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Hiding in plain sight: The distinct importance of low-arousal positive affect

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Abstract

Most past research on positive affect and emotion has focused exclusively on high-arousal positive affect (HAPA: e.g., *excited*), however, low-arousal positive affect (LAPA: e.g., *calm*) increasingly is included in emotion research. As such, there is a need to synthesize knowledge about the similarities and differences between LAPA and HAPA, the operationalization of LAPA and HAPA, and the distinct characteristics and importance of LAPA within emotional life. A systematic search identified 226 research papers comparing LAPA with HAPA from a broad spectrum of research topics; this review provides a narrative summary of their findings. Indications of differences between LAPA and HAPA were found in 89% of comparisons, with LAPA having a consistently distinguishable relationship to variables such as brain activity, cardiovascular health, decision-making, memory, mindfulness, personality, and solitude, among others. Other notable aspects of LAPA were found, including its role in stress, work, positive sociality, and well-being, as well as its importance in older adults and women. An analysis of items used to measure LAPA and HAPA revealed nuanced differences in conceptualizations, as well as emerging consensus around specific item usage. While considering item use in light of approach-avoidance motivation, we identified three possible LAPA subtypes: *calm* (a steady state of neither approach nor avoidance), *satisfaction* (having successfully approached), and *relief* (having successfully avoided). This review clarifies LAPA's role in affective life, underscoring that LAPA's differences from HAPA should be considered in research involving positive affect.

Keywords Emotion · Low-arousal positive affect · Calm · Relaxed · Contented

In recent decades, the study of positive affect and emotions has garnered attention by researchers interested in social behavior and decision making (e.g., Isen, 1987), human evolution and experience (e.g., Ellsworth & Smith, 1988; Fredrickson, 2001; Keltner, 2009; Shiota et al., 2014), health (e.g., Moskowitz, 2003; Pressman et al., 2019), and success (Lyubomirsky et al., 2005) to name just a few. However, much research on feeling good has focused on broad operationalizations of positive states (e.g., *happiness*, *cheerfulness*) or on high-arousal positive affect (HAPA) which involves feelings such as *excitement* or *enthusiasm*, to the relative omission of low-arousal positive affect (LAPA) which involves feelings such as *calm* or *relaxation*.

Multiple researchers have noted this omission. For example, in reviews of research on positive affect/emotion and health, Fredrickson and Cohn (2008) observed that "emotion measures have often conflated pleasantness with either high arousal or high personal control, even though pleasant emotions can span the range of these dimensions" (p. 779). Similarly, Pressman and colleagues (2019) stated that "most studies [on positive affect and health] do not take arousal level into account" (p. 640). In other literature reviews on positive affect and emotion, reviewers have looked for research involving LAPA and noted that it made up only a small fraction of the research included in the review or did not find it at all (Joseph et al., 2021; Liu et al., 2019; Salsman et al., 2019).

After years of relative omission from research on positive affect and emotion, LAPA is increasingly included, along with HAPA, in domains of research as varied as clinical psychology (e.g., Gilbert et al., 2008), cognition (e.g., Fröber & Dreisbach, 2012), cultural valuation of affect (e.g., Tsai, 2017), health (e.g., Schwerdtfeger & Gerteis, 2014),

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and well-being (e.g., Lomas et al., 2023; McManus et al., 2019). As this research finds that LAPA has distinct causes, associations, and outcomes from HAPA, a need has arisen for synthesized knowledge about how these positive affective states are operationalized, as well as the similarities and differences between them, so that the shape and impact of LAPA can be more fully understood, appreciated, and useful for informing action. To address this need, we conducted a systematic search yielding 226 diverse research papers comparing LAPA with HAPA and provide a narrative review of their findings.

Goals and structure for this review

Our goals for this paper are to provide to researchers and practitioners, in multiple domains of study, insight into the similarities and differences between LAPA and HAPA, the operationalization of LAPA and HAPA, and the distinct characteristics and importance of LAPA. Toward those ends, we first provide background on this topic, outlining the origins of LAPA and HAPA, and underscore why an investigation of LAPA/HAPA comparisons is needed. Next, we describe our methods, noting the systematic steps we took to find, screen, and summarize research comparing LAPA and HAPA. Then, we present narrative summaries of findings within different domains of research, along with tables containing brief descriptions of the pertinent research done in each reviewed article. After, we offer an overview and analysis of the manipulations and measures used for LAPA and HAPA in research reviewed here. Finally, we address questions that motivated the initiation of this review (Are LAPA and HAPA associated with different causes, correlations, and consequences? What characteristics of LAPA might help to explain such differences?) and questions that emerged while reviewing the findings (Does LAPA play a distinct role in integral aspects of life such as stress, work, positive sociality, and well-being? Is LAPA more important for some groups than others? To what degree is approach and avoidance related to LAPA and HAPA, and can integrating these concepts be helpful?) along with implications for future research.

The origins of the LAPA and HAPA distinction

The distinction between LAPA and HAPA is based on a widely accepted approach for organizing emotional experience, often referred to as the circumplex model of affect (Barrett, 2017; Russell, 1980). In this model, emotional experience is thought to be a function of varying degrees of valence (a subjective feeling ranging from negative to positive) and levels of arousal or activation (physiological stimulation ranging from low to high). Valence and arousal have been shown to be independent aspects of emotion (Kuppens et al., 2013). These affective states, which occur on the dimensions of valence and arousal, are referred to as "core affect" and are thought to be readily accessible to the conscious mind; it has been described as "simply feeling good or bad, energized or enervated" (Russell, 2003, p. 145).

It is from a valence/arousal perspective that the most influential measure of positive affect emerged, the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). The widespread adoption of this measure by researchers interested in positive affect may explain in part why LAPA has been unwittingly omitted from research involving positive affect. The PANAS asks participants to rate the feelings they experienced during a researcher-determined period of time. The items measuring positive affect on the original PANAS included only HAPA states (*active*, *alert*, *attentive*, *determined*, *excited*, *enthusiastic*, *inspired*, *interested*, *proud*, *strong*). In the original PANAS, LAPA states were not measured directly; states such as *calm* or *relaxed* were conceptualized as the absence of negative affect and not included in the scale. In their explanation of the factor structure used in the creation of the PANAS, Zevon and Tellegen (1982, p. 112) described the low end of their scales as referring to "the absence of affect (e.g., 'sleepy,' 'sluggish,' and 'tired' for low Positive Affect and 'content,' 'at ease,' and 'calm' for low Negative Affect)." Even though items directly measuring *calm*, *relaxed*, and *at ease* were included in a later modification of this scale (PANAS-X; Watson & Clark, 1994), the researchers retained the characterization of these states as low negative affect (Watson et al., 1999). The original PANAS continues to be used widely by researchers who may not be aware that they are measuring HAPA and omitting a broad category of good feeling: LAPA.

LAPA hiding in cultural and theoretical blind spots

The classification of states such as *calm*, *relaxed* and *at ease* as low negative affect, without accounting for the positive valence associated with these states, may explain why researchers working with valence/arousal theories have tended to overlook LAPA. But why has LAPA been largely omitted from research on positive affect from the wider field of affective science? We propose three other types of blind spots stemming from cultural and theoretical orientations that may unwittingly undervalue LAPA.

First, researchers may be working within a culture that tends to undervalue LAPA. Until relatively recently scholars were blind to findings of cultural differences in valuing HAPA and LAPA, wherein samples from Western cultures

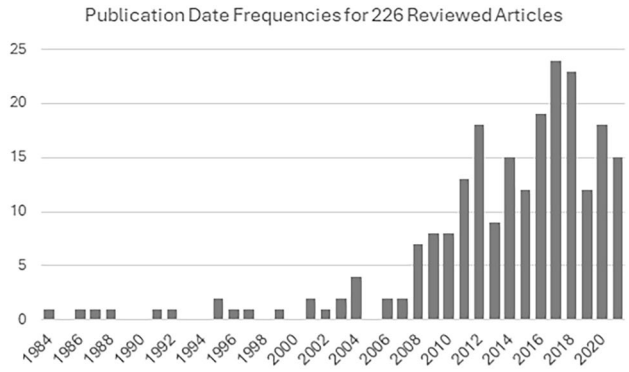

Fig. 1 Publication dates for reviewed articles

tend to value HAPA more than those from Eastern cultures, and those from the East tend to value LAPA more than those from the West (Tsai, 2017; Tsai et al., 2006). In fact, Tsai's research on affect valuation and ideal affect drew our attention to the unexamined importance of LAPA, and research on ideal affect is fast growing (e.g., Chim et al., 2018; Tsai et al., 2018, 2019). It may not be a coincidence that after the publication of this eye-opening work in 2006, an increase in research comparing LAPA and HAPA can be observed (see Fig. 1).

Second, researchers who work within discrete emotion theory focus their investigations on the characteristics of specific differentiated emotions such as *gratitude*, *pride*, and *awe*, rather than a broader category of affective experience like LAPA (e.g., Shiota et al., 2017). Discrete emotion theories investigate affective experiences that happen on a timescale brief enough to be recognized as a specific emotion (e.g., *joy*), with concordant physical manifestations (e.g., smile), cognitive appraisal of a situation (e.g., unexpected good fortune), and action tendencies (e.g., play), and these action tendencies are thought to have evolved to serve specific adaptive purposes (e.g., consolidate resources; Fredrickson, 2001). This lens for investigating emotions provides insightful observations and evidence about what can be considered low arousal positive emotions. For example, *contentment* has been described as a state of satiety or perceived completeness (Campos et al., 2013; Cordaro et al., 2016), *serenity* has been said to encourage savoring and integration (Fredrickson, 2013), and *tranquility* has been associated with a focus on process rather than outcome (Berenbaum et al., 2019), clearing one's mind (Smith & Kirby, 2010), and taking a breather (Lazarus et al., 1980).

However, even when discrete emotion research investigates positive states that could be considered low arousal, researchers tend not to characterize these states as low arousal (e.g., Algoe & Haidt, 2009; Campos et al., 2013; Revord et al., 2021; Yoon et al., 2016). Furthermore, LAPA is not a specific emotion; it is a category that can encompass several specific emotions such as *contentment*, *serenity*, and *tranquility*, along with positive states that are not generally studied by discrete emotion theorists, such as *calm*, *relaxed* and *at ease*. Therefore, investigating the category of LAPA should not replace the investigation of discrete emotions, but should complement it, since LAPA, so construed, may have its own effects, while its component emotions may have distinguishably different effects if investigated at that level of granularity (e.g., Ahn & Shin, 2015).

Finally, researchers working within approach-avoidance theories emphasize motivated goal pursuit, and such an emphasis may obscure affective experience that does not involve pursuing a goal. Approach-avoidance theories emphasize the motivational dimension of emotion, positing that emotions are the experiential components of tendencies to approach desired stimuli and avoid what is threatening or noxious (Carver & White, 1994; Elliot, 2008). Indeed, approach-avoidance theory conceptualizes positive affect as stemming from feedback that suggests progress toward a goal is advancing successfully (Elliot, 2008). Until recently, this theory has generally not accommodated the prospect that an emotion may involve neither approach nor avoidance motivation (see Harmon-Jones et al., 2016 for a relatively recent exception). Carver (2003) situates positive states such as *relief*, *contentment*, and *serenity* on the low end of the dimension of avoidance and introduces the concept of coasting. For Carver, coasting is a signal associated with positive affect that indicates that progress toward a goal is advancing enough that resources can be reallocated to a new goal. We observed that such an emphasis on goal pursuit continues the prioritizing of approach-avoidance over exploring the pleasure associated with no approach/no avoidance.

However, the pleasure of no approach/no avoidance was found to be impactful when Harmon-Jones et al. (2013) found that high-approach motivation positive affect (e.g., *excited*) narrowed the scope of attention, and low-approach motivation positive affect (e.g., *calm*) broadened the scope of attention. This research on low-approach motivation affect did much to rouse our interest in LAPA. However, the authors emphasize that approach motivation is not arousal, demonstrating that approach motivation impacts attentional scope, while physiological arousal does not (Gable & Harmon-Jones, 2013).

In sum, each of these perspectives on affect focus on aspects of emotion that reduce the likelihood of investigating LAPA; valence-arousal theories tend to avoid questioning the adaptiveness of different types of affect; discrete emotion theories tend not to investigate broad categories of emotion while considering arousal a relatively uninformative aspect of emotion; and approach-avoidance theories tend not to contemplate emotional states that may be independent of goal pursuit.

Theoretical integration may be needed to make sense of LAPA

Researchers have called for the integration of theoretical perspectives (e.g., Harmon-Jones et al., 2016; Mauss & Robinson, 2009; Smith & Ellsworth, 1985), noting that dimensions such as arousal and approach/avoidance motivation can be descriptors of discrete emotions, and that a lens of adaptive functionality can be used to describe affective dimensions. We suggest that comparisons between LAPA and HAPA make such an integration necessary. Arousal might describe an experiential difference between LAPA and HAPA, but it does not fully explain why LAPA and HAPA would be associated with different causes, consequences, and associations. For such an explanation, LAPA and HAPA should be considered in light of adaptive evolutionary function, motivational qualities, and cultural tendencies; doing so will allow for better descriptions, explanations, and predictions about what LAPA is, how LAPA operates in emotional life, and why LAPA is more or less important for different individuals of different ages and from different cultures.

A model of positive emotion that integrates arousal, approach motivation, and evolutionary adaptiveness was proposed by Gilbert, in his development of Compassion Focused Therapy (2005). Consistent with early theorizing on positive affect that identified two types of innately triggered positive affects (*interest-excitement* and *enjoyment-joy*; Tomkins, 1962), Gilbert (2005, 2014) has proposed two types of positive affect that are differentiated by whether the feeling is activating or deactivating. The activating type of positive affect, sometimes referred to as a "drive" system (Richardson et al., 2016, p. 321), is associated with the sympathetic nervous system and dopaminergic brain activity which empowers the body to get up and go for what is wanted and needed, as well as exploring new possibilities. The deactivating type of positive affect, sometimes referred to as a "contentment" system (Richardson et al., 2016, p. 321), is associated with the parasympathetic nervous system, brain activity involving opiates, oxytocin, and neural substrates involved in affiliation and attachment (Depue & Morrone-Strupinsky, 2005), enabling the body to rest and digest (Porges, 2007), restore balance, and feel safety amid familiar stimuli and in connection with others (Gilbert, 2014). This structure of positive affect not only maps well to HAPA and LAPA; it echoes brain-based distinctions in the reward system, where one neuronal system is associated with "wanting" something not yet possessed, and another is connected to a series of hedonic hotspots associated with "liking" something that is familiar (Berridge et al., 2003).

Given the physiological support for Gilbert's model with its distinction between activating, appetitive positive affect, and deactivating, soothing, and satisfying positive affect, as well as its similarity to Tomkins' (1962) postulates about positive affect, we used this review as an opportunity to look for literature that might provide further insight into whether HAPA and LAPA are respectively high and low in approach motivation. We sought, in part, to clarify whether the distinction between LAPA and HAPA is simply a difference in arousal or whether the difference in arousal signals a more complex and complementary function of positive affect as suggested by Gilbert (2014) and Tomkins (1962).

The case for investigating LAPA in contrast to HAPA

We see two primary reasons for investigating LAPA in contrast to HAPA. The first reason responds to the aforementioned blind spot within valence/arousal theories, where the cost of the omission of LAPA must be clarified. The second reason is to provide practitioners and lay people insight into the importance of the broad category of emotion that LAPA represents, by looking at LAPA's relationship to motivation (drawn from approach/avoidance theories), as well as LAPA's distinguishing characteristics and purpose (in a similar vein as discrete emotion theories). Furthermore, LAPA may be particularly useful for developing a more robust meta-emotional awareness, which involves attentiveness to, clarity for, and non-judgment of emotion, along with beliefs about the value and utility of emotion (Berenbaum & Chow, 2019; Gottman et al., 1996). LAPA may also play a meaningful role in an instrumental approach to emotion regulation (Tamir, 2009). Tamir (2016) emphasizes there are multiple motives for regulating emotions beyond optimizing immediate pleasure, that people also engage in emotional regulation to enhance their ability to accomplish what is meaningful to them over a longer time horizon. If people can, to some degree, choose from a menu of emotional states to shape their lives, it is important to understand what LAPA is good for, so that it can be integrated into strategies for emotional regulation.

Furthermore, we suggest that distinguishing the broad category of LAPA from the broad category of HAPA may be especially useful for those who do not readily identify distinctions in what they are feeling, those with low emotional granularity (Barrett & Bliss-Moreau, 2009). Indeed, Barrett (2017) emphasizes that an important advantage of a dimensional perspective is that it may better allow people of low emotional granularity to identify their inner experience. A deeper understanding of the usefulness of LAPA, which as a broad category of emotion could be more readily recognized than specific emotions with nuanced distinctions, may serve as a worthy first step for developing greater positive

emotional granularity and reaping the benefits thereof (Tugade et al., 2004; Wilson-Mendenhall & Dunne, 2021).

Method

Search

To find articles for this review, we focused our search terms on LAPA, since it has been studied much less frequently than HAPA; such an approach provided a more streamlined set of articles in which to look for comparisons between LAPA and HAPA. Our initial search (see Fig. 2) took place in April 2019 and used the following search terms: "low arousal positive affect," "low arousal positive emotion," "low activated positive affect," and "low activated positive emotion." These search phrases were in quotation marks when searching Google Scholar, but they were not in quotation marks when searching Web of Science and PsycINFO. The Web of Science results for "low activated positive affect" were further refined, such that we limited the results to articles that included "emotion," "affective," or "feeling," in order to avoid results from non-human fields, such as environmental or veterinary science.

An expanded search took place in July 2022, this time focusing on Google Scholar, which we had observed to yield results with fewer duplications and wider coverage of recently published research than the other databases. The search terms used in the expanded search were "positive deactivation," "pleasant deactivation," "positive low activation," "positive deactivating affect," "positive deactivating emotion," "*calm* AND *excitement* (no quotes)," and "*calm* AND *enthusiasm* (no quotes)." We inspected results from other search terms (e.g., "*contentment* and *excitement*") and observed that such results primarily contained items that did not meet our inclusion criteria. Additionally, in the process of inspecting articles or searching for contextual information, when we encountered articles that appeared to match our inclusion criteria, we investigated them and included those that matched. See Fig. 2 for more information about our search.

Inclusion/exclusion criteria

The inclusion criteria for articles in this review were as follows: (1) the paper must be available in English; (2) the article must have positive affect clearly conceptualized as varying in high and low arousal as an object of investigation; (3) there must be an empirical comparison between HAPA and LAPA; (4) the paper must have reported how HAPA and LAPA were measured, manipulated, or coded; (5) the results of the HAPA/LAPA comparison must have been clearly reported, discussed or displayed in tables or figures; and (6) the article must have been published in a peer-reviewed journal. After working with the articles meeting these criteria, we added an exclusion criterion: (7) articles whose main object of study was cultural differences in ideal affect were omitted due to the difficulty in disentangling the mediating effects of ideal affect and actual affect (see Tsai, 2017 for an overview of this important literature).

Selection process

The selection process followed the steps outlined by Moher et al. (2009). After obtaining the articles, titles were scanned and non-English and duplicate results were removed, as were encyclopedia entries. Abstracts were reviewed for evidence that affect or emotion was investigated. The text of articles was searched for key words (e.g., *arousal*, *activated*, *calm*). See Fig. 2 for details about the reduction flow. Selection decisions were primarily made by the first author. The reliability of such decisions was tested by presenting a random sample of articles (20 from 398 articles that had been marked for close reading) to a research assistant who was blind to the goals of the current research and the status of each article. The assistant used the inclusion criteria to assign an inclusion status for each article. Agreement was found on 18 of the 20 articles, $k = 0.79$. The two cases of initial disagreement were resolved by further inspection of the operationalization and reporting of each article. Additionally, the first author identified 42 articles where the inclusion decision was a close call, presented them to research team members, and consensus was achieved.

Data extraction, narrative review, table structure

We began data extraction by reading each article and recording sample size and type, dependent and independent variables, covariates, procedural details, measurement items, manipulations, and findings. It was soon evident that our dataset included a wide variety of methods, measures, and manipulations. Most importantly, LAPA or HAPA was sometimes the outcome variable, sometimes the independent variable, sometimes a moderator, and less frequently a covariate, and there was almost no overlap in what was being investigated (see Table 4, Developmental research, for an exception).

With such a wide variety of procedural approaches and range of outcome variables, we decided to narratively summarize the findings (Siddaway et al., 2019). Our goal was to provide an overview of similarities and differences between LAPA and HAPA along with integrative theoretical perspective, and a narrative review is consistent with such a goal (Möschl et al., 2020). This decision determined the format of the tables we use to report these findings, following the example of other narrative reviews (e.g., Frick et al., 2014;

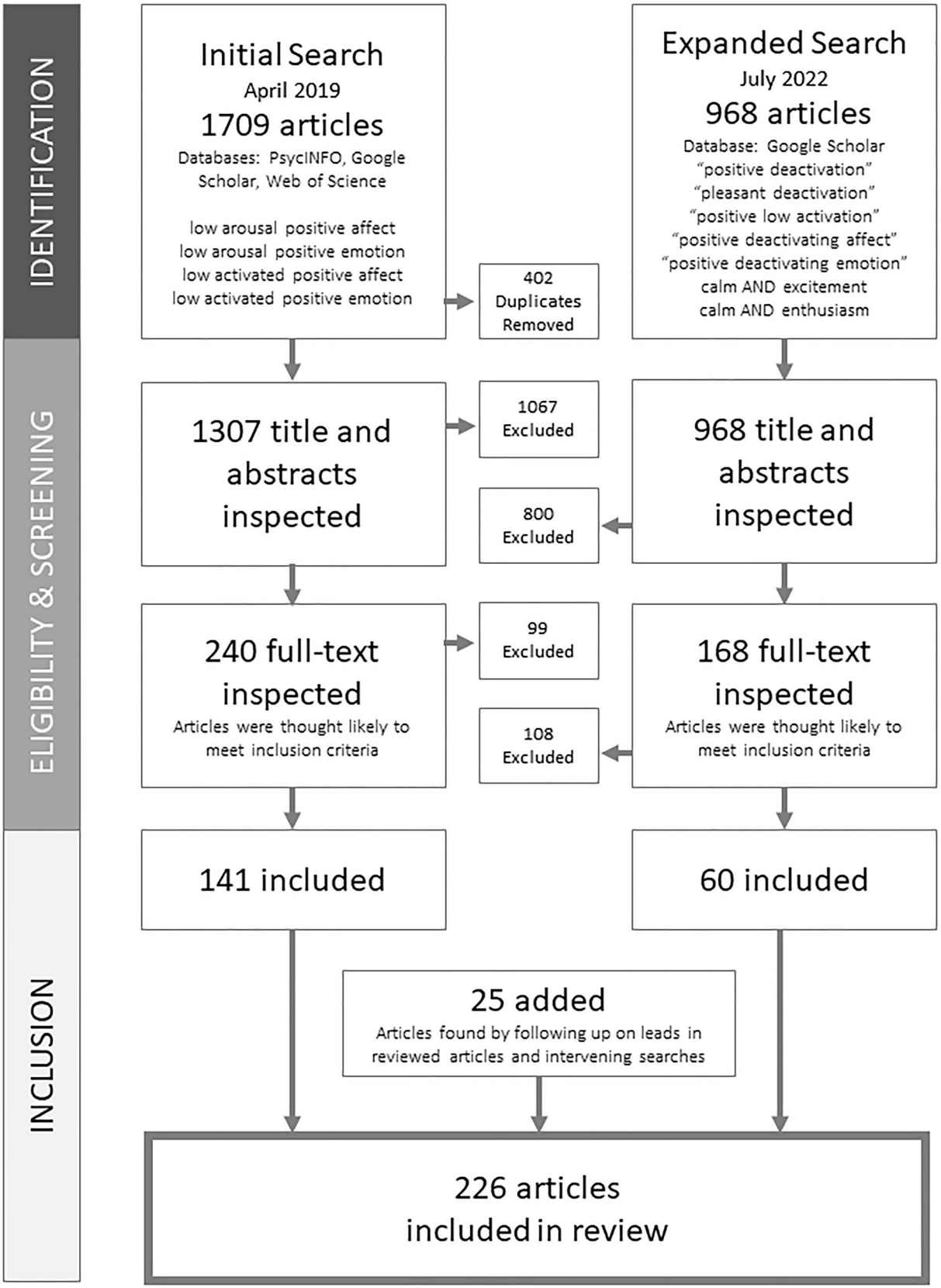

Fig. 2 Reduction flow

Table 1 Frequency of countries reported by articles that identified the location of their samples

Country	Total articles
United States	80
Canada	20
United Kingdom	15
Netherlands	14
China	12
Germany	12
Italy	10
Sweden	8
Australia	8
New Zealand	6
France	6
Belgium	6
Spain	3
Japan	3
Israel	3
Finland	3
Switzerland	2
South Korea	2
Portugal	2
Brazil	2
Argentina	1
Austria	1
Croatia	1
Czech Republic	1
Ghana	1
Hungary	1
India	1
Malta	1
Mexico	1
Norway	1
Romania	1
Serbia	1
South Africa	1
Taiwan	1

Ging-Jehli et al., 2021). In addition to providing information about the sample, procedures, operationalizations, and findings, we reported the country in which the research was conducted. Most papers reported the country from which the sample was drawn, but when they did not, we report the country associated with the first author. See Table 1 for the frequency with which research was conducted in each country.

Organization of findings

The search parameters did not limit results to psychological domains, but the majority of articles that met our inclusion criteria were published within the field of psychology. The final categories we used to organize findings were informed by the chapter structure of standard psychology textbooks and a recently published handbook on emotion (Barrett et al., 2016).

