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# Feeling Excited or Taking a Bath: Do Distinct Pathways Underlie the Positive Affect–Health Link in the U.S. and Japan?

Magali Clobert and Tamara L. Sims
Stanford University

Jiah Yoo and Yuri Miyamoto
University of Wisconsin—Madison

Hazel R. Markus
Stanford University

Mayumi Karasawa
Tokyo Women's Christian University

Cynthia S. Levine
Northwestern University

Feeling good is linked to better health in Western contexts. Recent studies show, however, that the affect–health link is not consistent across cultures. We suggest two reasons for such inconsistency. The first follows from research showing that North American (vs. East Asian) cultures tend to value high arousal positive (HAP) states, for example, excited, more than low arousal positive (LAP) states, for example, calm. The second is one we propose for the first time. Positive affective experience is manifest in internal feelings but also in affective practices, such as taking a bath (a highly valued affective experience in Japan) or a fitness workout (a highly valued affective experience in the United States). We hypothesized that the HAP feelings/practices–health link would be stronger in the United States versus Japan, and the LAP feelings/practices–health link would be stronger in Japan versus the United States. Using survey samples from the United States ($N$ = 640) and Japan ($N$ = 382), we examined how health outcomes are shaped by positive affective feelings and practices varying in arousal. In a first set of analyses, HAP feelings predicted better physical and biological health in the United States but not in Japan. No cultural differences were consistently found for the effect of LAP feelings on health. In addition, engaging in HAP practices predicted better physical and biological health in the United States whereas engaging in LAP practices predicted better physical health in Japan but not in the United States. These findings suggest that the pathways underlying the culture–health link are culturally variable.

*Keywords:* emotion, culture, positive affect, health, arousal

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> E-motion. It's energy in motion that heals us. [. . .] So the very fact that this is happening is HUGELY important to your health and self-esteem.
>
> —Dr. C. Northrup

> The way to health is to have an aromatic bath and scented massage every day.
>
> —Hippocrates

Strong beliefs and distinct theories about the sources of health and how to improve, maintain, or endanger health are common across time and contexts. Among these theories, the role of affective experience for health is particularly recurrent. In the United States, for instance, negative affect is widely believed to deplete resources and harm health, whereas positive affect is believed to build up resources and benefit health (e.g., Fredrickson, 2005). Yet, in other cultural contexts, affective experience is construed differently giving rise to other possibilities about the links between positive affect and health and how they might be assessed. As illustrated by the opening quotes, affective experience can take a variety of forms. It can take the form of an internal feeling that is either high in "energy" or arousal, such as excited, or one that is low in arousal, such as calm. Further, in many cultural contexts, affective experience is manifest not only, and not even primarily as an internal feeling, but also as a behavioral practice such as "going to a party" or "taking a relaxing bath." These multiple ways of construing affective experience and their potential to support health have yet to be the focus of research.

In this article, we propose that the pathways underlying the positive affect–health link can differ across cultural contexts. Using large survey samples—Midlife in the United States (MIDUS) and Midlife in Japan (MIDJA)—we compare affective experience in the United States and Japan. The MIDUS and

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Magali Clobert and Tamara L. Sims, Department of Psychology, Stanford University; Jiah Yoo and Yuri Miyamoto, Department of Psychology, University of Wisconsin—Madison; Hazel R. Markus, Department of Psychology, Stanford University; Mayumi Karasawa, Department of Communication, Tokyo Women's Christian University; Cynthia S. Levine, Department of Psychology, Northwestern University.

Tamara L. Sims is now at Stanford Center on Longevity, Stanford, California.

Correspondence concerning this article should be addressed to Magali Clobert, who is now at the Psychological Sciences Research Institute, Department of Psychology, Université catholique de Louvain, 10 Place Cardinal Mercier, 1348 Louvain-la-Neuve, Belgium. E-mail: magali.clobert@uclouvain.be

MIDJA surveys contain a variety of measures that index affective experience in multiple ways and so can be used for an initial examination of the hypothesized variation in the positive affect–health link.

The data analyses reported here are grounded in the research of multiple investigators that demonstrate ethnic and cultural variation in the affect–health link (e.g., Butler, Lee, & Gross, 2007; Cheung & Park, 2010; Consedine, Magai, & Horton, 2005; Curhan et al., 2014; Kitayama, Markus, & Matsumoto, 1995; Ryder, Ban, & Chentsova-Dutton, 2011), Drawing on Affect Valuation Theory (Tsai, 2007), we first examine the arousal level of the feeling state (high vs. low arousal) and hypothesize that normatively desired arousal level is a crucial factor in understanding variability in the positive affect–health link. Second, we explore the idea that affective practices are an important but as yet unexamined factor in understanding affective experience. In Japan, for example, one of the most affectively positive and pleasurable experiences, and one widely regarded as a critical component for health is the low-arousal activity of taking a bath (Clark, 1994). Here we hypothesize that normatively appropriate affective practices also have a role in the positive affect–health link and compare the United States and Japan.

Positive affective experience is most often conceptualized and measured as it is commonly understood in the West or in WEIRD contexts (Henrich, Heine, & Norenzayan, 2010; Kitayama & Markus, 1994; Mesquita & Frijda, 1992; Mesquita, Boiger, & De Leersnyder, 2016). As a consequence, affective experience has been "psychologized" (Kirmayer & Ryder, 2016; Ryder, Ban, & Chentsova-Dutton, 2011) and understood primarily as an internal state of positive high arousal (Tsai, 2007). Yet as emotion theorists expand the scope of their observations and analyses, it is increasingly evident that affective experience is multifaceted and can be manifest and assessed in ways that differ from those common in WEIRD contexts (e.g., Consedine et al., 2005, 2006; Consedine, Magai, Cohen, & Gillespie, 2002; Dzokoto, 2010; Dzokoto & Okazaki, 2006; Soto, Perez, Kim, Lee, & Minnick, 2011). For example, emotions can take the form of positive low arousal as well as positive high arousal (Tsai, 2007; Tsai & Clobert, in press) and can also manifest as interpersonal events, bodily experiences, and/or as observable behavioral practices (e.g., Barrett, 2017; Chentsova-Dutton & Dzokoto, 2014; Chentsova-Dutton & Tsai, 2010; Kitayama, Markus, & Kurokawa, 2000; Riemer, Shavitt, Koo, & Markus, 2014; Uchida, Townsend, Markus, & Bergsieker, 2009; Wierzbicka, 1994). Further, and of particular relevance to the current article, better physical and mental health are related to knowledge of emotional norms and the ability and motivation to enact them (Consedine, Chentsova-Dutton, & Krivoshekova, 2014; Tamir et al., 2016). Thus, adhering to the culturally appropriate nature and form of affective experience is likely an unseen but crucial factor for health.

## Cultural Fit, Affective Experience, Health, and Culture

Across cultures, affective experience matters for health. Indeed, a large body of work has established a clear and consistent association between the two. For instance, people who experience more negative affect report lower life satisfaction (Suh, Diener, Oishi, & Triandis, 1998), more pain and fatigue, and disease (e.g., Geisser, Roth, Theisen, Robinson, & Riley, 2000; Kubzansky & Kawachi, 2000; Watson, 1988), and are more likely to die sooner (e.g., Pinquart & Duberstein, 2010). The deleterious effect of negative affect on health appears to be ubiquitous, persisting across a wide variety of both industrialized and developing nations (Pressman, Gallagher, & Lopez, 2013). Yet recent studies find that the magnitude of this effect varies across cultural contexts (Curhan et al., 2014; Kitayama et al., 2015; Kuppens, Realo, & Diener, 2008; Miyamoto et al., 2013; Tsai, 2017; Tsai & Clobert, in press). In particular, negative affect is related to worse health outcomes including poorer physiological functioning, psychological well-being, or physical health in more individualistic (e.g., Western countries) versus more collectivistic (e.g., East Asian countries) contexts.

Relative to negative affect (e.g., Consedine et al., 2002, 2005; Consedine & Moskowitz, 2007), the link between positive affect and health has received much less sustained research attention. Yet increasing evidence points to the health benefits of experiencing positive affective states such as happiness, excitement, and calm (Boehm & Kubzansky, 2012; Cohen & Pressman, 2006). Self-reported positive affect is associated with fewer chronic conditions (Pressman & Cohen, 2005), higher self-reported health (Pettit, Kline, Gencoz, Gencoz, & Joiner, 2001), better health-related behaviors (Baruth et al., 2011; Leventhal, Ramsey, Brown, LaChance, & Kahler, 2008), decreased pain sensitivity and interferences (Finan & Garland, 2015), fewer sleep problems (Hamilton et al., 2007; McCrae et al., 2008), and better immune system and cardiovascular functioning (Davidson, Mostofsky, & Whang, 2010; Marsland, Pressman, & Cohen, 2007; Steptoe, O'Donnell, Badrick, Kumari, & Marmot, 2007; Steptoe, Wardle, & Marmot, 2005).

