated, religious and married (Wilson, 1967). Later, because only a relatively small part of variance in SWB could be explained, the focus shifted towards a more psychological approach for explaining SWB (Diener et al., 1999) which again can be related to Maslow’s universal needs theory, but also to the self-determination theory of Ryan & Deci (2000) and the six-factor model of psychological well-being (Ryff & Keyes, 1995). This approach thus focused on internal psychological structures and social processes that also contribute to an enhanced SWB, such as: the satisfaction of basic psychological needs (autonomy, relatedness, and competence according to the self-determination theory) (Ryan & Deci, 2000), personality traits, aspirations, comparisons, and processes of adaptation to certain life events. Consequently, these studies mainly concluded that ‘happy’ people have a positive temperament, are extroverted, tend to see things from the bright side, have better social relations, can better deal with bad events, and have the necessary resources for personal progress and to accomplish their goals (Diener et al., 1999; Diener, 2012).

In the recent years, the idea of universal needs revived after it faded for years because researchers were more convinced that socialization and adaptation shapes what contributes to well-being (Tay and Diener 2011). In 2011, Tay and Diener conducted a cross-sectional study into the association between the fulfillment of basic (food and shelter, safety and security) and psychological needs (social support, love, respect, pride, mastery, and autonomy) and SWB (Tay and Diener 2011). They also used the discussed needs theories as a guide to investigate whether these universal needs explain SWB. Based on their conducted analyses they concluded that fulfillment of different needs is largely independent of whether other needs are fulfilled. They also concluded that correlates differ among different types of

well-being (life satisfaction and affective components). As such, basic needs correlate most strongly with life satisfaction and negative feelings whereas social and respect needs more strongly correlate with positive feelings and autonomy and respect with negative feelings. They also compared people with high fulfillment of needs with people who had low need fulfillment and concluded that fulfillment of needs is a prerequisite for SWB, but not enough to ascertain high subjective well-being. As such, the authors argued that other additional factors are relevant beyond the investigated basic and psychological needs.

This conclusion forms the starting point of the current study. In other words, this study picks up where the authors left off by investigating if psychological concepts further contribute to SWB after controlling for the lower basic and psychological needs (focus on: autonomy, competence, and relatedness as defined by the self-determination theory). In this light, two psychological concepts derived from the Ancient Greek philosophy were considered: 'meaningfulness' (as part of 'eudaimonic well-being') and 'peace of mind' (linked to a key characteristic of 'ataraxia': equanimity).

First of all, 'peace of mind' (PoM) can be defined as an internal state of peacefulness and harmony (Lee et al., 2013). The choice for this psychological concept as potential contributing factor of SWB is linked to several philosophical movements. First, it is linked to the Pyrrhonist practice where ataraxia was considered as a necessary prerequisite of happiness (Warren, 2002). Next, in the tradition of Epicurus, equanimity - as a key feature of ataraxia - can be defined as an even-minded state (being calm and stable) towards several experiences despite their emotional valence (unpleasant, neutral, pleasant) and therefore manifests as a balanced reaction to both misery and joy and protects against negative emotions or events (Desbordes, Gard et al. 2015). As such, unpleasant emotions can be experienced without denying, aversion or judging, while pleasant emotions can be experienced without overexcitement and the tendency to get addicted to those moments (Grabovac et al., 2011). Although peace of mind does not fully capture this philosophical construct, it serves as a valuable approach for its empirical measurement as it is closely linked to equanimity which, as discussed, describes the capacity to find inner peace or an even-mind. Further, PoM has always played a central role in the science of happiness of Eastern cultures, such as Buddhism (Lee et al., 2013). Nevertheless, it has been understudied in SWB research of modern Western cultures (Lee et al., 2013) although recent evidence indicates that peace of mind also contributes to SWB in Western cultures. For example, a recently conducted study by Sikka and colleagues (2018) has shown that PoM generates enhanced affect regulation, which can be considered a prerequisite of better SWB (Sikka et al., 2018). The study of Lee et al., (2013) that developed a Peace of Mind Scale concluded that PoM is highly correlated with mental health and recommended to further elaborate on the role of PoM on SWB (Lee et al., 2013). Based on the available evidence, we argue that PoM should be studied as a potential contributing factor of SWB.

Next, 'meaningfulness' was identified as the second psychological concept. This concept is linked to the Aristotelian philosophy of eudaimonia. Although traditionally most SWB research focused on the hedonic perspective (affective or 'feeling good' dimension) of well-being, there has been a growing interest in the eudaimonic perspective of well-being (the 'living well' dimension) (Schotanus-Dijkstra et al., 2016). Eudaimonia, as Aristotle understood it, is living a complete human life by realizing one's full human potential through virtuous activity (arête) (Fowers, 2012). Despite Aristotle's objectivist approach to assess the good life, modern psychological sciences rely on subjectivist measures of the good life,