Transparency and openness

In our commitment to transparency, we report how we determined our sample size, all data exclusions, all manipulations, and all measures (if any) in the study. Even though this research was not preregistered, we make available on the Open Science Framework (https://osf.io/69cha/) working documents that were essential to our finding, selecting, coding, and interpreting articles included in this review.

Summaries of findings

The breadth and variety of research comparing LAPA and HAPA surprised us. Our assumptions about the relative omission of LAPA from emotion research did not account for research that used affect to reveal qualities of a specific target of interest that is not necessarily thought of in terms of affect. For example, we found LAPA/HAPA comparisons in studies about driving (Schmidt et al., 2017), pro-environmental behavior (Bissing-Olson et al., 2013), aircraft noise (Västfjäll et al., 2003), and evaluations of undergarments (Greggianin et al., 2018). In fact, roughly one fifth of article titles in this review did not mention emotion, indicating that there is pervasive relevance of affective inquiry across domains. While similarities between LAPA and HAPA were regularly found, differences between them were found in 89% of the articles in this review. In our summaries of findings, we highlight aspect of LAPA's causes, associations, and consequences that are distinct from HAPA, so as to underscore the importance of including LAPA in research on positive affect, while noting theoretical implications where relevant.

Cognitive research (Table 2)

Within the realm of cognition, LAPA has been found to be a help or hindrance to cognitive processes in ways that are consistent with theory that associates one type of positive affect with novelty and drive (HAPA) and another type of positive affect with familiarity and safeness (LAPA; Gilbert, 2005; Tomkins, 1962). For example, LAPA tends to be either unrelated to, or a negative influence on, cognitive processes that involve new ideas such as creativity (De Dreu et al., 2008; Gilet & Jallais, 2011; Hutton & Sundar, 2010; To et al., 2012) or goal-directed thought such as attentional control (Fröber & Dreisbach, 2012; Jefferies et al., 2008;

Table 2 Cognitive research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Attention and cognitive control					
Fröber and Dreisbach (2012)	62 students, 60 students, 60 students, Germany	In Studies 1 and 2, participants were shown a series of emotion-inducing images and then asked to identify whether or not a target letter is displayed, before which a cue that predicts the occurrence or non-occurrence of the target letter is displayed. In Study 3 the procedure incorporated task switching signaled by letters vs. digits	*Manipulation:* IAPS images (babies and families)	*Manipulation:* IAPS images (sport and adventure)	LAPA but not HAPA reduced cue validity effect on a task measuring proactive control of attention (using information cues to prepare for an upcoming task) but not on a task measuring reactive control of attention (responding to cues to execute an immediate task)
Jefferies et al. (2008)	100 students, Canada	Participants were randomly assigned to listen to emotion-inducing music for 10 min or a no-music control and then asked to identify letters among distractor digits	*Manipulation*: Calm music	*Manipulation*: Happy music	In a test of visual attention, HAPA and LAPA induced by music were both associated with intermediate performance on an attentional blink task
McConnell and Shore (2011)	66 students, Canada	Participants were randomly assigned to listen to affect-inducing music and engage in tasks involving cues related to timing, spatial orientation, and information congruency. Three attentional processes were assessed: alerting, orienting, and executive control	*Manipulation:* Mozart, major key, slow tempo	*Manipulation:* Mozart, major key, fast tempo	HAPA but not LAPA was associated with reduced executive control, while neither had impact on alerting or orienting processes
Nealis et al. (2016)	109 adults, 116 adults, 62 adults, Canada	In three studies, after completing an ego-depleting habit-breaking task, participants were shown videos consisting of IAPS photos with mood-consistent music, then asked to complete a Stroop task (identifying the color of the text even though it spelled out an incongruent color word)	*Manipulation:* IAPS images (smiling faces and landscapes); music from Venus the Bringer of Peace by Holst	*Manipulation:* IAPS images (active scenes such as victorious athletes and children on slides); music from Slavonic Dance No. 5 by Dvorak	Neither HAPA nor LAPA had a restorative impact on cognitive function after an ego depletion paradigm
Saxton et al. (2020)	29 students, United States	Participants viewed emotional pictures and were shown a stream of words (distractors and targets), while they were asked to identify target words (T1). After viewing the stream of words, participants were asked if they remembered another set of target words (T2) which had appeared immediately following T1 words	*Manipulations* *Target words:* gentle, serene, peace, relax *Music*: Brahms *Photos*: IAPS	*Manipulations* *Target words:* thrill, passion, desire, excite *Music*: Mozart *Photos*: IAPS	Those in a LAPA condition performed better on a word detection attentional blink task than those in a HAPA condition
Tibboel (2018)	157 students, Belgium	Participants were asked to recall an emotional memory and then listen to emotion-inducing music. Then they engaged in an attentional blink task where distractors were digits and targets were letters	*Manipulations*: Recalled memory, music	*Manipulations*: Recalled memory, music	No difference in attentional control were found between HAPA and LAPA conditions
Creativity					
De Dreu et al. (2008)	58 students, 179 students, 90 students, 546 students, Netherlands	Across 4 studies, participants rated their mood and then completed tasks to measure creative fluency, originality, cognitive flexibility, and within-category fluency	*Items*: at ease, calm, relaxed	*Items*: elated, excited, happy	HAPA was related to cognitive flexibility, but LAPA was not related to any measure of creativity

Table 2 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Gilet and Jallais (2011)	75 students, France and Switzerland	Participants were randomly assigned to write about an emotional memory, given a mood manipulation check, and then respond to 48 words, writing down the first word that comes to mind	*Manipulation*: Report a memory when you felt calm	*Manipulation:* Report a memory when you felt happy	Those in the HAPA condition generated more unusual word associations than those in the LAPA condition
Hutton and Sundar (2010)	90 students, United States	Participants' mood was induced by success or failure on a test (valence) and level of activity of dancing (arousal), they then completed a creativity task measuring fluency, originality, elaboration, and flexibility. Mood and skin conductance was assessed	*Manipulation*: Success on tests, low activity level dancing *Rating scale:* sad to happy	*Manipulation*: Success on test, high activity level dancing *Rating scale:* sad to happy	HAPA but not LAPA was associated with increased creativity
To et al. (2012)	60 students, Australia	After reporting on the perception of support from their supervisors, participants responded to questions about their current mood and creative process engagements 3 times a day for 10 days	*Items*: calm, relaxed, relieved	*Items*: enthusiastic, excited, inspired, interested	HAPA was associated with higher levels of creative process engagement, especially for those with goals for validating competence (vs. developing it) and supervisory support for creativity. LAPA was associated with lower levels of creative process engagement
Yeh et al. (2016)	266 students, Taiwan	Participants reported their emotions before and during a game-based creativity task which assessed creative problem solving	*Items*: calm, relaxed	*Items*: elated, happy	For women, LAPA prior to game play predicted improved creative problem-solving during game play. For all, HAPA during game play predicted improved creativity
Decision making, evaluation, and judgment					
Citron et al. (2014)	43 adults, United Kingdom	Participants were shown strings of letters (some of which were emotional words) and asked to decide whether the word was in English or not	*Manipulation*: Words that had been previously rated as positive low arousal	*Manipulation*: Words that had been previously rated as positive high arousal	LAPA words were associated with faster response times compared to HAPA words on a lexical decision task
Eder and Rothermund (2010)	75 students, Germany	Participants were asked to evaluate the valence of photos and identify colors. Reaction times for correct classifications were compared	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	Response times for detecting differences were similar in the LAPA and HAPA conditions
Fernandes et al. (2011)	80 students, Canada	Across multiple studies, after being shown images differing in valence and arousal, participants were shown digits and asked to indicate whether they were the same or different. Response times and accuracy were recorded	*Manipulation*: IAPS photos, e.g., bunny	*Manipulation*: IAPS photos, e.g., money	Response times for detecting differences were slower in the LAPA condition than the HAPA condition, while accuracy findings were mixed
Galentino et al. (2017)	125 students, Italy	Participants were shown either HAPA photos or LAPA photos in association with a series of choices between two lotteries (high risk or low risk). The risk level and time of decision were recorded	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	HAPA was associated with riskier decisions and taking more time to make decisions compared to a neutral control, while LAPA did not differ significantly from the control

Table 2 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Ihssen and Keil (2013)	18 female students, Germany	In Study 4, participants viewed images (natural scenes or abstractions) and were asked to identify whether it was a photo or not. The images were varied by emotion	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	Confirming that higher arousal has a slowing effect on N1 processing, and positive valence has an accelerating effect on P2 processing, LAPA images were discriminated faster than HAPA images
Lu et al. (2017)	26 students, China	Participants were shown emotional photos on a screen and asked to identify photos as either standard or deviant (in relation to a referent photo) as accurately and quickly as possible. Response times (reaction, press, return, choice, movement) and accuracy were recorded. Photos were shown in two blocks for each emotion. EEG activity was recorded	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	Even though no significant difference between HAPA and LAPA in response times identifying deviant photos were found, there were differences in brain activity. HAPA was associated with larger P1 amplitudes, but not N2 or LPP amplitudes compared to LAPA. N2 amplitude predicted faster choice time in LAPA condition, and slower return time in HAPA condition
Orlić et al. (2014)	49 students, Serbia	Participants were shown emotional photos followed by a sentence and asked to assess whether the sentence about the relationship of one number to another number was true or false	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	Semantic verification (assessing whether a sentence was true or false) was faster following a HAPA induction than a LAPA induction
Robinson et al. (2004)	20 students, 21 students, 20 students, 42 students, 15 students, 56 slides, 28 students, United States	Across 7 studies, participants were shown emotional photos and asked to signal the moment they identified the main theme of the photo (Study 1), identify whether the photo was positive or negative (Study 2), evaluate whether the photo gave them pleasant or unpleasant feelings (Study 3), identify whether there were 1 or 2 dots on the screen with the photo (Study 4), and signal with a laser pen while evaluating the emotional content (Study 5). Study 6 reanalyzed data with the individual photo as the unit of analysis. Study 7 asked participants to rate the valence and arousal of emotional words. Reaction times were assessed	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	Consistently across multiple studies involving evaluation of photos and words that were varied by valence and arousal, reaction times on evaluation tasks were faster in the LAPA condition than the HAPA condition
Roesch (1999)	308 students, United States	Participants reported their affect and answered pretest questionnaires about social judgment, then watched an emotion-inducing film clip, and reported their affect and answered a posttest questionnaire about social judgement and information processing	*Manipulation*: *Film clip:* Waves rolling on beach, *Affect grids:* bad to good; sleepy to aroused	*Manipulation*: *Film clip:* When Harry Met Sally—orgasm scene, *Affect grids:* bad to good; sleepy to aroused	HAPA and LAPA had similarly positive effects on social judgements regardless of whether they used heuristic or substantive information processing to form their judgements

Table 2 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Tauber et al. (2017)	82 adults, 80 adults, United States	In 2 studies, participants (younger and older adults) studied emotional photos and were asked to estimate how likely they were to remember them (judgement of learning), then asked to recall specific photos	*Manipulation*: IAPS photos (e.g., fishing, puppies)	*Manipulation*: IAPS photos (e.g., loving embrace, skydiving)	HAPA and LAPA images resulted in similarly higher levels of judgements of learning (estimates of likelihood of remembering) and recall compared to neutral images for both younger and older adults
Van Damme and Seynaeve (2013)	300 students, Belgium	Participants watched a short film, did logic puzzles, listened to emotion inducing music, and were asked to imagine emotion inducing situations. They then read a version of a summary of the film which contained misleading information. After doing more puzzles, they were given a recognition test about aspects of the film. Then they rated their confidence for each answer	*Manipulation*: Serene music and guided imagery: ''After a long winter's day, you calmly take a gloriously hot bath''	*Manipulation*: Happy music and guided imagery: ''You buy a lottery ticket and you win 250 euro instantly''	Neither HAPA nor LAPA impacted susceptibility to misinformation or confidence judgements
Yao et al. (2016)	19 students, 20 students, China	Participants were asked to distinguish pseudo words from real emotional words (concrete words in Study 1, abstract words in Study 2), while EEG recorded brain activity at specific sites at a specific number of milliseconds following exposure to the stimuli (N170, N400, LPC)	*Manipulation*: Words that had been previously rated as positive low arousal	*Manipulation*: Words that had been previously rated as positive high arousal	LAPA words were associated with faster response times and lower LPC activation than HAPA words, but only when words were abstract and not concrete
Memory					
Bergmann et al. (2012)	43 female students, Netherlands	Participants were shown pairs of photos (one neutral, one emotional varying in valence and arousal), and 10 s later they were shown another set of photos and asked if they matched previously shown photos (working memory). After several pairs, they were shown a single photo and asked if it had been shown at all previously (long-term memory). They rated their confidence in their recollection	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	LAPA was associated with better working memory and long-term memory compared to HAPA in photo recall task
Corson and Verrier (2007)	222 students, France	After mood inducing guided imagery, and while listening to mood inducing music, participants were read a list of words that have previously been found to be associated with a particular word that is not included on the list, referred to as a critical lure. Participants were later asked to recognize words that were on the list. If they identified the critical lure as having been on the list, it was considered a false memory	*Manipulation*: Guided imagery, music	*Manipulation*: Guided imagery, music	LAPA was associated with fewer false recognitions of words read aloud than HAPA

Table 2 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Greene et al. (2010)	24 students, United Kingdom	Participants were shown abstract shapes resembling paint smears and instructed to remember them, after which 5 min of music was played, and participants were encouraged to entertain thoughts and memories that were congruent with the music. Then participants were shown images and asked to identify old and new photos and rate their confidence	*Manipulation*: Music rated by participants themselves as positive and relaxing	*Manipulation*: Music rated by the participants themselves as positive and energizing	HAPA was associated with more accurate recall of abstract shapes and more confidence in recollection than LAPA
Loeffler et al. (2013)	55 adults, Germany	Over the course of one day, each 10 to 20 min, participants were asked to rate their current situation as positive, neutral, or negative while their physiology was monitored. Once for each type of situation participants were shown a list of emotionally valenced words and asked to remember the words. They spoke out loud to a voice recorder the words they remembered, immediately following the presentation of the list, the next day, and one week later	*Measures*: Rating a situation as positive, and lower heart rate that did not correspond to physical activity	*Measures*: Rating a situation as positive, and higher heart rate that did not correspond to physical activity	In positive situations, LAPA (low physiological arousal) enhanced recall of positive words more so than HAPA (high physiological arousal)
Schmidt et al. (2011)	24 adults, 24 students, United States	In 2 studies, participants were shown emotional images in different regions of the screen and asked to indicate whether there was a living creature in them, something commonly encountered in a week, or something they wanted to approach. Then the previously displayed images were again displayed amid an equal number of foil images, and participants were asked to classify them as old or new, whether they vividly remembered the item or if they simply knew which list they appeared in, what decision (living, common, approach) was made, and what side of the screen the image appeared on	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	HAPA items were more accurately remembered than LAPA items, including better recognition of where the image was seen on the screen and what order it was seen in
Sheldon and Donahue (2017)	48 students, Canada	Participants listened to emotional music of varied affect and valence in either a block of music or in randomized order. While listening they wrote a brief description of a memory brought to mind by the music. They indicated when it occurred, and rated the memory for vividness, uniqueness, socialness, and energizing nature of the memory. The valence and intensity of the memory was also rated. Memories were coded as specific, extended, repeated, semantic, or omitted	*Manipulation*: Solo piano classical music cues (Vieillard et al., 2008)	*Manipulation*: Solo piano classical music cues (Vieillard et al., 2008)	Memories in response to LAPA cues were more vivid and unique than HAPA cues when music was randomized. Memories recalled in response to HAPA cues were more social and energetic than LAPA. HAPA music was associated with shorter reaction time for recalling memories than LAPA music. No difference was found in valence rating of memory between HAPA and LAPA music cues

Table 2 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Steinmetz et al. (2010)	19 students, United States	Participants viewed emotional photos while an fMRI recorded brain activity. Ninety minutes later they viewed photos and identified them as old or new	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	In the LAPA condition, the strength of amygdala connections to the left inferior frontal gyrus, left hippocampus, and left middle occipital gyrus was greater than in the HAPA condition, and this connectivity was associated with successfully remembering photos
Van Damme and Smets (2014)	53 students, United States	Participants were shown emotional images and some were asked misleading questions about them. A memory test assessing central or peripheral details was administered	*Manipulation*: IAPS photo 2360, family	*Manipulation*: IAPS photo 8490, roller-coaster	HAPA was associated with more accurate recall of central details compared to LAPA, there was no difference in recall of peripheral details between the conditions. In the HAPA conditions, those who were misled had more false memories than those who weren't, but in the LAPA condition false memories between the misled and the control were similar
Wang et al. (2018)	6 female students, United States	In case study research, participants were interviewed three times over three years about their experience studying physics and their physics identity. Episodic memories were coded for affective states	*Example codes:* calm, relaxed, still	*Example codes:* enthusiastic, excited, very happy	LAPA physics lesson recollections were observed to have greater recall of context but not details; HAPA physics lesson recollections were observed to have greater memory for detail
Wang and Yang (2017)	60 adults, China	Participants (younger and older adults) were shown emotional photos and asked to rate their pleasantness. Later they were shown photos and asked to identify them as old or new and to rate their confidence in their recollection	*Manipulations*: IAPS photos (e.g., parents and children, puppies)	*Manipulations*: IAPS photos (e.g., erotic scenes, food)	LAPA pictures were more often remembered when compared to negative pictures, while there was no difference in remembering HAPA pictures compared to negative pictures

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Tibboel, 2018). Indeed, Fröber and Dreisbach found that LAPA, but not HAPA, reduced proactive control (using cues to predict an upcoming task) but not reactive control (responding to cues presented concurrent with a task).

Along these lines, LAPA may provide advantages to cognitive processes that involve familiarity, such as recollection amid distractions (Saxton et al., 2020) or other memory tasks involving photo recall (Bergmann et al., 2012; Steinmetz et al., 2010; Wang & Yang, 2017), false memories of spoken words (Corson & Verrier, 2007) and images (Van Damme & Smets, 2014), as well as recall of positive words (Loeffler et al., 2013). Furthermore, the association between LAPA and safeness is supported by findings that participants made less risky decisions in a LAPA condition compared to HAPA (Galentino et al., 2017). Though other studies found that LAPA leads to faster decisions of discernment than HAPA (Citron et al., 2014; Ihssen & Keil, 2013; Robinson et al., 2004; Trick et al., 2012), some associated LAPA with slower decisions (Fernandes et al., 2011; Orlić et al., 2014). Still others did not find a difference between LAPA and HAPA on cognitive processes (Eder & Rothermund, 2010; Lu et al., 2017; Roesch, 1999; Tauber et al., 2017; Van Damme & Seynaeve, 2013).

It may be that differences in cognition between LAPA and HAPA depend on the extent to which they are high or low in approach motivation, especially in light of findings that high-approach motivation positive affect narrows attention, and low-approach motivation broadens attention (Harmon-Jones et al., 2013). The findings of one study reviewed here is consistent with a narrowing and broadening of attention; HAPA was associated with recollecting details, and LAPA was associated with recollecting context (Wang et al., 2018). Though more research is needed to make sense of disparate results within research on cognition, we propose that conceptually linking HAPA to novelty, drive, and appetite, while linking LAPA to familiarity, safeness, and satisfaction may be useful for investigating potential distinctions.

Consumer research (Table 3)

In studies of consumer experiences, LAPA's distinctions from HAPA appear to be consistent with models of positive affect organized by desire or resource seeking (HAPA) and contentment or soothing (LAPA; Gilbert, 2005). This can be seen in research that associates HAPA with an orientation toward the future, or moving toward something that is desired, while LAPA is associated with an orientation toward the present, or enjoying the resources at hand (Mogilner et al., 2012). Furthermore, having high expectations, another future-oriented stance, was associated with HAPA but not LAPA (Aurier & Guintcheva, 2014). Indeed, in a qualitative analysis of positive affect and consumer experiences, HAPA was associated with anticipation, but LAPA was not, and the qualities associated with LAPA were feeling safe, unconcerned about time, and physically comfortable (Pham & Sun, 2020). Another novelty-related distinction can be observed in findings that LAPA was associated with lower intentions to adopt new technology, while HAPA was associated with higher intentions to do so (Ahn & Shin, 2015).

Consistent with the lower arousal level of LAPA, when marketing or commercial setting were energetic, exciting, or complex, a reduction in LAPA (but not HAPA) was observed (Greggianin et al., 2018; Henning et al., 2012; Wang et al., 2017). And, as might be indicated by the soothing qualities of LAPA, interpreting extreme complexity in marketing messaging was found to be aided by LAPA, while interpreting messaging of moderate complexity was aided by HAPA (Noseworthy et al., 2014). In keeping with LAPA's relationship to feeling safe, for riskier decisions, LAPA smiles were associated with a higher likelihood for signing up for a service, but for less risky decisions HAPA smiles were associated with a higher likelihood of signing up (Wang et al., 2017). Further evidence that LAPA is not associated with acquisitiveness can be seen in findings that LAPA was less likely than HAPA to increase trading bubbles, where prices go up despite decreasing value (Andrade et al., 2016).

Along with the proposition that LAPA is related to the familiar and safe, LAPA has been thought to be associated with positive, caring social interaction (Gilbert et al., 2008; Tomkins, 1962), and support for this can be found in some consumer experiences wherein the social interaction or the interpretation of social interaction was more positive in conditions involving LAPA compared to conditions involving HAPA (Chou et al., 2022; Panger, 2018; Seering et al., 2019), though some studies found that both LAPA and HAPA have a similar relationship to social situations (Andersson et al., 2016; Dubé et al., 1995).

Developmental research (Table 4)

One of the strongest indications that LAPA should not be ignored is the robust finding that, as adults grow older, LAPA becomes more prevalent, so much so that some researchers have suggested that LAPA emerges as a distinct form of happiness for older adults (Bjalkebring et al., 2015; Mogilner et al., 2011). Critically, researchers note when LAPA is not accounted for, that data can be misleading, suggesting that older adults are unhappier than younger adults (e.g., Pinquart, 2001). Multiple studies have found that levels of LAPA are higher among older adults than younger adults (Chu et al., 2020; English & Carstensen, 2014; Hamm et al., 2021; Ready et al., 2019; Santorelli et al., 2018; Scheibe et al., 2011; Simon & Nath, 2004), even after controlling for gender, health, and personality traits (Kessler & Staudinger, 2009). Though some studies found

Table 3 Consumer research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Advertising and marketing					
Nasar (1987)	70 adults, United States	Participants were shown sign scapes of varying coherence and complexity, and then asked to rate the affect imagined in that setting	*Items*: calm, distressing	*Items*: boring, exciting	LAPA levels were lower and HAPA levels were higher, the more complex the sign scape
Noseworthy et al. (2014)	144 adults, Canada	Participants viewed pleasant images of high or low arousal and rated their mood on a semantic differential scale, then viewed an ad for a product that was congruous, incongruous, or extremely incongruous with its product category, and then evaluated the product in the ad	*Manipulation*: IAPS photos, positive valence, low arousal; *Scale anchor*: very relaxed	*Manipulation*: IAPS photos, positive valence, high arousal; *Scale anchor:* very excited	Ads with moderately incongruous information were rated more positively in the HAPA condition compared to LAPA, while extremely incongruous ads were rated more positively in the LAPA condition compared to HAPA
Puccinelli et al. (2015)	203 adults, online	Participants were randomly assigned to write about affect or a typical day. They were then shown an energetic or moderately energetic commercial, and the watching time was recorded	*Manipulation*: A time you felt relaxed	*Manipulation*: A time you felt excited	LAPA but not HAPA was associated with shorter viewing times of highly energetic commercials, while both LAPA and HAPA were associated with similar viewing times of moderately energetic commercials
Wang et al. (2017)	123 adults, 219 students, 320 adults, 281 adults, United States	In 4 studies, with varying contexts, where photos of people smiling broadly or smiling slightly were shown, participants were asked to rate the warmth and competence of the pictured person. A fifth study compared financial support for Kickstarter campaigns using photos with broad smiles versus slight smiles	*Manipulation*: Slight smile	*Manipulation*: Broad smile	LAPA (slight smile) is perceived as more competent but not as warm as HAPA (bright smile), and this is amplified by prevention focus for LAPA and promotion focus for HAPA. Sign-ups were higher for HAPA in a low-risk situation and higher for LAPA in a high-risk situation. For HAPA there were more social media shares and small amount donations for campaigns with big samples (consistent with expectations for warmth), but for LAPA there were more large amount donations for campaigns with slight smiles (consistent with expectations for competence)

Table 3 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Purchase					
Ahn and Shin (2015)	156 adults online, South Korea	Participants answered questions about affect as it relates to smartphone use, and intentions to adopt new technology	*Items*: *Contentment*: discontent (r), gratified, satisfied; *Relaxation*: calm, relaxed, tranquil	*Items*: *Excitement*: excited, thrilled, vital; *Interest*: curious, interesting	HAPA (excitement and interest) was associated with higher levels of intention to adopt new technology, while LAPA (relaxation) showed no relationship, and LAPA (contentment) was associated with lower intentions to adopt new technology
Andersson et al. (2016)	140 students, 300 students, 172 students; Sweden	In 3 studies, participants read scenarios and looked at pictures of these scenarios describing a consumer interaction with the employee's gaze directed toward them or averted from them. They then answered questions about affect, social impressions, and satisfaction with the encounter	*Items*: calm, confident, relaxed	*Items*: alert, engaged, enthusiastic	LAPA and HAPA were higher in the direct gaze condition compared to averted gaze for non-embarrassing purchases. Direct gaze decreased HAPA, more so than LAPA, during embarrassing purchases
Andrade et al. (2016)	495 students, United States	In groups of 9, over 15 rounds, participants traded assets to gain real dividends. Participants in the same group were induced to the same type of positive affect. Prices of trades were analyzed to assess market bubbles	*Manipulation*: *Calm video clips:* Franklin and Peace in the Water; *Items:* calm, peaceful, relaxed	Manipulation: *Exciting video clips:* Knight and Day and Mr. and Mrs. Smith; *Items:* eager, excited, enthusiastic	HAPA increased the trading bubbles (increasing prices despite decreasing value) more so than LAPA
Chou et al. (2022)	40,485 tablet reviews; 23,459 drug reviews; 152,751 restaurant reviews	Researchers analyzed the sentiment expressed in a review, along with other characteristics of the review, to determine what is related to review helpfulness	*Coding*: positive and low arousal words	*Coding*: positive and high arousal words	Higher levels of LAPA were associated with reviews being rated more helpful on all three platforms, while HAPA was associated with helpful ratings for drug and restaurant reviews but not for tablet computers