Less is understood about whether the association between positive affect and health is a universal phenomenon. Findings from studies examining this link across cultures are mixed at best: some show a positive relationship (Sone et al., 2008), others show mixed (e.g., gender-specific) or weaker effects (Koizumi, Ito, Kaneko, & Motohashi, 2008; Leu, Wang, & Koo, 2011; Shirai et al., 2009; Tanno et al., 2009; Yoo, Miyamoto, & Ryff, 2016). For instance, the link between positive feelings and fewer depressive symptoms was stronger for European American than Asian American participants (Leu et al., 2011). Still, others have observed no effect of positive affect on biological health among East Asians (Yoo, Miyamoto, Rigotti, & Ryff, 2017).

Like affective experience, the relationship between affect and health can be shaped by relevant cultural values, beliefs and scripts, and also by the practices and norms, such as the affective states people want to feel (Consedine et al., 2014; Ryder et al., 2011; Tsai & Clobert, in press). As individuals tune into, fit with, or follow the affective values and scripts endorsed by their culture, they are more likely to flourish. Indeed, a fit or match between individuals and their cultural environments has positive consequences in many domains, including those of health and well-being (Consedine et al., 2014; De Leersnyder, Mesquita, Kim, Eom, & Choi, 2014; Levine et al., 2016; Mesquita et al., 2016; O'Reilly, Chatman, & Caldwell, 1991; Riemer et al., 2014; Scheibe, English, Tsai, & Carstensen, 2013; Stephens, Markus, & Fryberg, 2012).

One reason that positive affect may not be as beneficial for health in collectivistic and interdependent cultural contexts may be

due to the lesser relative value placed on positive feelings (see Tsai & Clobert, in press). In North American, individualistic contexts, people tend to maximize positive (and minimize negative) affect more often and to a greater degree than people in East Asian, collectivistic contexts (Curhan et al., 2014; Heine, Lehman, Markus, & Kitayama, 1999; Sims et al., 2015). Because positive affect is less valued in East Asian contexts, experiencing these states may be normatively inappropriate and may not lead to better health outcomes.

The value accorded positive affect is only a part of the explanation of this cultural variation, however. Two further distinctions pertaining to affective experience are also of particular relevance when studying the positive affect–health link across cultures. First, few studies differentiate between high arousal positive (HAP) and low arousal positive (LAP) states when examining whether positive affect shapes health, despite well-established cultural differences in the valuation of HAP and LAP (e.g., Tsai, Knutson, & Fung, 2006). Second, affective experience can be conceptualized and assessed as internalized, personal, feelings but also as affective practices or observable actions (Barrett, 2015; Kitayama et al., 1995; Lutz, 1988; Markus & Kitayama, 1994; Mesquita & Frijda, 1992; Potter, 1988; Uchida et al., 2009). Further, cultural contexts may differ in the relative balance of these aspects of affective experience.

## Cultural Differences in Valuing HAP Versus LAP States

There is now substantial evidence that cultures vary in terms of the specific types of positive states they value (Tsai, 2007). Independent cultural contexts (e.g., European American) emphasize influencing others which requires increases in physiological arousal. In these contexts, people report wanting to feel HAP states like excitement. On the other hand, many interdependent cultural contexts (e.g., East Asian) emphasize adjusting to others which is typically accompanied by decreases in physiological arousal. People In these contexts report wanting to feel LAP states like calm (Tsai et al., 2006; Tsai, Miao, Seppala, Fung, & Yeung, 2007). These cultural differences found in self-reports of ideal affect are further reflected and reinforced in many widely distributed cultural products and practices (Mogilner, Aaker, & Kamvar, 2012; Sims et al., 2018; Tsai et al., 2007; Tsai et al., 2016). These differences in ideal affect also have implications for health and the conception of well-being. For instance, although increased physical health problems were associated with feeling dull, sluggish, and other low arousal negative states (the opposite of HAP states) for European Americans, they were associated with feeling nervous, afraid, and other high arousal negative states (the opposite of LAP states) for Chinese (Young, Sims, Charles, & Tsai, 2013). In sum, because Americans value excitement more and define well-being using more HAP terms, experiencing HAP may lead to better health outcomes. For Japanese, who are part of an interdependent context in which calm is valued more and well-being is defined more in terms of LAP states, experiencing more LAP may have positive consequences for health.

## Cultural Differences in Construing Affect as Internal Feeling States and Overt Behavioral Practices

Relatively little empirical attention has been given to affective practice yet theorizing on culture and emotion often characterizes emotions as including behavioral practices. Many ethnographers and cultural psychologists have proposed that a focus on practices is useful in less individualized cultural contexts as this may be the way that people commonly experience emotions. Lutz (1988) suggested, for example, that affective experience can be conceived as "actions or ideological practices" rather than just internalized "entities." Similarly, examining everyday sentiments in China, Potter (1988) observed that the most appropriate method to understand affective experience may be through the observation of actions and not through the investigation of the self-reported internal feelings assessed with traditional Western measurement tools such as questionnaires. As another example, in Western, individualistic cultural contexts, the loss of a relationship, health, or status tend to co-occur with intense feelings of sadness or anxiety and labeled depression (Kleinman, 1980; Kirmayer & Ryder, 2016). Yet in more collectivistic cultural contexts (i.e., Chinese, Indian, African), loss is associated less with internal feelings and more with bodily aches, pain or fatigue (Parker, Cheah, & Roy, 2001; Paritala, Nallapaneni, & Chennamsetty, 2014).

Psychologists have offered a number of similar ideas when describing affective experience in East and Southeast Asia. Summarizing across many different theoretical perspectives on emotions, Markus and Kitayama (1994) defined them as "a set of socially shared scripts composed of various processes—physiological, subjective and behavioral—that develop as individuals actively (personally and collectively) adapt and adjust to their immediate socio-cultural, semiotic environment" (pp. 339–340). Consistent with this view of psychological experience as practice as well as internal or subjective state, Uchida and colleagues (Uchida et al., 2009) find that American respondents are likely to localize the origin of affect within themselves, whereas Japanese respondents localize the origin of affect outside the self, typically in the social and behavioral environment of which the person is a part. Related studies report that in East Asian samples parents and children are less likely to talk about their respective internal feeling states and more likely to talk with each other about behaviors and actions (Wang, 2017).

In line with the idea of affective experience as including practices, previous research has established a clear relationship between individuals' affective values and preference for activities (Tsai, 2007; Tsai, Chim, & Sims, 2015). European Americans are more likely to choose exciting activities such as surfing (vs. calm activities such as reading) for their ideal vacation or to choose excited (vs. calm) music than Hong Kong Chinese or Asian Americans (Tsai, 2007). Despite the many suggestions for the need to expand conceptions of affective experience to include affective practices, there have not been any direct empirical assessments of the potential impact of affective practices on health or other outcomes.

The current article makes three contributions to the literature on the association between affect and health. The first is the use a wide variety of measures of health and well-being to examine the associations between positive affect and health. The study includes objective and subjective measures of health and assesses health on three dimensions: physical, biological, and mental. The physical dimension includes health conditions, functional limitations, sleep problems, and pain interference. The biological includes the markers associated with greater biological health risks, that is, body

mass index (BMI), blood lipids, and proinflammatory marker. The mental health dimension includes life satisfaction, self-esteem, and psychological well-being. Previous research on the positive affect–health link across cultures has focused on only one or two health indicators at a time that were often either subjective (e.g., life satisfaction) or objective (e.g., interleukin [IL]-6, lipid profile) making difficult to understand the role of positive affect on different aspects of health measured simultaneously. A second important contribution of this article is to examine the role of HAP and LAP affect on health outcomes separately to provide a clearer, more nuanced, picture of the pathways between positive affect and health association across cultures. Third, the article explores the positive affect–health link in the United States and Japan by assessing positive affective experience in multiple ways, that is, as internalized feeling states using standard instruments (i.e., PANAS) and as practices using a scale developed to assess daily practices associated with well-being.

## The Present Work

Given cultural differences pertaining to the experience and valuation of HAP and LAP states, we expect HAP feelings to better predict good health in the United States than in Japan (Hypothesis 1a), and LAP states to be better predictors of good health in Japan compared to the United States (Hypothesis 1b). In the same line, we expect HAP affective practices to be better predictors of good health in the United States versus Japan (Hypothesis 2a) and we hypothesize that LAP affective practices will be better predictors of good health in Japan versus the United States (Hypotheses 2b).