**Table 1** Characteristics of the study participants (N=3770)

	Continuous: Mean (SD) Categorical: % (n)	Minimum	Maximum
<b>Demographics</b>			
Age, mean (SD)	44.7 (15.55)	15	87
Gender, % (n)	41.2% (1553)		
Male	58.6% (2209)		
Female	0.2% (8)		
Trans person			
Educational level, % (n)	11.8% (446)		
Low	33.8% (1273)		
Middle	54.4% (2051)		
High			
Region, % (n)	81.5% (3072)		
Flanders	5.9% (223)		
Brussels	12.6% (475)		
Wallonia			
Occupational status, % (n)	62.9% (2371)		
Employed	2.5 (94)		
Housewife/man	4.2 (159)		
Unemployed	16.6 (625)		
Retired (or early retirement)	6.6 (248)		
Unable to work	5.9 (221)		
Student	1.4 (52)		
Other			
Equivalised Income, mean (SD)	€ 2025.37 (1096.14)	€ 0	€ 6050
<b>Basic needs</b>			
Satisfaction with safety, mean (SD)	7.44 (1.95)	0	10
Subjective health, mean (SD)	6.92 (2.02)	0	10
Satisfaction of financial situation, mean (SD)	6.56 (2.53)	0	10
Satisfaction with living conditions, mean (SD)	7.76 (2.08)	0	10
Sleep deprivation, mean (SD)	2.45 (1.28)	1	5
<b>Satisfaction of psychological needs</b>			
Psychological needs, mean (SD)	1.54 (1.48)	-4	4
Autonomy	1.24 (1.45)	-4	4
Relatedness	1.22 (1.59)	-4	4
Competence			
<b>Psychological concepts</b>			
Peace of mind, mean (SD)	6.78 (1.71)	2	10
Meaningfulness in life, mean (SD)	7.24 (1.88)	2	10
<b>Subjective well-being (pre-dicted variables)</b>			
Life satisfaction, mean (SD)	6.7 (1.87)	0	10
Positive affect, mean (SD)	2.29 (0.49)		
Negative affect, mean (SD)	0.52 (0.17)		

such as meaningfulness. According to the philosopher Susan Wolf (2012), a good life is a meaningful life. Such a sense of meaningfulness emerges from the fulfillment of meanings or values – the things people find important in life (Baumeister, 1991; Bauer et al., 2015). The concept of meaningfulness can thus be interpreted as a subjective sense of living a good life, as a subjective impression of eudaimonia, and in that way, meaningfulness represents a sense of eudaimonic well-being. Eudaimonia - including 'meaningfulness' - has theoretically most often being approached as a SWB outcome (Diener et al., 2018). In contrast to this approach, we agree with the growing evidence suggesting that eudaimonic well-being is actionable (Ryan & Martela, 2016; Ryff, 2017; Diener et al., 2018) because it should not be considered as a kind of happiness, but as a good way of life that provides ingredients - such as 'meaningfulness' - that contribute to an enhanced SWB (Ryan & Martela, 2016; Diener et al., 2018). Moreover, when absent there is a substantial risk for mental illness (Ryff, 2017). As a result, awareness is also growing that promoting positive mental health is important in treating mental health problems (Ryff, 2017). An example of this is the use of 'well-being therapy' where the eudaimonic well-being approach is actively used by promoting positive psychological experiences to prevent mental illness or relapse (Ryff, 2017). More information on well-being therapy interventions can be consulted in (Ryff, 2014). Hence, this rationale indicates that eudaimonic well-being -including meaningfulness- can contribute to a higher subjective well-being.

In summary, this study further builds on the research of Tay and Diener (2011) and aims to investigate the potential additional roles of two psychological phenomena in further explaining the different types of SWB (life evaluation, positive and negative affect) in individuals. In other words, this study investigates to what extent 'meaningfulness' and 'peace of mind' contribute to explain life satisfaction and positive and negative affect beyond the well-known basic needs and the psychological needs. 'Meaningfulness' thus represents a (cognitive) evaluation that a particular value or meaning has been fulfilled (Bauer, 2016), whereas 'peace of mind' is closely related to 'equanimity' which can be seen as an adaptive form of affect regulation (Desbordes et al., 2015). As both psychological constructs (potentially) tap into different routes to enhanced SWB – a cognitive and an affective route – we deem them relevant candidates to further the research of Tay and Diener (2011).

## 2 Methods

### 2.1 Data source

The present study uses the cross-sectional data based on a sample (N=3770) of the Belgian National NN-UGent happiness study that was held between December 6th, 2017 and January 3rd, 2018 (Annemans, 2018). After the researchers obtained approval from the Ethical Committee of the Ghent University Hospital the data-collection phase started during which people completed an online anonymous questionnaire. Inclusion criteria to participate were living in Belgium and sufficient understanding of Dutch or French. More detailed information on the Belgian National NN-UGent happiness study and the published reports can be consulted elsewhere (Annemans, 2018, Annemans L 2020, Annemans & Vandepitte, 2020). The participants' characteristics are outlined in Table 1.

## 2.2 Measures

### 2.2.1 Components of subjective well-being

Life satisfaction (the evaluative component of SWB) was identified as the predicted variable and was measured with the widely known Cantril Ladder (Cantril 2001, Bjornskov 2010, Veenhoven, 2012) which asks the following question: “Please imagine a ladder with steps numbered from zero at the bottom to ten at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder do you feel you personally stand at the present time?” (OECD 2013). This one-item question has proven reliability. As such, a correlation of 0.75 between the Cantril Ladder from the Gallup World Poll and life satisfaction as measured in the World Values Survey was found (Bjornskov, 2010).