Table 3 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Dubé et al. (1995)	270 business students, Canada	Participants were randomly assigned to listen to music varied by tempo while engaged in a sales transaction. The music had been pretested to induce targeted valence and arousal levels. Their desire to affiliate with the salesclerk was compared	*Music*: 40–76 beats per minute. Horn concerto no.3 in E flat major K.447-first movement, Mozart	*Music*: 108–208 beats per minute. Oboe concerto in C major K.314-third movement, Mozart	Both the HAPA and LAPA music conditions were associated with higher desire to affiliate during a sales interaction than medium-arousal positive affect
Henning et al. (2012)	308 students, Germany	Participants were assigned to imagine that they were purchasing either a movie viewing (hedonic) or a calculator (utilitarian) and then asked to report the affect they would feel during watching/using (anticipatory) and after having purchased it (expected)	*Items*: calm, content, relaxed	*Items*: elated, enthusiastic, excited	HAPA but not LAPA predicted the purchase of a hedonic object (movie). LAPA but not HAPA predicted the purchase of a utilitarian object (calculator)
Lucia-Palacios et al. (2018)	377 shoppers, Spain	Participants were randomly assigned to an affect induction and then shown images of mall atmospheres, either exciting (bright lights, moderate crowding and warmer and more saturated color) or non-exciting (soft lights, minimum crowding and cooler and less saturated colors). Afterwards they reported self-perceived shopping behavior at that mall	*Items*: calm, peaceful, serene, tranquil	*Items*: active, lively, enthusiastic, excited	Those induced to LAPA had lower intended shopping behavior for images of malls with exciting atmosphere. Shopping behavior in those induced to HAPA did not vary by mall atmosphere

Table 3 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Mogilner et al. (2012)	31,876 sentences, 51 students, 50 older adults, 74 adults, 51 adults, United States	Pilot Studies 1 and 2 observed the association between a focus on the future or the present with mentions of excitement or calm in the context of blog posts. After manipulating future- or present-focus using a scrambled word task, Experiment 1 compared participants' subsequent choice of a calming or exciting tea. Experiments 2 and 3 compared future- or present-focus in definitions of happiness with choice of a calm or exciting version of a song. Experiment 4 compared expected happiness with bottled water positioned as calm or exciting	*Search criteria:* calm, peaceful; *Product choices:* Sweet Dreams, a relaxing blend of chamomile and mint; Happiness Water, Pure Calm	*Search criteria:* excited; *Product choices:* Peppermint, a refreshing peppermint blend; Happiness Water, Pure Excitement	HAPA was associated with a focus on the future, while LAPA was associated with a focus on the present moment. The finding was consistent across multiple different outcome measures, including—choice of branded tea, choice of song, definition of happiness, and choice of water bottle branding
Consumption					
Aurier and Guintcheva (2014)	400 adult moviegoers, France	Moviegoers were surveyed about their expectations for seeing the movie, affect during the movie, qualities of the theater, confirmation of expectations, and satisfaction with the movie	*Items*: calm, quiet, relaxed	*Items*: glad, happy, joyful	HAPA was higher and LAPA was lower when expectations for a movie were high. When HAPA during the movie was higher, satisfaction was higher, but when LAPA during the movie was higher, satisfaction was lower
Greggianin et al. (2018)	182 women, Brazil	Participants rated how they feel when they wear their favorite bra in terms of valence, arousal, and dominance. Then they identified product attributes and functional and aesthetic factors of their bra	*Measure*: SAM	*Measure*: SAM	Favorite bras were more associated with LAPA than HAPA, such that the more relaxed participants were in the bra, the more pleasant they rated the experience of wearing it, and such a rating was more related to the functional attributes of the bra rather than the aesthetics
Panger (2018)	778 adult social media users	Participants were asked to report their activities and affect several times a day for 1 to 2 weeks	*Items*: at ease, calm, peaceful, relaxed	*Items*: active, enthusiastic, excited, proud,	LAPA but not HAPA was reported in association with browsing social media

Table 3 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Pham and Sun (2020)	50 adults, online	Participants were asked in an online survey to describe consumption experiences that involved specific affect. Responses were qualitatively analyzed	*Prompt*: relaxation	*Prompt*: excitement	Researchers interpreted several aspects of consumer affect—three types of HAPA: anticipatory excitement, immersive excitement, outcome excitement; and three components of relaxation: being free of care (safety), unconcerned about time (peacefulness) and physical comfort (contentment)
Ravaja et al. (2004)	37 undergrads, Finland	Participants played 4 different video games (Tetris, Monkey ball, Monkey bowling, James Bond 007) for 5 min each in random order. After playing each game, participants rated their valence/arousal and momentary mood	*Measure*: SAM *Items*: calm, relaxed	*Measure*: SAM *Items*: enthusiastic, joyful, lively	Different video games evoke different patterns of HAPA and LAPA (e.g., Tetris was relaxing but less joyful, while Monkey Ball was both highly relaxing and joyful)
Seering et al. (2019)	120 adults, United States	While participants logged in to an online discussion thread, they were randomly assigned to view emotional images to validate that they were not a robot. Their subsequent comments were assessed for complexity, aggression, sociability, and sentiment	*Manipulation:* Photos of sunset, celloist, students studying, country roads, group photo	*Manipulation:* Photos of skydiving, cheerleader, astronaut, dogs	LAPA (but not HAPA) photos shown during CAPTCHA validation elicited comments that were more positive in tone, more analytically complex, and more sociable than a no-CAPTCHA control

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that LAPA was experienced to a similar degree among older and younger adults when measured longitudinally (Hudson et al., 2016) or after work (Scheibe et al., 2016), no studies found that LAPA was lower in older adults compared to younger adults.

The findings are not as clear cut when comparing HAPA in older and younger adults. Most studies find that HAPA is experienced to a similar degree by older and younger adults (English & Carstensen, 2014; Hudson et al., 2016; Kessler & Staudinger, 2009; Ready et al., 2019; Santorelli et al., 2018; Scheibe et al., 2016). Other studies have found that older adults experience HAPA less than younger adults (Hamm et al., 2021), but only when assessments were taken cross-sectionally, not longitudinally (Hudson et al., 2016). Still other studies have observed more HAPA in older adults than younger adults (Chu et al., 2020; English & Carstensen, 2014).

Differences between HAPA and LAPA appear to start early and continue steadily across the lifespan. Starting at two years old, children identified LAPA facial expressions as different than HAPA facial expressions (Russell & Bullock, 1986), and throughout childhood, the younger the child, the more likely the preference for HAPA over LAPA (Hunter et al., 2011), and younger children reported higher HAPA than older children (Raccanello et al., 2020). The trend continues into adulthood, with the fall of HAPA and rise of LAPA being relatively linear across the adult lifespan (Bjalkebring et al., 2015; Kern et al., 2014; Mogilner et al., 2011).

Studies in this review explored possible explanations for higher levels of LAPA in older adults, including their health, in that declining physical vigor causes older adults to choose emotional states that are physically less taxing (e.g., Windsor et al., 2013). Using data from several longitudinal studies in Australia ($N = 39{,}958$), Windsor and colleagues found that overall, after controlling for limitations in physical functioning such as bathing, dressing, and climbing stairs, the positive association between age and LAPA was strengthened, while the negative relationship between age and HAPA was reversed. Other studies indicate that this pattern of difference in positive affect in older adults and younger adults is related to memories (Mickley & Kensinger, 2009; Narme et al., 2016), cognitive function (Leclerc & Kensinger, 2008), meaning in life (Chu et al., 2020), and diminished future time perspective (Mogilner et al., 2011). Though more research is needed to explain the shift toward LAPA across the lifespan, the robustness of these findings underscores the importance of LAPA to the human experience of emotion.

Education and training research (Table 5)

Research involving education and training provides, to some extent, support for the view that HAPA facilitates achievement and LAPA facilitates a sense of safeness (Gilbert et al., 2008). In one study, when an exam was framed as a threat, LAPA was decreased and HAPA unaffected, while framing the exam as a challenge increased HAPA without impacting LAPA (Skinner & Brewer, 2002). It may be this relationship to threat, and the possibility that many people experience educational tasks as threatening, that explains the findings of several studies that LAPA, more so than HAPA, was associated with beneficial learning processes in settings such as online (Howardson & Behrend, 2016), in smaller conversational groups (Hendrix & Morrison, 2020), during medical training scenarios (Fraser & McLaughlin, 2019; Fraser et al., 2012), and during mental imagery sessions to improve dart throwing (Kuan et al., 2018). It has less frequently been found that LAPA and HAPA had similar beneficial effects (Young et al., 2021) or HAPA had more beneficial effects (Brooks, 2014). Understanding HAPA as driving and LAPA as soothing, along with understanding the learners' contexts, could yield fruitful predictions for the effects of positive affect on educational performance and learning.

Emotion and affect research (Table 6)

Research where the object of interest is affect and emotion itself provides clues about why LAPA has been overlooked and underscores why it should not be. One possible explanation for the omission of LAPA from research on positive affect is its close proximity to emotional neutrality (Gasper et al., 2021; Kirkland & Cunningham, 2012), involving fewer thoughts that lead to action (Sugawara & Sugie, 2020), thus rendering LAPA less noticeable than HAPA. However, even if LAPA does not demand attention or spur activity, it is most decidedly associated with feeling good. In research on happiness from around the globe, when people define happiness, they are more likely to include LAPA than HAPA in their definitions (see Delle Fave et al., 2016, described in Table 13). Additionally, when participants in Germany were asked to generate a positive state without any further elaboration or instruction, people reported feeling LAPA more frequently than HAPA (Engen et al., 2017). In Sweden, happiness was higher when it was framed as LAPA and lower when it was framed as HAPA, when compared to a control condition (Bjalkebring et al., 2015, described in Table 4). So even though LAPA may be considered to be similar to neutrality, its valence is as (or more) positive than HAPA, and as such any conceptualization of positive affect that does not include LAPA is incomplete.

Health research (Table 7)

Research from the health domain highlights the importance of including both HAPA and LAPA in research on positive

Table 4 Developmental research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Adulthood:					
Bjalkebring et al. (2015)	193 adults, Sweden	Participants were randomly assigned to read different definitions of happiness and then asked to rate their happiness across 9 time points from 10 years ago to 10 years in the future. Happiness ratings from younger adults (<55) and older adults (>55) were compared to a no-definition control group	*Manipulation:* Happiness is to be satisfied, to have a life filled with positive emotions	*Manipulation:* Happiness is to be ecstatic, to be bursting with positive emotions	Compared to the control, happiness was higher when it was framed as LAPA and lower when it was framed as HAPA. Older adults, but not younger adults, rated themselves as happier based on a description of LAPA than on a description of HAPA
Chu et al. (2020)	162 younger and older adults, China	Participants answered questions about their momentary affect and meaning in life 3 times a day for 14 days	*Items:* calm, peaceful, relaxed, serene	*Items:* elated, enthusiastic, excited	Compared to younger adults, both LAPA and HAPA were higher in older adults. The effect of positive affect on meaning in life was weaker for momentary HAPA and stronger for global LAPA in older adults compared to younger adults
English and Carstensen (2014)	135 adults, United States	Participants completed daily diaries in the mornings and evenings for 10 days, where they answered questions about their momentary emotional experiences and sleep. Age differences in each emotion in morning and evening were analyzed, controlling for physical health and verbal fluency	*Items:* calm, content, relaxed	*Items:* enthusiastic, excited, proud	Older adults reported more HAPA, and especially more LAPA, compared to younger adults. Age differences in LAPA (relaxed, content) were more pronounced in the morning, while age differences for HAPA (enthusiastic) were more pronounced in the evening. Those higher in morningness felt more HAPA in the morning and more LAPA in the evening

Table 4 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Gomez et al. (2013)	212 adults, Switzerland	Participants viewed 12 sets of 14 photos that differed on valence and arousal, rating the valence and arousal of the photos after each set. Ratings were analyzed based on age and gender of participant, controlling for education, initial mood, health, verbal fluency, and 5-factor personality traits	*Manipulation:* IAPS photos pleasant family scenes, pleasant landscapes; *Measure*: 9-point SAM	*Manipulation*: IAPS photos erotic heterosexual couples, sport scenes; *Measure*: 9-point SAM	LAPA images were rated more pleasant (family scenes and landscapes) and more relaxing (landscapes) by women than men. HAPA images (erotic scenes) were rated more pleasant by men than women, and this was not moderated by age
Hamm et al. (2021)	146 younger and older adults, 320 older adults; Canada	In Study 1 participants reported their daily levels of affect each day for one week. In Study 2, a longitudinal study, participants reported their daily affect for three days over the course of one week, for at least two of six waves of data collection spaced 2 years apart	*Item*: calmness	*Item*: excitement	Compared to younger adults, older adults experience more LAPA and less HAPA in daily life. Higher levels of LAPA predicted lower subsequent levels of stress, depression, and physical symptoms, especially for those in low control circumstances
Hogan et al. (2013)	144 adults, United States	Participants reported their affect and then were randomly assigned to 15 min on a stationary bicycle or a control condition wherein neutral images were viewed. Their affect was then measured	*Items:* calm, content, relaxed	*Items:* activated, enthusiastic, excited	Compared to a control condition, exercise increased HAPA and decreased LAPA, and the decrease in LAPA was more pronounced for younger adults
Hudson et al. (2016)	2,303 adults in 2012, 1,920 in 2013, 1,763 in 2014; Germany	Participants answered questions about their feelings on the previous day, one time each year for three years	*Item:* satisfied	*Item:* enthusiastic	Cross-sectionally, as age increased HAPA decreased, but LAPA did not. Longitudinally, both HAPA and LAPA decreased over three years for all ages
Jiang (2020)	231 adults, China	Participants answered questions about their daily affect and stress once a day for 14 days	*Item*: calm	*Item:* enthusiastic	Both HAPA and LAPA were associated with less perceived stress, but the association between HAPA and lower levels of stress was not as strong in older adults compared to younger adults

Table 4 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Kern et al. (2014)	74,859 English-speaking Facebook users	Differential language analysis was applied to Facebook posts to track the frequency of words and phrases used by people of different ages. Use of emotion words was compared	*Tracked words:* grateful, proud	*Tracked word:* excited	In a cross-sectional analysis, use of HAPA words (excited) peaked between age 20 and 30 then declined, while use of LAPA words (grateful, proud) gradually increased with age, with LAPA word use surpassing HAPA word use at roughly age 35
Kessler and Staudinger (2009)	277 adults, Germany	Participants answered questions about their affective experience, affect regulation, future time perspective, 5-factor personality, health, and sociodemographics. Age groups (young 20–35, middle-aged 36–58, and older 59–80) were used to look for age-related differences	*Items*: at ease, at rest, relaxed, serene	*Items*: elated, euphoric, excited	LAPA was higher among older adults compared with middle and younger adults, even controlling for age, gender, illness, and personality traits. No age differences in HAPA were found
Leclerc and Kensinger (2008)	48 adults, United States	Participants were asked to report when an array of photos contained a different item instead of all the same items. The valence and arousal of the photos was manipulated, accuracy and response times of younger and older adults was compared, controlling for several differences in state affect and cognition	*Manipulation*: Images rated high valence, low arousal	*Manipulation:* Images rated high valence, high arousal	Older adults detected HAPA and LAPA images faster than neutral images while younger adults detected only HAPA images faster than neutral
Mickley and Kensinger (2009)	26 students and 26 adults, United States	Participants viewed 100 emotional and neutral pictures, rating each for making them want to approach or back away. Later participants were asked to identify pictures they had been shown among pictures they had not been shown. They rated their confidence in their memory and the amounts of recalled details and thoughts	*Manipulation*: IAPS images (e.g., sunset)	*Manipulation*: IAPS images (e.g., money)	Older adults had higher quality memories than young adults for LAPA recollections but not HAPA recollections

Table 4 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Mogilner et al. (2011)	70,153 blog posts; 386 younger and older adults, 74 adults, 86 adults, 82 adults; United States	In Study 1 researchers analyzed 70,153 sentences in personal blogs that start with the words "I feel" and expressed happiness. When the age of the author could be ascertained along co-occurring words indicating HAPA and LAPA, usage frequency was reported by age group (divided by decades). In Study 2, participants were surveyed about the overall happiness and the percent of time they felt either excited or peaceful. In Study 3, participants of different ages were made to listen to a HAPA or LAPA version of the same song and asked to rate their affect and happiness. In Study 4, participants were assigned to stimuli that engendered a focus on the present moment or not. A manipulation check indicated the stimuli increased present moment focus for young adults, but no change in older adults. Then participants rated HAPA and LAPA in their definition of happiness. In Study 5, participants were asked about a planned purchase, and a recent purchase that made them happy. Responses were coded for LAPA and HAPA	*Coded words*: calm, peaceful, relaxed, relieved	*Coded words:* ecstatic, elated, excited, giddy	With each successive decade LAPA words co-occur with "happy" more frequently and HAPA words less frequently. With each successive decade time spent in LAPA increases and HAPA decreases. The correlation of each to overall happiness shifts, such that by age 50, LAPA is positively, and HAPA is negatively, correlated with happiness. Older adults made to feel LAPA reported more happiness than those made to feel HAPA; the reverse was true for younger adults. Older adults endorsed LAPA more so than HAPA in their definition of happiness, as did young adults made to focus on the present moment, but the reverse was true for young adults in the control condition. Older adults reported purchase decisions involving LAPA more so than HAPA, while the reverse was true for younger adults

Table 4 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Narme et al. (2016)	113 older and younger adults, France	Participants (older and younger adults) were exposed to sets of melodies and later asked to rate how much they liked (preference) a melody and whether they had heard it before (recognition)	*Manipulation*: Peaceful melodies in major mode with intermediate tempo	*Manipulation*: Happy melodies in major mode with high tempo	HAPA melodies were preferred more than LAPA melodies by both age groups. Compared to younger adults, LAPA but not HAPA melodies were remembered less frequently among older adults
Ready et al. (2019)	83 younger and older adults. United States	Participants were asked to rate the similarity of paired affect words after baseline affect was measured. Differences in similarity ratings between older and younger adults were analyzed, controlling for depressive symptoms	*Items*: at ease, relaxed, resting, serene	*Items*: delighted, elated, euphoric, excited	Older adults reported higher levels of baseline LAPA than younger adults, while HAPA levels did not differ. Ratings of similarity for HAPA emotions (but not LAPA emotions) were less distinct among older adults compared to younger adults. For both LAPA and HAPA, less differentiation was correlated with greater depressive symptoms
Ready et al. (2021)	300 students and older adults, United States	Participants wrote definitions for 11 emotions which were coded for valence, arousal, and other factors	*Stimuli*: Serene	*Stimuli*: Elated	Both younger and older adults described HAPA using "happy," "excited," and "joy," but older adults used the word "accomplished," and younger adults did not. Both younger and older adults described LAPA using "calm," "peace," and "content," but younger adults used "relaxed," and older adults used "happy," and "quiet."
Santorelli et al. (2018)	123 younger and 43 older adults; 34 younger, 41 middle aged, 16 older adults; United States	Younger and older participants rated their own affect as well as the perceived affect of a younger person and older person that they knew	*Items*: at ease, relaxed, resting, serene	*Items*: delighted, elated, euphoric, excited	All age groups perceived HAPA but not LAPA to be lower in older adults with whom they are familiar. However, self-reported HAPA was similar and self-reported LAPA was higher in older adults compared to younger adults

Table 4 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Scheibe et al. (2011)	Adults: 995 pre-election, 471 post-election; United States	Participants rated how they expected to feel if their candidate won or lost in an upcoming election, and then rated how they actually felt after the election results were known. Age difference in forecasting and the accuracy of the forecasts were analyzed	*Items*: calm, content, relaxed	*Items*: activated, enthusiastic, excited	HAPA, more so than LAPA, was forecasted to be experienced after one's candidate wins, however in older adults compared to younger, the forecasted HAPA increase was not as strong. HAPA, more so than LAPA was experienced after one's candidate won, however among the oldest adults, LAPA was experienced to a greater degree than HAPA following their candidate winning. Older adults were less likely than younger adults to overestimate LAPA, but not HAPA
Scheibe et al. (2016)	92 healthcare workers, United States	After work for 10 days, participants reported their affect and emotional regulatory processes. Age differences in afterwork affect was analyzed	*Items*: at ease, relaxed, resting in oneself	*Items*: delighted, euphoric, excited	No difference was found between older and younger adults in after work HAPA or LAPA
Windsor et al. (2013)	39,958 adults, Australia	Responses to questions about affect and physical function in a longitudinal study were analyzed looking for age differences in affective experience	*Items*: calm, peaceful	*Item*: full of life	LAPA was higher, while HAPA was lower, in older adults compared to middle aged adults. After controlling for physical functioning, the relationship between age and LAPA was strengthened, while the relationship between age and HAPA was reversed
Childhood and adolescence					
Hunter et al. (2011)	120 children and adult students, Canada	Participants were made to listen to short excerpts of music and asked to rate how much they liked each. After a break they heard the same excerpts in random order and were asked to identify the emotion of each (happiness, fear, peacefulness, sadness)	*Stimuli*: Music excerpts as rated in Vieillard et al., 2008 *Item*: peacefulness	*Stimuli*: Music excerpts as rated in Vieillard et al., 2008 *Item*: happiness	Children preferred HAPA music, while adults equally preferred HAPA and LAPA music. HAPA emotions were identified more frequently than LAPA emotions by all age groups

Table 4 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Raccanello et al. (2020)	64 second- and fourth-graders, Italy	Participants used a web application designed to promote earthquake-related emotional preparedness. They then answered questions about text comprehension and affect	*Item*: relaxed	*Item*: proud	HAPA but not LAPA was higher in younger compared to older children. Both LAPA and HAPA were associated with better digital self-concept (self-efficacy beliefs about using digital devices).
Russell and Bullock (1986)	38 2-year-olds, 21 3-year-olds, 19 4-year-olds; 30 adults; Canada	Participants were asked to sort 10 images of varied facial expressions in terms of difference and similarity	*Image*: calm	*Image*: excitement	Children and adult groups identified a LAPA image as different than a HAPA image

IAPS International Affective Picture System (Lang et al., 1997), *SAM* The Self-Assessment Manikin (Bradley & Lang, 1994)

affect and health, since important differences can be found in how each type of positive affect relates to health, and these differences largely align with what would be expected from positive affect that activates and positive affect that deactivates (Gilbert, 2005, 2014; Tomkins, 1962). First, HAPA and LAPA have different relationships to the autonomic nervous system in response to pain. Even though both HAPA and LAPA were associated with an increase in the soothing parasympathetic response to pain, they had opposite effects on the action-oriented sympathetic response to pain, in that LAPA buffered the sympathetic response, while HAPA amplified it (Acevedo et al., 2020).

Second, LAPA and HAPA relate differently to cardiovascular health, with findings that LAPA is associated more consistently than HAPA with indicators of heart health, including good cholesterol (Shirom et al., 2009), lower blood pressure (Armon et al., 2014), and better cardiac function such as heart rate variability (Lynar et al., 2017; Petrocchi et al., 2017; Reynaud et al., 2012), pre-ejection period (Neumann & Waldstein, 2001), and vagal tone (Lane et al., 2011; Schwerdtfeger & Gerteis, 2014). However, when it comes to vagal tone, trait HAPA (as opposed to momentary) is associated with better vagal tone than trait LAPA (Schwerdtfeger & Gerteis, 2014), and one study found the beneficial relationship to vagal tone to be limited to a safe/content factor of LAPA (Duarte & Pinto-Gouveia, 2017).

Third, LAPA and HAPA relate differently to sleep, with evidence that LAPA is beneficial to various aspects of sleep such as sleeping longer, shorter bouts of waking during the night, and falling asleep more quickly (Tavernier et al., 2016) and a lower heart rate and better heart rate variability while sleeping (Schwerdtfeger et al., 2015). However, one study found that LAPA's association with better sleep efficiency was limited to days of high stress (Pressman et al., 2017).

Fourth, LAPA and HAPA relate differently to exercise, with evidence that HAPA is increased during exercise (Lathia et al., 2017) and immediately following exercise (Petruzzello et al., 2001; Stevens et al., 2016; Williams et al., 2011). However, LAPA induced by music has been found to promote recovery from exercise (Karageorghis et al., 2018) and LAPA experienced during exercise predicted higher levels of physical activity 45 min later compared to those who experienced HAPA (Kanning & Schoebi, 2016).