To test these hypothesis, we analyzed data from the Midlife in the United States (MIDUS) and Japan (MIDJA) surveys because they offered measures of affective experience that were reasonably culturally appropriate (including both internal affective HAP and LAP states and practices), a large set of health outcomes (i.e., physical health, biological function, and mental health), and two cultural contexts (i.e., Western, individualistic and Eastern, collectivistic). We conducted analyses across two waves of these surveys comparing participants in the United States (2004) and Japan (2008) in which we examined the relationships between positive feelings varying in arousal (i.e., HAP and LAP) and different health outcomes (i.e., physical health, biological function, and mental health), as well as the association between positive affective practices varying in arousal (HAP and LAP practices) and health outcomes. Notably, the original design of the multiple waves MIDUS-MIDJA comparison predates Affect Valuation Theory (Tsai, 2007) or the hypothesis that affective practices may be particularly relevant to health in East Asian contexts. Thus, the available measures were not designed with these hypotheses in mind.

# Method

## Procedure

Participants were recruited through the MIDUS and MIDJA studies. The MIDUS survey, first conducted in 1995–1996, is based on a national probability sample of midlife and older adults recruited through random digit dialing. The MIDJA survey, first conducted in 2004, is based on a random sample of Japanese participants from the Tokyo metropolitan area. The American sample participated in the second wave of the survey in 2004. The Japanese sample participated in the first wave of the survey conducted in 2008. The MIDUS (protocol numbers 2016–0054 and 2014–0813) and MIDJA (protocol number 2011–0458) surveys were approved by the Institutional Review Board of the University of Wisconsin—Madison.

The survey includes a self-administered questionnaire in which participants reported their affective feelings, subjective health, functional limitations, and psychological well-being (Time 1). A subset of participants who provided biological data several months later (Time 2) also reported their affective practices and health problems at the same time. Biological data were collected at the University of Wisconsin—Madison, the University of California, Los Angeles, and Georgetown University for American participants and at a clinic near the University of Tokyo for Japanese participants, and the data was then sent to the General Clinical Research Centers (for further details, see Coe et al., 2011). A clear illustration of survey's waves and time points across countries is available in the online supplemental material (Supplemental Figure S1).

## Participants

For this study, participants were a subset of respondents who provided biological data. To maximize comparability with the Japanese sample, we excluded twins, siblings, and the Milwaukee subset from the analyses. The final American sample included in total 640 participants (301 males, 339 females; *M* age = 58.64, *SD* = 11.72). The participants' ethnicity was as follow: 583 European Americans, 24 African Americans, four Asian Americans, three Native Americans, and 26 others (unspecified). In total, the final Japanese sample included 382 participants (168 males, 214 females; *M* age = 55.47, *SD* = 14.04). All Japanese participants were Asian. See Table 1 for national comparisons in demographic variables. Although the American sample is slightly older and more educated than the Japanese, both samples come from an industrialized and modern society, are well-educated (most of them attended at least some college), and are middle-aged.

## Measures

**Positive affect.** A total of 10 items were initially used to measure positive affective feelings at Time 1 including *cheerful*, *in good spirits*, *extremely happy*, *calm and peaceful*, *satisfied*, *full of life*, *enthusiastic*, *attentive*, *proud*, and *active* (Mroczek & Kolarz, 1998). Participants rated how frequently they experienced each feeling during the past 30 days using 5-point Likert scale from 1 (*a little of the time*) to *5* (*all the time*). We computed a summary score indexing overall positive affect (United States: $\alpha = .92$; Japan: $\alpha = .92$).

Because we aimed to distinguish between HAP and LAP feelings, we conducted a principal component analysis set to identify two factors (higher and lower arousal) with varimax rotation (see Supplemental Table S1 in the online supplemental material). The item extremely happy was excluded from the analyses since unlike all the other items it included a judgment about the feeling state's intensity. Although the initial eigenvalue of the second factor was slightly smaller than 1 (United States = .902; Japan = .970), analyses showed that a two-factor solution explained more of the

Table 1
*Descriptive Statistics and Mean Comparisons (Analyses of Variance) for All Variables*

| Variable | United States ($n$ = 640) | | Japan ($n$ = 382) | | Mean comparisons | |
|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *F*(1, 1020) | *p* |
| Demographics | | | | | | |
| Age | 58.64 | 11.72 | 55.47 | 14.04 | 15.05 | .000 |
| Gender | 53% female | | 56% female | | $\chi^2(1) = .897$ | .343 |
| Level of education | 4.96 | 1.61 | 4.38 | 1.63 | 31.42 | .000 |
| Positive affects | | | | | | |
| Higher arousal positive | 3.60 | .78 | 3.06 | .77 | 112.87 | .000 |
| Lower arousal positive | 3.60 | .68 | 3.33 | .72 | 36.99 | .000 |
| Affective practices | | | | | | |
| Higher arousal positive | 2.11 | .34 | 1.86 | .38 | 118.22 | .000 |
| Lower arousal positive | 2.25 | .37 | 1.88 | .42 | 214.39 | .000 |
| Health outcomes | | | | | | |
| Physical health | | | | | | |
| Functional limitations | 1.73 | .84 | 1.38 | .63 | 50.76 | .000 |
| # symptoms/conditions | 4.23 | 3.07 | 1.65 | 1.67 | 227.73 | .000 |
| Sleep problems | 5.43 | 2.96 | 4.94 | 2.32 | 6.82 | .009 |
| Pain interferences | 2.22 | 1.30 | 2.09 | 1.01 | 2.98 | .085 |
| Biological health | | | | | | |
| Body Mass Index | 29.56 | 6.21 | 22.58 | 2.96 | 424.90 | .000 |
| IL-6 | .32 | .33 | .04 | .36 | 164.38 | .000 |
| Total/HDL cholesterol | .55 | .15 | .47 | .14 | 65.45 | .000 |
| Mental health | | | | | | |
| Life satisfaction | 7.49 | 1.29 | 6.29 | 1.51 | 182.93 | .000 |
| Self-esteem | 38.18 | 7.48 | 31.29 | 5.93 | 233.94 | .000 |
| Psychological well-being | 38.98 | 5.81 | 32.47 | 4.36 | 358.60 | .000 |

*Note*. IL-6 = interleukin-6; HDL = high-density lipoprotein.



variance (United States = 71.2%, Japan = 67.9%) compared to a one factor solution (United States = 61.1%, Japan = 57.1%). The rotated component matrix revealed that *satisfied, calm and peaceful, cheerful*, and *in good spirits* loaded better on the first factor (labeled LAP) whereas *enthusiastic, active, proud, and attentive* loaded on the second factor (labeled HAP). Except for *full of life*, all items across samples presented factor loading higher than .614 (cross loadings > .462). The item *full of life* presented problematic cross loadings especially in the United States, which made it difficult to classify it as belonging to factor 1 (loading = .635) or 2 (loading = .544). For this reason, we excluded this item from our analyses. HAP and LAP factors presented good reliability (excluding *full of life*) across cultures (United States: HAP $\alpha$ = .85, LAP $\alpha$ = .87; Japan: HAP $\alpha$ = .88, LAP $\alpha$ = .78). In accordance, two different variables reflecting HAP and LAP feelings were created by averaging the ratings of the corresponding items.[1]

Multigroup confirmatory factor analyses using AMOS 20 confirmed that this two-factor model was equivalent across cultures. We followed the analytical strategy described by Cheung and Rensvold (2002) and examined difference scores of several indices between an unconstrained model ($\chi^2$ = 331.172, $df$ = 38, $p < .001$; comparative fit index [CFI] = .935, root mean square error of approximation [RMSEA] = .087, McDonnald's noncentrality index [NCI] = .866, Gamma hat = .989) and a model constrained to present equal structural weights ($\chi^2$ = 343.170, $df$ = 44, $p < .001$; CFI = .934, RMSEA = .082, McDonnald's NCI = .864, Gamma hat = .987) across samples. Overall, fit indices supported the validity of a two-factor model for positive affect across cultures (see Cheung & Rensvold, 2002), $\Delta\chi^2$ = 11.998, $\Delta df$ = 6, $p$ = .062 (nonsignificant); $\Delta$CFI = −.001 (difference < −.01). $\Delta$RMSEA = −.005 (difference < .01), $\Delta$McDonald's NCI = −.002 (difference < −.02), $\Delta$gamma Hat = −.002 (difference < −.005).