Positive and Negative affect (the affective component of SWB) were questioned using an abbreviated version of the Positive and Negative Affect Schedules (PANAS) (Watson et al., 1988). Positive affect was the sum of positive emotions items divided by the number of items, while negative affect was the sum of negative emotions divided by the number of items. As a result their respective scales ranged between: 0–4 (never to always). The Cronbach’s alpha of both affect scales was 0,798 in the negative affect scale and 0,661 in the positive affect scale.

### 2.2.2 Sociodemographics

The following sociodemographic variables are controlled for in the model: age, gender, educational level, region, occupational status, and equivalised income. Educational level was divided in three groups according to the International Standard Classification of Education: low educated (from early childhood education to lower secondary education), medium educated (upper secondary education to post-secondary non-tertiary education), and high educated (short-cycle tertiary education to doctoral degree or equivalent). Gender was divided in three categories: woman, man, trans person. The variable region distinguished between Flanders, Brussels, and Wallonia. Occupational status contained the following categories: professionally active, unemployed, unable to work, retired (or early retirement), student, housewife/husband, informal caregiver, career break, or other situation. Household income was calculated based on the OECD-modified equivalence scale (EUROSTAT 2018) that assigns one adult household member a value of 1, while each other adult member receives a value of 0.5, and each child member a value of 0.3.

### 2.2.3 Basic needs

Satisfaction with one’s safety (circumstance), living conditions, financial situation, daily main activity (job, voluntary work, studies, chores), sleep and subjective health were questioned. To obtain information on the first four variables, a question was asked about how satisfied one was with a certain life domain nowadays on a 11 point Likert scale ranging from 0 (totally unsatisfied) to 10 (totally satisfied). Subjective health was also evaluated with an eleven point Likert scale whereby ‘0’ represented the worst imaginable health and

'10' the best imaginable health. Finally, sleep deprivation was evaluated with a five point Likert scale ranging from 1 (never) to 5 (always).

### 2.2.4 Psychological needs: autonomy, competence, and relatedness

According to the Self-Determination Theory (concerned with human motivation and personality) three basic intrinsic psychological needs were identified that determine the well-being and growth, the intrinsic motivation and the self-regulation of individuals: autonomy (a sense of psychological freedom), competence (sense of effectiveness and mastery) and relatedness (sense of connection with important others) (Ryan & Deci, 2000). When these three innate psychological needs are fulfilled, this stimulates intrinsic motivation and leads to enhanced internally regulated motivation, well-being, creativity and performance, while a lack of fulfillment of these needs causes diminished motivation (more externally regulated) and well-being. In this study, the basic psychological needs were measured with a shortened version of the Basic Psychological Need Satisfaction and Frustration Scale (6 items) (Chen et al., 2015). This scale combines a balanced combination of satisfaction (positively formulated) and frustration (negatively formulated) items of which the latter are especially predictive of ill-being (problematic behavior and psychopathology) (Vansteenkiste & Ryan, 2013). Each psychological need was evaluated by combining a positive and a negative item on a 5-point Likert scale ranging between 0 (never) and 4 (always). Scores for each psychological need were then calculated by subtracting the positive item from the negative item of each particular need. This resulted in a score between  $-4$  (high frustration) and 4 (high satisfaction). The correlations were respectively: 0.57 for the autonomy items, 0.61 for the competence items and 0.58 for the relatedness items.

### 2.2.5 Peace of mind

To collect data on the peace of mind an abbreviated version of the recently developed "Peace of Mind Scale" was used (Lee et al., 2013). As such, the following two statements were questioned in Dutch (based on forward-back translation) using a 5 point Likert scale from 0 (not at all) to 5 (all of the time): 'my mind is free and at ease' and 'I have peace and harmony in my mind'. The scores in this scale, by combining the two questions, ranged between 0 (very low peace of mind) and 10 (very high piece of mind). A correlation of 0,868 indicated good reliability.

### 2.2.6 Meaningfulness

Meaningfulness data were based on Diener's Flourishing scale whereby only the item referring to having a purposeful life was selected and divided in two items because in the Dutch language (forward-back translation) 'purpose' and 'meaningfulness' are not the same concepts (Diener et al., 2010). As such, two questions were asked: 'my life has a purpose' and 'what I do in life is meaningful'. To answer these questions a 5-point Likert scale was used ranging from completely disagree to completely agree. The total score on this scale, by combining the two questions, varied between 0 (no meaningful living) and 10 (very meaningful living). A correlation of 0.79 indicated good reliability.