Finally, LAPA and HAPA relate differently to substance abuse and addictive behaviors, though the evidence does not seem to be well explained by theory. For example, heavy episodic drinking was predicted by higher levels of momentary HAPA (not LAPA) and trait LAPA (not HAPA; Jones et al., 2021). Moreover, beer consumption was increased by both LAPA and HAPA, but for those with trait positive urgency, LAPA decreased beer consumption, while HAPA increased it (Dinc & Cooper, 2015). It is possible that such a

Table 5 Education and training research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Brooks (2014)	140 students, 188 students, 218 students; United States	In three studies (Study 1 did not compare HAPA and LAPA) involving public speaking and math, participants were randomly assigned to a calm or excited condition. While physiological measures of arousal were assessed, participants completed an anxiety producing task, and their performance was measured. In the final study, participants' interpretations of threat vs. opportunity were assessed	*Manipulation*: Study 2 -Saying "I am calm"; Study 3 and 4 -Being told "Try to remain calm"	*Manipulation*: Study 2—Saying "I am excited"; Study 3 and 4—Being told "Try to get excited"	Public speakers in the HAPA condition were rated more persuasive, competent, confident, and persistent, and they spoke longer than those in the LAPA and control conditions. HAPA was associated with better math performance than LAPA. There were no differences in self-reported anxiety between the conditions. Those in the HAPA condition were more likely to describe a math task as an opportunity (vs. threat) than those in the LAPA condition
Fraser et al. (2012)	84 medical students, Canada	During a medical training scenario on which their performance would be rated, participants reported their affect and cognitive load	*Anchors:* nervous-relaxed, stressed-serene, tense-calm, upset-contented	*Anchors:* bored-alert, depressed-elated, lethargic-excited, sad-happy	Higher levels of LAPA were associated with lower levels of cognitive load during a medical training simulation, while higher levels of HAPA was associated with higher cognitive load
Fraser and McLaughlin (2019)	174 medical students, Canada	Before a medical training scenario on which their performance would be rated, participants reported their affect. After the training they reported their affect and cognitive load and did so again after debriefing	*Anchors:* tense-calm, nervous-relaxed, stressed-serene, upset-contented	*Anchors:* bored/alert, depressed-elated, lethargic-excited, sad-happy	LAPA decreased after training compared to before and returned to baseline after debriefing. HAPA levels remained constant across time points. Higher LAPA was associated with less cognitive load, and higher HAPA with more cognitive load
Hendrix and Morrison (2020)	103 students, United States	Participants completed surveys that asked them to rate their affect for four imagined situations in which they are talking: with 1 or 2 others, with a group of 3 to 15, with a group of 16 to 30 people, and to a group of 30 or more people	*Items*: calm, contented, relaxed, serene	*Items*: alert, elated, excited, happy	LAPA was relatively more frequently endorsed than HAPA for talking with 1 or 2 others, or 3 to 15 people. LAPA and HAPA were endorsed to a similar degree for larger groups and public speaking

Table 5 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Howardson and Behrend (2016)	395 adults online, United States	Participants were directed to take an online training course and afterward were surveyed about their affect, learning, and intentions to recommend the course	*Item*: calm	*Items*: energizing, enthusiastic, exciting, fascinating	LAPA was associated with increased learning, and HAPA was associated with decreased learning. Both LAPA and HAPA were associated with more positive recommendation intentions
Skinner and Brewer (2002)	118 students, Australia	Participants answered questions about threat/challenge appraisals and affect one week prior, the night before, and immediately following an exam	*Anchors:* nervous–at ease, panicky– calm, tense–relaxed	*Anchors:* bored–focused and alert, discouraged– enthusiastic, dejected–excited	Appraising an exam as a threat decreased LAPA but not HAPA; appraising it as a challenge increased HAPA but not LAPA
Yang et al. (2021)	6 adult students of English, China	In a qualitative study, participants wrote 4 reflexive journal entries over the course of a 16-week online English class, after which they responded to semi-structured interview questions	*Coded affect:* calmness, relaxation	*Coded affect:* enjoyment, hope	Among English learners, the antecedents of LAPA were observed to be not having to answer questions from the teacher, listening to audio but not showing themselves on video, and teacher kindness. The antecedents of HAPA were observed to be positive feedback from teacher, classmates' presentations, learning at their own pace, receiving bonus points, and contemplating goals for using English
Young et al. (2021)	693 doctors, United States	Participants answered questions about a training for performing patient handovers, including their affect and three types of cognitive load: intrinsic (the complexity and importance of the task), extraneous (factors unrelated to the task like behavior of others), and germane (accessing and synthesizing knowledge)	*Anchors:* tense-calm; nervous-relaxed; stressed-serene; upset-contented	*Anchors:* bored-alert, depressed-elated; lethargic-excited, sad-happy	Higher levels of LAPA and HAPA were both related to lower intrinsic and extraneous cognitive load

Table 6 Emotion and affect research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Clark et al. (1984)	38 students, United States	Participants were randomly assigned to either an exercise or relaxation condition and then asked to rate the mood shown by people in photographs	*Item*: serenity	*Item*: joy	Those in an increased arousal state (following exercise) were more likely to interpret positive facial expressions as indicating HAPA rather than LAPA, though no difference between self-reported HAPA and LAPA were found following the arousal manipulation
Davis and Gatersleben (2013)	144 older adults, United States	Visitors to a wild natural environment (cliffs) and a manicured natural setting (botanical gardens) were asked to report their affect	*Items*: calm, content, relaxed	*Items*: activated, enthusiastic, excited	LAPA was higher in a manicured natural setting (botanical garden) than in a wild natural setting (cliff side), while the reverse was true for HAPA
Engen et al. (2017)	293 recruits from a research panel, Germany	Participants were asked to generate positive or negative emotions while fMRI monitored brain activity and afterward were asked to identify the emotion they were generating	*Example*: calmness, caring	*Example*: happiness, joy	When asked to generate a positive emotional state, participants reported generating LAPA (61%) more frequently than HAPA (39%)
Facciani (2015)	34 students, United States	Participants were randomly assigned to imagine an image of either a winning lottery ticket or a kitten and then rate their feelings	*Items:* calm, relaxed	*Item*: excited	Those asked to imagine a kitten reported feeling LAPA, while those asked to imagine a winning lottery ticket reported feeling HAPA
Gasper et al. (2021)	239 adults online, 463 adults online	In two studies, participants answered questions about their current affect	*Items:* calm, at-ease, at-rest, relaxed, serene,	*Items:* alert, attentive, energetic, full-of-pep, wide-awake	HAPA was negatively correlated with neutral affect in two studies, while LAPA was positively correlated with neutral affect in one study and uncorrelated in another
Kirkland and Cunningham (2012)	40 students, United States	Participants were asked to imagine themselves in scenarios in which valence (good, bad), prediction (great, terrible, no prediction) and outcome (as expected, better, worse) were manipulated, then they rated their feelings in each scenario	*Item*: contentment	*Item*: joy	LAPA was associated with neutral expectations being met. HAPA was associated with good expectations being met and better-than-expected outcomes

Table 6 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Ruan et al. (2020)	468 patients and healthy adults, United States	Participants responded to questions about their affect and emotion suppression 10 times a day for 3 days	*Items*: calm, relaxed	*Items*: alert, attentive, enthusiastic, excited (in a positive way), interested	Both HAPA and LAPA were lower during suppression of negative emotion, but at the next affect measurement following emotion suppression, neither HAPA nor LAPA were impacted
Simon and Nath (2004)	1,346 adults; United States	Participants reported how many days in the previous week they experienced specific affects, along with other sociodemographic factors	*Items:* at ease, calm, contented	*Items:* excited, happy, overjoyed, proud	Women report less frequent LAPA and HAPA than men. For HAPA, this discrepancy was not impacted by sociodemographic factors, but differences in LAPA were nonsignificant after accounting for social status (particularly having children under 18 in the home). Having children at home was associated with less frequent LAPA but not HAPA. Being older was associated with more LAPA but not HAPA. Having more education was associated with more of both LAPA and HAPA
Sugawara and Sugie (2020)	62 students, Japan	Participants were randomly assigned to watch an emotion-inducing or neutral film clip, rate their affect, and then were given 3 min to write twenty statements about what they would like to do at the present moment. Average number of written statements was compared between groups	*Manipulation*: 3-min film clip, The Four Seasons of Nikko (spring landscapes) *Measure*: Affect grid; valence and arousal	*Manipulation*: 3-min film clip, M-1 Grand Prix 2011 (comedy) *Measure*: Affect grid; valence and arousal	HAPA increased thought-action repertoire compared to both LAPA and a neutral condition

Table 7 Health research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Addictive substances and behaviors					
De Jong et al. (2018)	203 female students, United Kingdom	After participants reported their motives for having sex, once a week for 5 weeks they reported on their casual sex ("hooking up") and their emotional response to it during the previous week	*Items*: calm, contented, pleasant	*Items*: ecstatic, enthusiastic, excited	After hooking up, both HAPA and LAPA were more likely among women with enhancement motives (for pleasure and having fun), while LAPA but not HAPA was more likely among women with peer approval motives (avoiding negative judgement of peers)
Dinc and Cooper (2015)	106 students, United Kingdom	Participants were given written scenarios and asked to imagine themselves in them, while mood-congruent background music played. Then they engaged in a beer tasting where consumption was measured	*Manipulation*: Pleasant, relaxing vignettes such as lying on a beach; *Measure:* UMACL	*Manipulation*: Appetitive, activating vignettes such as winning the lottery; *Measure*: UMACL	On average both LAPA and HAPA increased beer consumption compared to a neutral condition, but those with higher levels of trait positive urgency drank more beer after HAPA and less beer after LAPA
Holt et al. (2012)	40 adults, United States	Participants were surveyed 5 times a day for 4 weeks (at the start of alcohol abuse treatment or two weeks prior and two weeks after quitting smoking). They answered questions about affect, urges, confidence in abstinence, and smoking/drinking behavior	*Items*: quiet, relaxed	*Items*: active, peppy	Low levels of HAPA but not LAPA predicted smoking relapse. Neither LAPA nor HAPA predicted alcohol relapse
Jones et al. (2021)	93 drinkers, United States	After initial assessment of affect and alcohol use, participants were prompted to report their affect 7 times a day for 7 days and to report their alcohol use at the end of the day	*Items:* at ease, calm, content, satisfied	*Items:* cheerful, enthusiastic, excited, happy	More heavy episodic drinking of alcohol was associated with higher person-level LAPA, but not momentary LAPA, while more heavy episodic drinking was associated with higher momentary HAPA, but not person-level HAPA

Table 7 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Litt et al. (2021)	198 adult cannabis users, United States	Participants were assigned to one of four conditions: standard of care for reducing cannabis use (motivational enhancement and cognitive behavioral treatment: MET-CBT) with and without contingency management support, and an approach under investigation (Individualized Assessment and Treatment Program: IATP) with and without contingency management support. Affect was assessed at several time points over 14 months	*Items*: quiet; relaxed	*Items*: active; peppy	LAPA, more so than HAPA, was increased by individualized treatment. HAPA, but not LAPA, was increased by contingency management
Padovano et al. (2020)	166 adolescent smokers, United States	After completing a questionnaire about nicotine dependence, participants made daily diary entries recording their smoking experience and affect one week prior to and one week following a decision to quit smoking	*Items*: calm, relaxed	*Items*: cheerful, excited	LAPA was associated with a reduced likelihood of smoking relapse, while HAPA was associated with an increased likelihood of smoking relapse, irrespective of severity of nicotine dependence
Silva et al. (2016)	56 adults; Netherlands and Portugal	Participants of focus groups discussed their conceptualizations of wine, beer, and non-alcoholic beer, and their responses were content analyzed	*Concepts*: calm, comforted, loving	*Concepts*: adventurous, amused, energetic	Wine was associated with LAPA (calm and loving). Beer was associated with HAPA (adventurous and energetic). Non-alcoholic beer was associated with neither
Cardiovascular health					
Armon et al. (2014)	1807 adults, Israel	Patients responded to a survey during a routine health checkup	*Items:* at-ease, calm, content, relaxed, satisfied	*Items:* ecstatic, energetic, enthusiastic, excited, inspired	Higher levels of work-related LAPA were associated with lower levels of systolic and diastolic blood pressure. Systolic blood pressure and heart rate were higher when HAPA levels were high or low, and lower when HAPA levels were moderate

Table 7 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Duarte and Pinto-Gouveia (2017)	91 female students, Portugal	Participants completed questionnaires about how they felt in the last month, and then their heart rate variability was measured	*Items*: calm, relaxed, peaceful (relaxed subscale); safe, secure, warm (safe/content subscale)	*Items*: active, dynamic, excited	Quadratic relationship with heart rate variability was found for LAPA (safe/content) but not for LAPA (relaxed) or HAPA
Lane et al. (2011)	161 patients with Long QT Syndrome, United States	Participants reported on affect 10 times a day for 3 days. Electrocardiograms were taken each day	*Items*: calm, relaxed	*Items*: attentive, excited, interested	Daily LAPA was associated with longer cardiac QT intervals (improved vagal tone in circumstances of parasympathetic cardiac regulation), while daily HAPA was associated with shorter QT intervals
Neumann and Waldstein (2001)	42 students, United States	Participants were asked to talk for 3 min about an emotional recollection, hemodynamic data was collected, and post-task levels were compared to individual baseline	*Manipulation*: A time you felt relaxed; *Items*: at ease, calm, content, relaxed, satisfied, serene	*Manipulation*: A time you felt joyful; *Items*: aroused, delighted, excited, glad, happy, pleased	Talking about recollections of both HAPA and LAPA increased blood pressure, heart rate, and total peripheral resistance, with a decrease in stroke index, compared to baseline. LAPA lengthened the pre-ejection period to a greater degree than HAPA. No gender difference was found
Schwerdtfeger and Gerteis (2014)	122 adults, Austria	Participants answered questionnaires in the morning and wore physiological recording equipment throughout the day. They answered questions every 50 to 80 min throughout the day on an iPad in response to a prompt	*Items*: calm, relaxed	*Items*: awake, brisk, delighted, dynamic	Momentary LAPA was associated with improved vagal tone, while momentary HAPA was associated with worse vagal tone. Trait-like LAPA was not related to vagal tone, while trait-like HAPA was associated with improved vagal tone
Shirom et al. (2009)	1,585 adult patients, Israel	Participants reported their job-related affect at health checkups 24 months apart	*Items*: at ease, calm, content, relaxed, satisfied	*Items*: ecstatic, energetic, enthusiastic, excited, inspired	Among men but not women, higher LAPA predicted higher levels of HDLC (good cholesterol) and lower levels of triglycerides. Higher HAPA predicted lower levels of good cholesterol, and very low or very high levels of HAPA predicted higher levels of triglycerides

Table 7 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Diurnal rhythms and sleep					
Deer et al. (2018)	370 adolescents, United States	Participants collected saliva samples and recorded affect 5 times a day for 2 days	*Items*: calm, cheerful, happy	*Items*: enthusiastic, excited, interested, joyful	HAPA and LAPA were lower among African American and Asian youth compared to White youth, the difference was more pronounced for HAPA. Affect did not explain racial differences in cortisol slope
Hoyt et al. (2015)	315 adolescents, United States	Participants collected saliva samples and reported thoughts, feelings, sleep, and health behaviors 6 times a day for 3 days	*Items*: cheerful, happy, relaxed	*Items*: active, alert	HAPA but not LAPA was associated with a steeper decline in cortisol throughout the day and lower evening cortisol, a pattern which is associated with lower risk of depression and heart disease
Nováková et al. (2021)	60 adults, Czech Republic	Participants were randomly assigned to spend three nights in a control or treatment condition, which included exposure to a pleasant odor (vanilla) and an unpleasant odor (similar to rotten eggs). Affect was assessed each morning	*Items*: serene, calm, and relaxed rather than tense, anxious, and nervous	*Items*: interested, engaged, and optimistic rather than bored, indifferent, and pessimistic	Neither LAPA nor HAPA, as measured in the morning, were significantly impacted by exposure to pleasant or unpleasant odors the previous night
Pressman et al. (2017)	83 students, United States	Four times a day for 13 days, participants reported their momentary affect, stress, and sleep quality	*Items*: at ease, calm, relaxed	*Items*: energetic, full of pep, lively	State LAPA, but not state HAPA, was associated with better sleep efficiency on days of high stress and worsened sleep efficiency on days of low stress. Trait LAPA was associated with shorter sleep duration, while trait HAPA was associated with more efficient and better-quality sleep
Schwerdtfeger et al. (2015)	63 adults, Germany	Participants reported affect 15 times on a weekday, and electrocardiogram and bodily movements were recorded that night	*Items*: calm, content, even-tempered, relaxed	*Items*: active, awake, brisk, delighted, dynamic	Daytime LAPA, but not HAPA, was associated with lower heart rate and better heart rate variability during sleep

Table 7 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Tavernier et al. (2016)	77 adolescents, United States	For 3 days participants answered questions, in the morning about sleep and in the evening about daily experiences including affect	*Item*: calm	*Items:* energetic, excited, happy	LAPA was associated with falling asleep more quickly at bedtime, while HAPA was associated with falling asleep less quickly
Exercise and sport					
Holahan et al. (2020)	881 middle aged women, United States	Participants answered questions as part of the second wave of the National Survey of Midlife Development in the United States	*Items*: calm, peaceful, satisfied	*Items*: active, attentive, cheerful, enthusiastic, extremely happy, full of life, in good spirits, proud	Both HAPA and LAPA were related to higher levels of physical activity in middle aged women
Kanning and Schoebi (2016)	65 students, Germany	Participants rated their affect every 45 min during waking hours over a 24-h period while an accelerometer measured physical activity	*Anchors*: calm-agitated, relaxed-tense	*Anchors*: tired-awake, without energy-full of energy	HAPA and LAPA were associated with higher levels of physical activity in concurrent moments, but only HAPA predicted lower levels of physical activity 45 min later
Karageorghis et al. (2018)	42 students, United Kingdom	With each participant going through all 3 conditions, they vigorously cycled to exhaustion and then listened to sedative music, stimulating music, or no music for 30 min, and cortisol, heart rate, and blood pressure were measured	*Manipulation*: Music with average of 71 beats per minute	*Manipulation*: Music with average of 129 beats per minute	LAPA, but not HAPA, decreased cortisol levels after exercise, especially for women
Kuan et al. (2018)	63 adults, Australia	Baseline performance was assessed, and participants underwent 12 sessions of imagery training for dart throwing while listening to relaxing music, arousing music, or no music, after which dart throwing performance was reassessed and competitive anxiety was measured	*Manipulation*: Frederick Delius's Florida Suite: III Sunset "Near the Plantation"	*Manipulation*: Edmond De Luca's Conquerors of the Ages "Attila the Hun"	Subsequent dart throwing scores and self-confidence were higher and heart rate and cognitive anxiety were lower after listening to LAPA music during success imagery compared to listening to HAPA music or no music. Anxiety decreased with both HAPA and LAPA music compared to no music
Lathia et al. (2017)	12,838 app downloaders	Participants were prompted twice a day to report mood and behavior while accelerometer data was collected	*Items*: calm, content, relaxed	*Items*: alert, attentive, enthusiastic, excited, interested	HAPA but not LAPA was predicted by higher levels of self-reported and app-collected physical activity

Table 7 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Petruzzello et al. (2001)	29 students, United States	Participants were assessed for EEG measures and affect, and then worked out on treadmill. EEG and affect were measured again 10, 20 and 30 min after exercise	*Items*: at-rest, calm, placid, quiet, still,	*Items*: active, energetic, full-of-pep, lively, vigorous	Those with greater left frontal activity as measured by EEG, showed HAPA, but not LAPA, increase following acute aerobic exercises, especially among highly fit individuals
Stevens et al. (2016)	120 women, United States	After assessing affect, participants were randomly assigned to walk on a treadmill or engage in hula hooping for 30 min, and then affects were again assessed	*Items*: e.g., relaxed	*Items*: e.g., energetic	HAPA but not LAPA was higher after exercising. HAPA but not LAPA was higher for hula hooping compared to treadmill walking
Williams et al. (2011)	60 women smokers, United States	Among smokers, craving and affect were measured prior to and immediately following either a moderate exercise condition or a wellness film (control)	*Items*: at-rest, calm, placid, quiet, still	*Items*: active, energetic, full-of-pep, lively, vigorous	HAPA but not LAPA increased following moderate aerobic exercise
Pain, healing, and longevity					
Acevedo et al. (2020)	283 students, United States	Participants' heart activity was recorded while their affect was induced through a writing task, affect manipulation was checked, and they then plunged their hand into painfully cold water. They answered questions about affect, stress, and response to pain	*Manipulation*: Write about a time when you were calm and/or relaxed; *Items*: calm, relaxed	*Manipulation*: Write about a time when you were excited and/or elated; *Items*: lively, enthusiastic	LAPA buffered and HAPA amplified sympathetic activation response to pain. Both LAPA and HAPA increased parasympathetic soothing response to pain
Campo and Uchino (2013)	162 adults, United States	After a baseline assessment of affect, participants engaged in two tasks: a mental arithmetic task and holding a frozen ice pack to their forehead, while the support of either their dog or their best friend was present in the room. Then affect was again assessed	*Items*: at ease, calm, relaxed	*Items*: attentive, determined, strong	In neither LAPA nor HAPA were differences found between stressor type or support condition

Table 7 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Moreno et al. (2016)	186 breast cancer patients, United States	Affect was measured at baseline, and participants provided blood samples at baseline, 6 months and 12 months later	*Items*: calm, relaxed	*Items*: active, alert, enthusiastic, excited	LAPA was related to lower levels of a marker of inflammation regardless of fatigue levels, while HAPA's relationship to lower levels of inflammation was mediated by fatigue
Pressman and Cohen (2012)	88 autobiographical essays, United States	Percentage use of affect words in autobiographical personal content was calculated and associated with longevity	*Coded words*: calm, content, relaxed	*Coded words*: active, alert, attentive, confident, determined, energetic, enthusiastic, giggle, happy, inspired, jovial, laugh, lively, proud	Use of HAPA words but not LAPA words in autobiographical essays predicted longevity among influential psychologists
Robinson et al. (2017)	122 biopsy patients, New Zealand	Participants were asked to write about their deepest thoughts and feelings about a traumatic and upsetting experience in their lives for 3 days. Affect was measured before, during, and after	*Items*: calm, peaceful, relaxed, rested	*Items*: enthusiastic, excited, strong	HAPA decreased during, and rebounded after, an expressive writing task about a traumatic experience; and healing from a biopsy wound was slower as HAPA levels decline, and faster as HAPA levels increased, while LAPA was not related

UMACL The UWIST Mood Adjective Checklist (Matthews et al., 1990)

result could be related to the finding that beer has been found to be associated with HAPA and wine with LAPA (Silva et al., 2016). Smoking relapse among teens was less likely when experiencing LAPA and more likely when experiencing HAPA (Padovano et al., 2020), but for adults this pattern was not found (Holt et al., 2012). Different approaches to treating substance abuse impact positive affect differently; treatment that includes contingency management, a system for building skills based on operant conditioning, increases HAPA more so than LAPA, while treatment that includes individualized plans, which involves careful observation of actual behavior in order to target specific behaviors, increases LAPA more so than HAPA (Litt et al., 2021). Such a finding could be seen as consistent with the view that HAPA is related to achievement and LAPA is related to interpersonal support (Gilbert, 2005, 2014).

Neurological and physiological research (Table 8)

Differences between LAPA and HAPA in terms of brain activity have been found in electroencephalogram (EEG) studies measuring the amplitudes of brain waves (da Silva et al., 2016; Leite et al., 2012; Sommer et al., 2016), as well as in functional magnetic resonance imaging (fMRI) studies involving viewing images (Nielen et al., 2009) and listening to music (Trost et al., 2012). Trost and colleagues emphasized that "no brain structure was activated in common by all pleasant music experiences independently of the degree of arousal. This further supports the distinction of positive emotions into two distinct clusters" (p. 2780). Furthermore, these findings provide support for associating HAPA with drive (Gilbert, 2005, 2014) in that HAPA, more so than LAPA, was associated with brain regions involved in motivated attention (Leite et al, 2012).

Among these findings there is support for the proposition that LAPA is associated with the familiar, in that low-arousal positive emotions were related to areas of the brain associated with memory (Trost et al., 2012). Furthermore, as would be expected, LAPA is found to have a lower galvanic skin response, a measure of arousal, than HAPA (Aguado et al., 2016; Lynar et al., 2017; Reynaud et al., 2012), as well as less movement of muscles associated with smiling (Aguado et al., 2016; Reynaud et al., 2012). Additionally, support for the proposition that HAPA is associated with action and alertness was observed, in that HAPA was related to upright posture (Nair et al., 2015; Wilkes et al., 2017), as well as cooler temperatures (Schmidt et al., 2017) and better braking while driving (Trick et al., 2012).

Perception and sensation research (Table 9)

In keeping with operationalizations of LAPA that include "warm" (Gilbert et al., 2008), research on perception and sensation, supports an association between LAPA and warmth as well as other soothing sensations, such as warm reddish lighting (Kim & Mansfield, 2021; Kuijsters et al., 2015), indirect sunlight (Boubekri et al., 1991), and softer sounds (Västfjäll et al., 2003). Conversely, HAPA has been associated with cool bluish lighting (Kim & Mansfield, 2021; Kuijsters et al., 2015), higher toned sounds (Västfjäll et al., 2003), and sweet tastes (Jaeger et al., 2018, 2019). Research on time perception may be potentially important in light of theory and research that associates LAPA with an orientation toward the present moment (Mogilner et al., 2011, 2012). However, findings are mixed; LAPA has been associated with overestimating time duration (Angrilli et al., 1997), accurately estimating time duration (among healthy controls) and underestimating time duration (among manic patients; Ryu et al., 2015). Without more research, finding a pattern in positive affect and estimating time duration is elusive.

Personality research (Table 10)

Research on the relationship of different types of positive affect to personality traits has consistently indicated differences in LAPA and HAPA but has not yet yielded a discernable pattern. We observed that LAPA and HAPA are each related to different types of desirable traits, and that neither is a clear marker of a better way to be. Such findings are consistent with the proposition that LAPA and HAPA may be more relevant for people based on their different needs and contexts. However, Ditzfeld and Showers (2014) noted a possible concern about an orientation toward HAPA, and by implication, a possible benefit of LAPA, when they wrote, "We suggest that some affective cores indeed do burn hotter than others. And with these hotter cores comes higher arousal and less stable affect" (p. 597).