**HAP and LAP practices.** Positive behaviors or practices were measured at Time 2 using a subset of items from the Positive Events Schedule (MacPhillamy & Lewinsohn, 1982) that measures the frequency of engaging in practices associated with positivity. We chose 12 practices with high face validity representing HAP states (*laughing*, *going to a party*, *learning to do something new*, *having a good fitness workout*, *amusing people*, and *being with happy people*) and LAP states (*appreciating nature*, *reading*, *taking a relaxing bath*, *seeing beautiful scenery*, *praying or meditating*, and *being relaxed*). Participants were asked how frequently they engaged in each activity in the past 30 days on a 3-point Likert scale from 1 (*never*) to *3* (*7 times or more*). MIDUS and MIDJA survey included additional behaviors (46 events in total) that we did not include since they were not obviously identified as being associated with HAP or LAP (e.g., planning trips, helping someone, having spare time, or shopping). To confirm our classification, we asked European American ($n$ = 10) and Japanese ($n$ = 28) undergraduate coders to categorize the affective practices as calming, exciting, or neither. Coders reached substantial agreement (Hallgren, 2012; Landis & Koch, 1977) when classifying practices (United States: Fleiss' $\kappa$ = 0.49; intraclass coefficient [ICC] = 0.93, 95% confidence interval [CI] = [0.85, 0.98]; Japan:

[1] Partial correlations controlling for age, gender, and level of education showed a significant association between HAP and LAP feelings in the United States, $r$ = .70, $p < .001$, and in Japan, $r$ = .65, $p < .001$.

Fleiss' $\kappa = 0.61$; ICC = 0.98, 95% CI = [0.97, 0.99]).[2] Specifically, more than 70% of American raters and 60% of Japanese raters identified LAP practices as calming while HAP practices were classified as exciting by more than 70% and 75% of the American and Japanese raters, respectively. Additional factorial analyses are available in the online supplemental material (see Supplemental Table S2).

Multigroup confirmatory factor analyses of the MIDUS and MIDJA sample ratings using AMOS 20 confirmed that this two-factor model was overall equivalent across cultures (United States and Japan). While comparing between an unconstrained model ($\chi^2 = 304.895$, $df = 106$, $p < .001$; CFI = .876, RMSEA = .043, McDonald's NCI = .907, Gamma hat = .995) and a model constrained to present equal structural weights ($\chi^2 = 340.403$, $df = 116$, $p < .001$; CFI = .860, RMSEA = .044, McDonnald's NCI = .896, Gamma hat = .993), fit indices supported the validity of a two factor model for positive affective practices across cultures (see Cheung & Rensvold, 2002), $\Delta\chi^2 = 35.508$, $\Delta df = 10$, $p < .001$; $\Delta$CFI = −.016; $\Delta$RMSEA = .001; $\Delta$McDonald's NCI = −.011; $\Delta$gamma hat = −.002. Therefore, we averaged ratings across each set of six items to create overall scores for HAP and LAP practices (HAP: United States $\alpha = .62$; Japan $\alpha = .62$; LAP: United States $\alpha = .55$; Japan $\alpha = .66$).[3]

**Health outcomes.** To measure different aspects of mental, physical, and biological health, we used nine indices that were the only ones available in the dataset (i.e., physical health outcomes) and/or have been previously differently linked to affective experience across cultures (i.e., biological and mental health outcomes), including both subjective and objective measures. At Time 1, participants reported their (a) functional limitations (seven items). At Time 2, participants reported (b) number of health symptoms and conditions, (c) sleep problems (19 items; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989), (d) pain interference (five items), (e) BMI, (f) IL-6 as a biomarker of inflammation, and (g) blood lipids as a measure of bad cholesterol (the ratio of total to high-density lipoprotein [HDL] cholesterol) were additionally collected. At Time 1, participants also reported their (h) life satisfaction (6 items; see Prenda & Lachman, 2001), (i) self-esteem (seven items; Rosenberg, 1965), and (j) psychological well-being (18 items; Ryff, 1989).

**Physical health.** (a) Participants indicated their functional limitations by rating how much their health limits them in doing seven different daily practices (e.g., lifting and carrying groceries, climbing several flights of stairs) on a 4-point Likert scale ranging from *1* (*not at all*) to *4* (*a lot*). We calculated the mean across the seven items to create a single score (United States: $\alpha = .93$; Japan: $\alpha = .88$). Functional limitations were the only physical health outcome measured at Time 1. (b) Participants reported the total number of health symptoms and conditions they suffered out of a possible 25 (e.g., asthma, arthritis, heart disease). A continuous variable based on the total number of chronic conditions checked by the participant was then created. (c) Participants indicated sleep problems using the Pittsburg Sleep Quality Index (Buysse et al., 1989), which includes seven dimensions (i.e., subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping meds, and daytime dysfunctions). Items comprising these seven components have different response format and we followed the procedure described by Buysse and colleagues to calculate a Global Sleep Score (see Buysse et al., 1989). The final score (ranging from 0 to 21) is the sum of each dimensions' score (ranging from 0 to 3) with higher scores indicating more sleep problems. (d) Finally, participants indicated pain interference by rating the extent to which pain interfered with their practices, mood, relations, sleep, and enjoyment over the past week from a scale of 0 (*did not interfere*) to 10 (*completely interfered*; United States: $\alpha = .92$; Japan: $\alpha = .89$). We averaged across the five ratings to create a final score.

**Biological health.** Because BMI, inflammation, and cardiovascular risk are all important indices of biological health risk and have been previously linked with positive affect (Boehm & Kubzansky, 2012; Stellar et al., 2015; Yoo et al., 2016), we focused on these three outcomes. (e) BMI was computed by dividing weight (in kilograms) by height squared (in meters). We assessed the (f) proinflammatory marker IL-6 as a biomarker of inflammation and (g) blood lipids as a measure of bad cholesterol (the ratio of total to HDL cholesterol). Frozen blood samples were shipped on dry ice from the three General Clinical Research Centers in the United States and from Tokyo to a single testing laboratory (MIDUS Biocore Laboratory, University of Wisconsin—Madison, WI). Serum IL-6 levels were determined by high-sensitivity enzyme-linked immunosorbent assay (ELISA; Quantikine, R&D Systems, Minneapolis, MN), with a lower sensitivity of detection at 0.16 pg/ml. All values were quantified in duplicate; in cases of a value greater than 10 pg/ml, the sample was rerun in diluted sera to fall on the standard reference curve. Total and HDL cholesterol were assayed at Tokyo labs and Meriter Labs (Madison, WI), using a Cobas Integra analyzer (Roche Diagnostics, Indianapolis, IN). To reduce the effect of extreme outliers, we winsorized a small number of high IL-6 ($n = 7$) and total cholesterol ($n = 3$) values to 3 standard deviations from the mean (calculated separately for each culture; see Boylan & Ryff, 2013, and Miyamoto et al., 2013, for similar approaches). Because the distributions of both markers were positively skewed, values were log-transformed.

**Mental health.** (h) Participants rated their overall life satisfaction regarding six domains (i.e., health, work, relationship with family, marriage, life in general, and finances) from 0 (*worst possible*) to 10 (*best possible* (United States: $\alpha = .73$; Japan: $\alpha = .70$). We averaged across the six items to create a single score of life satisfaction. (i) To measure self-esteem (Rosenberg's Self-Esteem Scale; Rosenberg, 1965), participants indicated their agreement with seven different statements (e.g., "I am able to do things as well as most people", "On the whole, I am satisfied with myself") on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*; United States: $\alpha = .78$; Japan: $\alpha = .70$). We summed the value of all items to create a single score of self-esteem. (j) To measure psychological well-being (Ryff's Scale of Psychological Well-Being; Ryff, 1989), participants responded to

[2] We additionally reported the ICC since we can also consider our categorization as ordinal. The kappa statistic quantifies inter-judge reliability as all-or-nothing agreement while the ICC incorporates the magnitude of the disagreement (Hallgren, 2012). In our classification of affective practices, we can indeed consider that categorizing an affective practice theorized to be exciting as calming (which is the opposite) is worse than classifying this practice as neither exciting nor calming.

[3] Partial correlations controlling for age, gender, and level of education showed a significant association between HAP and LAP practices in the United States, $r = .41$, $p < .001$, and in Japan, $r = .57$, $p < .001$.

42 questions tackling six different dimensions (i.e., autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance; United States: $\alpha = .93$; Japan: $\alpha = .92$). Participants were asked to what extent they endorsed each item on a 7-point Likert scale. For each dimension, we summed across items and then averaged across dimensions to reflect a single measure of psychological well-being.

