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The predictive power of low-arousal positive affect

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Abstract
Relative to high-arousal positive affect (HAPA), low-arousal positive affect (LAPA) is less likely to be included in research on positive affect and emotion. To gauge the possible cost of omitting LAPA from such research, two studies were conducted assessing the unique contribution of LAPA (e.g., *calm, relaxed, content*) in predicting variance in measures of well-being and mental health above and beyond HAPA (e.g., *alert, excited, enthusiastic*). In two studies, multiple regression analyses revealed that LAPA uniquely predicted life satisfaction, depression, feeling good, mindfulness, anxiety, and stress beyond HAPA. Furthermore, the results indicated that when both LAPA and HAPA were in the regression model, LAPA significantly predicted variance in mindfulness, anxiety, and stress whereas HAPA did not. These data indicate that the inclusion of LAPA in research can improve the field's ability to investigate the causes and effects of positive affectivity. Theoretical perspectives on different types of positive affect and practical implications for researchers are discussed.

Keywords Low-arousal positive affect · High-arousal positive affect · Emotion · PANAS · Contentment

Emotions have been considered by many to be organized on two continua: positive versus negative valence and high- versus low-arousal or activation (Russell 1980). When positive affect is measured, only high-arousal positive affect (HAPA) is typically included, as evidenced by the fact that the most widely used scale of positive affect contains only HAPA items, including: *active, alert, attentive, determined, excited, enthusiastic, inspired, interested, proud*, and *strong* (PANAS-PA; Watson et al. 1988). Low-arousal positive affect (LAPA), which includes affective states such as *calm, relaxed*, and *content*, is by comparison rarely included in research on positive affectivity (Fredrickson and Cohn 2008). Despite increased attention to this category by clinical researchers (e.g., Gilbert 2009), affective neuroscientists (e.g., Depue and Morrone-Strupinsky 2005; Koelsch et al. 2015; Porges 2007), researchers on culture and emotion (e.g., Tsai 2007), researchers on cognition (e.g., Fröber and Dreisbach 2012), health psychology researchers (Pressman et al. 2017; Schwerdtfeger and Gerteis 2014), and researchers on discrete emotions (e.g., Griskevicius et al. 2010), the measurement of positive affect still frequently omits LAPA.

Moreover, we found only a few articles where researchers discussed their rationale for the inclusion or exclusion of LAPA in their study design. For example, in a study of workplace emotions and leadership, *contentment* and *calm* were deemed to be "of low relevance" (Bono et al. 2007, p. 1361). In research on positive affect and mindfulness, "I feel relaxed" was excluded from the assessment of positive affect because, in a factor analysis, it didn't load with high-arousal positive emotions, and researchers chose not to assess it as a separate factor (Garland et al. 2015). Remarkably, LAPA is often omitted from research on mindfulness (Fredrickson et al. 2017), even though *calm* has been described as an intended outcome of certain approaches to mindfulness (Koopmann-Holm et al. 2013).

Indeed, the relative omission of LAPA has engendered concern about the accuracy and completeness of measures of positive affect. Lyubomirsky et al. (2005) noted that assessment of HAPA might not be the same as assessing other pleasant emotions. Brief and Weiss (2002), in their review of the literature on affect in the workplace, cautioned that heavy reliance on one instrument (PANAS) may result in "narrower than desirable methodological and theoretical orientations" (p. 297: see also Harmon-Jones

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et al. 2016, for an extensive discussion of PANAS as an incomplete measure of affect). Fredrickson and Cohn (2008) suggested that overlooking LAPA may hinder our ability to understand how positive affectivity relates to human behavior.

The relative omission of LAPA from research can be understood in light of how LAPA is often conceptualized. Proponents of valence/arousal theories of emotion tend to consider LAPA as a less intense occurrence of positivity (Watson et al. 1988) or the absence of negativity (Barrett 2017; Russell 1980). In this view there is no distinction between HAPA and LAPA in terms of the quality of positive experience; they are seen as less or more of the same phenomenon. Yet some researchers have suggested that these low-arousal positive states have distinct qualities. These researchers emphasize the adaptive purpose of such states. For example, the function of low-arousal positive states is thought to be related to soothing and affiliation (Gilbert 2014; Koelsch et al. 2015; Panksepp 2004), post goal-attainment (Harmon-Jones et al. 2016), the integrative promotion of rest (Shiota 2014), or the enjoyment of reward without the disturbance of wanting (Kringelbach and Berridge 2017). We do not, in current research, attempt to explain the origins and purpose of a low-arousal positive affective experience. Nor do we try to reconcile the theoretical nuances of emotions that may be grouped among low-arousal positive affect. Our main interest is in whether there is unique predictive power in the broad category of low-arousal positive affect. Therefore, we draw the boundaries of low-arousal positive affect around states that have been described as such by clinical researchers (Gilbert 2014), discrete emotion theorists (Griskevicius et al. 2010), approach-motivation researchers (Harmon-Jones et al. 2016), and proponents of valence/arousal matrices (Barrett 2017; Russell 1980; Watson et al. 1988). Low-arousal states that are not generally considered to be positive (e.g., *sleepy, bored*) are not included.

The current research seeks to assess the power of LAPA to predict mental health and well-being outcomes above and beyond HAPA. If the implications of valence/arousal theories of positive affect are correct, and *calm, content*, and *serene* are simply the absence of *fear* and *anger* or lower levels of *enthusiasm* and *inspiration*, then we would expect that LAPA would not provide any additional predictive power. However, if LAPA represents a quality of positive affect that is unique and additive above HAPA, as suggested by other researchers (e.g., Gilbert et al. 2008; Kringelbach and Berridge 2017), the exclusion of LAPA would be particularly problematic. Researchers may be failing to capture the full effect of the causes and consequences of positive affect. The goal of the current research is to assess the cost of omitting LAPA by measuring the predictive power of LAPA across several outcome measures in two studies.

Study 1

The goal of Study 1 was to ascertain whether LAPA accounts for variance over and above HAPA in three measures of well-being and mental health. Life satisfaction was chosen because it is widely used in measures of well-being (Pavot and Diener 1993). Depression was chosen because the relationship between positive affect and depression is important and well-documented (Denollet and De Vries 2006). Lastly, feeling good was chosen because it is a simple, intuitive way to refer to overall positive affectivity. We proposed the following hypotheses:

H1 LAPA will uniquely predict higher levels of life satisfaction beyond HAPA.

H2 LAPA will uniquely predict lower levels of depression beyond HAPA.