Extraversion and neuroticism were the most frequently studied personality traits, and the findings are difficult to interpret. We expected that introverts might have an affinity for LAPA, but no personality-based differences were found between LAPA and HAPA in moments of daily life (Komulainen et al., 2014) nor at work (Madrid & Patterson, 2014, see Table 14). However, personality may impact what emotional experiences are remembered; one study found that those higher in extraversion and having lower or higher levels of neuroticism were more likely to exaggerate past experiences of HAPA and underreport LAPA (Lay et al., 2017). In keeping with the view that LAPA is associated with soothing (Gilbert et al., 2008), neuroticism (being more sensitive to threat and negative emotion) amplified LAPA's positive effect on attention, but was unrelated to HAPA (Siyaguna et al., 2019).

Research on other traits indicates that LAPA has been found to be more prominent than HAPA in the lives of those

Table 8 Neurological and physiological research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Aguado et al. (2016)	38 students, Spain	Participants' baseline physiological activity was recorded (skin conductance, cheek muscle activity, brow muscle activity), then they watched emotional film clips, while the same physiological activity was recorded	*Manipulation*: Nature films	*Manipulation:* Baby films	HAPA increased skin conductance and cheek muscle activity compared to baseline, while LAPA decreased cheek muscle activity and did not change skin conductance compared to baseline. No difference in brow muscle activity was found
da Silva et al. (2016)	22 students, United States	Participants were asked to identify whether an image was in color or not while images of different mouth positions were shown. Participants also rated the mouth images as positive, negative, or neutral. EEG activity was recorded	*Manipulation:* Smile without teeth	*Manipulation:* Smile with teeth	LAPA (no-teeth smile) was rated as less arousing than HAPA (teeth-showing smile), though both were rated positive at a similar frequency. HAPA smiles were associated with more brain activity, such that HAPA was associated with ERPs with larger amplitude in the left occipitotemporal scalp, including P100, N170, VPP and SPW
Leite et al. (2012)	15 female students, Finland	Participants were shown emotion-inducing images while intermittently subjected to a burst of white noise to induce startle. EEG activity and blink response time were recorded	*Manipulation:* IAPS images	*Manipulation:* IAPS images	Compared to a control, HAPA images, more so than LAPA images, enhanced latent positive potential (LPP) and early posterior negativity (EPN), indicating HAPA has a stronger relationship to heightened motivational attention than LAPA. HAPA and LAPA similarly inhibited the startle response
Lynar et al. (2017)	94 university students and staff, Australia	Participants completed a questionnaire measuring baseline emotional state, then listened to music pieces (jazz, classical, self-selected uplifting) successively, rating emotion after each piece. Physiological activity (heart rate, respiration, galvanic skin response) was recorded	*Item:* relaxed	*Item:* joyful	HAPA and physiological arousal was induced by listening to self-selected uplifting music, while LAPA, along with improved heart rate variability, was induced by listening to classical music

Table 8 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Nair et al. (2015)	74 adults, New Zealand	Baseline affect was assessed, and participants were randomly assigned to sit in either an upright or slumped seated posture. Then mood was assessed. Then they were given a stressful task and affect was again assessed	*Items*: calm, peaceful, relaxed, rested	*Items*: enthusiastic, excited, strong	After a stress task, HAPA was higher in an upright posture than a slumped posture, while there was no difference in LAPA
Nielen et al. (2009)	23 women, Netherlands	While in an fMRI scanner, participants viewed affective images and were asked to identify whether the image was indoor or outdoor as brain activity was recorded	*Manipulation*: IAPS photos, e.g., nature, neutral faces	*Manipulation*: IAPS photos, e.g., sports, erotica	Both HAPA and LAPA activated several brain regions such as the right and left ventrolateral PFC, amygdala, and fusiform gyrus, and left hippocampus, among others. HAPA and not LAPA activated the right dorsolateral PFC, cuneus, right middle occipital gyrus, left superior occipital gyrus, right precuneus, putamen, and posterior thalamus. LAPA not HAPA activated the left dorsolateral PFC, left middle temporal gyrus, left anterior thalamus, and left substantia nigra
Petrocchi et al. (2017)	34 adults, Italy	Participants were assigned to receive in a random counterbalanced order a series of sham procedure or transcranial direct current stimulation (tDCS) over the left temporal lobe, closer to the insular cortex than dlPFC, while heart rate was monitored, after which affect change was assessed	*Items*: calm, content, peaceful, relaxed, serene, tranquil	*Items*: active, dynamic, energetic, enthusiastic, excited, lively	LAPA, but not HAPA, increased following transcranial direct current stimulations (tDCS) of the left frontal lobe. Positive changes in heart rate variability were associated with LAPA but not HAPA

Table 8 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Reynaud et al. (2012)	50 adults, France	Participants watched 45-s film clips while either attending carefully to the film or suppressing emotions associated with the film. The order of these tasks was pseudorandomized across subjects. Skin conductance, heart rate, cheek and brow muscle were assessed during film watching. Then participants rated emotions	*Manipulation*: Excerpt of ''Marche of the Penguins'' by Jacquet; *Item*: peacefulness	*Manipulation*: Excerpt of the movie ''Le Dıner de Cons'' by Weber; *Item:* happiness	Those in the HAPA condition had higher skin conductance, heart rate, and cheek activity than those in the LAPA condition, but no difference in brow activation. HAPA but not LAPA showed significant differences in heart rate and cheek activity among those asked to suppress emotion, compared to those who did not suppress emotion
Sommer et al. (2016)	50 female students, Italy	After completing questionnaires about behavioral approach and inhibition and state anxiety, participants were shown emotional images and then were exposed to a weak auditory stimulus before a startle inducing auditory stimulus. Startle response and brain potential were measured	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	LAPA and HAPA differences in brain wave activity in responses to a prepulse inhibition paradigm were observed in the N100 and P200 potentials measured in parietal sites
Trost et al. (2012)	31 adults, France	Participants listened to music that had previously been rated as being one of 9 emotions, and then they rated the extent to which they felt each 9 emotions, arousal, valence, and familiarity. The fMRI experiment consisted of 3 consecutive scanning runs. Each run contained 9 musical epochs	*Items*: nostalgia, tenderness	*Items*: joy, power, wonder	Positive valence was not associated with any particular neural substrate, rather HAPA and LAPA activated different aspects of the brain. HAPA was associated with activation of the left striatum, insula, and sensory and motor areas, while LAPA was associated with activation of the right striatum, orbitofrontal cortex, ventromedial prefrontal cortex, and right parahippocampal cortex

Table 8 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Wilkes et al. (2017)	61 adults, New Zealand	Baseline affect was assessed and then participants were randomly assigned to sit either upright (supported by a taping procedure) or normally (tape was applied but not supportively). Affect was assessed. Then they were given a stressful task, followed by mood assessment	*Items*: calm, peaceful, relaxed	*Items*: elated, enthusiastic, excited	HAPA but not LAPA was increased following a stressful task by an upright posture intervention
Psychomotor response					
Hälbig et al. (2011)	87 younger and young-old adults, United States	Participants were shown emotional pictures and asked to rate their valence and arousal. Later, participants were shown pictures and their response times were assessed as they distinguished between old and new pictures	*Manipulation*: IAPS photos (smiling faces)	*Manipulation*: IAPS photos (erotica)	Psychomotor responses were longer for HAPA than LAPA for both young and young-old adults in a task recognizing old and new photos
Schmidt et al. (2017)	50 employees, Germany	Participants were assigned to one of two driving conditions: cool or neutral temperature. Then affect and sleepiness was assessed	*Items*: at-rest, calm, placid, quiet, still	*Items*: active, energetic, full-of-pep, lively, vigorous	HAPA was higher in a cool driving condition compared to a neutral temperature, while no difference in LAPA were found
Trick et al. (2012)	26 students, Canada	Participants were seated in a driving simulator and shown emotional images appearing in roughly the same position as dashboard screens. They were asked to rate images as positive or negative, all while engaged in simulated driving that included braking events timed to appear at specific time intervals after images	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	LAPA images were associated with better steering performance than HAPA images. LAPA images were judged as positive faster than HAPA images. HAPA images were associated with better braking performance than LAPA, but only when there was a short time lapse between the emotional stimuli and the braking event

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Table 9 Perception and sensation research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Hearing					
Bolders et al. (2017)	81 adults, 84 female adults, Netherlands	In 2 studies, participants were asked to detect a tone while a white noise was in the background. Base line sound detection was assessed, then mood induced, and another test of sound detection was administered. In Study 1 mood was induced with music and mental imagery. In Study 2 mood was induced with photos	*Manipulations*: *Music*: Venus, The Bringer of Peace (Holst) Ave Maria (Bach); *Imagery*: Taking a bath; *IAPS photos*: Flowers, nature	*Manipulations*: *Music*: Eine Kleine Nachtmusik: Allegro (Mozart); The Nutcracker: Waltz of the Flowers (Tchaikovsky); *Imagery*: Winning lottery; *IAPS photos*: Sports romance	When moods were induced with music and mental imagery, LAPA was associated with a lower threshold for detecting sounds in noise compared to HAPA, but this effect was not found when moods were induced with pictures
Västfjäll et al. (2003)	20 students, Sweden	Participants listened to 18 different sounds simulating the interior of an aircraft and rated their affective reactions	*Items*: pleasantness plus low activation	*Items*: pleasantness plus high activation	A sound of low volume and sharpness, with medium tone induced LAPA reactions, while a sound of medium volume and high tone induced HAPA reactions
Lorenzo-Trueba et al. (2017)	414 adults, Japan	Participants were asked to listen to different emotionally coded voices recorded with varying degrees of car noise and then asked to identify the emotions and rate their strength	*Manipulation:* Calm voice recordings *Item:* calm	*Manipulation:* Excited, happy voice recordings *Items:* excited, happy	LAPA voices were more likely to be misinterpreted in noisy recordings than HAPA voices
Lighting					
Kim and Mansfield (2021)	42 adults, United Kingdom	Participants were exposed to 15 different lighting scenarios and asked to rate their affect	*Items*: calm, pleasing, placid, quiet, boring (r)	*Items*: activating, delightful, energetic, enthusiastic, satisfying	HAPA was evoked by bright, blue-enriched task lighting and accent lighting that formed a directional pattern. LAPA was evoked by moderately bright, warm-white task lighting, with diffused up lit accent lighting

Table 9 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Kuijsters et al. (2015)	38 older adults, Netherlands	Elderly participants were shown either an anxiety- or sadness-provoking film, then asked to sit for 10 min in a room that was lit with blue activating light, red deactivating light, or neutral light, during which they repeatedly reported their valence and arousal	*Manipulation:* Red lighting	*Manipulation:* Blue lighting	Compared to a neutral control, LAPA (red-lit ambiance) improved mood (more pleasure, less self-reported arousal, lower skin conductance, lower heart rate) after anxiety induction, while HAPA (blue-lit ambiance) improved mood (more pleasure, higher skin conductance and heart rate) after sadness induction
Boubekri et al. (1991)	40 workers, United States	Participants were randomly assigned to face toward or sideways to sunlight that was varied by window size and sunlight penetration. They were asked to do a proof-reading task, and then their mood and satisfaction were assessed	*Items*: calm, peaceful, restful, hectic (r), rushed (r)	*Items*: excited, exhilarated, stimulated	Neither LAPA nor HAPA was impacted by sunlight when participants were facing sunlight. LAPA but not HAPA was higher for those sitting sideways to sunlight penetrating the room when sunlight levels were moderate. Too much or too little indirect sunlight decreased LAPA
Taste					
Jaeger et al. (2018)	128 adults, 118 adults, 141 adults, 192 adults, 106 adults; New Zealand and Italy	Participants selected sensory words and emotion words to describe foods they were tasting. Each of the 5 studies involved different foods: cashews, peanuts, chocolate, tomato sauce, and fruit	*Items*: calm, relaxed, secure	*Items*: alert, enthusiastic, excited	Various linkages between HAPA and LAPA and sensory attributes were endorsed for different foods, and no pattern of differences between them was observed
Jaeger et al. (2019)	270 adults, 125 adults, 104 adults, 105 adults, 122 adults, 161 adults; New Zealand	In 6 studies, participants were asked to taste and rate affect for salted snacks, potato chips, yoghurt, cheese, snack bars, and fruit	*Items*: at ease, calm, relaxed, secure	*Items*: energetic, enthusiastic, excited, inspired	HAPA, but not LAPA was consistently associated with sweet tastes. HAPA and LAPA were differently and similarly associated with numerous perceptions of taste
Time					

Table 9 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Angrilli et al. (1997)	53 students, Italy	Participants were shown slides of images and rated valence and arousal for each slide. They then estimated the duration of the time the slide was shown, by either indicating on paper or holding a button to replicate the duration	*Manipulation*: IAPS babies, puppies; *Anchors*: sad-happy, calm-activated	*Manipulation*: IAPS erotic; *Anchors*: sad-happy, calm-activated	Relative to negative images, the duration of HAPA images were underestimated, while LAPA images were overestimated
Ryu et al. (2015)	70 adults, South Korea	Participants (manic, bipolar, healthy) were shown emotional photos for either 2, 4, or 6 s and asked to estimate the time and reproduce the time by pushing a button	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	Healthy controls and euthymic patients underestimated time duration of viewing HAPA images but not LAPA images, while manic patients underestimated the time duration of both HAPA and LAPA images, underestimating LAPA to a greater degree than HAPA

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high in agreeableness (Komulainen et al., 2014), low in reward seeking (Kuppens, 2008), integrated self-structure (Ditzfeld & Showers, 2014), prevention focus (Wang et al., 2017, see Table 3), with overwhelmed emotional processing style (Sperry & Eckland, 2021) and empathizers (Greenberg et al., 2015). HAPA has been found to be more prominent than LAPA in the lives of those high in reward seeking (Kuppens, 2008), with compartmentalized self-structure (Ditzfeld & Showers, 2014), promotion focus (Wang et al., 2017, see Table 3) and systemizers[1] (Greenberg et al., 2015). Taken together, the traits that cluster around HAPA are indicative of reward-seeking, and those that cluster around LAPA are indicative of positive sociality, a realistic sense of self, and a tendency to avoid losses instead of seeking gains.

Psychological disorders (Table 11)

Accounting for the difference between LAPA and HAPA could be essential for understanding and treating psychological disorders. For example, Gilbert and colleagues (2008) emphasized that the gentle feelings associated with LAPA serve as a signal of social safeness and respite from activating emotions, suggesting that it plays a healing role in therapeutic settings and daily life. Indeed, researchers found that LAPA, particularly when the measure of it includes safeness and security, has been found to predict lower levels of depression, anxiety and stress (Gilbert et al., 2008; McManus et al., 2019), as well as self-criticism, and insecure attachment (Gilbert et al., 2008). One possibility is that people with depression are less likely to notice low arousal positive states, in light of research that indicates people with depression are less likely than healthy controls to remember LAPA words, but not HAPA words (Deldin et al., 2009). Even if LAPA plays a role in the experience and treatment of depression, it may not be effective at increasing help seeking for depression, given that HAPA, but not LAPA, has been found to increase help seeking intentions (Straszewski & Siegel, 2020), which is consistent with the view that HAPA is associated with spurring action (Gilbert et al., 2008).

The distinction between LAPA and HAPA can help reveal the emotional goal associated with certain dysfunctional behaviors. For example, LAPA could be considered an emotional goal for some types of self-harm. Particularly when the measure of LAPA includes *relief*, LAPA has been found to increase for those having just engaged in non-suicidal self-injurious behavior such as cutting, burning, or

[1] The distinction between empathizers and systemizers was proposed by Baron-Cohen (2009) to describe characteristics of autism such as narrow interests, need for sameness, and attention to detail. He posited a continuum where on one end systemizers have a drive to analyze phenomena or construct system, and on the other end empathizers have a tendency to engage with the emotional and mental states of others.

self-shocking (Ammerman et al., 2018; Claes et al., 2010; Di Pierro et al., 2014; Klonsky, 2009; Kranzler et al., 2018) as well as bulimia (Becker et al., 2018; Cooper et al., 1988). However, HAPA can be seen as an emotional goal for manic behavior, as is suggested by research indicating that hypomanic patients are more likely to endorse HAPA words, but not LAPA words, compared to healthy controls (Pyle & Mansell, 2010). Furthermore, HAPA has been found to elicit reactivity among people suffering from schizophrenia (Lakis et al., 2011; Phillips et al., 2007) and anhedonia (Heininga et al., 2017), suggesting that HAPA may pose risks that LAPA does not. Finally, there is evidence that LAPA may be less disrupted by trauma than HAPA (Bunce et al., 1995), which suggests the possibility that LAPA might be an overlooked resource for resilience in the face of traumatic events.

Relationships and solitude (Table 12)

Differences found between LAPA and HAPA in the realm of relationships and solitude can be considered to be consistent with Gilbert's (2005) proposition that, in contrast to the type of positive affect that encourages reward seeking and achievement (e.g., HAPA), the type of positive affect that signals safety (e.g., LAPA) recruits the same neural pathways as those involved in secure attachment and affiliation (Depue & Morrone-Strupinsky, 2005). As direct evidence, LAPA (a safe/content subscale) was positively related to secure attachment among adults, while HAPA was not (Gilbert et al., 2008). Indirect evidence also supports this theory. If we infer that mothers tend to be the primary attachment figure in infants' lives, the relationship between LAPA and attachment security is supported by the finding that LAPA and medium arousal was more characteristic of mothers' interaction with infants, while fathers were observed to interact with infants in playful ways, more characterized by HAPA (Feldman, 2003). Furthermore, for romantic partners whose implicit motivation was for affiliation in the relationship, having more LAPA was satisfying, while in romantic partners whose implicit motivation was for power, having more HAPA was satisfying (Job et al., 2012). Additionally, among those with avoidant attachment style, LAPA (but not HAPA) was decreased in response to being asked to savor an interpersonal event (Palmer & Gentzler, 2018). Finally, when people find moments of social contact satisfying, both HAPA and LAPA are higher in that moment, but only LAPA is still elevated two hours later (Liu et al., 2021).

In as much as the above research suggests that LAPA may be involved in safeness among other people, a different kind of safeness might be experienced in everyday moments of being alone; moments of solitude were consistently associated with higher LAPA and lower HAPA (Lay et al., 2019; Nguyen et al., 2018; Pauly et al., 2017, 2018). However, more research is needed to explain why and under what conditions LAPA increases during moments of solitude. Pauly and colleagues posited that these low arousal positive moments of solitude may promote "self-reflection, creative thinking, and emotional renewal" (2017, p. 63).

Well-being and mindfulness (Table 13)

Research on well-being and mindfulness are prime examples of the benefits of upending assumptions that conflate positive affect with HAPA. Even though some research supports HAPA's primacy relative to LAPA in association with well-being constructs such as meaning in life (Chu et al, 2020), flow (Collins et al., 2009), gratitude (Jans-Beken et al., 2019), basic psychological needs (Gui et al., 2019), fun (Reis et al., 2017) and identity integrity (Chishima & Nagamine, 2021), the inclusion of LAPA in study designs has clarified understandings of mindfulness and happiness. Early research on mindfulness often failed to find a significant relationship between mindfulness and positive affect when using only HAPA items to measure positive affect (e.g., Chambers et al., 2008; Davis & Zautra, 2013; Jislin-Goldberg et al., 2012). However, one of the most consistent findings of this review is that mindful practices tend to increase LAPA but not HAPA (Imtiaz et al., 2018; Jones et al., 2018; Kerekes et al., 2017; Lymeus et al., 2018; Rowland et al., 2020; Zeng et al., 2019). Albeit, some specific types of meditation, such as a positive empathy meditation, show a different pattern (Zeng et al., 2017). Still, it may be fair to say that LAPA, feeling *calm*, *relaxed*, and *content*, is a signal of success for developing the equanimity, acceptance, and non-judgement associated with mindfulness.

Regarding happiness, research that allows LAPA to be included in the definition of happiness exposes the error of conflating happiness with feelings such as *excitement*, *elation*, and *exuberance* (HAPA). Delle Fave and colleagues (2016) conducted interviews with people in 12 countries on five continents, asking them to define happiness. Among the many aspects of happiness described, affective qualities were coded, and LAPA qualities such as *peace of mind*, *harmony*, and *contentment* were mentioned in roughly 30% of descriptions, while HAPA qualities such as *joy*, *vitality*, and *enthusiasm* were mentioned in roughly 14%. This emphasis on LAPA was echoed in a study of conceptualizations of well-being in Ghanaian languages (Osei-Tutu et al., 2020). The importance of LAPA to happiness across the world was confirmed by a recent Gallup World Poll, which introduced a question that asked participants if they prefer feeling *calm* or *excited*; in nearly all of 116 surveyed countries (96%), a majority of people reported a preference for *calm* (Lomas et al., 2023).

Table 10 Personality research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Ditzfeld and Showers (2014)	305 students, United States	Participants were identified as compartmentalized or integrated in their self-structure, and their affect was assessed	*Items*: at rest, calm, relaxed, serene	*Items*: elated, enthusiastic, excited	HAPA was more experienced and desired by those with compartmentalized self-structure (seeing different aspects of themselves as good or bad), while LAPA was more experienced and desired by those with integrated self-structure (seeing good and bad in different aspects of themselves)
Greenberg et al. (2015)	353 adults, MTurk	Participants completed questionnaires about cognitive styles and listened to musical excerpts that had been coded for psychological attributes and rated their preference for them	*Attributes*: gentle, reflective, relaxing, sensual, warm	*Attributes*: amusing, animated, fun, lively, thrilling, strong	Music with HAPA attributes was preferred by systemizers, while music with LAPA attributes was preferred by empathizers
Komulainen et al. (2014)	104 students, Finland	Participants responded to 10 prompts a day for 6 to 8 days answering questions about affect and activities in the moment. NEO Five Factor personality traits were assessed	*Item*: content	*Item*: excited	HAPA and LAPA were both negatively predicted by neuroticism. Extraversion predicted more momentary LAPA and HAPA, but not person-level LAPA and HAPA. Agreeableness predicted momentary LAPA, but not HAPA
Kuppens (2008)	80 students, Belgium	At an introductory session, participants answered the BIS/BAS questionnaire, and then they rated their arousal, valence, and emotion when signaled once a day for seven days	*Measure:* affect grid, from unpleasant to pleasant, and from sleepy to aroused	*Measure:* affect grid, from unpleasant to pleasant, and from sleepy to aroused	Those high in reward seeking were more likely to associate high arousal with pleasure (HAPA) and low arousal with sadness. Those low in reward seeking were more likely to associate high arousal with stress and low arousal with relaxation (LAPA)
Lay et al. (2017)	179 adults, United States	After personality was assessed, participants reported momentary affect 6 times a day for 10 days, and then retrospectively reported affect for those 10 days on the 10th day and one month later	*Items*: calm, quiet	*Items*: excited, happy	Retrospective reports of HAPA were exaggerated and LAPA was underreported among those high in extraversion and those both high and low in neuroticism

Table 10 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Siyaguna et al. (2019)	37 students, United States	After personality was assessed, participants were given attentional blink tests (identifying a second target after having already identified one) with stimuli that was HAPA or LAPA successively, while corresponding HAPA or LAPA music played	*Manipulations:* IAPS photos Brahms (Variations on a Theme by Haydn, Op. 56)	*Manipulations:* IAPS photos Mozart (Eine Kleine Nachtmusik, KV 525; Divertimento in D major, KV 136; and Divertimento in B flat major, KV 137)	Participants performed better in the LAPA condition on an attentional blink task than in the HAPA condition, and this effect was stronger among those who were high in neuroticism, low in emotional regulation, and low in attentional control
Sperry and Eckland (2021)	233 students, United States	Participants responded to emotional processing scales and were clustered into four styles: hot, cold, cerebral, and overwhelmed. Participants were prompted to respond to affect questions 8 times a day for 14 days. Affect intensity, instability, and inertia were assessed	*Items:* calm, content	*Items:* determined, enthusiastic, excited, proud	Intensity of LAPA was lower in those with overwhelmed processing style compared to cerebral, and inertia of LAPA was lower on the overwhelmed compared to those who are hot. No difference in HAPA were observed across styles

BIS/BAS Behavioral Inhibition Scale/Behavioral Activation Scale (Carver & White, 1994), *IAPS* International Affective Picture System (Lang et al., 1997)

To better understand the importance of either type of positive affect when both are related to a construct, the relationship can be investigated by assessing the degree to which HAPA or LAPA uniquely explains variance in a construct after controlling for the other. Such was the design of research conducted by McManus and colleagues (2019), who assessed levels of affect along with mental health and well-being outcomes, and through multiple regression analysis identified the predictive power of LAPA above and beyond HAPA. LAPA uniquely explained a significant portion of the variance in life satisfaction, feeling good, depression, anxiety, stress, and mindfulness after the variance explained by HAPA had been accounted for. Such results underscore the findings of many studies in this review; even though these positive affective states are highly related, HAPA and LAPA each have unique relationships to many aspects of life, and both should be accounted for when investigating well-being.

Work and leisure (Table 14)

Differences between LAPA and HAPA at work can be explained to some degree by the proposition that low arousal positivity is associated with support and safety and high arousal positivity is associated with drive and achievement (Gilbert, 2005, 2014). For example, LAPA is higher when workers get support (Popa-Velea et al., 2021) and practice self-compassion (Kreemers et al., 2020). Furthermore, when workers describe positive incidents they had with leaders, they were more likely to use LAPA words than HAPA words (Dasborough, 2006). Conversely, LAPA is lower when workaholism is high (Balducci et al., 2012) and when jobs are more demanding (Madrid & Patterson, 2014; Warr, 1992). This may explain the lower levels of LAPA in lower status jobs such as housekeeping (Urick et al., 2018) as well as jobs associated with higher status (Warr, 1992). An indication that LAPA is not associated with drive can be seen in research showing that more LAPA was related to less task engagement (Salanova et al., 2011).