### Data Analysis

To test Hypotheses 1a and b, we conducted three multivariate analyses of variance (MANOVAs) to test for the effect of country, HAP/LAP feelings as well as the interaction between country and HAP/LAP feelings on three sets of variables: physical health (i.e., health conditions, functional limitations, sleep problems, and pain interference), biological health (i.e., BMI, blood lipids, and proinflammatory marker), and mental health (i.e., life satisfaction, self-esteem and psychological well-being). Control variables such as participants' age, gender, and level of education were additionally included in our analyses. When the multivariate test was significant (or marginally significant) for one set of health variables, the distinctive effect of HAP/LAP feelings by country for each health outcome are detailed. The same analytical strategy was used to test Hypotheses 2a and 2b. HAP and LAP practices as well as the interaction between country and HAP/LAP practices were entered in the model instead of feelings. Descriptive statistics for all variables separately by country are reported in Table 1. Given a relatively high correlation between HAP and LAP feelings (United States: $r = .70$, $p < .001$; Japan: $r = .65$, $p < .001$), we also tested for multicollinearity among the independent variables entered in the multivariate models. No variance inflation factor (VIF) exceeded 2.29 which is below the various recommended thresholds for multicollinearity of 10, 5, or 3.3 (Hair, Black, Babin, & Anderson, 2009; Kock & Lynn, 2012). Nevertheless, it still indicates a bias in estimated standard errors of the predictors which we should keep in mind. Similar analyses were conducted for the multivariate models including HAP/LAP practices and no VIF value exceeded 1.8.

## Results

### H1a: HAP Feelings Predict Better Health More in the United States Than in Japan

**HAP feelings and physical health.** In accordance with our predictions, besides a main effect of HAP feelings, $F(4, 926) = 7.80$, $p < .001$, $\eta^2 = .03$, multivariate tests showed a significant interaction between country and HAP feelings in predicting physical health outcomes, $F(4, 926) = 4.62$, $p = .001$, $\eta^2 = .02$.[4] (a) For functional limitations, the tests of between-subjects effects indeed showed a significant interaction between country and HAP feelings, $F(1, 998) = 13.18$, $p < .001$, $\eta^2 = .01$. HAP feelings predicted fewer functional limitations in the United States, but not in Japan as displayed in Table 2 in the main article. (b) For number of symptoms and conditions, we did not find a significant interaction between country and HAP feelings, $F(1, 998) = 0.26$, $p = .610$, $\eta^2 = .00$. (c) For sleep problems, we also found a significant interaction between country and HAP feelings, $F(1, 998) = 5.53$, $p = .019$, $\eta^2 = .01$. HAP feelings predicted fewer functional limitations in the United States, but there was no effect in Japan (see Table 2). (d) For pain interference, between-subjects effects tests revealed a significant interaction between country and HAP feelings, $F(1, 998) = 7.24$, $p = .007$, $\eta^2 = .01$. HAP feelings were associated with less pain in the United States, but not in Japan (see Table 2). Results are further illustrated in Figure 1, top panel.

**HAP feelings and biological health.** In line with Hypothesis 1a, multivariate tests revealed a significant interaction between countries and HAP feelings in predicting biological health outcomes, $F(3, 849) = 6.96$, $p < .001$, $\eta^2 = .02$. No main effect of HAP feelings was found, $F(3, 849) = 1.23$, $p = .297$, $\eta^2 = .00$. (e) For BMI, between-subjects effects tests indeed showed a significant interaction between countries and HAP feelings, $F(1, 851) = 10.68$, $p = .001$, $\eta^2 = .01$. HAP feelings significantly predict lower BMI in the United States, but not in Japan (see Table 2). (f) In a similar vein, for inflammation, a significant interaction between country and HAP feelings was found, $F(1, 851) = 11.24$, $p = .001$, $\eta^2 = .01$. HAP feelings predicted lower inflammation in the United States, but not in Japan (see Table 2). (g) Finally, similar results were found for bad cholesterol. The between-subjects effects tests revealed a significant interaction between country and HAP feelings, $F(1, 851) = 7.98$, $p = .005$, $\eta^2 = .01$. HAP feelings marginally predicted lower cholesterol in the United States, but not in Japan (cf. Table 2). Results are further illustrated in Figure 1, top panel.

**HAP feelings and mental health.** Finally, MANOVAs while showing a main effect of HAP feelings on mental health outcomes, $F(3, 996) = 71.67$, $p < .001$, $\eta^2 = .18$, did not reveal an interaction between countries and HAP feelings, $F(3, 996) = 0.89$, $p = .445$, $\eta^2 = .00$. In accordance with our analytical strategy, we did not detail the results separately by each mental health outcome given the nonsignificance of the multivariate test. Results are further illustrated in Figure 1, top panel.

### H1b: LAP Feelings Predict Better Health More in Japan Than in the United States

**LAP feelings and physical health.** Contrary to our hypothesis, although multivariate analyses showed a significant main effect of LAP feelings, $F(4, 926) = 6.91$, $p < .001$, $\eta^2 = .03$, the interaction between countries and LAP feelings was not found to be significant, $F(4, 926) = 1.36$, $p = .247$, $\eta^2 = .00$. Results are further illustrated in Figure 1, bottom panel.

**LAP feelings and biological health.** Although multivariate tests did not show a main effect of LAP feelings in predicting biological health, $F(3, 849) = 0.86$, $p = .459$, $\eta^2 = .00$, we found a significant interaction between countries and LAP feelings, $F(3, 849) = 2.93$, $p = .033$, $\eta^2 = .01$. When looking more closely at the between-subjects effect tests distinctly for each biological health outcome, we found a significant interaction between countries and LAP feelings for (f) inflammation, $F(1, 851) = 7.41$, $p = .007$, $\eta^2 = .01$, but not for (e) BMI, $F(1, 851) = 2.18$, $p = .140$, $\eta^2 = .00$ or (g) bad cholesterol, $F(1, 851) = 2.11$, $p = .146$, $\eta^2 = .00$. Not in line with our predictions, LAP feelings marginally

[4] We only report significant main effects in the Results section. Statistics for nonsignificant main effects are nevertheless available on demand. Negative affect was not used as a control variable in the subsequent analyses. Doing so, however, does not change the pattern of reported results.

Table 2
*Effect of HAP and LAP Feelings on Health in the United States and Japan*

| Feeling | United States | | | | | | Japan | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *b* | *SE* | β | *t*-test | *p* | 95% CI | *b* | *SE* | β | *t*-test | *p* | 95% CI |
| HAP feelings | | | | | | | | | | | | |
| Physical health | | | | | | | | | | | | |
| Functional limitations (T1)[a] | −.388 | .069 | −.284 | −5.62 | .000 | [−.52, −.25] | .024 | .065 | .023 | .36 | .718 | [−.10, .15] |
| # symptoms/conditions (T2) | −.183 | .070 | −.136 | −2.61 | .009 | [−.32, −.04] | −.087 | .047 | −.118 | −1.86 | .064 | [−.18, .01] |
| Sleep problems (T2)[a] | −.377 | .073 | −.272 | −5.16 | .000 | [−.52, −.23] | −.125 | .078 | −.115 | −1.61 | .109 | [−.28, .03] |
| Pain (T2)[a] | −.189 | .074 | −.136 | −2.53 | .011 | [−.33, −.04] | .115 | .076 | .106 | 1.50 | .134 | [−.03, .26] |
| Biological health | | | | | | | | | | | | |
| BMI (T2)[a] | −.181 | .073 | −.141 | −2.48 | .013 | [−.32, −.04] | .021 | .039 | .034 | .53 | .597 | [−.06, .10] |
| Inflammation (T2)[a] | −.243 | .063 | −.215 | −3.84 | .000 | [−.37, −.12] | .021 | .078 | .016 | .26 | .791 | [−.13, .17] |
| Bad cholesterol (T2)[a] | −.138 | .070 | −.107 | −1.97 | .050 | [−.27, .00] | .078 | .077 | .066 | 1.01 | .311 | [−.07, .23] |
| Mental health | | | | | | | | | | | | |
| Life satisfaction (T1) | .303 | .049 | .275 | 6.22 | .000 | [.21, .40] | .288 | .074 | .221 | 3.91 | .000 | [.14, .43] |
| Self-esteem (T1) | .556 | .055 | .448 | 10.08 | .000 | [.45, .66] | .453 | .059 | .453 | 7.73 | .000 | [.34, .57] |
| Psychological well-being (T1) | .543 | .050 | .452 | 10.97 | .000 | [.45, .64] | .431 | .052 | .473 | 8.35 | .000 | [.33, .53] |
| LAP feelings | | | | | | | | | | | | |
| Physical health | | | | | | | | | | | | |
| Functional limitations (T1) | −.171 | .079 | −.108 | −2.15 | .032 | [−.33, −.01] | −.057 | .070 | −.053 | −.82 | .413 | [−.19, .08] |
| # symptoms/conditions (T2)[a] | −.192 | .081 | −.124 | −2.38 | .017 | [−.35, −.03] | .037 | .050 | .047 | .75 | .455 | [−.06, .13] |
| Sleep problems (T2) | −.194 | .084 | −.122 | −2.32 | .021 | [−.36, −.03] | −.172 | .083 | −.146 | −2.07 | .039 | [−.34, −.01] |
| Pain (T2)[a] | −.431 | .086 | −.268 | −5.00 | .000 | [−.60, −.26] | −.186 | .082 | −.158 | −2.26 | .024 | [−.35, −.02] |
| Biological health | | | | | | | | | | | | |
| BMI (T2) | .027 | .087 | .018 | .32 | .750 | [−.14, .19] | .001 | .042 | .002 | .03 | .973 | [−.08, .08] |
| Inflammation (T2)[a] | .127 | .072 | .098 | 1.76 | .079 | [−.01, .27] | −.101 | .083 | −.074 | −1.21 | .227 | [−.26, .06] |
| Bad cholesterol (T2) | .001 | .081 | .001 | .01 | .990 | [−.16, .16] | −.091 | .082 | −.071 | −1.10 | .270 | [−.25, .07] |
| Mental health | | | | | | | | | | | | |
| Life satisfaction (T1) | .446 | .056 | .350 | 7.95 | .000 | [.34, .56] | .562 | .078 | .401 | 7.17 | .000 | [.41, .72] |
| Self-esteem (T1)[a] | .292 | .063 | .204 | 4.61 | .000 | [.17, .42] | .097 | .062 | .091 | 1.57 | .117 | [−.02, .22] |
| Psychological well-being (T1)[a] | .392 | .057 | .283 | 6.88 | .000 | [.28, .50] | .118 | .055 | .120 | 2.14 | .033 | [.01, .23] |