H3 LAPA will uniquely predict higher levels of feeling good beyond HAPA.

Study 1 method

Participants and procedure

Participants were 207 adults residing in the United States who were recruited through Amazon's Mechanical Turk (MTurk) and paid $.20 each for their participation in a 7 min survey. Samples from MTurk have been found to be representative of the U.S. population and provide reliable, high-quality data (Paolacci and Chandler 2014). The average age was 37 ($SD = 12.7$), with ages ranging from 20 to 79 years old. Females made up 48% of the sample. The racial make-up of the sample was 73% White, 13% African American, 6% Asian, 5% Hispanic, and 3% other. After giving their informed consent, participants were asked to reflect on how they had been feeling over the past week and write a brief description: "Briefly describe how you have been feeling over the last seven days." Participants were then asked to rate how good they felt over the past week, and then they were asked to rate the extent of their feelings on specific high-arousal positive emotions and low-arousal positive emotions, presented in random order. Following these questions about positive emotion, participants were asked about depression, then life satisfaction, followed by three demographic questions about age, race, and gender.

Table 1 Study 1: Mean, standard deviation, Cronbach's alpha, and zero order bivariate correlations for all variables ($N = 207$)

	M	*SD*	α	1	2	3	4	5	6
1. Age	37	12.70	–						
2. Gender	0.48	0.50	–	0.08					
3. Satisfaction with life	3.21	1.14	0.93	0.11	0.06				
4. Depression	2.00	0.90	0.95	−0.22**	0.01	−0.51***			
5. Feeling good	4.18	1.88	–	0.16*	−0.15*	0.66***	−0.60***		
6. HAPA	4.52	1.51	0.95	0.23**	−0.07	0.57***	−0.63***	0.79***	
7. LAPA	4.31	1.51	0.91	0.17*	−0.15*	0.60***	−0.54***	0.83***	0.69***

Male = 0, Female = 1 , *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Measures

Reliability (Cronbach's alpha) was computed for all composite measures. They are presented in Table 1, along with means, standard deviations, and bivariate correlations.

Positive affect

Items from positive affect scales were presented in random order and participants were asked to rate, on a 7-point scale (1 = *not at all*; 7 = *extremely*), the extent to which they had experienced each emotion over the past 7 days.[1]

High-arousal positive affect (HAPA) HAPA was measured by the 10-item PANAS-PA (Watson et al. 1988). Strong internal consistency for the PANAS was found among undergraduate students and university employees (α = 0.88, the time reference was "past few days"). The 8-week test–retest reliability for the measure when the time reference was "past week" was 0.47. Items included *active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud*, and *strong*. A sample item is: "How excited have you felt this week?"

Low-arousal positive affect (LAPA) LAPA was measured using an adaptation of positive affect subscales developed by Gilbert et al. (2008). In assessing multiple items representing positive affect they identified three factors: an activation factor (i.e., HAPA) and two factors of LAPA centering around relaxation (*relaxed, peaceful, calm, tranquil, laid back*, and *serene*) and safeness (*safe, content, secure*, and *warm*). With the exception of *safe* and *secure*, these words can be found on the low-arousal positive quadrant in the circumplex model of affect (Russell 1980; Watson et al. 1988). In the current study, four items, *tranquil, serene, laid back*, and *warm* were omitted, in order to minimize possible confusion in the context of an online survey. *Tranquil* and *serene* may be less familiar to people with lower levels of education, while *laid back* was suspected of being less used by older people. *Warm* was omitted due to its possible confusion with the experience of external temperature rather than internal feeling. The final list of LAPA items included *calm, content, peaceful, relaxed, secure*, and *safe*. A sample item is: "How content did you feel last week?"

Life satisfaction

Life satisfaction was measured by the Satisfaction with Life Scale (SWLS; Diener et al. 1985). Participants answered five questions on a 5-point scale (1 = *not at all*; 5 = *extremely*). A sample item is: "I am satisfied with my life."

Depression

Depression, or depressive symptomatology, was measured by the Center for Epidemiologic Studies Depression Scale Revised (CESD-R; Eaton et al. 2004), a modification of the CESD that has been widely used in depression epidemiology. Participants were asked to answer 20 questions on a 5-point scale (1 = *not at all*; 5 = *nearly every day*) in reference to the past week. A sample item is: "I could not get going."

Feeling good

Feeling good was measured by one question. One-item measures have been used occasionally in research on positive emotion (Lyubomirsky et al. 2005). Participants were asked to answer, "How good have you felt this week?" by rating on a 7-point scale (1 = *not at all*; 7 = *extremely*). We sought to investigate how completely HAPA accounts for overall positive affect, so we looked for an approach that might broadly and intuitively encompass all positive affect. Research on positive emotion often refers to "feeling good"

[1] One word (i.e., *enjoyment*) was originally included among positive affect items because of its importance to early emotion theory (Tomkins 1962). It was removed from all analysis due to its cross-loading in factor analysis on both HAPA and LAPA, with loadings of 0.76 and 0.81, respectively.

as an informal or umbrella term for a positive state (Isen and Levin 1972).

Study 1 results

Analyses were conducted on SPSS version 24 for PC. Answers to the open-ended questions were reviewed to insure participants were constructively engaged in the survey; no exclusions were made on this account. Two multivariate outliers were excluded based on the Mahalanobis distance ($df = 5$) for final scales, critical value of 20.52 with $p < 0.001$ (cf. Tabachnick and Fidell 2007), resulting in a sample of 207. Skewness values ranged from −0.317 to 0.910, and kurtosis values ranged from −1.235 to −0.090. Reasonable normality of distributions was confirmed by visual inspection of histograms. Means, standard deviations, Cronbach's alphas, and zero-order bivariate correlations for all variables are presented in Table 1.

Principal axis factor analysis with direct oblimin rotation was conducted to explore the structure of positive affect. The KMO measure of sampling adequacy was 0.945, and the sample size of 207 was adequate for factor analysis with 17 items (Tabachnick and Fidell 2007) and a subject to item ratio of 12:1 (Costello and Osborne 2011). Parallel analysis, based on a 1000-case permutation, indicated that there were two eigenvalues that exceeded a 95% significance level (Hayton et al. 2004). Two factors with eigenvalues greater than 1 (9.50 and 1.86) together explained 71% of the variance. The first rotated factor consisted of the 10 HAPA items. The second factor consisted of the six LAPA items. The two factors were correlated at 0.563. This finding was not inconsistent with Gilbert and colleagues (2008) who found that two similar factors had eigenvalues greater than 1. See Table 2 for factor loadings of each item.