## 2.3 Statistical analysis

The eligible variables for the model were included in the multiple regression model using a three step forward selection process starting with the basic needs and sociodemographic variables, second, including the psychological needs and finally, adding the ‘meaningfulness’ and ‘peace of mind’ variables. Additionally, for each step, the Adjusted R squared was

**Table 2** Factors contributing to subjective well-being based on stepwise general linear models

Step 1: basic needs			
	<i>Life satisfaction<sup>a</sup></i>	<i>Positive affect<sup>a</sup></i>	<i>Negative affect<sup>a</sup></i>
Subjective health	.23**	.15**	-.17**
Sleep deprivation	-.07**	-.05*	.24**
Satisfaction with financial situation	.27**	.08**	-.10**
Satisfaction with living conditions	.22**	.14**	-.10**
Satisfaction with safety	.08**	.11**	-.16**
<b>Adjusted R<sup>2</sup><sup>b</sup> in step 1</b>	<b>45.4%</b>	16.3%	33.8%
Step 2: basic+ satisfaction of psychological needs			
	<i>Life satisfaction<sup>a</sup></i>	<i>Positive affect<sup>a</sup></i>	<i>Negative affect<sup>a</sup></i>
Subjective health	.19**	.08**	-.10**
Sleep deprivation	-.03*	.02	.16**
Satisfaction with financial situation	.22**	.01	-.02
Satisfaction with living conditions	.18**	.08**	-.04*
Satisfaction with safety	.04*	.05*	-.10**
Autonomy	.10**	.12**	-.12**
Relatedness	.10**	.11**	-.09**
Competence	.14**	.28**	-.35**
<b>Adjusted R<sup>2</sup><sup>b</sup> in step 2</b>	<b>50.6%</b>	27.9%	48.9%
Step 3: basic+ satisfaction of psychological needs+ peace of mind+ purpose in life			
	<i>Life satisfaction<sup>a</sup></i>	<i>Positive affect<sup>a</sup></i>	<i>Negative affect<sup>a</sup></i>
Subjective health	.14**	.03	-.05**
Sleep deprivation	-.003	.04*	.13**
Satisfaction with financial situation	.19**	-.02	.01
Satisfaction with living conditions	.15**	.05*	-.02
Satisfaction with safety	.02	.02	-.07**
Autonomy	.06**	.08**	-.08**
Relatedness	.06**	.05*	-.05**
Competence	.03	.14**	-.24**
Peace of mind	.24**	.22**	-.37**
Meaningfulness in life	.16**	.27**	.009
<b>Adjusted R<sup>2</sup><sup>b</sup> in step 3</b>	<b>56.7%</b>	37.2%	56.1%

All analyses are controlled for: age, gender, educational level, region, occupational status, and equivalised income;

<sup>a</sup> standardised beta coefficients, <sup>b</sup> adjusted R squared represents the total amount of variance explained in the predicted variables (life satisfaction, positive affect, negative affect), \*\* $p \leq 0.001$ , \* $p < 0.05$ . Missing data were not included in the model



reported in order to evaluate if the model improved when adding new variables while correcting for the higher number of parameters relative to the sample size.

Alongside building the model, collinearity diagnostics (Variance Inflation Factor, Tolerance) were performed and correlations (see correlation matrices in Appendix 1) were analyzed to test for potential multicollinearity (Posada & Buckley, 2004). Based on these analyses, none of the variables had to be removed. Also, the assumptions underlying the use of multiple regression analysis were checked via graphical plotting of the residuals. All analyses were conducted in IBM SPSS statistical software (version 24.0).

### 3 Results

#### 3.1 The role of basic needs in explaining subjective well-being

As discussed above threefold stepwise forward regression analyses were conducted after inspecting the univariate associations (consultation based on request). Based on these analyses, equivalised income was removed due to multicollinearity (equivalised income and financial satisfaction).

Next, in the first step of the models basic needs were entered whilst controlling for several demographics (age, gender, educational level, region, and occupational status). The results of this first step are displayed in Table 2. The adjusted R squared (explained variance) was 45.4% in the predicted variable life satisfaction, 16.3% in the dependent variable positive affect, and 33.8% in the predicted variable negative affect. For all the three SWB components (life satisfaction, positive and negative affect) all the included basic needs (subjective health, sleep deprivation, satisfaction with financial situation, satisfaction with living conditions, satisfaction with safety) were significantly associated with the dependent variable. For life satisfaction: subjective health ( $p \leq 0.001$ ), satisfaction with the financial situation ( $p \leq 0.001$ ) and with the living conditions ( $p \leq 0.001$ ) were identified as factors with high relative importance in relation to life satisfaction as the standardized beta coefficients of these factors were nominally the highest (Siegel, 2016). For positive affect: subjective health ( $p \leq 0.001$ ) and satisfaction with living conditions ( $p \leq 0.001$ ) were identified as strong positively associated factors. Finally, for the predicted variable negative affect, sleep deprivation was identified as a strong positively associated factor ( $p \leq 0.001$ ) with the nominally highest standardized beta coefficient.

#### 3.2 The role of psychological needs in explaining subjective well-being

In the next step of the models the adjusted R squared increased towards 50.6% for life satisfaction, towards 27.9% for positive affect and towards 48.9% for negative affect. The strongest increases in the explained variance were thus detected in the dependent variables positive (+11.6%) and negative affect (+15.1%). Further, all the basic needs that were already included in the first step of the models remained significant despite two exceptions: satisfaction with the financial situation was no longer significantly associated with the positive and negative affect components and sleep deprivation was no longer significantly associated with positive affect while it remained a significantly associated factor of negative affect ( $p \leq 0.001$ ).