*Note.* CI = confidence interval; T1 = Time 1; T2 = Time 2; BMI = body mass index; HAP = high arousal positive; LAP = low arousal positive.
[a] Indicates significant difference between countries in effect of affective practices on health outcome.

predicted higher levels of inflammation in the United States, but not in Japan (see Table 2). Results are further illustrated in Figure 1, bottom panel.

**LAP feelings and mental health.** Finally, MANOVAs revealed both a main effect of LAP feelings, $F(3, 996) = 44.39$, $p < .001$, $\eta^2 = .12$, as well as a significant Countries × LAP feelings interaction, $F(3, 996) = 5.64$, $p = .001$, $\eta^2 = .02$. When results were detailed by each mental health outcome, we found a significant interaction between countries and LAP feelings for (i) self-esteem, $F(1, 998) = 4.63$, $p = .032$, $\eta^2 = .00$, and (j) psychological well-being, $F(1, 998) = 11.50$, $p = .001$, $\eta^2 = .01$, but not for (h) life satisfaction, $F(1, 998) = 1.72$, $p = .190$, $\eta^2 = .00$. Contrary to our hypothesis, LAP feelings predicted higher self-esteem in the United States, but not in Japan (see Table 2). In the same vein, LAP feelings were a stronger predictor of better psychological well-being in the United States than in Japan. Results are further illustrated in Figure 1, bottom panel.

## H2a: HAP Practices Predict Better Health More in the United States Than in Japan

Because HAP and LAP practices were measured at Time 2 (see Supplemental Figure S1 in the online supplemental material), we only used health indicators measured at Time 2 as outcome variables including for physical health—(a) the number of symptoms and conditions, (b) sleep problems, and (c) pain interference—and for biological health—(d) BMI, (e) interleukin-6 (IL-6) as a biomarker of inflammation, and (f) blood lipids as a measure of bad cholesterol (the ratio of total to HDL cholesterol).

For physical health, as anticipated, multivariate tests showed a significant countries x HAP practices interaction, $F(3, 795) = 7.66$, $p < .001$, $\eta^2 = .03$, while no significant main effect of HAP practices was found, $F(3, 795) = 1.22$, $p = .303$, $\eta^2 = .00$. Detailed between-subjects effects tests showed significant interactions between countries and HAP practice for (a) number of symptoms and conditions, $F(1, 797) = 6.06$, $p = .014$, $\eta^2 = .01$; (b) sleep problems, $F(1, 797) = 8.03$, $p = .005$, $\eta^2 = .01$; and (c) pain interference, $F(1, 797) = 18.65$, $p < .001$, $\eta^2 = .02$. Further analyses revealed that, HAP practices predicted fewer symptoms and conditions, fewer sleep problems, and less pain in the United States, but not in Japan (see Table 3). Results are further illustrated in Figure 2, top panel.

For biological health, although we found no main effect of HAP practices, $F(3, 842) = 0.99$, $p = .399$, $\eta^2 = .00$, multivariate tests showed a marginally significant interaction between countries and HAP practices, $F(3, 842) = 2.33$, $p = .073$, $\eta^2 = .01$. Between-subjects effects tests revealed a significant country x HAP practices interaction for (d) BMI, $F(1, 844) = 4.11$, $p = .043$, $\eta^2 = .01$, and (f) bad cholesterol, $F(1, 844) = 4.38$, $p = .037$, $\eta^2 = .01$, but not for (e) inflammation, $F(1, 844) = 1.74$, $p = .187$, $\eta^2 = .00$.

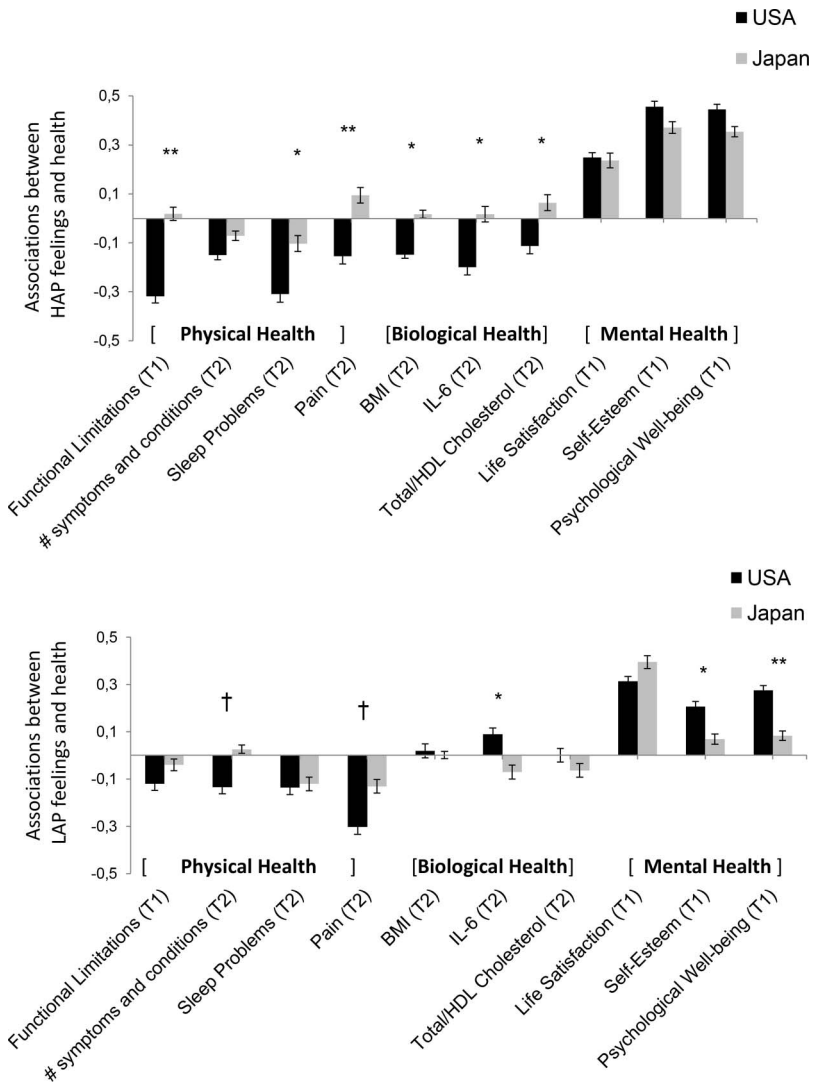


*Figure 1.* High arousal positive (HAP) and low arousal positive (LAP) feelings and health outcomes in the United States and Japan. Bars represent unstandardized regression coefficients. For the purpose of presentation, all variables are standardized. Analyses controlled for age, gender, and education. $^{\dagger}$ $p < .10$. $^{*}$ $p < .05$. $^{**}$ $p < .01$.