To assess the predictive power of LAPA relative to HAPA, we performed two statistical analyses. First, hierarchical multiple regression was conducted measuring the amount of variance in each dependent variable explained by LAPA after controlling for age, gender, and HAPA. Confidence intervals for standardized regression coefficients were obtained through bootstrapping with 1000 resamples. Second, a test of dependent correlations was conducted, comparing the correlations of HAPA and LAPA to each outcome variable while accounting for the correlation of HAPA and LAPA to each other (Steiger 1980).

Satisfaction with life (H1)

Multiple regression analysis showed that LAPA significantly predicted participants' ratings of life satisfaction beyond HAPA. After controlling for age and gender, which did not significantly account for variance in satisfaction with life, HAPA explained 32% of the variance ($F_{1,203} = 99.15$, $p < 0.001$), and LAPA explained 9% of the variance in satisfaction with life ($F_{1,202} = 33.03$, $p < 0.001$) above and beyond HAPA, gender, and age. When both affect variables were in the model, LAPA predicted life satisfaction [$\beta = 0.42$, $t = 5.74$, $p < 0.001$, 95% CI (0.25, 0.59)], as did HAPA [$\beta = 0.30$, $t = 4.06$, $p < 0.001$, 95% CI (0.10, 0.48)]. Combined, the four variables explained 43% of the variance in satisfaction with life (see Table 3). A test comparing the dependent correlations revealed no significant difference between HAPA and LAPA in their power to predict life satisfaction (see Table 7).

Table 2 Study 1: pattern matrix for factor analysis for items measuring positive affect using principal axis factoring and direct oblimin rotation ($N = 207$)

	Two-factor solution factor loadings	
	1 High-arousal	2 Low-arousal
Alert	**0.874**	−0.146
Determined	**0.872**	−0.123
Attentive	**0.841**	−0.105
Active	**0.772**	−0.010
Interested	**0.762**	0.163
Strong	**0.705**	0.205
Proud	**0.695**	0.197
Excited	**0.694**	0.211
Inspired	**0.677**	0.256
Enthusiastic	**0.604**	0.381
Relaxed	−0.123	**0.975**
Calm	−0.096	**0.923**
Peaceful	0.133	**0.791**
Content	0.306	**0.609**
Secure	0.329	**0.553**
Safe	0.186	**0.424**

Loadings above 0.4 are in bold

Pre-rotation eigenvalues = 9.50 and 1.86; total variance = 71.03%. Post-rotation sums of squared loadings = 8.24 and 6.68

Depression (H2)

Multiple regression analysis revealed that LAPA significantly predicted participants' depression score, beyond HAPA. After controlling for age and gender, which accounted for 5% of the variance in depression, HAPA explained 35% of the variance ($F_{1,203} = 118.13$, $p < 0.001$), and LAPA explained 3% of the variance in depression, above and beyond HAPA, gender, and age ($F_{1,202} = 8.89$, $p < 0.01$). When both affect variables were in the model, LAPA significantly predicted depression [$\beta = -0.22$, $t = -2.98$, $p < 0.01$,

Table 3 Study 1: multiple regression for low-arousal positive affect predicting life satisfaction, depression, and feeling good ($N = 207$)

Step and predictor	Life satisfaction			Depression			Feeling good		
	ΔR^2	F	β	ΔR^2	F	β	ΔR^2	F	β
Step 1	0.01	1.46		0.05**	5.17		0.05**	5.48	
Age			0.10			−0.22**			0.17*
Gender			0.05			0.03			−0.16*
Step 2	0.32***	99.15		0.35***	118.13		0.59***	331.56	
Age			−0.04			−0.07			−0.02
Gender			0.10			−0.02			−0.09*
HAPA			0.59***			−0.61***			0.79***
Step 3	0.09***	33.03		0.03**	8.89		0.15***	137.83	
Age			−0.05			−0.07			−0.03
Gender			0.15**			−0.05			−0.04
HAPA			0.30***			−0.46***			0.43***
LAPA			0.42***			−0.22**			0.53***
Total R^2	0.43			0.42			0.79		

Male = 0, Female = 1; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

95% CI (− 0.35, −0.10)], as did HAPA [β = −0.46, $t = -6.19$, $p < 0.001$, 95% CI (− 0.59, −0.33)]. Combined, the four variables explained 42% of the variance in depression (see Table 3). HAPA and LAPA did not differ significantly in their power to predict depression (see Table 7).

Feeling good (H3)

Multiple regression analysis showed that LAPA significantly predicted participants' ratings of feeling good, beyond HAPA. After controlling for age and gender, which accounted for 5% of the variance in feeling good, HAPA explained an additional 59% of the variance ($F_{1,203} = 331.56$, $p < 0.001$), and LAPA explained 15% of the variance in feeling good ($F_{1,202} = 137.83$, $p < 0.001$), above and beyond HAPA, gender, and age. When both affect variables were in the model, LAPA predicted feeling good [β = 0.53, $t = 11.74$, $p < 0.001$, 95% CI (0.43, 0.63)], as did HAPA [β = 0.43, $t = 9.53$, $p < 0.001$, 95% CI (0.33, 0.53)]. Combined, the four variables explained 79% of the variance in feeling good (see Table 3). HAPA and LAPA did not differ significantly in their power to predict feeling good (see Table 7).

Study 1 discussion

The predictive power of LAPA was found to explain unique variance beyond HAPA for all three outcome measures. LAPA accounted for variance that was not predicted by HAPA, gender, or age: 9% for life satisfaction, 3% for depression, and 15% for feeling good. We note that the basic relationship between HAPA and these outcome measures comports with prior studies. For example, the positive correlation between life satisfaction and HAPA in this study was moderate ($r = 0.57$), which is similar to the correlation found by Palmer, Donaldson and Stough (2002): $r = 0.55$. Furthermore, the negative correlation between HAPA and depression as measured by the CESD-R was moderate ($r = -0.63$), as was the correlation found by Denollet and De Vries (2006): $r = -0.49$. The consistency of our correlations with correlations in prior studies supports the finding that positive affect is not completely accounted for by HAPA alone, and that LAPA represents a distinct quality of positive affect.