The newly added psychological needs (autonomy, relatedness, competence) were significantly associated with all three SWB components. However, the strongest associations were found between competence and the predicted variables positive affect ( $p \leq 0.001$ ) and negative affect ( $p \leq 0.001$ ). For both predicted variables, competence was the predictor with the nominally highest standardized beta coefficient.

### 3.3 The additional role of 'peace of mind' and 'meaningfulness' in explaining subjective well-being

In the final models the adjusted R squared increased towards 56.7% for life satisfaction (+6.1%), 37.2% for positive affect (+9.3%), and 56.1% for negative affect (+7.2%) with the strongest increase detected in positive affect.

In this final step of the model, peace of mind became one of the strongest associated factors in all three SWB components compared with the other basic needs and psychological needs, more specific: life satisfaction ( $p \leq 0.001$ ), positive affect ( $p \leq 0.001$ ), and negative affect ( $p \leq 0.001$ ). For all three SWB components, the standardized beta of peace of mind was nominally stronger compared to those of the other basic and psychological needs.

Next, meaningfulness also played a crucial role in the life satisfaction ( $p \leq 0.001$ ) and in the positive affect ( $p \leq 0.001$ ) components of SWB. Nevertheless, in the negative affect component, meaningfulness was not an associated factor.

Regarding the earlier included basic needs, the results of the final step of the models indicated that basic needs became less important in explaining positive and negative affect compared to life satisfaction. For both positive and negative affect, the standardized beta coefficients of the basic needs were nominally among the weakest in the model. This corresponds to the findings in the two earlier steps of the models where basic needs already played a more important role in life satisfaction than in positive and negative affect. However, while subjective health, satisfaction with the financial situation and satisfaction with the living conditions remained important in explaining life satisfaction, sleep deprivation and satisfaction with safety were no longer significantly associated. The latter two factors did however remain significantly associated with negative affect (both  $p \leq 0.001$ ). Regarding the psychological needs, especially competence remained important in explaining positive ( $p \leq 0.001$ ) and negative affect ( $p \leq 0.001$ ), while this factor was no longer significantly associated with life satisfaction. Autonomy and relatedness remained significantly associated with all dependent variables.

## 4 Discussion

This study investigated whether the psychological concepts 'meaningfulness' and 'peace of mind' contribute to SWB (in terms of life satisfaction, positive affect, and negative affect) beyond basic and psychological needs of which it is accepted that they play an important role. Next, this study provides detailed evidence about the importance of the different needs in relation to the different SWB components. As a starting point the evidence and conclusions discussed in the research of Tay and Diener (2011) were used where six basic and psychological needs and their relation with the different components of SWB were

investigated. However, the current study goes one step further by investigating whether two psychological concepts further contribute to SWB.

In order to answer this research question three 3-step multiple regression models were built, inspired by several needs theories (Maslow, 1943; Ryff & Singer, 1998; Ryan & Deci, 2000). As such, in a first step factors corresponding to lower basic needs were entered in the models, followed by including factors related to the typical psychological needs (derived from the self-determination theory), and finally including meaningfulness and peace of mind in the latest step. The latter was done under the assumption that both meaningfulness and peace of mind additionally contribute to achieve SWB.

Based on the results of this study several conclusions can be drawn that form a first theoretical basis for future policy recommendations. First, in congruence with the study of Tay & Diener (2011), this research reconfirms that using needs theories as a starting point was appropriate and has led to an increase in the variance that was explained in SWB by this stepwise procedure (Tay and Diener 2011). Next, as Ryan & Deci (2000), and Maslow (1943) argue, these findings also indicate that universal needs exist and that fulfilling them is related to enhanced SWB (Maslow, 1943; Ryan & Deci, 2000). Further, our evidence is also in congruence with Tay & Diener (2011) who concluded that fulfilment of the classical basic and psychological needs is a prerequisite, but is not enough to achieve a high level of SWB (Tay and Diener 2011). As the authors argued that other factors are relevant in explaining SWB as well without simply attributing those to genetic components, this study indeed confirmed this hypothesis by showing that peace of mind and meaningfulness also substantially contribute to SWB.

The first step of the models indicated that basic needs play an important role in the different components of SWB and especially in life satisfaction where already 47% of its variance was explained by these needs. This finding is again in line with Tay & Diener (2011) who also concluded that basic needs are most important in explaining life satisfaction. A novel and remarkable finding is that sleep deprivation is highly related to negative affect, while its role is rather limited in the other SWB components.

Next, including psychological needs caused an additional increase in the total variance explained in the three components, with the highest increase in positive and negative affect. First, the results in this step underpin the extensive evidence into the importance of fulfilling psychological needs besides fulfilling basic needs as claimed by the self-determination theory (Ryan & Deci, 2000; Vansteenkiste & Ryan, 2013). Further, this evidence also corresponds to the earlier research of Tay & Diener (2011) who also pointed out that psychological needs where more strongly associated with positive and negative affect (Tay and Diener 2011) than with life satisfaction and with Steverink et al., (2020) who also concluded that different social needs (here focus on: affection, behavioral confirmation, and status) contribute to different types of well-functioning (defined as: psychological strength, life satisfaction, positive affect, and the absence of loneliness and negative affect) (Steverink et al., 2020). Based on both studies and our new evidence it becomes clear that it is not only important to look at both basic and psychological needs, but also to focus on different social needs independently as they contribute differently to our overall well-being. Finally, while not measured in the study of Tay & Diener (2011), the current study also pointed out that competence is most strongly related to positive and negative affect, more than to life satisfaction.