On the other hand, indications that HAPA is associated with drive can be seen in research showing that more HAPA was related to higher task engagement (Salanova et al., 2011), more proactive behavior at work (Ouyang et al., 2019), and more unethical behavior done to benefit others (Umphress et al., 2020). Additionally, an association between HAPA and achievement can be inferred from findings that leaders who exhibited more HAPA were rated as more charismatic (Damen et al., 2008) and effective (Connelly & Ruark, 2010). Moreover, those with higher organizational influence experience more HAPA (Warr, 1992) especially when their work networks are larger (Totterdell et al., 2004). Furthermore, an important element of achievement is effectiveness, which is associated with HAPA, in that HAPA but not LAPA was associated

Table 11 Psychological disorders

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Non-Suicidal Self Injury (NSSI)					
Ammerman et al. (2018)	507 adults, United States	Participants selected the intensity of a shock to be administered to their finger after losing reaction time trials and affect was assessed	*Item:* calm	*Item:* happy	LAPA but not HAPA increased following a self-aggression in an analog paradigm for self-injurious behavior
Claes et al. (2010)	177 female eating disorder patients, Belgium	As a part of admission and routine assessment for an inpatient treatment program, participants rated the frequency of specific affect before and after NSSI	*Item:* relieved	*Item:* happy	LAPA but not HAPA was higher following NSSI, however higher levels of HAPA was correlated with increasing number of reasons for NSSI
Di Pierro et al. (2014)	30 adolescent self-injurers, Italy	Participants responded to a questionnaire measuring trait impulsivity and affect before and after NSSI	*Item:* relieved	*Item:* happy	LAPA but not HAPA increased following high-arousal negative NSSI events, more so for those low on impulsivity than for those who are high on impulsivity
Klonsky (2009)	39 young adult self-injurers, United States	Participants responded to questions in a structured interview about self-injurious behavior. 40 affective states were mentioned, and researchers organized them by valence and arousal	*Example:* relaxed, relieved	*Example:* euphoric, excited	LAPA but not HAPA was higher following NSSI
Kranzler et al. (2018)	47 adolescent self-injurers, United States	Participants reported their affect and self-injurious behavior 5 times a day for 2 weeks	*Items:* calm, content, relieved, satisfied	*Items:* happy, proud	LAPA but not HAPA was higher following NSSI
Other disorders					
Becker et al. (2018)	133 female bulimics, United States	Participants reported their affect and eating behavior 6 times a day for two weeks	*Items*: calm, cheerful, confident, happy, proud, relaxed	*Items*: alert, attentive, determined, enthusiastic	Both momentary HAPA and LAPA were lower before and higher after binge/purge, but daily LAPA, not HAPA, was lower on the day of binge eating events
Bunce et al. (1995)	58 students, United States	Participants, those who had experienced traumatic events (e.g., deaths, assaults, crashes) and those who had not, reported their affect twice daily for four consecutive weeks	*Items*: at rest, calm, quiet, relaxed, still, tranquil	*Items*: affectionate, aroused, astonished, elated, enthusiastic, excited, happy loving, pleased surprised, warm-hearted, wild	HAPA but not LAPA was higher among those who had not experienced trauma compared to those who had. Higher levels of HAPA but not LAPA were associated with experience of trauma at older ages

Table 11 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Cooper et al. (1988)	50 bulimics, United States	Participants were asked retrospective questions about their affect during binging, after bingeing, and after purging	*Items*: relieved, secure	*Items*: energized, excited	HAPA decreased after binging and stayed low after purging, while LAPA decreased after binging and increased after purging
Deldin et al. (2009)	36 adults, United States	Participants, with and without Major Depressive Disorder (MDD), were shown words and asked to memorize them. Later, they were asked to write down the words that they remembered	*Manipulation*: Adjectives such as "kind"	*Manipulation*: Adjectives such as "ecstatic"	Those with MDD recalled fewer LAPA words than HAPA words, but the difference was not found among controls. Those with MDD remembered fewer LAPA words, and similar number of HAPA compared to the control
Gilbert et al. (2008)	203 students, United Kingdom	Participants responded to surveys measuring characteristic affect, mental health, and attachment. Factor analysis yielded HAPA and two LAPA factors. Relative contribution of each was assessed with multiple regression	*Relaxed subscale:* calm, laidback, peaceful, relaxed, serene, tranquil *Safe/content subscale:* content, safe, secure, warm	*Items*: active, adventurous, dynamic, eager, energetic, enthusiastic, excited, lively	Factor analysis yielded HAPA and two LAPA factors: safe/content and relaxed. With all arousal levels in the same model, LAPA (safe/content), but not HAPA, predicted lower levels of depression, anxiety, stress, and self-criticism, as well as attachment style. LAPA (relaxed) predicted lower levels of stress
Heininga et al. (2017)	139 young adults, Netherlands	Participants, with and without anhedonia, reported momentary affect and recalled daily pleasurable experience for 30 days	*Items*: calm, relaxed	*Items*: energetic, enthusiastic	HAPA, but not LAPA, was associated with stronger reactivity to pleasurable experience and greater variability in people with anhedonia compared to those without anhedonia
Kerns et al. (2008)	70 students with and without anhedonia, United States	Participants were asked to describe emotional events and respond to surveys assessing affect intensity on a given day	*Items:* calm, contented, relaxed, serene	*Items:* alert, elated, excited, happy	The intensity of both LAPA and HAPA were lower in those with social anhedonia compared to a healthy control group and a group of those with magical ideation

Table 11 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Lakis et al. (2011)	74 adults, Canada	Participants, schizophrenic patients, and healthy adults were shown blocks of emotional photos and asked to identify whether or not a person was in the photo while in an fMRI scanner. 15 min later they were asked to identify photos they had been previously shown among a larger set of emotional photos. Participants rated the intensity of their emotional response to each block of pictures	*Manipulation*: IAPS photos	*Manipulation*: IAPS photos	HAPA photos were rated as more emotionally salient than LAPA, for both schizophrenics and control. HAPA photos (but not LAPA) were remembered more accurately by the control than schizophrenics
Phillips et al. (2007)	22 adults, United States	Participants, schizophrenics and controls, were audiotaped while answering questions that had been rated for valence and arousal. Transcribed responses were rated for referential errors such as confused references, missing information, and structural unclarities. The number of errors per 100 words was calculated	*Manipulation*: Questions regarding desired places to live, personal pride, favorite singers, and miracles	*Manipulation*: Questions about happiest moments, inspirational moments, passions, exciting experiences	Those with schizophrenia responded to LAPA questions with fewer words and proportionately fewer errors than HAPA questions, indicating less affective reactivity to LAPA questions than HAPA questions
Pyle and Mansell (2010)	48 adults, United Kingdom	Participants, scoring high and low on a measure of hypomanic personality, were shown high activated and low activated words that describe personality and asked to rate how well each word described them or another person	*Manipulation*: Words including likable, grateful, respectful, composed, relaxed, attentive, trusting, cooperative, appreciative, tolerant	*Manipulation*: Words including energetic, courageous, high-spirited, vivacious, outstanding, adventurous, optimistic, talented, ambitious, enthusiastic	HAPA words were endorsed more, and LAPA words were endorsed less by those high in hypomania to describe themselves and others compared to those low in hypomania

Table 11 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Straszewski and Siegel (2020)	1238 adults, United States	Participants described a memory (either excited, calm, or control) and then were asked to recall in more detail how they felt in that moment. Depression, current help seeking, and help seeking intentions were subsequently assessed	*Manipulation:* Savoring a calm memory	*Manipulation:* Savoring an exciting memory	Savoring a HAPA memory increased help-seeking intentions, especially for those who believed themselves to be depressed, while savoring a LAPA memory had no effect

IAPS International Affective Picture System (Lang et al., 1997)

with job search systematicity, an adaptable and persistent approach to finding a job which predicted actually finding a job (Kreemers et al., 2021).

Findings suggest that, in the complexity of work environments, there may be an interplay of support and achievement, as well as an interplay of LAPA and HAPA, in that LAPA and HAPA are both related to many work-related constructs such as perceived justice (Cassar & Buttigieg, 2015), communication with colleagues (Monnot & Beehr, 2014), and effectiveness and confidence in meetings (Rogelberg et al., 2006), following leaders high in either type of positive affect (Kelloway et al., 2013), and innovation at work (Laguna et al., 2021).

Studies on leisure and commuting provide fairly consistent indicators that LAPA is more strongly tied to nature than HAPA. One study found that only LAPA was heightened during leisure activities, particularly walking in nature and sitting in rooms with a view of nature, but less so for walking in urban settings (Hull et al., 1996). Furthermore, cycling to work has been found to consistently increase LAPA (de Kruijf et al., 2019; De Vos, 2018), while car and public transport were associated with heightened HAPA (De Vos, 2018). Still, each type of positive affect was differently impacted by different aspects of nature; when cycling to and from work, LAPA was higher on warmer days and HAPA was higher on windy days (Ettema et al., 2017).

Overall, as would be expected with the relaxing qualities associated with LAPA, LAPA is higher at home and at leisure, and HAPA higher at work (Sandstrom et al., 2017). Furthermore, LAPA may be a buffer against negative spillover from work to home, in that weeks with more LAPA were associated with less work-nonwork interference, and weeks with HAPA were associated with more work-nonwork interference (Wood & Michaelides, 2016).

Operationalizations

Manipulations of LAPA and HAPA

Among all the articles in this review, 70 articles (31%) reported manipulating HAPA and LAPA. Among the articles that manipulated affect, most of the research that manipulated HAPA and LAPA was within cognitive psychology (39% of articles that manipulated affect). Manipulations of positive affect involved photos (46%), music (23%), words (13%), recollections (11%), guided imagery (6%), and film (6%). Information about photo manipulations is reported in Table 15, mood manipulations in Table 16, and specific music manipulations in the various summary tables (e.g., Bolders et al., 2017, see Table 9).

Table 12 Relationship and solitude research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Relationships					
Feldman (2003)	100 mother- father-child triads, Israel	Participants' interactions were videotaped (mother-infant, father-infant) having been instructed to play with the infant for 5 min	*Coded behavior:* averting gaze plus attending to an object and/or attending to parent	*Coded behavior:* social play and object play, exuberance, energy	Father-infant interactions were more characterized by HAPA, while mother-infant interactions were more characterized by LAPA or medium arousal
Job et al. (2012)	78 adults, 81 adults United States	In Study 1, participants answered an online questionnaire about relationships, and later in the lab were assessed for implicit motives (power or affiliation). In Study 2, participants' relationship satisfaction was assessed after being made to think of a HAPA or LAPA experience and implicit motives were assessed	*Items:* calm, peaceful, relaxed; *Manipulation:* Feeling calm and relaxed with partner	*Items:* elated, enthusiastic, excited; *Manipulation:* feeling strong and excited with partner	Correlationally, more relationship satisfaction was related to higher levels of LAPA but not HAPA among those with implicit affiliation motives. Experimentally, LAPA increased satisfaction among those with affiliation motives, and HAPA increased satisfaction among those with power motives
Liu et al. (2021)	78 older adults, China	Participants were prompted to respond to questions about affect, social contact, and satisfaction with social contact 7 times a day for 7 days	*Items:* calm, quiet	*Items:* alert, excited, happy	Higher levels of both HAPA and LAPA were associated concurrently with satisfaction with social contact, though neither HAPA nor LAPA predicted satisfaction with the next occasion of social contact. Higher levels of LAPA, but not HAPA, were associated with having experienced contact satisfaction at the previous assessment
Palmer and Gentzler (2018)	120 adults, United States	After their attachment style was assessed, participants reported baseline affect, were asked to recall a positive relationship experience, and then randomly assigned to savor that experience or reflect on their morning routine. Then affect was again assessed	*Items:* at ease, calm, relaxed	*Items:* active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong	Among the avoidantly attached, LAPA but not HAPA was lower after savoring a positive relationship experience, while it was unrelated to both LAPA and HAPA among those with anxious attachment style
Solitude					

Table 12 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Lay et al. (2019)	100 adults and students, Canada	Participants responded to questions about their current affect, current situation, and desire for solitude 3 times a day for 10 days	*Items:* calm, close to others, satisfied	*Items:* excited, happy	LAPA but not HAPA was found to be useful in distinguishing positive solitude experiences from negative solitude experiences, in that positive solitude was characterized by LAPA but not HAPA
Lay et al. (2020)	100 middle age and older adults, Canada	Participants were prompted to answer questions about current affect, activities, and desire for solitude 3 times a day for 10 days	*Items:* calm, satisfied	*Items:* excited, happy	Current solitude was associated with less HAPA but not less LAPA. Solitary passive leisure was associated with more LAPA but not more HAPA. Compared with desiring social interaction, desiring solitude was associated with lower HAPA and LAPA in middle aged adults, but not older adults
Nguyen et al. (2018)	108 students, 343 students, 173 students, United States	Across 3 studies where participants were directed to spend 15 min of solitude after which affect was assessed, a meta-analysis of the effect of solitude on affect was conducted	*Items:* at ease, calm, content, peaceful, relaxed	*Items:* alert, attentive, energized, enthusiastic, excited, happy, interested, open	HAPA was lower and LAPA was slightly higher when participants were alone and not engaged in any tasks
Pauly et al. (2017)	185 young, middle aged, and older adults, Canada	Participants responded to questions about current affect and solitude, while providing saliva samples seven times a day for 10 days	*Items:* calm, quiet	*Items:* alert, excited, happy	Overall, more solitude was related to lower HAPA but not LAPA. During momentary solitude LAPA was higher and HAPA lower among all ages of adults. However, as age increased, HAPA increased during momentary solitude
Pauly et al. (2018)	183 adults, 97 older adults, Canada	In two studies, participants answered questions about their social situation, relationship quality and momentary affect, 5 or 3 times a day for 10 days	*Items:* calm, quiet	*Items:* alert, excited, happy	LAPA was higher while HAPA was lower during momentary solitude compared to time spent with others. Better relationship quality predicted higher person-level HAPA in all age groups, and higher LAPA among older adults

Types of measures of LAPA and HAPA

Most of the articles in this review (66%) measured LAPA and HAPA. Among those that assessed LAPA and HAPA via self-report, most (93%) presented participants with positive emotion words on which to rate themselves. Sometimes validated scales were used, such as the Activation-Deactivation Adjective Checklist (Thayer, 1986), Affect Valuation Index (AVI; Tsai et al., 2006), Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988), Job-related Affective Well-being Scale (JAWS; Van Katwyk et al., 2000), or Positive and Negative Affect Schedule-Expanded Form (PANAS-X; Watson & Clark, 1994). More often, instead of a scale, representative emotions were assessed (see below for analysis of the positive emotion words used as items). Roughly 15% of the articles that measured LAPA and HAPA with positive items also included negative items, either reverse coded or as anchors for a negative to positive continuum. Less-used approaches to assessment involved rating valence and arousal separately (e.g., Self-Assessment Manikin [SAM], Bradley & Lang, 1994), or on an affect grid (e.g., Russell et al., 1989), and measures that present a series of statements (e.g., Howardson & Behrend, 2016). More rarely, physiological data were used to assess or validate arousal (e.g., Schwerdtfeger & Gerteis, 2014).

Items used to measure LAPA and HAPA

We identified the items used to measure LAPA and HAPA in 150 articles based on the authors reporting the exact items used, a representative sample of the items used, or a validated scale from which the items could be derived. Table 17 displays the frequency with which each item was used. Beyond reporting the frequency of items used to measure LAPA and HAPA, we offer observations about possible measurement problems and conceivable qualities of HAPA and LAPA that can be inferred from item usage.

Frequency of items used

For both LAPA and HAPA, two items were used more frequently than other items. For LAPA, researchers converged on *calm* and *relaxed* which were used in 82% and 67%, respectively, of articles that measured affect with positive items. For HAPA, less of a consensus was apparent for the top two items; *excited* was used in 56% and *enthusiastic* in 49% of papers measuring HAPA, and there was a wider range of positive words used to assess HAPA (52) compared to those used to assess LAPA (31). In the 21 articles using negative items, we did not observe a pattern in positive/negative pairs, but the most frequently reverse-coded or opposite anchor words were *tense* and *worried* for LAPA and *bored* and *depressed* for HAPA.

Possible concerns in item use

Regarding possible measurement problems, we noted four areas of concern. First, some items were used to measure both HAPA and LAPA with relative frequency. For example, the word *happy* was frequently used to assess HAPA and sometimes used to assess LAPA, as was *cheerful*. Such overlap suggests that researchers should consider avoiding these words as a measure of either LAPA or HAPA.

The second concern is related to the first; like *happy* and *cheerful*, the arousal level of some words used to measure either HAPA or LAPA can be considered ambiguous or in dispute. For example, *satisfied* or *satisfaction* was used 16 times to connote low arousal, and this comports with the conceptualization of some scholars (e.g., Russell, 1980) but not others (e.g., Tsai et al., 2006; Watson et al., 1999). In fact, Tsai's conceptualization of *satisfaction* as MAP (medium arousal positive) is consistent with recent factor analyses that locate *satisfied* (along with *happy*, *content*, and *pleased*) within a moderate-arousal positive affect factor (MAPA; e.g., Longo, 2015), distinct from both LAPA and HAPA. We note that other items can also be seen as having ambiguous arousal levels such as *interested* (Tomkins, 1962), *grateful* (Kranzbühler et al., 2020), and *wonder* (Irrgang et al., 2016).

A third concern about the items used to measure LAPA and HAPA is the occasional use of words that may not actually be affect. For example, *challenge* is a characteristic of a situation (Nakamura & Csikszentmihalyi, 2002), *talkative* describes a specific behavior, *responsibility* is a phenomenon related to agency and choice (Frith, 2014), and *optimism/pessimism* are cognitive orientations (Bruininks & Malle, 2005).

Finally, only a few researchers reported English translations of the words they used in their research. For example, Madrid and Patterson (2014) provide their Spanish translations for *calm* (*calmado[a]*), *relaxed* (*relajado[a]*), *laid-back* (*distendido[a]*), *at ease* (*tranquilo[a]*), *enthusiastic* (*entusiasmado[a]*), *joyful* (*alegre*), *inspired* (*inspirado[a]*), and *active* (*activo[a]*). Reporting translations is important, because the words used for emotions in any language shape the nuance of the experience (Barrett, 2017; Mesquita & Frijda, 1992; Russell et al., 1989), and the field should be afforded the opportunity to investigate and evaluate such nuances.

Indication of motivational intensity in item use

Our inspection of items used to assess LAPA and HAPA provided an initial indication that motivational intensity can be considered a quality that distinguishes LAPA from HAPA, and that characteristics related to approach and

Table 13 Well-being and mindfulness research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Mindfulness					
Imtiaz et al. (2018)	156 students, Canada	Participants were randomly assigned to a mindfulness workshop or waitlist control, then were asked to complete an anagram task and answer questions about affect	*Items:* calm, peaceful, relaxed	*Items:* lively, vigorous	LAPA but not HAPA increased following a mindfulness induction
Jones et al. (2018)	115 students, United States	After random assignment to a mindfulness meditation condition (training and daily practice) or waitlist control, participants completed a daily diary for 3 weeks	*Items:* calm, quiet, relaxed	*Items:* aroused, enthusiastic, happy, peppy, surprised	LAPA but not HAPA was associated with more time meditating
Kerekes et al. (2017)	152 inmates, Sweden	Participants were randomly assigned to a control group or a yoga class once a week for 10 weeks. Affect was assessed before and after the intervention period	*Measure:* PANAS-X	*Measure:* PANAS-X	LAPA, but not HAPA, was increased by a yoga class, when comparisons were made between pre and posttest and between the intervention and control group
Lymeus et al. (2018)	89 students, 51 students; Sweden	In 2 studies, participants were assigned to engage in 20-min meditation in the contexts of a conventional mindfulness training in a classroom or a restoration skills training in a garden setting, 3 times over 5 weeks. Affect and attention was assessed before and after each meditation	*Anchors*: tense-relaxed	*Anchors*: indifferent-engaged	LAPA but not HAPA increased each week in mindfulness training, especially for those in a garden setting
Rowland et al. (2020)	125 students, Germany	After random assignment to a mindfulness training or a waitlist control, participants responded to questions about momentary affect and mindfulness 6 times a day for 40 days	*Items:* relaxed, satisfied	*Items:* excited, happy	With mindfulness training having increased momentary and dispositional mindfulness, a higher level of momentary mindfulness was associated with more LAPA and HAPA, more persistent LAPA (but not HAPA), and less fluctuation in both LAPA and HAPA

Table 13 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Zeng et al. (2017)	119 students, China	Participants were randomly assigned to a positive empathy meditation (imagining the experience of the happiness of others) or an appreciative joy meditation (wishing that others be happy) both involving stories of academic achievement. Affect and positive attitudes were compared	*Items:* calm, peace, serenity	*Items:* elation, enthusiasm, excitement	A positive empathy meditation increased HAPA and decreased LAPA, while an appreciative joy meditation did not impact either type of positive affect
Zeng et al. (2019)	101 university students and staff, China	Participants were randomly assigned to appreciative joy meditation training or a waitlist control. Affect and other measures were assessed post training and one month later	*Items:* calm, relaxed, serene, tranquil	*Items:* elated, energetic, enthusiastic, excited	Appreciative joy meditation training was associated with higher levels of LAPA, but not HAPA, at post-training and one-month follow up
Well-being					
Collins et al. (2009)	54 older adults, United States	Participants reported their happiness and flow experiences in a daily diary for 7 days	*Items:* calm, relaxed, satisfied	*Items:* enthusiastic, happy, peppy	Higher quality flow was associated with higher HAPA but not LAPA, but more frequent flow was associated with lower HAPA and LAPA
Chishima and Nagamine (2021)	794 adults, Japan	Participants initially completed questionnaires measuring derailment, affect, and depression, and again one year later	*Items:* calmness, easiness, feeling laid back, relaxation	*Items:* enjoyment, fun, pleasure	Higher levels of derailment predicted lower HAPA one year later, but not LAPA
Delle Fave et al. (2016)	2,799 adults, Argentina, Brazil, Croatia, Hungary, India, Italy, Mexico, New Zealand, Norway, Portugal, South Africa, United States	Participants responded to open-ended questions about their definition and experience of happiness, as well as Likert scale questions, in face-to-face interviews. Responses were coded	*Codes:* contentment, peace of mind, serenity, tranquility	*Codes:* cheerfulness, enthusiasm, joy, vitality	In a large sample from 12 countries on 5 continents, definitions of happiness most frequently contained qualities related to LAPA (roughly 30%), while roughly 14% contained HAPA qualities
Gärling and Gamble (2012)	99 students, Sweden	Participants rated their affect before and after responding to the Satisfaction with Life Scale (SWLS)	*Anchors*: anxious-calm, nervous-relaxed, tense-serene	*Anchors*: bored-interested, indifferent-engaged, pessimistic-optimistic	Neither LAPA nor HAPA were correlated to the SWLS when affect was assessed before the SWLS, and both were correlated to the SWLS when affect was assessed after the SWLS

Table 13 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Jans-Beken et al. (2019)	106 adults, Netherlands	Participants answered questions about gratitude and affect throughout the day for 7 days	*Item:* satisfied	*Item:* cheerful	HAPA and LAPA were both related to previous and subsequent experiences of momentary gratitude. High positive mental health strengthened the effect of HAPA (but not LAPA) on subsequent gratitude
McManus et al. (2019)	207 adults, 184 adults, United States	In 2 studies, participants completed online surveys about how they felt during the past week along with measures of mental health and well-being	*Items:* calm, laid back, peaceful, relaxed, safe, secure, serene, tranquil	*Items:* active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong	LAPA predicted higher levels of life satisfaction and overall feeling good, lower levels of depression, anxiety, and stress above and beyond HAPA. LAPA and HAPA were both correlated with gratitude and meaning in life, though LAPA did not predict them above and beyond HAPA
Osei-Tutu et al. (2020)	34 adults, Ghana	Interviews with participants were conducted to uncover conceptualizations of well-being in 4 Ghanaian languages	*Theme:* peace of mind	*Theme:* happiness, joy	LAPA themes are elaborated on in conceptualizations of well-being in 3 of 4 Ghanaian languages, while HAPA themes are less prominent
Reis et al. (2017)	167 adults, 52 adults, North America	Participants answered questions about their affect and fun 10 times a day for 3 days	*Items:* at ease, calm, content, grateful, hopeful, peaceful, relaxed	*Items:* alert, attentive, enthusiastic, excited, happy, interested	Fun was related to both HAPA and LAPA, however HAPA, but not LAPA, was related to increased levels of fun when with other people vs. alone