Study 2

To replicate and extend the findings of Study 1, we conducted a second study that included additional measures of well-being and mental health. Three indicators of well-being included dispositional gratitude (McCullough et al. 2002), the presence of meaning in life (Steger et al. 2006), and mindfulness (Brown and Ryan 2003). Three indicators of mental health included depression, anxiety, and stress (Lovibond and Lovibond 1995). The one-item measure of feeling good was also included in this study. Life satisfaction was not included as a dependent variable in this study due to concern for participant fatigue.

For the sake of consistency, when hypotheses from Study 1 were tested again in Study 2, we used the same numbering as Study 1. Because H1 was not re-tested in Study 2, these hypotheses start with H2. The hypotheses for Study 2 are as follows:

H2 LAPA will uniquely predict variance in *depression* beyond HAPA.

H3 LAPA will uniquely predict variance in *feeling good* beyond HAPA.

H4 LAPA will uniquely predict variance in *gratitude* beyond HAPA.

H5 LAPA will uniquely predict variance in *meaning in life* beyond HAPA.

H6 LAPA will uniquely predict variance in *mindfulness* beyond HAPA.

H7 LAPA will uniquely predict variance in *anxiety* beyond HAPA.

H8 LAPA will uniquely predict variance in *stress* beyond HAPA.

Study 2 method

Participants and procedure

Participants were 184 adults residing in the United States who were recruited through Amazon's MTurk and paid $.50 each for their participation in a 10 min survey. The average age was 36 ($SD = 10.6$), with ages ranging from 20 to 70 years old. Females made up 44% of the sample. The racial make-up of the sample was 74% White, 10% Asian, 9% Hispanic, 5% African American, and 2% other. As in Study 1, participants wrote a brief description of how they felt over the past week and rated how good they felt over that time period. Participants rated high-arousal positive emotions and low-arousal positive emotions, presented in random order. Participants were then asked about their gratitude, meaning in life, and mindfulness, presented in random order. Next participants answered a set of randomly ordered questions about depression, anxiety, and stress. Finally, participants answered demographic questions.

Measures

Reliability (Cronbach's alpha) is presented in Table 4 for all composite measures in Study 2, along with means, standard deviations, and bivariate correlations.

Positive affect

As in Study 1, affect items were presented in random order. Participants were asked to rate, on a 7-point scale (1 = *not at*

Table 4 Study 2: mean, standard deviation, Cronbach's alpha, and zero order bivariate correlations for all variables ($N = 184$)

	M	*SD*	α	1	2	3	4	5	6	7	8	9	10
1. Age	36	10.64	–										
2. Gender	0.44	0.50	–	0.14									
3. HAPA	4.71	1.44	0.96	0.13	0.14								
4. LAPA	4.64	1.57	0.95	0.14	−0.19*	0.76***							
5. Depression	2.52	1.45	0.94	−0.19**	0.05	−0.64***	−0.64***						
6. Feeling good	4.45	1.72	–	0.12	−0.16*	0.81***	0.83***	−0.64***					
7. Gratitude	3.84	0.78	0.86	0.25**	0.11	0.34***	0.23**	−0.45***	0.26***				
8. Meaning	4.66	1.66	0.96	0.21**	0.06	0.45***	0.34***	−0.49***	0.33***	0.48***			
9. Mindfulness	5.53	0.85	0.93	0.21**	−0.01	0.24**	0.32***	−0.60***	0.28***	0.32***	0.35***		
10. Anxiety	2.31	1.24	0.90	−0.17*	0.08	−0.35***	−0.52***	0.79***	−0.45***	−0.40***	−0.32***	−0.64***	
11. Stress	2.72	1.40	0.93	−0.18*	0.16*	−0.47***	−0.65***	0.80***	−0.55***	−0.34***	−0.33***	−0.64***	0.82***

Male = 0, Female = 1; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

all; 7 = *extremely*), the extent to which they had experienced each emotion over the past 7 days.

High-arousal positive affect (HAPA) HAPA was measured with items from the PANAS-PA. Consistent with Study 1, 10 items were used (*active, alert, attentive, determined, excited, enthusiastic, inspired, interested, proud*, and *strong*).

Low-arousal positive affect (LAPA) LAPA was measured with items derived from Gilbert et al. (2008) measure of LAPA. Consistent with Study 1, six items were used (*calm, content, peaceful, relaxed, safe*, and *secure*).

Gratitude

Gratitude was measured by the Six-item Gratitude Questionnaire (GQ6; McCullough et al. 2002). The GQ6 consists of six statements about the frequency and intensity of experiencing gratitude. Participants rate their agreement with each statement from 1 (*strongly disagree*) to 7 (*strongly agree*). An example from the GQ6 is "I am grateful to a wide variety of people."

Meaning in life

Meaning in life was measured by the Presence subscale of the Meaning in Life Questionnaire (MLQ-P; Steger et al. 2006). In this subscale, five statements about the presence of meaning in life are rated on a 7-point scale from 1 (*absolutely untrue*) to 7 (*absolutely true*), such as "I understand my life's meaning."

Mindfulness

Mindfulness was measured by the Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003). The 15-item scale includes items that describe un-mindful behaviors in everyday life, such as "I find myself doing things without paying attention." Participants rated how strongly they agreed with each statement, from 1 (*strongly disagree)* to 5 (*strongly agree*). So that higher scores would indicate higher trait mindfulness, the scores on this scale were reverse coded.

Depression, anxiety and stress

Although we used the CES-D to measure depression in Study 1, for Study 2 we chose to use the depression measure used by Gilbert et al. (2008). Therefore, depression, anxiety, and stress were measured with the 21-item Depression, Anxiety and Stress Scale (DASS-21; Lovibond and Lovibond 1995). Each subscale consists of seven statements for which participants rate their agreement from 1 (*strongly disagree*) to 6 (*strongly agree*). Examples of items include "I felt down-hearted and blue" for depression, "I felt close to panic" for anxiety, and "I found it hard to wind down" for stress.

Study 2 results

Analyses were conducted on SPSS version 24 for PC. Answers to the open-ended questions and one attention check question were reviewed to insure participants were constructively engaged in the survey; three cases were excluded based on this criterion. Fifteen additional cases were excluded based on analysis of boxplots and Mahalanobis distance (Tabachnick and Fidell 2007), resulting in a sample of 184. Skewness values ranged from − 0.83 to 0.83, and kurtosis values ranged from − 0.93 to 0.74. Reasonable normality of distributions was confirmed by visual inspection of histograms. Means, standard deviations, Cronbach's alphas and zero order bivariate correlations for all variables are presented in Table 4.