The most novel finding of this study was that including meaningfulness and peace of mind resulted in a substantial increase in the total variance that was explained in the different components of SWB. More specific, the explained variance in life satisfaction increased towards 56.7%, in positive affect towards 37.2%, and in negative affect towards 56.1%. The latter thus confirms our hypothesis that additional factors related to psychological concepts do play a role in explaining SWB beyond the typical basic and psychological needs. Remarkably here is that while both concepts were associated with life satisfaction and positive affect, in the negative affect component only peace of mind was strongly associated and meaningfulness was not associated with negative affect. A possible explanation could be that meaningfulness, or the cognitive evaluation that a particular value or meaning has been fulfilled (Bauer, 2016), predominately provokes positive evaluations about one's life (i.e. life satisfaction) and positive feelings. With regard to negative emotions, however, emotion regulation or PoM might be a more effective strategy than meaningfulness to diminish these emotions. Indeed, as the meta-analysis of Berking and Wuperman (2012) suggests, maladaptive emotion regulation is related to various forms of psychopathology. Moreover, several other conclusions can be drawn based on the final models without claiming the direction of causal relationship between the predicted SWB components and the needs. First, it should be noted that several basic needs (satisfaction with living conditions, satisfaction with the financial situation, and perceived health) remained important in the latest step of the life satisfaction model which was not the case in the affective components. This shows that the life satisfaction component of SWB highly depends on basic needs even when psychological needs may be fulfilled. Moreover, this finding contains a clear policy message to keep investing in health for all and 'good societal livability'. Further, the results in the final positive affect model suggest that especially feelings of competence, peace of mind and meaningfulness had the highest relative importance in relation to positive affect. This is an important finding as it shows that people must experience feelings of competence, have inner peace and experience meaningfulness in what they undertake in order to report high levels of positive affect even when other basic and psychological needs are fulfilled. Finally, the final negative affect model indicated the apparent importance of good sleep, feelings of competence and high peace of mind for experiencing low negative affect independently of whether other basic and psychological needs have been met. This finding again contains an important message. If we want to avoid or prevent negative feelings/emotions which lead to lower levels of SWB it is important to have enough sleep, experience inner peace and feel competent.

Some strengths and weaknesses should be mentioned allowing to better understand the context of these findings. A first strength is that this study had a notable large sample size based on a sample of Belgian citizens. Although we also constructed a representative subsample of this sample ( $N=1700$ ), we decided to use the full sample for two reasons: the main purpose in the research was to investigate associations between variables and the models were controlled for demographic characteristics. A second strength is that many variables and concepts potentially related to SWB were questioned, as such allowing to build these three step models and to consider a wide range of factors. Third, the results of this study have contributed to new evidence into this research field by introducing meaningfulness and peace of mind variables as potential and actionable contributing factors of SWB. Fourth, we were able to draw some clear conclusions based on the results of our models that can be further investigated and translated into valuable policy recommendations.

Our study also had some weaknesses. First, although it was certainly a major strength that many concepts were questioned, this approach resulted in the necessity to shorten or slightly adapt several measurements in order to limit the time to fill out the questionnaire to avoid response bias. As a result, several measurements were no longer strictly validated measures and the reported Cronbach's alpha's were lower (but still sufficient) because only a restricted number of items were selected to measure several constructs. Also, when Dutch versions were not available in the literature, we had to translate them using a forward back translation method. Second, due to the cross-sectional nature of our data no causal relationship or bidirectional causality between variables could be investigated. Therefore, in future studies, experimental interventions targeted to fulfill certain needs is highly desirable. Third, we did not include interaction terms in our model as a previous similar high-quality study concluded that there was a large independence of needs in affecting SWB (Tay and Diener 2011). Fourth, we only used self-report questionnaires which can induce bias from a person's mood or social desirability bias. However, social desirability bias should have remained limited because the questionnaire was strictly anonymous. Nevertheless, future research could benefit from using additional measurement methods to obtain information about needs and SWB. Finally, because an online questionnaire was used, only people who have access and who are familiar with internet participated. Also, as people were recruited via social media and a research and consulting company, we have no data on the non-response.

Next, important to mention as well, is that income was excluded from our model due to its high conceptual overlap with 'satisfaction with the financial situation'. The latter was chosen over income because it is a wider concept also taking into account the impact of loans and debts and because it has been argued that once needs are taken into account the role of income disappears in explaining SWB (Tay and Diener 2011).