Further analyses revealed that HAP practices were associated with marginally lower BMI in the United States, but there was no effect in Japan. In addition, HAP practices predicted lower cholesterol in the United States, but marginally predicted more cholesterol in Japan (see Table 3). Results are further illustrated in Figure 2, top panel.

## H2b: LAP Practices Predict Better Health More in Japan Than in the United States

For physical health, although no main effect of LAP practices was found, $F(3, 795) = 1.33$, $p = .263$, $\eta^2 = .01$, multivariate tests showed a significant Countries × LAP practices interaction, $F(3, 795) = 3.93$, $p = .008$, $\eta^2 = .01$. More detailed analyses separately by physical health outcome revealed a significant interaction between countries and LAP practices for (a) number of symptoms and conditions, $F(1, 797) = 5.03$, $p = .025$, $\eta^2 = .01$; (b) sleep problems, $F(1, 797) = 5.71$, $p = .017$, $\eta^2 = .01$; and (c) pain interference, $F(1, 797) = 6.93$, $p = .009$, $\eta^2 = .01$. Simple slopes analyses (cf. Table 3) showed that, although no significant coefficient was found, LAP practices tend to be positively associated with symptoms/conditions in the United States, $\beta = .035$, $p = .415$, and negatively associated in Japan, $\beta = -.054$, $p = .381$. In support of our hypothesis, LAP practices predicted fewer sleep problems and less pain in Japan, but not in the United States. Results are further illustrated in Figure 2, bottom panel.

Finally, regarding biological health, multivariate tests showed neither a main effect of LAP practices in predicting better biological function, $F(3, 842) = 0.40$, $p = .751$, $\eta^2 = .00$, nor a significant Countries × LAP practices interaction, $F(3, 842) = 0.93$, $p = .424$, $\eta^2 = .00$. Results are further illustrated in Figure 2, bottom panel.

Table 3
*Effect of High Arousal Positive (HAP) and Low Arousal Positive (LAP) Practices on Health in the United States and Japan*

| Practice | United States | | | | | | Japan | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *b* | *SE* | β | *t*-test | *p* | 95% CI | *b* | *SE* | β | *t*-test | *p* | 95% CI |
| HAP practices | | | | | | | | | | | | |
| Physical health | | | | | | | | | | | | |
| # symptoms/conditions (T2)[a] | −.371 | .125 | −.121 | −2.97 | .003 | [−.62, −.12] | .015 | .090 | .010 | .16 | .872 | [−.16, .19] |
| Sleep problems (T2)[a] | −.592 | .134 | −.191 | −4.42 | .000 | [−.85, −.33] | .096 | .155 | .042 | .62 | .535 | [−.21, .40] |
| Pain (T2)[a] | −.529 | .136 | −.170 | −3.89 | .000 | [−.80, −.26] | .290 | .152 | .128 | 1.91 | .058 | [−.01, .59] |
| Biological health | | | | | | | | | | | | |
| BMI (T2)[a] | −.241 | .128 | −.083 | −1.88 | .060 | [−.49, .01] | .118 | .076 | .094 | 1.55 | .123 | [−.03, .27] |
| Inflammation (T2) | −.341 | .110 | −.133 | −3.09 | .002 | [−.56, −.12] | −.015 | .151 | −.006 | −.10 | .920 | [−.31, .28] |
| Bad cholesterol (T2)[a] | −.146 | .120 | −.085 | −2.05 | .041 | [−.48, −.01] | .274 | .150 | .112 | 1.83 | .068 | [−.02, .57] |
| LAP practices | | | | | | | | | | | | |
| Physical health | | | | | | | | | | | | |
| # symptoms/conditions (T2)[a] | .099 | .121 | .035 | .82 | .415 | [−.14, .34] | −.075 | .085 | −.054 | −.87 | .381 | [−.24, .09] |
| Sleep problems (T2)[a] | .087 | .129 | .030 | .67 | .502 | [−.17, .34] | −.546 | .145 | −.267 | −3.78 | .000 | [−.83, −.26] |
| Pain (T2)[a] | .256 | .132 | .088 | 1.94 | .052 | [−.01, .51] | −.293 | .140 | −.145 | −2.09 | .037 | [−.57, −.02] |
| Biological health | | | | | | | | | | | | |
| BMI (T2) | .105 | .124 | .039 | .85 | .398 | [−.14, .35] | −.054 | .072 | −.047 | −.75 | .454 | [−.19, .09] |
| Inflammation (T2)[a] | .173 | .107 | .072 | 1.61 | .107 | [−.04, .38] | −.181 | .141 | −.077 | −1.29 | .199 | [−.46, .10] |
| Bad cholesterol (T2) | .162 | .117 | .060 | 1.39 | .165 | [−.07, .39] | −.163 | .141 | −.073 | −1.16 | .248 | [−.44, .11] |

*Note.* CI = confidence interval; T1 = Time 1; T2 = Time 2; BMI = body mass index.
[a] Indicates significant difference between countries in effect of affective practices on health outcome.

## Discussion

Overall, we found strong support for the hypothesis1a that in the United States compared to Japan, HAP feelings would predict better physical and biological health. Among Japanese, HAP feelings did not predict most of the health outcomes, and this was particularly evident for physical and biological health. These findings with positive feelings are in line with previous work by Curhan et al. (2014) finding that negative feelings also do not predict well-being as strongly in Japan compared to the United States. We did not find support for Hypothesis 1b that LAP feelings would be associated with better health more in Japan versus the United States. In fact, in some cases, LAP feelings predicted better health more strongly in the United States than in Japan (e.g., symptoms and conditions, self-esteem, and psychological well-being), which is the opposite of what we predicted, and in other cases LAP feelings predicted worse health in the United States (e.g., inflammation).

Although HAP feelings were better predictors of both physical and biological health in the United States than in Japan, this was not the case for mental health. HAP feelings predicted better mental health in both the United States and Japan and LAP feelings predicted self-esteem and psychological well-being more in the United States than in Japan. Thus, our hypotheses were not supported (and even contradicted) when examining measures of mental health. In interpreting these findings, it is essential to note that virtually all measures of mental health have been developed and validated in the United States. Furthermore, the affective feeling states measure was strongly skewed toward HAP feelings making it difficult to adequately measure LAP states.

To highlight the theoretically significant questions of whether cultural variation in how people construe emotions may help account for inconsistencies in the affect–positive health link, we titled the article with the question: "Feeling excited or taking a bath: Do distinct pathways underlie the positive affect–health link in the U.S. and Japan?" Assuming that affective experience can be manifest and measured in a variety of ways, for example, as high arousal or as low arousal, as internal feelings and as behavioral practices, we reasoned that Western and Eastern cultural contexts may well reflect and foster different manifestations of affective experience. The analyses of the relevant measures of MIDUDS/MIDJA data sets suggest that the answer to the title's question is a partial "yes."

Specifically, we observed significant cultural differences in the relationship between positive affect and health in two relatively comparable samples. The United States and Japan are both modernized, democratized, industrialized societies with well-developed systems of health care. Yet these two societies are markedly different in their historically derived ideas about affect and in the everyday social practices that lend form and organization to affective experience (Markus & Kitayama, 1994; Mesquita & Leu, 2007). Consistent with our hypotheses, we found that HAP feelings, such as excitement, predicted better physical and biological health in the United States but not in Japan. Contrary to our expectation, LAP feelings did not predict better health to a greater extent for Japanese than Americans. With respect to practices, engaging in HAP practices predicted better physical (i.e., sleep quality and pain) and biological health (inflammation) in the United States than in Japan. Engaging in LAP practices predicted better physical health in Japan but not in the United States. These findings suggest that the pathways underlying the culture–health link are culturally variable and deserve more research attention.