We conducted confirmatory factor analyses on one- and two-factor solutions for responses to all positive affect items. After inspecting modification indices, we established covariation for three pairs of synonyms: *alert* and *attentive; excited* and *enthusiastic*; and *safe* and *secure*. The one-factor model had poor fit: $\chi^2(101, N=184)=640.85$, $p<0.001$, $\chi^2/df=6.35$, CFI = 0.83, RMSEA = 0.17, AIC = 710.85. The fit indices for the two-factor model, with high-arousal items on one factor and low-arousal items on another factor, were somewhat improved: $\chi^2(100, N=184)=327.40$, $p<0.001$, $\chi^2/df=3.27$, CFI = 0.93, RMSEA = 0.11, AIC = 399.40. While the fit indices for the two-factor model do not indicate good fit, the fit significantly improved over the one-factor model: $\Delta\chi^2(1)=313.45$, $p<0.001$.

As in Study 1, hierarchical multiple regression analysis was performed for each outcome variable with bootstrapped confidence intervals of regression coefficients for each predictor. In addition, correlations of HAPA and LAPA with each outcome variable were compared for statistically significant differences.

Depression (H2)[2]

Multiple regression analysis showed that LAPA significantly predicted participants' ratings of depressive

[2] The numbering of the hypotheses has been synchronized across studies. Since H1 from Study 1 was not included as an outcome variable in Study 2, the numbering of the hypotheses in this study starts with H2.

Table 5 Study 2: multiple regression for positive affect predicting depression, feeling good, gratitude, and meaning in life ($N = 184$)

Step and predictor	Depression			Feeling good			Gratitude			Meaning in life		
	ΔR^2	F	β	ΔR^2	F	β	ΔR^2	F	β	ΔR^2	F	β
Step 1	0.04*	4.00		0.05*	4.52		0.07**	6.78		0.04*	4.10	
Age			−0.20**			0.15*			0.24**			0.20**
Gender			0.07			−0.18*			0.08			0.03
Step 2	0.38***	120.48		0.61***	326.14		0.11***	22.92		0.19***	44.45	
Age			−0.11			0.03			0.19**			0.13*
Gender			−0.03			−0.05			0.13			0.10
HAPA			−0.63***			0.80***			0.33***			0.45***
Step 3	0.05***	18.70		0.11***	84.27		0.001	0.26		0.00	0.03	
Age			−0.09			−0.001			0.20**			0.13*
Gender			−0.06			0.01			0.13			0.10
HAPA			−0.37***			0.43***			0.37***			0.43***
LAPA			−0.36***			0.51***			−0.05			0.02
Total R^2	0.48			0.77			0.18			0.23		

Male = 0, Female = 1; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

symptoms beyond HAPA. After controlling for age and gender, which accounted for 4% of the variance in depression, HAPA explained an additional 38% of the variance ($F_{1,180} = 120.48$, $p < 0.001$), and LAPA explained 5% of the variance in depression ($F_{1,179} = 18.70$, $p < 0.001$) above and beyond HAPA, gender, and age. When both affect variables were in the model, LAPA predicted lower levels of depression [$\beta = -0.36$, $t = -4.33$, $p < 0.001$, 95% CI (−0.52, −0.21)] as did HAPA [$\beta = -0.37$, $t = -4.48$, $p < 0.001$, 95% CI (−0.54, −0.18)]. Combined, the four variables explained 48% of the variance in depression (see Table 5). HAPA and LAPA did not differ significantly in their power to predict depression (see Table 7).

Feeling good (H3)

Multiple regression analysis showed that LAPA significantly predicted participants' ratings of feeling good beyond HAPA. After controlling for age and gender, which accounted for 5% of the variance in feeling good, HAPA explained an additional 61% of the variance ($F_{1,180} = 326.14$, $p < 0.001$), and LAPA explained 11% of the variance in feeling good ($F_{1,179} = 84.27$, $p < 0.001$) above and beyond HAPA, gender, and age. When both affect variables were in the model, LAPA predicted feeling good [$\beta = 0.51$, $t = 9.18$, $p < 0.001$, 95% CI (0.40, 0.63)] as did HAPA [$\beta = 0.43$, $t = 7.78$, $p < 0.001$, 95% CI (0.31, 0.54)]. Combined, the four variables explained 77% of the variance in feeling good (see Table 5). HAPA and LAPA did not differ significantly in their power to predict feeling good (see Table 7).

Gratitude (H4)

Multiple regression analysis showed that LAPA did not significantly predict participants' ratings of gratitude beyond HAPA. After controlling for age and gender, which accounted for 7% of the variance in gratitude, HAPA explained an additional 11% of the variance ($F_{1,180} = 22.92$, $p < 0.001$). When all four variables were in the model, HAPA predicted gratitude [$\beta = 0.37$, $t = 3.58$, $p < 0.001$, 95% CI (0.14, 0.64)], but LAPA did not. Combined, the four variables explained 18% of the variance in gratitude (see Table 5). A test for dependent correlations revealed HAPA is a significantly stronger predictor of gratitude than LAPA ($p = 0.03$). See Table 7.

Meaning in life (H5)

Multiple regression analysis showed that LAPA did not significantly predict participants' ratings of the presence of meaning in life beyond HAPA. After controlling for age and gender, which accounted for 4% of the variance in meaning in life, HAPA explained an additional 19% of the variance ($F_{1,180} = 44.45$, $p < 0.001$). When all four variables were in the model, HAPA predicted meaning in life [$\beta = 0.43$, $t = 4.33$, $p < 0.001$, 95% CI (0.21, 0.69)], but LAPA did not. Combined, the four variables explained 23% of the variance in meaning in life (see Table 5). A test for dependent correlations revealed HAPA is a significantly stronger predictor of meaning in life than LAPA ($p = 0.03$). See Table 7.