Finally, although a large percentage of the total variance was explained by our model, there is still room for improvement in explaining SWB. As such, additional factors that we have not captured in our model could also contribute to subjective well-being. One hypothesis is that a person's tendency to experience 'joy in life' (not measured in this study) could be added. The latter could be conducted under the assumption that this concept covers a certain personal emotion or state that also contributes to SWB, but that was not yet captured by other variables. Finally, it would have been interesting to add a person's intrinsic aspirations (such as: meaningful relationships, personal growth, and community contributions) and extrinsic aspirations (wealth, fame, and image) to our model because previous research has already revealed that having strong extrinsic aspirations is negatively associated with well-being, while having strong intrinsic aspirations is positively associated with well-being (Ryan et al., 1999). Therefore, future research investigating the potential added value of these concepts to SWB could complete our model.

In conclusion, this study contributed to today's knowledge about SWB by explaining a large amount of its variance based on three models that integrated elements of several needs theories. Next, the results confirmed that meaningfulness and especially peace of mind contribute substantially to SWB beyond the typical basic and psychological needs. Further, this study strengthens the existing rationale for approaching peace of mind and meaningfulness as actionable factors that are related to high SWB, instead of rather approaching them as SWB outcomes. Finally, this study showed that different types of needs play an independent role in the different components of SWB. As such, life satisfaction is seemingly the most

correlated with basic needs, peace of mind and meaningfulness; positive affect is seemingly most strongly related to high feelings of competence, peace of mind and meaningfulness; and negative affect is seemingly most strongly associated with sleep deprivation, low competence and low peace of mind. These insights can serve as a starting point to develop adequate interventions and policy measures in order to enhance SWB.

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**Availability of data and material** The data supporting this article can be made available from the corresponding author on reasonable request.

**Code Availability** Not applicable.

## Declarations

**Conflict of interest** The authors declare to have no conflict of interest.

**Consent for publication** Consent for publication does not apply for this manuscript.

**Ethics approval** This study has obtained ethical approval from the ethical committee of the University of Ghent (B670201940146).

**Informed consent** All participants signed the informed consent before participation.

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## References

- Annemans, L. (2018). "Leerstoel NN Perspectieven op een gezond en gelukkig leven." Retrieved April 6th, 2020, from <http://www.geluk.ugent.be/>
- Annemans, L. (2020). "Het Nationaal Geluksonderzoek." from <https://gelukkigebelgen.be/nationaal-geluksonderzoek/>
- Annemans, L., & Vandepitte, S. (2020). "Leerstoel NN 2020: Tweede fase van het nationaal geluksonderzoek." Retrieved April 6th, 2020, from <https://geluk2020.ugent.be/>
- Bauer, J. J. (2016). Eudaimonic Growth: The Development of the Goods in Personhood (or: Cultivating a Good Life Story). In J. Vittersø (Ed.), *Handbook of Eudaimonic Well-Being* (pp. 147–174). Springer International Publishing. [https://doi.org/10.1007/978-3-319-42445-3\\_10](https://doi.org/10.1007/978-3-319-42445-3_10)
- Bauer, J. J., Park, S. W., Montoya, R. M., & Wayment, H. A. (2015). Growth Motivation Toward Two Paths of Eudaimonic Self-Development. *Journal of Happiness Studies*, 16(1), 185–210. <https://doi.org/10.1007/s10902-014-9504-9>
- Baumeister, R. F. (1991). *Meanings of life*. Guilford Press
- Berking, M., & Wupperman, P. (2012). Emotion regulation and mental health: Recent findings, current challenges, and future directions. *Current Opinion in Psychiatry*, 25(2), 128–134. <https://doi.org/10.1097/YCO.0b013e3283503669>