Table 14 Work and leisure research

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Employee behavior					
Balducci et al. (2012)	574 employees, 282 employees, Italy	In 2 studies, participants responded to a questionnaire administered during working hours	*Item*: satisfaction	*Item*: enthusiasm	Workaholism was related to lower levels of LAPA but not HAPA in one of two samples
Bissing-Olson et al. (2013)	56 workers, Australia	After completing a baseline survey on pro-environmental attitudes, participants answered questions about affect, task-related pro-environmental behaviors, and proactive pro-environmental behaviors	*Items:* at rest, calm, content, relaxed	*Items:* elated, enthusiastic, euphoric, excited	Overall LAPA, but not HAPA, was related to daily task-related pro-environmental behavior at work. However, among those with less pro-environmental attitude, HAPA but not LAPA predicted daily pro-environmental behavior
Green (2010)	2,913 employed adults, United Kingdom	Participants were interviewed in person in their homes about aspects of their job. Fifteen months later the responded to a follow up survey mailed to them	*Items*: calm, contented, relaxed, tense (r), uneasy (r), worried (r)	*Items*: cheerful, enthusiastic, optimistic, depressed (r) gloomy (r), miserable (r)	Neither HAPA nor LAPA were associated with a reduced likelihood of quitting the job
Ouyang et al. (2019)	183 employees, China	Participants answered three surveys a day (morning, afternoon, evening) for 10 days, answering questions about affect and behavior during work and leisure	*Items*: at ease, calm, laid-back, relaxed	*Items*: enthusiastic, excited, inspired, joyful	Higher levels of morning HAPA were related to mastery experiences in the previous evening and predicted proactive behavior at work. Higher levels of morning LAPA were predicted by relaxation experiences in the previous evening and were not related to proactive behavior at work
Popa-Velea et al. (2021)	80 physicians, Romania	Participants (those who had attended a Balint-style support group and those who had not) completed questionnaires about meaning in life, affect on the job, coping strategies, and happiness	*Items*: at ease, calm, laid-back, relaxed	*Items*: enthusiastic, excited, inspired, joyful	Physicians who attended a support group focused on processing emotions related to difficult cases were more likely to experience more LAPA than those who did not attend a support group, while no significant differences in HAPA were found

Table 14 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Salanova et al. (2011)	100 students, Spain	After efficacy beliefs were assessed, participants engaged in a group idea generation task at three-week intervals (T1, T2, T3), during which positive affect and engagement were collected	*Item*: comfort	*Item*: enthusiasm	Efficacy beliefs predicted higher levels of both HAPA and LAPA. HAPA during a task predicted higher levels of engagement in that task and a similar task three weeks later. LAPA predicted lower levels of engagement in that task
Umphress et al. (2020)	67 employees, United States	Participants answered questions about moral engagement and then reported their affect, creative mindset, and unethical behaviors at the end of the workday for two weeks	*Items*: at ease, calm, relaxed	*Items*: determined, excited, strong	HAPA but not LAPA was associated with higher self-reported unethical behavior to benefit a teammate, and that relationship was mediated by creative mindset
Job characteristics					
Cassar and Buttigieg (2015)	710 employees, Malta	Participants were surveyed about their perception that their employer breached the contract of their employment, along with measures of affect, procedural justice, and interactional justice	*Items*: calm, comfortable, relaxed, tense (r), uneasy (r), worried (r)	*Items*: cheerful, enthusiastic, optimistic, depressed (r), gloomy (r), miserable (r)	Both HAPA and LAPA were associated with both procedural justice and interactional justice, and these relationships were partially mediated by lower levels of perceived breach of contract
Conway et al. (2011)	166 employees, United Kingdom	Participants who were employed at a pharmaceutical company were given a survey 8-months apart. They answered questions about their perception that their employer breached or fulfilled there contract with them, along with affect, job satisfaction, and organizational commitment	*Items*: calm, comfortable, relaxed, uneasy (r), worried (r), tense (r)	*Items*: cheerful, enthusiastic, optimistic, depressed (r), gloomy (r), miserable (r)	The negative effects of contract breach had a stronger impact than the positive effects of contract fulfillment for HAPA but not LAPA
Madrid and Patterson (2014)	281 staff members, Chile and United Kingdom	Participants answered questions about affect, personality, and job resources and demands	*Items:* calm [calmado(a)], relaxed [relajado(a)], Laid-back [distendido(a)], at ease [tranquilo(a)]	*Items:* enthusiastic [entusiasmado(a)], joyful [alegre], inspired [inspirado(a)], active [activo(a)]	Higher levels of HAPA but not LAPA were related to extraversion at work. HAPA and LAPA were similarly related to lower levels of neuroticism and higher levels of job resources. LAPA but not HAPA was related to lower levels of job demands

Table 14 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Monnot and Beehr (2014)	1,342 adults, 1,050 adults, United States	Participants responded to a questionnaire about subjective well-being (hedonic and non-hedonic) (Studies 1 and 2) and about types of communication (positive, negative, non-work) with colleagues of different levels (subordinate, coworker, supervisor)	*Items*: calm, contented, relaxed, tense (r), uneasy (r), worried (r)	*Items*: cheerful, enthusiastic, optimistic, depressed (r), gloomy (r), miserable (r)	LAPA and HAPA were similarly correlated to different types of communications with different level colleagues
Rogelberg et al. (2006)	676 employees, 304 employees; Australia	Participants answered surveys about meeting qualities and job affect as experienced in general (Study 1) and in particular meetings (Study 2)	*Items*: calm, comfortable, relaxed, tense (r), anxious (r), worried (r)	*Items*: enthusiastic optimistic, motivated, depressed (r), gloomy (r), miserable (r)	Across two studies, both HAPA an LAPA were correlated with higher levels of perceived effectiveness of meetings, confidence in meetings, and job satisfaction
Totterdell et al. (2004)	327 employees; 47 employees; United Kingdom	Participants answered questions about their affect and social network. In Study 2, the survey was administered before and after the merger of two work groups	*Items*: e.g. calm	*Items*: e.g. enthusiastic	When measured before a merger the following was found: Higher LAPA but not HAPA was related to interacting with more people to complete work. HAPA but not LAPA was likely to be shared by employees with similar positions within the organization. Higher HAPA but not LAPA was related to larger work networks, but only for those with higher influence in the organization. Neither LAPA nor HAPA was related to the density of a work network. After a merger the following was found: Overall LAPA and HAPA decreased. Larger networks were related to lower LAPA and HAPA. Reductions in LAPA and HAPA were mitigated by having more cross-network ties

Table 14 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Urick et al. (2018)	213 healthcare employees, United States	Participants (housekeepers and non-housekeepers) responded to questions about affect and counterproductive work behavior	*Items:* at-ease, calm, content, satisfied, relaxed	*Items:* ecstatic, energetic, enthusiastic, excited, inspired	In the context of their work, HAPA but not LAPA was lower for housekeepers than non-housekeepers
Warr (1992)	1,686 employees, United Kingdom	Participants answered questions about job affect, job characteristics, work values, demographics, and family	*Items*: calm, contented, relaxed, tense (r), uneasy (r), worried (r)	*Items*: cheerful, enthusiastic, optimistic, depressed (r), gloomy (r), miserable (r)	Both HAPA and LAPA were higher for the youngest and older workers compared to other workers, but this difference was not found when other job characteristics were accounted for. Higher levels of HAPA and lower levels of LAPA were related to higher job levels, income, and educational qualifications. HAPA, more so than LAPA, was related to decision latitude. HAPA, but not LAPA, was higher when employees preferred intrinsic job rewards. LAPA was lower, but HAPA unrelated, when work demands were higher
Job search					
Kreemers et al. (2018)	99 job seekers, 227 career starters, Netherlands	Participants were asked about their self-compassion, job search, and affect in the last 4 days	*Items:* at ease, calm, content, relaxed	*Items:* energetic, enthusiastic, happy, lively	Both HAPA and LAPA emotions were lower the more job search difficulties were perceived and were less negatively impacted by job search difficulties when job seekers were higher in self-compassion (Study 1)
Kreemers et al. (2020)	180 job seekers, Netherlands	After baseline affect was assessed, participants were randomly assigned to a self-compassion writing task or a control writing task, and affect was assessed post-intervention and one week later	*Items*: at ease, calm, relaxed, laid back	*Items*: cheerful, energetic, enthusiastic, lively	LAPA but not HAPA was increased immediately following a self-compassion writing exercise, and it stayed elevated one week later

Table 14 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Kreemers et al. (2021)	217 job seekers, Netherlands	In a 5-wave longitudinal study, participants answered questions about job search and affect	*Items*: ease, calm, relaxed, laid back	*Items*: cheerful, energetic, enthusiastic, lively	HAPA but not LAPA was associated with job search systematicity (an adaptable and persistent approach to finding a job) which predicted job search success
Leadership					
Connelly and Ruark (2010)	288 students, United States	Participants were randomly assigned to conditions that varied descriptions of leadership style and leader affect in the instructions for a task about creating a marketing plan. Participants completed the task and then evaluated the leader	*Items:* contentment, happiness, optimism	*Items:* challenge, pride, responsibility	Leader HAPA but not LAPA was associated with higher follower ratings of satisfaction with leader, leader effectiveness, and transformational leadership style
Damen et al. (2008)	152 students, 100 employees, Netherlands	In 2 studies, participants were randomly assigned to read a speech from the leader of a company that varied in terms of affective tone, and then they rated their feeling toward the leader	*Manipulation:* The leader used words such as "tranquil" and "relaxed"	*Manipulation:* The leader used words such as "enthusiastic" and "excited"	Leaders exhibiting HAPA were rated as charismatic, but leaders exhibiting LAPA were not, and this relationship was mediated by the transfer of arousal and positive feelings to participants who read the leader messages
Dasborough (2006)	24 employees, Australia	In focus groups of roughly 3 employees, participants were asked about their leaders' behavior. Verbatim transcripts were coded for emotional incidents	*Example code:* comfort/calm	*Example code:* excited/enthusiastic	When discussing positive incidents with their leaders, LAPA and mid-arousal positive affect words were used more frequently than HAPA words
Kelloway et al. (2013)	26 employees, Canada	Employees at a retail coffee organization completed a survey about their leaders and affect 6 times over 3 weeks	*Items:* at-ease, calm, content, relaxed, satisfied	*Items:* ecstatic, energetic, enthusiastic, excited, inspired	Positive leadership predicted higher levels of both HAPA and LAPA in followers when transformational leadership was low
Laguna et al. (2021)	796 business owners and employees; Netherlands, Poland, Spain	Participants answered questions about work-related affect and innovation	*Items:* calm, contented, relaxed	*Items:* cheerful, enthusiastic, optimistic	Business owners' HAPA was related to employee's HAPA and LAPA, and business owners' LAPA was related to employees' HAPA and LAPA. Employees' HAPA and LAPA were both related to innovation at work

Table 14 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
Leisure vs. Work					
Sandstrom et al. (2017)	12,310 mobile app users, United Kingdom	Participants self-selected into using an experience sampling app and answered questions about affect twice a day	*Grid*: negative to positive, sleep to alert, *Positive anchor:* relaxation	*Grid*: negative to positive, sleep to alert *Positive anchor:* excitement	LAPA was more often experienced at home, while HAPA was more often experienced at work
Wood and Michaelides (2016)	47 adults, United Kingdom	Participants answered questions about job demands, hours of work, work-nonwork interference, affect each day for 26 weeks	*Items*: calm, anxious (r)	*Items*: enthusiastic, gloomy (r)	A week with more LAPA was associated with less work-nonwork interference, while a week with more HAPA was associated with more work-nonwork interference
Leisure					
Gui et al. (2019)	583 employees, China	Participants were telephoned and asked about the satisfaction of their Basic Psychological Needs (relatedness, competence, autonomy) and affect during leisure activities	*Items:* calm, relaxed	*Items:* enthusiastic, excited	During leisure activities, autonomy need satisfaction was related to higher levels of both HAPA and LAPA, while relatedness, and competence need satisfaction were related to more HAPA, but not LAPA
Hu et al. (2021)	79 adults online, United States	Participants were assigned to one of three conditions, a control, or participation in active leisure or passive leisure. For one week they answered daily surveys about their activity and affect among other psychological constructs	*Items*: e.g., calm	*Items*: e.g., excited	Neither HAPA nor LAPA was directly increased by the active leisure intervention. Spending more time in active leisure was associated with more HAPA and LAPA. Passive leisure was associated with decreased HAPA, but not LAPA
Hull et al. (1996)	10 students, Italy	Participants chose among four activities to engage in over seven weeks: rural walking, urban walking, sitting in a room with a view of nature, sitting in a room with no windows. Affect was assessed at the beginning of the activity, 15–30 min later, 15 to 30 min later still, and at the conclusion	*Items*: calm, peaceful	*Items*: energized, excited, lively, thrilled	LAPA increased at the beginning of leisure experiences and stayed elevated, and LAPA was lower during an urban walk compared to other activities. No differences in HAPA were found
Commuting					

Table 14 (continued)

Authors	Sample	Procedure	LAPA	HAPA	Relevant findings
de Kruijf et al. (2019)	547 adults, Netherlands	Participants, some commuting in cars and some adopting ebiking, responded to three surveys assessing their satisfaction with travel at baseline, one month and six months later	*Items*: calm, confident, relaxed, hurried (r), stressed (r), worried (r)	*Items*: alert, engaged, enthusiastic, bored (r), fed up (r), tired (r)	For both LAPA and HAPA commuting on ebike had a higher rating vs. commuting in car, but LAPA was higher than HAPA while ebiking, and LAPA increased between one month and six months of ebiking, while HAPA did not
De Vos (2018)	1,656 adults, Belgium	Participants responded to a survey assessing mode of travel for a recent leisure trip, preference for that mode, satisfaction with that trip, and attitudes toward car use, public transport use, cycling, and walking	*Items*: calm, confident, relaxed	*Items*: alert, engaged, enthusiastic	LAPA but not HAPA was higher among cyclists who prefer cycling compared to those who do not, while HAPA but not LAPA was higher for car users who prefer car use and public transport users who prefer public transport compared to those who do not
Ettema et al. (2012)	520 adults, Sweden	Participants were surveyed about recent trips to and from work or school and asked about trip characteristics, activities engaged in, and travel satisfaction	*Anchors*: stressed-calm, worried-confident, tense-relaxed	*Anchors*: bored-enthusiastic, tired-excited, unengaged-engaged	Both LAPA and HAPA were higher when public transport commutes were crowded, and lower when commutes to work were longer. Both were higher on commutes from work when talking to others. On commutes to work, LAPA was lower when commuters consumed entertainment, and HAPA was lower when they engaged in internet communication
Ettema et al. (2017)	363 adults, Sweden	Participants reported their mood and satisfaction with travel before commuting to work and after commuting from work. Responses were linked to weather data	*Anchors*: stressed-calm, tense-relaxed, worried-confident	*Anchors*: bored-enthusiastic, tired-excited, unengaged-engaged	After a commute, both LAPA and HAPA were higher for older people and those cycling or walking compared to those taking public transport or car. Both LAPA and HAPA were higher on sunny days. However, only LAPA was higher on warmer days and on rain/snow days, and only HAPA was higher on windy days

avoidance motivation can distinguish between different types of LAPA. Regarding HAPA, the item most used in its assessment (*excitement*) connotes high approach motivation, eagerness, appetite, and reward seeking. Other frequently used HAPA items could be argued to connote approach motivation (e.g., *enthusiasm*, *inspired*, *interested*), but many could not (e.g., *joyful*, *elated*, *energetic*). So, if we take item usage as an indicator of the underlying phenomenon, we must conclude that HAPA may often involve approach motivation, but not always.

However, when we reviewed the items used to assess LAPA, almost none connote approach motivation or suggest any future movement toward or away from anything (with the possible exception of the infrequently used "*sensual*" which could suggest moving toward sensual gratification). Furthermore, we observed that states that are often considered LAPA may encompass a steady state that is neither active nor reactive (*calm*) and two deactivating states that involve the fulfillment of a need or a desire (*satisfaction*) or the alleviation of pain or avoidance of a threat (*relief*). *Calm* was the most frequently used item for measuring LAPA, with 114 articles across all domains using *calm* in their LAPA assessment. *Satisfaction* was used less frequently, but still widely, across research domains, including development (e.g., Hudson et al., 2016), cardiovascular health (Armon et al., 2014; Neumann & Waldstein, 2001; Shirom et al., 2009), solitude (Lay et al., 2019), well-being (Collins et al., 2009; Jans-Beken et al., 2019), and work (Balducci et al., 2012; Kelloway et al., 2013; Urick et al., 2018). *Relief* was used primarily in research about non-suicidal self-injury (Claes et al., 2010; Di Pierro et al., 2014; Klonsky, 2009; Kranzler et al., 2018). Such observations indicate that LAPA can be conceptualized as involving neither approach nor avoidance in the moment in which it is experienced, though it may involve previously experienced approach or avoidance which was resolved with *satisfaction* or *relief*.

Ultimately, researchers are responsible for ensuring that their methodology is sound when manipulating and measuring constructs such as LAPA and HAPA, using measures that provide as much valid data as possible, while also considering whether their approaches are used by other researchers. As more clarity is brought to our understanding of LAPA and HAPA, the field should endorse highly valid items and manipulations and reject or qualify others.

Discussion

This review was motivated by indications that LAPA and HAPA are substantially different and that this difference is often overlooked. In other words, LAPA is not simply less of a good thing, but an altogether different kind of good thing. We reasoned that if LAPA is considerably different than HAPA, then we would expect to find that LAPA and HAPA have different relationships to varied phenomena. Therefore, our search and summarizing were animated by these questions: What evidence indicates that LAPA and HAPA have, or do not have, different causes, associations, and consequences? What characteristics of LAPA might help to explain such differences?

We found overwhelming evidence of differences between LAPA and HAPA across a wide range of research domains, with 89% of 226 articles comparing LAPA and HAPA indicating some kind of difference in their relationships to varied phenomena. See Table 18 for a summary of the most consistently found differences. Furthermore, we observed in these differences that the differentiating characteristics of LAPA and HAPA can often be seen as consistent with theory that integrates dimensions (valence/arousal, approach/avoidance) and functions (evolutionary, everyday) of emotion. Namely, Gilbert's (2005, 2014) model of emotion delineates two types of positive affect, one that is associated with drive, desire, novelty, and achievement (HAPA) and one that is associated with soothing, rejuvenation, familiarity, and affiliation (LAPA). To shed additional light on LAPA and to point to future research directions, we now offer observations about LAPA and its role in human functioning, relating such observations to existing research on positive affect and emotion.

What is LAPA's role in human functioning, distinct from HAPA?

As stated earlier, inclusion of LAPA in research on positive affect is increasing, but research focused specifically on LAPA's distinction from HAPA is limited (Longo, 2015; Pressman et al., 2019). As such, the observations we make here should be seen as only a preliminary answer to this question. Here we focus on broader themes supported by consistent findings, avoiding single findings, mixed results, or data from areas that require specialization beyond our abilities.

LAPA as the soothing inverse of stress and anxiety

Consistent with Gilbert's emphasis that LAPA serves a soothing function (2005, 2014) and Warr's (1990) emphasis that *contentment* is the opposite of anxiety, and depression is the opposite of *enthusiasm*, the evidence for LAPA's strong inverse relationship to anxiety and stress is indicated across multiple studies. Some studies find that HAPA and LAPA have similar relationships to these outcomes (Jiang, 2020; McManus et al., 2019), and some studies find that LAPA has a stronger relationship to them than HAPA (Gilbert et al.,

Table 15 Themes and IAPS numbers (where available) for photos used for affect manipulation

Authors	LAPA	HAPA
Angrilli et al. (1997)	Babies, puppies	Erotic scenes
Bolders et al. (2017)	Flowers, nature; 1450, 1610, 1900, 2560, 5030, 5201, 5250, 5593, 5720, 5750, 5800, 7900	Sports, romance; 1650, 4611,5621, 5626, 5629, 8030, 8034, 8080, 8200, 8370, 8470, 8501
Fernandes et al. (2011)	Bunny	Money
Fröber and Dreisbach (2012)	Babies, families	Sports, adventure
Galentino et al. (2017)	2397, 2514, 2580, 2850, 5000, 5020, 5030, 5220, 5250, 5300, 5500, 5520, 5631, 5635, 5720, 5731, 5764, 5779, 5780, 5891, 7140, 7180, 7490, 7900	2352, 4652, 4653, 4656, 4658, 4659, 4660, 4664, 4670, 4681, 4683, 4695, 4800, 4810, 5629, 8030, 8191, 8210, 8300, 8370, 8400, 8490, 8501
Hälbig et al. (2011)	Smiling face	Erotica
Fröber and Dreisbach (2012)	1440,1710,1750,1920,2057,2150,2260,2311,2340,2530	5260,5621,5623,5626,5629,8161,8180,8190,8200,8490
Leite et al. (2012)	2000, 2005, 2010, 2025, 2030, 2040, 2050, 2057, 2070, 2080, 2091, 2153, 2154, 2165, 2170, 2299, 2304, 2306, 2310, 2311, 2332, 2340, 2341, 2360, 2370	4607, 4643, 4647, 4651, 4652, 4656, 4658, 4659, 4660, 4664, 4666, 4670, 4672, 4676, 4677, 4680, 4681, 4683, 4687, 4689, 4690, 4694, 4695, 4800, 4810
Lu et al. (2017)	1600, 1603, 1604, 1610, 1620, 1670, 1812, 1910, 2360, 5000, 5001, 5010, 5200, 5201, 5220, 5779, 5780, 5870, 5891, 7545	1650, 2216, 5470, 5621, 5626,5629, 8030, 8034, 8080, 8161, 8170, 8180, 8185, 8190, 8200, 8370, 8400, 8470, 8490, 8501
Mickley and Kensinger (2009)	Sunset	Money
Nealis et al. (2016)	Smiling faces, landscapes	Victorious athletes, children on slides
Nielen et al. (2009)	Nature, neutral faces	Sports, erotica
Ryu et al. (2015)	1610 rabbit, 2370 three men, and 5200 flowers	5621 sky divers, 8030 skiers, 8185 sky divers
Robinson et al. (2004)	1440, 1460, 1750, 1810, 2040, 2050, 2057, 2070, 2165, 2352, 2550, 2660, 4606, 8350	4599, 4607, 4608, 4641, 4651, 4652, 4660, 5621, 8180, 8200, 8370, 8380, 8470, 8490
Saxton et al. (2020)	1440, 460, 1610, 1620, 1750, 1920, 2040, 2050, 2057, 2070, 2080, 2091, 2165, 2170, 2260, 2311, 2360, 2370, 2530, 2540, 2550, 2660, 5000, 5010, 5200, 5760, 5780, 5831, 5982, 7580	2209, 2216, 5470, 5621, 5626, 5629, 5700, 5910, 7270, 7502, 8030, 8034, 8080, 8161, 8170, 8180, 8185, 8190, 8200, 8210, 8300, 8370, 8380, 8400, 8420, 8470, 8490, 8496, 8501, 8502
Sommer et al. (2016)	1601, 1602, 1610, 1850, 1999, 2209, 2389, 2391, 2791, 4533, 4603, 4617, 5200, 5250, 5260, 5480, 5600, 5660, 5820, 5849, 5875, 5890, 5990, 7280, 7282, 7501, 7502, 7570, 7580, 8034, 8120, 8170, 8300, 8420, 8501, 8600	1920, 2070, 2165, 2216, 2303, 2310, 2345, 2352–1, 2550, 2660, 4607, 4608, 4651, 4653, 4656, 4658, 4659, 4660, 4664–1, 4670, 4687, 4689, 4800, 4810, 5621, 5626, 5830, 5831, 7350, 8161, 8180, 8185, 8200, 8490, 8497
Tauber et al. (2017)	Fishing, puppies	Loving embrace, skydiving
Van Damme and Smets (2014)	Family	Rollercoaster
Wang and Yang (2017)	Parents with children, puppies	Erotic scenes, food

IAPS International Affective Picture System (Lang et al., 1997)

Table 16 Prompts used for mood inductions

Authors	LAPA	HAPA
Acevedo et al. (2020)	Write about a time when you were calm and/or relaxed	Write about a time when you were excited and/or elated
Bjalkebring et al. (2015)	Happiness is to be satisfied, to have a life filled with positive emotions	Happiness is to be ecstatic, to be bursting with positive emotions
Dinc and Cooper (2015)	Vignettes such as lying on a beach	Vignettes such as winning the lottery
Facciani (2015)	Kitten	Winning lottery ticket
Gilet and Jallais (2011)	Report a memory when you felt calm	Report a memory when you felt happy
Job et al. (2012)	Feeling calm and relaxed with partner	Feeling strong and excited with partner
Neuman and Waldstein (2001)	A time you felt relaxed	A time you felt joyful
Phillips et al. (2007)	If you could choose to live anywhere in the world, where would it be? Tell me about some singers or performers that you really enjoy? Tell me about something you are proud of. Do you believe in miracles?	Tell me about one of the happiest moments of your life? Tell me about one of the most inspirational moments of your life. Tell me about something that you love. What are you most passionate about? What is one of the most exciting experiences that you've ever had?
Straszewski and Siegel (2020)	Savoring a calm memory	Savoring an exciting memory
Van Damme and Seynaeve (2013)	After a long winter's day, you calmly take a gloriously hot bath	You buy a lottery ticket, and you win 250 euro instantly

2008; Kuan et al., 2018; Kuijsters et al., 2015), but no studies find that HAPA has a relationship to stress and/or anxiety when LAPA does not. Furthermore, the soothing function of LAPA is suggested by the results of research by Pressman and colleagues (2017), where state LAPA was associated with better sleep on days when stress levels were high and worse on days when stress levels were low. Such a finding suggests that LAPA is comforting in the face of stressful emotion.

LAPA's opposition to stress may be particularly important to research on cardiovascular health. Cardiovascular health has long been associated negatively with stress and anxiety (Steptoe & Kivimäki, 2012), and LAPA has been found to have a more consistent advantageous relationship to cardiovascular health than has HAPA by some studies (e.g., Armon et al., 2014; Shirom et al., 2009). It may be that LAPA's soothing impact on anxiety and stress could explain some of this relationship, however, more research is needed to support causal claims in this relationship. It is not known whether LAPA is a by-product of other circumstances that produce better cardiovascular health, or how LAPA may or may not impact these outcomes. For example, is it a function of valuing LAPA (Tsai, 2017) that motivates people to choose less stress-inducing contexts? Or could valuing LAPA cause people to interpret low-arousal situations as positive (Kuppens, 2008)? Can interventions for increasing LAPA have positive effects on cardiovascular health and other health indicators such as sleep?