Table 6 Study 2: multiple regression for positive affect predicting mindfulness, anxiety and stress ($N = 184$)

Step and predictor	Mindfulness			Anxiety			Stress		
	ΔR^2	F	β	ΔR^2	F	β	ΔR^2	F	β
Step 1	0.05*	4.41		0.04*	3.85		0.07**	6.62	
Age			0.22**			−0.19*			−0.21**
Gender			−0.04			0.10			0.19*
Step 2	0.04**	8.74		0.10***	21.34		0.18***	44.16	
Age			0.18*			−0.14			−0.14*
Gender			−0.01			0.05			0.12
HAPA			0.22**			−0.33***			−0.44***
Step 3	0.04**	7.73		0.15***	37.38		0.19***	59.96	
Age			0.17*			−0.11			−0.11
Gender			0.02			−0.002			0.06
HAPA			−0.01			0.11			0.06
LAPA			0.30**			−0.59***			−0.67***
Total R^2	0.13			0.29			0.44		

Male = 0, Female = 1; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Mindfulness (H6)

Multiple regression analysis showed that LAPA significantly predicted participants' ratings of mindfulness beyond HAPA. After controlling for age and gender, which accounted for 5% of the variance in mindfulness, HAPA explained an additional 4% of the variance ($F_{1,180} = 8.74$, $p < 0.01$), and LAPA explained 4% of the variance in mindfulness ($F_{1,179} = 7.73$, $p < 0.01$) above and beyond HAPA, gender and age. When both affect variables were in the model LAPA predicted mindfulness ($\beta = 0.30$, $t = 2.78$, $p < .01$, 95% CI [0.09, 0.54]), but HAPA was no longer a significant contributor ($\beta = -0.01$, $t = -0.06$, $p = 0.96$, 95% CI [−0.23, 0.20]). Combined, the four variables explained 13% of the variance in mindfulness (see Table 6). A test comparing the dependent correlations revealed HAPA and LAPA did not differ significantly in their power to predict mindfulness (see Table 7).

Anxiety (H7)

Multiple regression analysis showed that LAPA significantly predicted participants' ratings of anxiety beyond HAPA. After controlling for age and gender, which accounted for 4% of the variance in anxiety, HAPA explained an additional 10% of the variance ($F_{1,180} = 21.34$, $p < 0.001$), and LAPA explained 15% of the variance in anxiety above and beyond HAPA, gender, and age ($F_{1,179} = 37.38$, $p < 0.001$). When both affect variables were in the model, LAPA predicted lower levels of anxiety [$\beta = -0.59$, $t = -6.11$, $p < 0.001$, 95% CI (−0.78, −0.42)], but HAPA was no longer a significant contributor [$\beta = 0.11$, $t = 1.16$, $p = 0.25$, 95% CI (−0.08, 0.31)]. Combined, the four variables explained 29% of the variance in anxiety (see Table 6). A test comparing the dependent correlations revealed LAPA is a significantly stronger predictor of anxiety than HAPA ($p < 0.001$). See Table 7.

Stress (H8)

Multiple regression analysis showed that LAPA significantly predicted participants' ratings of stress beyond HAPA. After controlling for age and gender, which accounted for 7% of the variance in stress, HAPA explained an additional 18% of the variance ($F_{1,180} = 44.16$, $p < 0.001$), and LAPA explained 19% of the variance in stress ($F_{1,179} = 59.96$, $p < 0.001$) beyond HAPA, gender, and age. When both affect variables were in the model, LAPA predicted lower levels of stress ($\beta = -0.67$, $t = -7.74$, $p < 0.001$, 95% CI [−0.84, −0.49]), but HAPA was no longer a significant contributor [$\beta = 0.06$, $t = 0.64$, $p = 0.52$, 95% CI (−0.11, 0.23)]. Combined, the four variables explained 44% of the variance in stress (see Table 6). A test comparing the dependent correlations revealed LAPA is a significantly stronger predictor of stress than HAPA ($p < 0.001$). See Table 7.

Study 2 discussion

Similar to Study 1, LAPA was found to explain unique variance for five of the seven outcome variables tested. LAPA accounted for variance beyond what was predicted by HAPA, gender, and age: 5% for depression, 11% for feeling good, 4% for mindfulness, 15% for anxiety, and 19% for stress. Despite being a significant predictor by itself, LAPA was not a unique predictor of gratitude or meaning in life when HAPA was in the model. Interestingly, for three of these outcome measures—mindfulness, anxiety, and

Table 7 Dependent correlation of HAPA and LAPA with each dependent variable and the test of their difference

	Study 1 (N = 207) r(HAPA, LAPA) = 0.69			Study 2 (N = 184) r(HAPA, LAPA) = 0.76						
	Life Satisfaction	Depression (CESD-R)	Feeling Good	Depression (DASS-21)	Feeling Good	Gratitude	Meaning in life	Mindfulness	Anxiety	Stress
HAPA	0.57	−0.63	0.79	−0.64	0.81	0.34	0.45	0.24	−0.35	−0.47
LAPA	0.60	−0.54	0.83	−0.64	0.83	0.23	0.34	0.32	−0.52	−0.65
t	−0.71	−1.95	−1.32	−0.11	−0.79	2.20	2.26	−1.52	3.92	4.56
p	0.48	0.05	0.19	0.91	0.43	0.03	0.03	0.13	<0.001	<0.001

Test comparing dependent correlations, df = N − 3

stress—when LAPA was added to the model, HAPA was no longer a significant predictor (see Table 4). Even though we found no prior studies that related LAPA specifically to these outcome measures, we were able to confirm that the basic relationship between HAPA as measured by the PANAS-PA and these variables comports with prior studies. The strength of the correlation (see Gerstman 2016) between gratitude and HAPA in this study ($r = 0.34$) was moderate, similar to McCullough et al. (2002): $r = 0.31$. The correlation between the presence of meaning in life and HAPA in this study ($r = 0.45$) was moderate, as it was for Grozdanovska (2016): $r = 0.33$. The correlation between mindfulness as measured by the MAAS and HAPA in this study ($r = 0.24$) was weak, similar to Waters et al. (2009): $r = 0.28$. The correlations between the mental health outcomes measured by the DASS-21 and HAPA were somewhat stronger in our study than those found by Crawford and Henry (2003). Depression and HAPA correlated at $r = -0.64$ in our study compared to −0.48, while stress and HAPA correlated at $r = -0.47$ in our study compared to $r = -0.31$. The correlations between anxiety and HAPA were not notably different: $r = -0.35$ in our study compared to $r = -0.29$. Given that our assessment of the relationship between HAPA and these outcome variables is largely in line with prior studies, the finding the LAPA explains variance above and beyond HAPA is all the more notable. Furthermore, the fact that LAPA predicts some variables better than others, and other variables not at all, is consistent with the proposition that LAPA is a qualitatively distinct aspect of positive affect with unique predictive powers derived from that distinctive quality.[3]