- Bjornskov, C. (2010). "How Comparable are the Gallup World Poll Life Satisfaction Data?" *Journal of Happiness Studies* **11**(1): 41–60.
- Cantril, H. (2001). "The Pattern of Human Concern." *The British Journal of Sociology* **18**
- Chen, B. W., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J. ... Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*(2), 216–236
- Desbordes, G., Gard, T., Hoge, E. A., Hölzel, B. K., Kerr, C., Lazar, S. W., & Olenzki, A. and Vago D. R. (2015). "Moving beyond Mindfulness: Defining Equanimity as an Outcome Measure in Meditation and Contemplative Research". *Mindfulness*, *6*(2), 356-372. <https://doi.org/10.1007/s12671-013-0269-8>
- Diener, E. (1984). "SUBJECTIVE WELL-BEING." *Psychological Bulletin*, *95*(3), 542–575
- Diener, E. (2012). New findings and future directions for subjective well-being research. *American Psychologist*, *67*(8), 590–597
- Diener, E., & Chan, M. Y. (2011). Happy People Live Longer: Subjective Well-Being Contributes to Health and Longevity. *Applied Psychology-Health and Well Being*, *3*(1), 1–43
- Diener, E., Lucas, R. E., & Oishi, S. (2018). "Advances and Open Questions in the Science of Subjective Well-Being." *Collabra-Psychology***4**(1)
- Diener, E., Lucas, R. E., & Scollon, C. N. (2006). "Beyond the hedonic treadmill - Revising the adaptation theory of well-being." *American Psychologist*, *61*(4), 305–314
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). "Subjective well-being: Three decades of progress." *Psychological Bulletin*, *125*(2), 276–302
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D. W., Oishi, S., & Biswas-Diener, R. (2010). "New Well-being Measures: Short Scales to Assess Flourishing and Positive and Negative Feelings." *Social Indicators Research*, *97*(2), 143–156
- EUROSTAT (2018). "Glossary: Equivalised disposable income." Retrieved november, 11, 2019, from [https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Equivalised\\_disposable\\_income](https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Equivalised_disposable_income)
- Fowers, B. J. (2012). Placing virtue and the human good in psychology. *Journal of Theoretical and Philosophical Psychology*, *32*(1), 1–9. <https://doi.org/10.1037/a0025819>
- Grabovac, A. D., Lau, M. A., & Willett, B. R. (2011). "Mechanisms of Mindfulness: A Buddhist Psychological Model." *Mindfulness***2**(3):154–166
- Lee, Y. C., Lin, Y. C., Huang, C. L., & Fredrickson, B. L. (2013). The Construct and Measurement of Peace of Mind. *Journal of Happiness Studies*, *14*(2), 571–590
- Lyubomirsky, S., King, L., & Diener, E. (2005). "The benefits of frequent positive affect: Does happiness lead to success?." *Psychological Bulletin*, *131*(6), 803–855
- Maslow, A. H. (1943). "A theory of human motivation." *Psychological Review*, *50*(4), 370–396
- Ngamaba, K. H. (2017). Determinants of subjective well-being in representative samples of nations. *European Journal of Public Health*, *27*(2), 377–382
- OECD (2013). OECD Guidelines on Measuring Subjective Well-being
- Posada, D., & Buckley, T. R. (2004). "Model selection and model averaging in phylogenetics: advantages of akaike information criterion and bayesian approaches over likelihood ratio tests." *Systematic Biology*, *53*(5), 793–808
- Ryan, R., Chirkov, V., Little, T., Sheldon, K., Timoshina, E., & Deci, E. (1999). "The American Dream in Russia: Extrinsic Aspirations and Well-Being in Two Cultures." *Personality and Social Psychology Bulletin*, *25*, 1509–1524
- Ryan, R. M., & Deci, E. L. (2000). "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being." *American Psychologist*, *55*(1), 68–78
- Ryan, R. M., & Martela, F. (2016). Eudaimonia as a Way of Living: Connecting Aristotle with Self-Determination Theory. *Handbook of Eudaimonic Well-Being*. J. Vittersø. Cham, Springer International Publishing:109–122
- Ryff, C. D. (2014). Psychological Well-Being Revisited: Advances in the Science and Practice of Eudaimonia. *Psychotherapy and Psychosomatics*, *83*(1), 10–28
- Ryff, C. D. (2017). Eudaimonic well-being, inequality, and health: Recent findings and future directions. *International review of economics*, *64*(2), 159–178
- Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, *69*(4), 719–727
- Ryff, C. D., & Singer, B. (1998). The contours of positive human health. *Psychological Inquiry*, *9*(1), 1–28
- Schotanus-Dijkstra, M., Ten Klooster, P. M., Drossaert, C. H. C., Pieterse, M. E., Bolier, L., Walburg, J. A., & Bohlmeijer, E. T. (2016). Validation of the Flourishing Scale in a sample of people with suboptimal levels of mental well-being. *BMC psychology*, *4*, 12–12
- Siegel, A. F. (2016). Multiple Regression. In *Practical Business Statistics* (pp. 355–418). Elsevier. <https://doi.org/10.1016/B978-0-12-804250-2.00012-2>

- Sikka, P., Pesonen, H., & Revonsuo, A. (2018). "Peace of mind and anxiety in the waking state are related to the affective content of dreams." *Scientific Reports* **8**
- Steuerink, N., Lindenberg, S., Spiegel, T., & Nieboer, A. P. (2020). The Associations of Different Social Needs with Psychological Strengths and Subjective Well-Being: An Empirical Investigation Based on Social Production Function Theory. *Journal of Happiness Studies*, *21*(3), 799–824
- Tay, L., & Diener, E. (2011). Needs and subjective well-being around the world. *J Pers Soc Psychol*, *101*(2), 354–365
- Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, *23*(3), 263–280
- Veenhoven, R. (2012). Happiness: Also Known as "Life Satisfaction" and "Subjective Well-Being": 63–77
- Vik, M. H., & Carlquist, E. (2018). "Measuring subjective well-being for policy purposes: The example of well-being indicators in the WHO "Health 2020" framework." *Scandinavian Journal of Public Health*, *46*(2), 279–286
- Warren, J. (2002). *Epicurus and Democritean Ethics: An Archaeology of Ataraxia*. Cambridge: Cambridge University Press
- Watson, D., Clark, L. A., Tellegen, A., & "DEVELOPMENT AND VALIDATION OF BRIEF MEASURES OF POSITIVE AND NEGATIVE AFFECT - THE PANAS SCALES." (1988). *Journal of Personality and Social Psychology* *54*(6):1063–1070
- Wilson, W. (1967). "CORRELATES OF AVOWED HAPPINESS." *Psychological Bulletin*, *67*(4), 294–
- Wolf, S. R. (2012). *Meaning in life and why it matters*. Princeton University Press

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