The current research builds upon previous work examining the association between affect and health across cultures in several important ways. First, we were able to analyze data from national samples that vary in terms of their predominant cultural prescriptions. As such, it is likely that the variation we observed in the relationships between positive affect and health are due at least in part to differences in culturally constituted and maintained values,

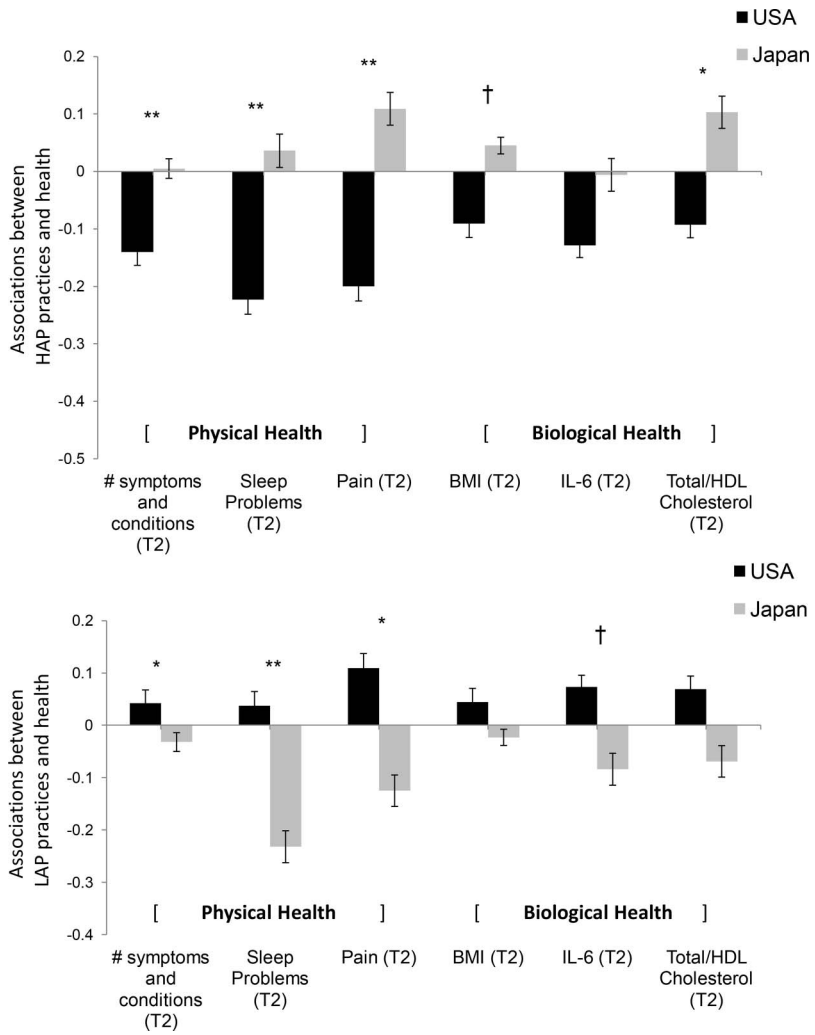


*Figure 2.* High arousal positive (HAP) and low arousal positive (LAP) feelings and health outcomes in the United States and Japan. Bars represent unstandardized regression coefficients. For the purpose of presentation, all variables are standardized. Analyses controlled for age, gender, and education. $^{\dagger}$ $p < .10$. $^{*}$ $p < .05$. $^{**}$ $p < .01$.

beliefs, and practices. Second, most work examining positive affect and health does not differentiate among subtypes of positive affect. Our findings align with previous work that does distinguish high from LAP states both in terms of cultural differences in preferences for these states and in how each may shape behavioral outcomes independently (e.g., Sims et al., 2018; Tsai, 2007). Third, although many studies have investigated the role of positive affect in physical health, biological function, and mental health, none have comprehensively assessed the relationship between HAP and LAP affect and all three types of outcomes simultaneously.

These results leave several important questions unanswered, however. Why was no significant cultural variation observed in the effect of positive affective feelings on mental health? It may be that psychological well-being and self-esteem are more strongly linked to HAP feelings because they focus on American ideals of independence, self enhancement, and the expression of positive attributes (Curhan et al., 2014; Heine et al., 1999; Markus & Conner, 2014). The core definition of well-being used to develop these measures is anchored in HAP feelings and independent goals (Qu et al., 2018). The majority of the specific items used in the mental health measures focus on autonomy, environmental mastery, self-acceptance and enhancement. For example, in the Ryff Scale of Psychological Well-Being measure used here, only one subscale (i.e., positive relations with others) is oriented toward interpersonal goals (Ryff, 1989). Most of the items in the scale assess HAP feelings (e.g., "I like most parts of my personality"). Because independent goals have been showed to be strongly related to HAP affect (Tsai et al., 2007), which is mainly what the PANAS measures, this may explain the lack of observed cultural variation for mental health.

A second question from these results concerns the relatively greater importance of affective experience, whether HAP or LAP, in the United States. Viewed as a whole, these results could suggest the possibility that positive affective experience of any type—HAP or LAP, feelings or practices—is more predictive of

health in the United States than in Japan (Curhan et al., 2014). This suggestion poses the challenging issue of whether the form of the measures of affective experience used in these surveys are equally culturally appropriate for both contexts. It also raises the questions of what else might predict health in Japan and in other settings outside the mainstream United States and how it could be assessed (see Bastian, Kuppens, De Roover, & Diener, 2014 for a related discussion of culture and life satisfaction). Our findings suggest that the development of a variety of measures of affective experience beyond self-ratings of internal feelings should be included. Such measures might include self-reports of everyday affective practices, reports from close others, expert observations of the respondent's affective practices, interpersonal or relational experiences, and fit or match with cultural norms or expectations of the right way to feel and act (De Leersnyder et al., 2014; Riemer et al., 2014; Tsai & Clobert, in press).

## Limitations

To rigorously test our hypotheses, we used large surveys assessing different types of positive affective experiences and multiple health outcomes in two national contexts. In doing so, however, there are some clear limitations of the current work. First, we used existing measures available to us in the MIDUS and MIDJA surveys and thus, we were limited to the types of affective feelings and practices that were already assessed. In addition, our measures of HAP and LAP feelings were highly correlated which considerably inflated the variance of our predictors. Future studies are needed to replicate these findings with measures specifically designed to examine these hypothesized differences in high and low arousal feelings and to assess low and high arousal affective practices. Second, we examined only three types of biomarkers to assess biological function. Although there are other biomarkers available in these surveys, we focused on these ones because they have been previously linked to positive emotional experience (e.g., Boehm & Kubzansky, 2012; Stellar et al., 2015; Yoo et al., 2017). Future work should consider other biomarkers. Third, although our hypotheses were theoretically derived, we based them on the assumption that cultural differences in the associations between positive affect and health are due to pervasive cultural differences in emotional values, construals, and normative practices. However, given the measures available in these data sets, we were unable to directly examine this possibility. Follow up studies could explore these potential mechanisms as well as the causal direction of each. Finally, the American sample only includes a small percentage of non-White participants making it difficult to test our hypotheses on an ethnically diverse American population. We could indeed have expected variations in the positive affect–heath link within the American sample across ethnic groups (e.g., Asian Americans could be more similar to Japanese).

## Implications

The results reported here are the first test of our hypotheses about cultural variability in the pathways between positive experience and health and require replication. This first study, however, raises important theoretical, methodological, and practical questions. Theoretically, many models of affect and health are limited to the analysis of internal affective feeling states and have yet to fully consider the multiple hypothesized pathways through which people value, construe or experience emotion. Our findings highlight the importance of doing so for understanding the relative impact of certain positive affective experiences on health and well-being. The current research adds to a growing literature demonstrating that cultural beliefs and practices regarding affect shape not only our subjective assessment of health but also our bodily responses as well.

Methodologically, our results suggest greater attention to the conceptualization and measurement of positive affect. Because we find that HAP and LAP affect differentially predict health outcomes, assessments of positive affect should be balanced accordingly to ensure that each type is adequately represented. In addition, affective practices and norms should also be considered in addition to feeling states, especially in cultural contexts that promote interdependence and fitting in with and adjusting to others (Riemer et al., 2014). As intranational cultural diversity increases, widely used measures such as the PANAS that are largely comprised of high arousal feeling states may not be sufficient for assessing well-being across or within countries (see Hitokoto & Uchida, 2015 for a discussion of cultural variation well-being).

Finally, our findings also have implications for efforts to promote well-being in clinical, educational and workplace settings, as well as for large scale campaigns such as happiness challenges. Positive feelings may be more beneficial to health in cultural contexts that value those states, especially for feeling HAP states. By comparing cultures that differ systematically in terms of how they understand, value, and construe emotion, we may be able to determine why positive affect is so important for health in many U.S. settings, and determine to what extent positive affect matters for physical, biological, and mental functioning in other in settings grounded in different assumptions and theories about the nature and role of emotions. . . . Our findings indicate that although feeling good (i.e., feeling positively in the sense of HAP internal states, such as excitement) may help to prevent illness and promote wellness in some contexts, this may not be universally the case. In some contexts, for example, doing good (i.e., behaving in normatively appropriate ways such as taking a bath) may be an important pathway to health and wellness. In general, health promotion efforts that seek to optimize well-being are likely to be more effective to the extent that they are a fit with culturally pervasive and normative ideas and practices about affect and health.

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