General discussion

To assess the predictive power of low-arousal positive affect (LAPA), we investigated the contribution of LAPA relative to high-arousal positive affect (HAPA) in explaining the variance in several mental health and well-being outcomes. Even though LAPA and HAPA were highly correlated, in two studies we found that LAPA uniquely explained variance in six of eight outcome measures beyond HAPA. After accounting for variance explained by age, gender, and HAPA, LAPA explained additional variance in life satisfaction (9%), feeling good (15% and 11%), depression (3% and 5%), mindfulness (4%), anxiety (15%) and stress (19%). Of

[3] To make sure that the safeness items were not disproportionately responsible for LAPA's unique predictive power, especially because *safe* did not load as highly on the LAPA factor as other LAPA items in Study 1, we ran the multiple regression analyses with and without *safe* and *secure* included in the measurement of LAPA. The pattern of results and significance levels were the same regardless of whether the safeness items were included.

note, when both LAPA and HAPA were in the regression model, LAPA significantly predicted mindfulness, anxiety, and stress, but HAPA did not. Moreover, the predictive power of LAPA relative to HAPA was found to vary across outcomes when dependent correlations were compared. For two outcomes (anxiety and stress), LAPA was found to have significantly greater predictive power than HAPA. For four outcomes (life satisfaction, depression, feeling good, and mindfulness) no significant difference between the predictive power of HAPA and LAPA was found. For two outcomes (gratitude and meaning in life) HAPA was found to be a stronger predictor than LAPA.

These findings are important for two primary reasons. First, the finding that LAPA predicts variance over and above HAPA indicates that when researchers omit LAPA from their assessment of positive affect, they are failing to capture the full effect of positive affect. As such, when researchers are using PANAS, or any other measure that includes only HAPA, researchers should be aware of the limitations. Second, the unique predictive power of LAPA, as well as its varied relationship to different outcome measures, indicates that low-arousal positive affect is not simply less of a good thing; it may be a different kind of good thing altogether; LAPA is contributing something *qualitatively different* than HAPA.

This qualitative difference could explain why low-arousal positive states such as *calm* and *contentment* predict variance in outcomes over and above states such as *excitement* and *enthusiasm*. An appreciation for this qualitative difference may be needed to counteract the cultural bias toward HAPA often found in Western populations (Tsai 2007). Such an appreciation may also be needed to break free of the unexamined habit of using the original PANAS as if it were a complete measure of positive affect rather than a measure of activated positive affect only [see PANAS-X for an expanded positive affect measure with a LAPA subscale from these same researchers (Watson and Clark 1994)]. For greater insight into the qualities of LAPA that may account for its predictive power, we offer here an overview of perspectives on positive emotion outside of the valence/arousal conceptualization, perspectives that have been investigating the purpose and function of low-arousal states such as *calm* and *contentment*.

We focus on two perspectives that propose there are different types of positive affectivity, different systems that serve different functions, recruit different neural networks, and respond differently to the same stimuli. In discussing feelings such as *calm, content*, and *relaxed*, some researchers emphasize a soothing quality associated with parasympathetic activity (e.g., Gilbert 2009; Richardson et al. 2016), while others emphasize the low-approach, non-appetitive quality of *liking* as opposed to *wanting* (Berridge et al. 2009; Harmon-Jones et al. 2016).

One of these perspectives that may help to explain the predictive power of LAPA emphasizes the soothing quality of *contentment* and *calm*. This perspective is derived from the application of neurophysiological findings to clinical psychology (Gilbert 2009; Richardson et al. 2016).[4] In this perspective it is proposed that feelings such as *calm* and *contentment* are part of a system of emotion regulation associated with consummatory pleasure, deactivation, soothing, and affiliation (Depue and Morrone-Strupinsky 2005; Gilbert 2014; Koelsch et al. 2015). This soothing system promotes a sense of feeling safe through parasympathetic vagal activity, naturally occurring opioids, and oxytocin. It is contrasted with an activating drive system that involves sympathetic activity and dopamine. These soothing emotions serve an important function in therapy according to Gilbert (2009), in that cultivating *contentment* and *calm* can help clients who are overly sensitive to threat in ways that drive-oriented, activating emotion does not.

Evidence for a soothing system of positive affect exists in empirical research. For example, a compassionate mind intervention was found to increase a Relaxed subscale and a Safe/content subscale, but not an Activated subscale of positive affect or the PANAS-PA (Matos et al. 2017). In another study, when participants were asked to focus on a caring and compassionate individual, there was an increase in Relaxed and Content positive affect and a decrease in Activated positive affect in pretest/posttest comparison (Rockliff et al. 2011). Furthermore, Richardson and colleagues (2016) found support for a relaxed/content subsystem of emotional regulation in a meta-analysis of 15 heart rate variability studies that examined sympathetic and parasympathetic vagal activity. Among the studies analyzed, nine supported a model with such a relaxed/content subsystem, and six provided partial support for it. Therefore, the qualitative difference between low-arousal positive states and high-arousal positive states may be associated with the soothing qualities of parasympathetic activity.

[4] There is some debate whether the data support *contentment* and *calm* as the same type of positive affect. While Richardson et al. (2016) conceptualized *calm* as an aspect of the soothing subsystem, there is some evidence that they may not belong together. Gilbert et al.'s (2008) factor analysis indicated that there were three factors of positive affect in his dataset: activated, relaxed, and safe/content. Moreover, Gilbert emphasized that contentment may be better characterized by a specific pattern of sympathetic and parasympathetic functioning than by low-arousal. However, our data did not support three factors. Because we did not use the same items as Gilbert, we cannot directly compare the factor structure in our studies to that of Gilbert et al. (2008). In our study an inspection of parallel analysis, scree plot, eigenvalues, and factor loadings all supported a two-factor solution. Even when we forced a three-factor solution, *safe* and *secure* loaded together with an eigenvalue less than 1, but *content* cross-loaded on all three factors.

Another perspective that could account for the qualitative difference in states such as *calm* and *contentment* from states such as *excitement* and *enthusiasm* is also based in psychophysiological distinctions; however, the emphasis is less on soothing and more on satisfaction. In this perspective, the dimension of approach and avoidance is a defining characteristic of emotion, in addition to valence and arousal. Positive affectivity is understood to range from high approach motivation, such as desire, appetite, and pre-goal attainment, to low approach motivation, such as satisfaction, non-appetite, and post-goal attainment (Berridge et al. 2009; Gard et al. 2006; Harmon-Jones et al. 2016). In this view, feeling *calm* and *content* is associated with a non-appetitive reward system referred to as *liking* as opposed to *wanting* (Berridge et al. 2009). Whereas *wanting*, or incentive salience, is linked to dopamine and distributed brain networks, *liking* is generated in a small set of discrete interconnected hedonic hotspots (Kringelbach and Berridge 2017). These are brief neural processes, not conscious emotions, that work together and independently to constitute the brain's pleasure system. Optimal functioning, according to Kringelbach and Berridge, is characterized by the oscillating and interacting balance of desire and satisfaction over time.