Researchers should investigate LAPA's role in the "undoing" effect, wherein positive affect has been found to help people recover from physiological stress responses (sympathetic activation) associated with negative emotion (Fredrickson et al., 2000). A recent meta-analysis has indicated that such an effect may be limited to cardiovascular reactivity (Behnke et al., 2022). Behnke and colleagues (2022) suggest that to understand the undoing effect of positive emotions, "it will be important to clarify whether and how enthusiasm might support the fast, active pursuit of tangible resources and how contentment might facilitate physical rest and digestion" (p. 55). We propose that the broader conceptualization of HAPA and LAPA may be useful in this effort.

LAPA at work: Psychological safety

We observed an interesting irony when interpreting the findings related to positive affect at work. The measure of affect used in much of work-related research, the Job-Related Affective Well-Being Scale (JAWS; Van Katwyk et al., 2000), was based on Warr's model (1990), which is rooted in decidedly clinical terms (depression and anxiety). However, we consider Gilbert's model a better fit for understanding behavior at work, even though it was proposed in a clinical context. Not only does Gilbert (2005, 2014) describe HAPA as having driving force, but he also includes aspects of feeling safe in his conceptualization of LAPA. The inclusion of feeling safe in conceptualizing LAPA is important, because it connects the concept to a large body of research on psychological safety at work (Edmondson, 1999; Edmondson & Lei, 2014). In this literature, psychological safety is a context in which team members feel free to share ideas and make mistakes without fear of reprisal.

Table 17 Frequency of use for items measuring HAPA and LAPA

LAPA (positive)		LAPA (negative)		HAPA (positive)		HAPA (negative)	
Calm	115	Tense	13	Excited	78	Bored, boring	9
Relaxed	94	Worried	6	Enthusiastic, enthusiasm	69	Depressed	7
Content, contented	35	Nervous	5	Happy	33	Sad	5
At-ease, easiness	29	Anxious	4	Energetic, energized	25	Gloomy	4
Peaceful, peacefulness	21	Uneasy	4	Alert	22	Tired	4
Serene, serenity	21	Stressed	4	Active, activated	20	Lethargic	3
Satisfied, satisfaction	16	Upset	2	Elated	19	Miserable	3
At-rest, resting	14	Agitated	1	Lively, full of life	16	Indifferent	2
Quiet	13	Distressing	1	Cheerful	12	Unengaged	2
Laid-back	8	Hectic	1	Interested	12	Dejected	1
Tranquil	7	Hurried	1	Joy, joyful, overjoyed	11	Discouraged	1
Safe, secure	6	Panicky	1	Attentive	10	Fed up	1
Confident	6	Rushed	1	Inspired	10	Pessimistic	1
Relief, relieved	5			Proud, pride	10	Sleepy	1
Happy, happiness	4			Optimistic	9	Without energy	1
Placid	4			Peppy, full-of-pep	9		
Still	4			Delighted	7		
Comforted, comfortable	4			Engaged	7		
Cheerful	3			Aroused	5		
Warm	2			Determined	5		
Pleasant, pleased	2			Dynamic	5		
				Ecstatic	5		
				Euphoric	5		
				Strong	5		
				Awake, wide awake	4		
				Vigorous	4		
				Pleased, pleasure	3		
				Glad	2		
				Surprised	2		
				Thrilled	2		

Positive items used once for LAPA: close to others, even-tempered, grateful, gratified, hopeful, nostalgia, optimism, proud, tenderness. Positive items used once for HAPA: adventurous, affectionate, astonished, brisk, challenge, curious, eager, enjoyment, exhilarated, fascinating, fun, in good spirits, motivated, open, power, responsibility, satisfying, stimulated, vital, warm-hearted, wild, wonder. Negative items were either reverse coded or as anchors on a continuum

The work-related findings reviewed here are consistent with a view of HAPA as driving and LAPA as signaling safety, and researchers should consider the complex relationship between LAPA and HAPA at work. Take, for example, the case of creativity. Even though much research in this review directly links HAPA and not LAPA to creativity (e.g., De Dreu et al., 2008; Hutton & Sundar, 2010), studies have consistently shown that psychological safety in teams promotes creativity (Edmondson & Lei, 2014). That LAPA signals psychological safety needs further study, since very few studies investigate psychological safety's relationship to affectivity, and when they do, they tend to be oriented toward HAPA (e.g., Kark & Carmeli, 2009) or discrete emotion (e.g., Lee, 2021). Future research on positive affect at work should consider the aspects of HAPA that drive productivity, creativity, and innovation; at the same time, such research should consider the aspects of LAPA involved in the psychological safety that enables and sustains such creativity.

LAPA is especially associated with positive sociality

Looking across domains of research in this review, we observed a trend that LAPA's relationship with positive sociality may be more consistent than HAPA's. By positive sociality we mean a broad concept of beneficial interactions with other people, including supportive tone, affection, and positive relationships. For example, when participants viewed LAPA images during their log-in process, they were more sociable and positive in tone compared to participants who viewed no images (Seering et al., 2019). Among those with

avoidant attachment (those for whom intimacy and closeness can be threatening), savoring a positive emotional relationship experience actually decreased their LAPA but not HAPA (Palmer & Gentzler, 2018). And people who score high on an empathetic personality test prefer LAPA music to HAPA music (Greenberg et al., 2015).

Such findings are consistent with Gilbert's (2005, 2014) model of affect in which the soothing aspect of LAPA is associated with affiliation, care for others, and attachment. This model highlights findings that the neural substrates that are used to signal "liking" (Berridge & Winkielman, 2003) were recruited in our evolutionary need to develop care instincts for our mammalian offspring, along with cooperative problem-solving among our tribe. Recent research on mothers and infants is consistent with the proposition that social interaction engages the soothing function of LAPA. Cirelli et al. (2020) asked mothers to alternately sing a lullaby to infants in upbeat, exciting tones and calming, soothing tones while consistently monitoring skin conductivity to measure arousal. They found that arousal levels were not impacted by the exciting renditions, but arousal levels for both mother and infant decreased continuously as the soothing rendition progressed.

Research on LAPA and positive sociality should be integrated with discrete emotion research on the nature of love and the qualities of specific loving emotions. Take for example, Fredrickson's (2013, 2016) conceptualization of love as positivity resonance, characterized by three components: shared positive affect, caring nonverbal synchrony, and biological synchrony (Zhou et al., 2022b). It is possible that moments of LAPA may be found to be more related to the experience of love than HAPA moments. In addition, LAPA's role in prosocial behavior and attitudes (i.e., *empathy*) warrants further research (Telle & Pfister, 2016).

LAPA contributes to happiness and well-being

That LAPA plays an important role in happiness and well-being is especially apparent in cross-cultural research, even though it has often been overshadowed by HAPA in constructs emanating from Western cultures. For example, a widely used measure of subjective well-being measures life satisfaction, negative affect, and activated positive affect, without assessing LAPA (Diener et al., 2002). Additionally, within this review, the frequency with which *happy* is conflated with either HAPA or LAPA is revealing. *Happy* was used to measure HAPA eight times more frequently (33) than it was used to measure LAPA (4). Furthermore, nearly all of the research conflating HAPA with happiness occurred in North American or European countries (91%). And yet when samples around the globe are asked to describe well-being, they more frequently mention LAPA-related concepts than HAPA-related concepts (Delle Fave et al, 2016; Osei-Tutu et al., 2020). This is consistent with other research that has found that definitions of happiness in East Asian countries and cultures emphasize *calm* (Kitayama & Markus, 2000).

These findings should be considered in light of recent work on cultural differences in valuing positive affect (Tsai, 2017). Tsai's research has found that people in Western cultures tend to value HAPA more than people in East Asian cultures and people in East Asian cultures tend to value LAPA more than people in Western cultures, though recent studies have found variations in these findings (e.g., Gui et al., 2020; Zhou et al., 2022a). This research indicates that happiness is greatest when people get more of the type of positive affect that their culture values. This preference for LAPA or HAPA has been found to relate to cultural differences in evaluations of politicians (Tsai et al., 2016), children's books (Tsai et al., 2007), and doctor's visits (Sims et al., 2014), among others. The finding that entire civilizations have come to value these two types of positive affect differently is important to consider when interpreting this review and contemplating future directions of research. Tsai's fundamental insight, that affect can be valued differently, highlights that researchers should be aware of what type of affect they have been acculturated to value, and what type of affect they have been given to overlook. This review provides further support for this recommendation by demonstrating the different roles that HAPA and LAPA play in myriad aspects of life; if researchers overlook one in favor of the other, knowledge about happiness and well-being will be skewed.

Some scholars have addressed the potential for such a skewed assessment of well-being by introducing the Peace of Mind Scale (PoM), noting that it "reflects Chinese' affective well-being, one that reflects the importance of LAP affect and mental harmony" (Lee et al., 2013, p. 573). Consequently, the PoM emphasizes different qualities of well-being than does the Satisfaction with Life Scale (SWLS: Diener et al., 1985). Though both scales contain several statements about one's life, a contrast can be made between a sample item from the LAPA-inspired PoM ("The way I live brings me feelings of peace and comfort," p. 585) and from the HAPA-inspired SWLS ("So far I have gotten the important things I want in life," p. 72). Whereas the former connotes a self-contained sufficiency, the latter implies the culmination of acquisition. The contrast in these scales is a subtle but powerful example of the contrast between LAPA and HAPA, and the need to attend to their differences.

Indeed, detecting the value of LAPA as a contributor to well-being may be simply a matter of scratching the surface, even in Western cultures. For example, when happiness was framed with an emphasis on LAPA (*satisfied*) or HAPA (*ecstatic*), more Swedes rated themselves as happier when presented with the LAPA definition than the HAPA definition (Bjalkebring et al., 2015). Furthermore, when HAPA

Table 18 Indications of differences between LAPA and HAPA

Topic	Finding	Studies
Age	Older adults experience LAPA more than younger adults	Chu et al., 2020; English & Carstensen, 2014; Hamm et al., 2021; Kessler & Staudinger, 2009; Mogilner et al., 2011; Ready et al., 2019; Santorelli et al., 2018; Scheibe et al., 2011; Simon & Nath, 2004; Windsor et al., 2013
	HAPA is experienced to a similar degree in older and younger adults	Kessler & Staudinger, 2009; Ready et al., 2019; Santorelli et al., 2018
Attention	LAPA and HAPA sometimes impact different aspects of attention differently	Fröber & Dreisbach, 2012; McConnel and Shore 2011; Saxton et al., 2020
Brain	LAPA and HAPA activate different parts of the brain	Leite et al., 2012; Nielen et al.,; 2009; Steinmetz et al., 2010; Trost et al., 2012
Cardiovascular health	LAPA has a stronger or more consistently beneficial relationship to cardiovascular health than HAPA	Armon et al., 2014; Duarte & Pinto-Gouveia, 2017; Lane et al., 2011; Neumann & Waldstein, 2001; Shirom et al., 2009
Creativity	HAPA is related to creativity more so than LAPA	De Dreu et al., 2008; Gilet & Jallais, 2011; Hutton & Sundar, 2010; To et al., 2012; Yeh et al., 2016
Decision-making	LAPA decision-making reaction times are faster than HAPA	Citron et al., 2014; Galentino et al., 2017; Ihssen & Keil, 2013; Robinson et al., 2004; Yao et al., 2016
Memory	LAPA is beneficially related to memory more so than HAPA	Bergmann et al., 2012; Corson & Verrier, 2007; Loeffler et al., 2013; Steinmetz et al., 2010; Van Damme & Smets, 2014; Wang & Yang, 2017
Mindfulness	Mindfulness practice increases LAPA but not HAPA	Imtiaz et al. (2018); Jones et al., 2018; Kerekes et al., 2017; Lymeus et al., 2018; Zeng et al., 2019
Non-suicidal self-injury	LAPA increases after non-suicidal self-injury, but HAPA does not	Ammerman et al., 2018; Claes et al., 2010; Di Pierro et al., 2014; Klonsky, 2009; Kranzler et al., 2018
Personality	Different types of individual differences are related to experiencing and remembering LAPA and HAPA differently	Ditzfeld & Showers, 2014; Greenberg et al., 2015; Komulainen et al., 2014; Kuppens, 2008; Lay et al., 2017; Siyaguna et al., 2019; Sperry et al., 2021
Solitude	LAPA increases and HAPA decreases in moments of solitude	Lay et al., 2020; Nguyen et al., 2018; Pauly et al., 2017, 2018

Indications of differences were observed when three or more articles reported similar findings, and these findings outnumbered findings to the contrary

and LAPA were directly compared to "feeling good" over the past week in two U.S.-based studies (McManus et al., 2019), the correlation between LAPA and feeling good ($r = 0.83, 0.83$) was similar to the correlation between HAPA and feeling good ($r = 0.79, 0.81$). Indeed, when LAPA's unique contribution to "feeling good" over the past week was assessed, it explained roughly 10% of the variance above and beyond HAPA, indicating that LAPA is an equal associate to the general sense of feeling good, and contributes to feeling good in its own unique way. Future research should consider both HAPA and LAPA in concepts of happiness and well-being, especially in light of recent research which found that across a variety of positive psychology interventions designed to increase well-being, LAPA was increased, but HAPA was not (Kraiss et al., 2023).

For whom is LAPA especially important?

LAPA and older adults

Robust evidence indicates that LAPA is experienced more by older adults than younger adults (e.g., English & Carstensen, 2014; Kessler & Staudinger, 2009; Ready et al., 2019). Many explanations for the relationship between LAPA and older adulthood have been put forth. For example, some researchers have postulated the age difference in LAPA is attributable to age-related cognitive decline (Bjalkebring et al., 2015), reduced physiological flexibility in older adults (Scheibe et al., 2013), a by-product of late-life events such as retirement (Hudson et al., 2016), an adaptive reaction to managing functional loss and stress (Kessler & Staudinger, 2009), or a shift in attention from the future toward the present (Carstensen, 2006; Mogilner et al., 2012). Additionally, these findings may be partially explained by an age-related increase in acceptance of negative affect (Shallcross et al., 2013). However, we observed that researchers tended to agree with English and Carstensen's (2014) statement that "the reasons for such differences remain highly speculative and demands targeted investigation" (p. 8).

With such a wide array of possible explanations, we suggest that exploratory qualitative research is indicated, so as to allow for the emergence of unarticulated explanations and the possibility of complex relationships between causes. Here we offer two additional possible explanations. First, it

is possible that a preference for LAPA is learned, through trial and error, and as adults age, they consciously choose more LAPA-inducing behavior because, in their experience, LAPA proved to be more rewarding. Second, another possible explanation could be related to the LAPA subtypes of satisfaction and relief. With desires fulfilled (or abandoned) and threats averted (or accommodated), the circumstances of life hold increasingly fewer things to move toward or against, because past approach and avoidance tendencies have been resolved. Such possibilities may be consistent with aspects of Charles's (2010) Strength and Vulnerability Integration (SAVI) model of the development of emotional regulation and well-being across adulthood, which posits that older adults develop strategies for avoiding negative and arousing stimuli while maximizing positive emotional experiences. Future research should explore these possibilities, especially in light of efforts to understand positive aging (Nakamura & Chan, 2020).

LAPA and women

An unanticipated theme emerged from the studies comparing HAPA and LAPA across varied domains of research; differences between men and women were found, especially in terms of LAPA. For example, women's experiencing less LAPA than men was mediated by socioeconomic factors, particularly having children, but lower levels of HAPA was not related to socioeconomic factors (Simon & Nath, 2004). LAPA images (family scenes and landscapes) were rated more pleasant by women than men (Gomez et al., 2013). For women, but not men, LAPA prior to game play predicted improved creative problem-solving during play of a computer game (Yeh et al., 2016). Following exercise, LAPA decreased cortisol levels to a greater degree for women than for men (Karageorghis et al., 2018). When mothers interact with infants, their style of play is more often characterized as LAPA, while fathers' interaction with infants is more often characterized as HAPA (Feldman, 2003). When men reported more LAPA at work, levels of good cholesterol were higher and triglycerides were lower, but this relationship was not observed in women (Shirom et al., 2009). These findings of gender differences are consistent with research on ideal affect where it was found that men and women experienced LAPA more than HAPA during leisure, but neither experienced as much HAPA as they desired, and only women did not experience as much LAPA as they desired (Mannell et al., 2014).

Do these associations mean that LAPA is a woman's emotion? We think not. Rather, it may be that cultural practices may cause women to experience demands and deprivations that men do not, and such experiences may make LAPA less attainable in women's daily life, and therefore more precious. Indeed, symbols of *calm* and *relaxation* are used in advertising and media targeted to women to signal a kind of ultimate luxury. For example, women-targeted smartphone apps promise to induce calm, magazines celebrate simplicity, and products are linked to the cozy feeling of hygge (Altman, 2016; Raphael, 2019; Rose, 2000). More research is needed to investigate gender-related differences in LAPA.

Investigating other moderating factors

Very few of the articles reviewed here investigated other potentially important moderating factors such as race, where lower levels of positive affect especially HAPA were found among African American and Asian youth compared to White youth (Deer et al., 2018), or socioeconomic status, where social status mediated the lower levels of LAPA in women (Simon & Nath, 2004). As emotion researchers attend to social injustice (Cropanzano et al., 2011; Rimke, 2016), these factors and others that may impact positive affect should be investigated. Such moderating factors could potentially include childhood trauma (DePierro et al., 2018), family structure (Barden et al., 2016), encounters with law enforcement (Barkworth & Murphy, 2015), housing status (Labella et al., 2023), and immigration status (Alivernini et al., 2019).

What characterizes LAPA, beyond positive valence and low arousal?

We include in this discussion observations about characteristics of LAPA, because we hope to provide researchers with tools for paying more attention to it. The nature of low arousal emotion is that it does not demand the attention of those who experience it (Berridge & Winkielman, 2003), and if it is not valued, it is even more difficult to detect. People are less likely to remark on and share emotion when it is lower arousal (Rimé et al., 1992). When everyday language use does not take notice of positive low arousal, it can make recognition of these states less likely (Barrett, 2017). The characteristics of LAPA described here can provide clues for its detection in everyday life as well as novel approaches for its inclusion in research.

LAPA is rooted in the present moment

One of the more intriguing findings in this review is the contrast between LAPA and HAPA in terms of time orientation; LAPA was found to be associated with a focus on the present moment, while HAPA was found to be associated with an orientation toward the future (Mogilner et al., 2011, 2012). This finding is somewhat surprising in light of research that links the savoring technique of focusing on the present moment to an increase in HAPA (Quoidbach et al., 2010), but in that research, there was no assessment of LAPA, so

a comparison between HAPA and LAPA was not possible. The association between the present moment and LAPA may help to explain the evidence that LAPA is increased by mindfulness interventions when HAPA is not (e.g., Imtiaz et al., 2018; Zeng et al., 2019). Turning the attention toward the present moment is a core aspect of mindfulness practice, which involves monitoring what is happening in the inner and outer world at the present moment with acceptance and non-judgement (Lindsay & Creswell, 2019; Teper & Inzlicht, 2013), and this acceptance of the present moment may be key to understanding why LAPA is associated with mindfulness more so than HAPA. As will be discussed in the next subsection, LAPA itself may be characterized by accepting the present moment, and what came immediately before without wanting more or less of what is present.

LAPA as the resolution of approach-avoidance motivation

In this section we explore a way of conceptualizing low arousal positive states in terms of their relationship to approach and avoidance. As mentioned earlier in our analysis of items used to measure HAPA and LAPA (see Table 17), we looked for words that indicated approach motivation in each type of affect. We observed that the vast majority of items used to measure LAPA connoted no approach motivation in the present moment. In fact, we observed three subtypes of LAPA based on whether and when approach-avoidance was implied (*calm*, *satisfaction*, *relief*). These three possible subtypes can be considered similar in terms of arousal level and positivity, but they differ in terms of the conditions implied by them: a steady state of neither approach nor avoidance (*calm*), having approached and attained something wanted or needed (*satisfaction*), and having avoided or stopped something unwanted (*relief*).

Calm, the most-used item, could be considered a no-motion emotion, in that it suggests moving neither toward nor away from any experience. It implies stability of mind and ease within the body in which there are minimal (or manageable) external and internal demands. In contrast to *calm*, which implies a steady state, the other two subtypes of LAPA, *satisfaction* and *relief*, indicate movement, a shift from a prior state, where emotional arousal had been elevated in response to desire or threat. To be *relieved* is to have shifted away from a negative experience (the resolution of avoidance), and to be *satisfied* is to have shifted toward the attainment of a desired experience (the resolution of approach). Both of these states may involve deactivation, or diminishing arousal, but they are not entirely explained by arousal, because this decreased arousal results from goal achievement (*satisfaction*) or threat aversion/pain alleviation (*relief*). Even though some emotion researchers have noted that positive states such as *joy* and *contentment* call forth inaction (Frijda, 1986; Tugade et al., 2014), the importance of such inaction has not been fully explored.

We cannot overstate the importance of the observation that a critical component of feeling good involves moments of no-approach and no-avoidance. We believe that recognizing the low-arousal and deactivating goodness of wanting nothing, needing nothing, or fixing nothing, is akin to mathematicians discovering zero. It is a concept, hiding in plain sight, that could illuminate myriad emotional processes associated with development, health, mental health, and well-being, empowering practitioners and laypeople to solve otherwise unsolvable emotional equations.

LAPA conceptualized as an optimal homeostasis

We offer a final observation about LAPA, consistent with the increased attention to and promotion of LAPA. We suggest that LAPA can be conceptualized as a kind of optimal homeostasis, the condition of balance and stability to which a system returns to as it dynamically adjusts to the demands of its environment. This view of LAPA comports with the concept of a homeostatically protected mood, which Cummins (2016) describes as a nonconscious, unreflective, resting state which "is best reflected as a general feeling of contentment, but also comprises aspects of related affects including happy and alert" (p. 63). This perspective can be considered in light of a number of other views on emotion, including the neurologic meta-stability of liking and wanting (Kringelbach & Berridge, 2017), a dynamic systems perspective on emotion regulation (Fogel et al., 1992; Thompson, 2011), the "coasting" response to positive affect (Carver, 2003, p. 243), emotional equilibrium across the lifespan (Labouvie-Vief, 2015), hedonic set-point (Fujita & Diener, 2005), and the positivity offset, or the tendency for people to interpret neutral, low-arousal circumstances as positive (Cacioppo & Berntson, 1999; Diener et al., 2015).

A key consideration here is that any affective state exists in relationship to other emotions and how they unfold over time. For example, in describing emotion dynamics, Kuppens and Verduyn (2017) highlight the importance of studying processes associated with one emotion predicting another emotion across time. We propose that LAPA may have a particularly central relationship to other affective experiences. It may serve as a kind of home base which affective experience departs from and returns to – a state of satiety and pleasantness which fosters restoration and rejuvenation. It may be the state to which all other emotions are attached – the systemic safe haven from the demands of arousal, and the secure base from which to rise to meet those demands. If the emotional system continually returns to this central, pleasant low-arousal state, then more time spent in LAPA may signal a healthier emotional system. Researchers could investigate the sequential relationship of LAPA to other desirable and undesirable emotions and life outcomes

to explore the possibility that LAPA is a particularly potent signal of optimal human functioning.

Limitations

Among the most significant limitations of this paper is that despite (or perhaps because of) our systematic approach to searching and selecting articles, this review might not have yielded all of the findings related to LAPA and HAPA. Although we used an expansive range of search terms, examining thousands of articles, our exclusion of papers that did not conceptualize affect in terms of arousal may have left out some conceivably relevant papers. For example, this criterion led to the exclusion of research on the discrete emotions of *contentment* and *pride* (Griskevicius et al., 2010) and *awe* (Shiota et al., 2011), as well as research on approach motivation investigating *calm* and *excitement* (e.g., Gable & Harmon-Jones, 2008). Similarly, our exclusion of research on the large body of work involving ideal affect and differences in cultural valuation of affect (e.g., Tsai, 2017), leaves much remaining to be said about LAPA and HAPA in such contexts. We excluded several unpublished papers (e.g., theses and dissertations) that would have otherwise met our criteria, suggesting that the universe of comparisons between LAPA and HAPA is expanding, and that even at the completion of this paper, the story it tells will be incomplete.

An additional limitation involves negative affect; many of the studies in this review researched HAPA and LAPA in order to detect differences or interactions in the effect of valence and arousal and included high- and low-arousal negative affect as variables in their experiments. As such, when positive affect is contrasted with negative affect, there may be a pattern of effects that we did not look for. Finally, the variability in the conceptualization, operationalization, and manipulation of HAPA and LAPA should be considered a limitation of the findings reported here; given that the operational distinction between HAPA and LAPA is sometimes blurry, the findings of such studies should be interpreted with caution. To be sure, shedding light on the status of LAPA and HAPA operationalizations was a strong motivation for conducting this review.

Conclusion

This review provides strong evidence that the two types of positive affect, LAPA and HAPA, are similar in positivity but have different associations across a wide variety of domains, most notably adult development, mindfulness, creativity, exercise, brain activity, and cardiovascular health. We observed that many of these differences fit with theory that associates HAPA with drive and LAPA with soothing and affiliation (e.g., Gilbert, 2005; Tomkins, 1962) and suggest that such a pattern of findings warrants direct investigation. Additionally, conceptualizations of LAPA should incorporate the positive qualities of no-approach/no-avoidance, along with the circumstance of such a state, whether it is due to a steady state of *calm*, the recent satisfaction of desire, or the removal of something not wanted. Furthermore, the relationships of LAPA to well-being, stress, work, positive sociality, older adults, and women warrant further investigation. Researchers, practitioners, and laypeople should be aware of the distinctions between LAPA and HAPA in terms of their causes, consequences, and associations, because the consideration of these distinctions can help in discovering and deploying effective approaches to optimizing human functioning.

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Declarations

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