The distinction between high- and low-approach as a differentiating characteristic of positive affect is not limited to the approach/avoidance dimensional view of emotion, nor is it new. When describing the characteristics of *contentment*, discrete emotion researchers posit that *contentment* signals satiety (Griskevicius et al. 2010) and satisfaction (Cordaro et al. 2016). These low-approach states are associated with adaptive behaviors such as rest, digestion, and consolidation of resources (Shiota 2014). Indeed, high- and low-approach motivation as a differentiating feature of positive affect was proposed by Tomkins (1962), who distinguished between two basic flavors of positive emotionality, one that was appetitive (*interest-excitement*) and one that was consummatory (*enjoyment-joy*). According to Tomkins, *interest-excitement* is the innate response to new and non-threatening stimuli, while *enjoyment-joy* is the innate response to stimuli that are known and known to be safe and nurturing.

Ample empirical evidence exists for approach motivation as a defining characteristic of positive affect. Positive affect with high- and low-approach motivation have differential effects. For example, relative to high-approach positive affect, low-approach positive affect is related to broadened attentional scope (Harmon-Jones et al. 2013), increased distractibility (Liu and Wang 2014); attenuated goal maintenance and increasing cognitive flexibility (Liu and Xu 2016), and improved reactive, rather than proactive, cognitive control (Li et al. 2018). Researchers measuring asymmetric frontal activity found that levels of brain activity associated with approach motivation were lower in a *contentment* condition than in *enthusiasm* and neutral conditions (Neal 2016). Therefore, approach motivation may account for the qualitative difference between affective states associated with high and low arousal states.

Whether the distinguishing quality of LAPA is best characterized by soothing or by low approach is not within the scope of the current research to resolve. More research on this topic would be beneficial; for example, a functional account (Keltner and Gross 1999) of this broad category of emotion could enhance therapeutic interventions (Gilbert 2014) and help efforts to understand and optimize happiness (Kringelbach and Berridge 2017). Nevertheless, the current findings make it clear that LAPA, with its unique predictive power, should be more fully appreciated as qualitatively different from HAPA.

Future directions

Given the predictive power and unique quality of low-arousal positive states, future research on positive affect should include LAPA. Researchers who want to include LAPA items in their assessment of positive affect could turn to instruments such as the PANAS-X (Watson and Clark 1994), Gilbert's et al. (2008) Relaxed and Safe/content subscales, the Discrete Emotions Questionnaire (DEQ: Harmon-Jones et al. 2016) or the items in the Affect Valuation Index (AVI: Tsai et al. 2006). Fortified with more complete measures of positive affect, researchers may have more power to detect the causes and consequences of overall positive affect.

It is also important to consider the possibility that our current understanding of the causes and consequences of positive affect may have been distorted by the omission of LAPA. For example, the omission of LAPA may exacerbate the file drawer problem (Rosenthal 1979). It could prove fruitful to dig into file drawers to look for studies involving positive affect with results that failed to reach significance to see if the significance of positive affect would change with the inclusion of LAPA when these studies are rerun. Reopening the file drawer may be particularly relevant for research that involves stress, anxiety, and mindfulness, because HAPA was no longer a significant predictor of these outcomes when LAPA was in the regression model. Indeed, research on interventions that are designed to improve mental health, such as meditation, stress reduction, or emotion regulation, may not be associated with *enthusiasm* and *excitement* but may be associated with *contentment* and *calm*.

Finally, we note that many of the positive states that have been classified as high arousal (e.g., *determined, excited, enthusiastic, inspired*, and *interested*) could be considered high approach, and many of the positive states that have been classified as low arousal (e.g., *calm, content, relaxed, serene*, and *peaceful*) could be considered low approach. Accordingly, we are currently conducting

research to detect whether or not there is a meaningful difference between low arousal and low approach in positive affectivity. In doing so we hope to compare the utility of arousal and approach in understanding the function of positive states.

Limitations

A few limitations must be considered when interpreting these data. First, these data are cross-sectional. It cannot be determined from these studies whether emotions lead to outcomes such as life satisfaction and depression; it is possible that a lack of depression leads a person to experience positive emotions; and it is also possible that a third unknown variable is the cause of the relationships. Nonetheless, these findings show that LAPA has a relationship that is distinct from HAPA with six of eight outcome measures. Second, the time reference for this cross-sectional assessment of affect was the past week; different results might be obtained if participants were asked to assess their emotions over a longer or shorter period of time, since the relationship between emotions and outcome measures has been found to vary based on the timeframe of assessment (Diener and Emmons 1985). The time frame of measurement may be a determining factor for whether HAPA and LAPA should be analyzed together or as separate variables, but the current research can offer no insight into that question. Third, the data were collected via MTurk. Even though there have been numerous studies indicating that such data are sound (Buhrmester et al. 2011), replication with additional samples, using various modes of data collection, is warranted.

A final limitation is that our operationalization of LAPA has not been widely tested; the pros and cons of including or omitting safeness and contentment as part of LAPA have not been deeply assessed. We decided to include items related to safety, even though feeling safe and secure is not often found in valence/arousal-based descriptions of low-arousal positive affect, because Gilbert et al. (2008) found that feelings of safeness (*safe, secure, content*, and *warm*) were predictive of lower levels of depression, anxiety, and stress. Since we did not use the same items as Gilbert (e.g., PANAS-PA items were used to assess HAPA and other items such as *tranquil* and *warm* were omitted), we cannot directly compare the two-factor structure in our studies to the three-factor solution found by Gilbert and colleagues. Gilbert's proposition that feeling safe is an important aspect of a soothing system of rewarding affect is compelling, and more research is needed to understand how the experience of feeling safe may relate to heart rate variability, arousal, and approach motivation.

Conclusion

These data provide an argument for including low-arousal positive affect in future investigations into positive affectivity. The findings indicate that LAPA (e.g., *calm* and *content)* describes a quality of feeling good that is different than HAPA (e.g., *excitement* and *enthusiasm)*. This qualitatively different form of positive affect could be better at predicting some outcomes than HAPA. More research is called for to uncover the differential or additive effects of low-arousal positive states.

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