

From Affect to Action:

How Pleasure Shapes Everyday Decisions in Japan and the U.S.

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## Abstract

How do affective considerations shape people's everyday decisions around the world? To address this question, we asked 245 Japanese and 229 American adults to report what they did and how they felt on the previous day using the Day Reconstruction Method. We then examined how affective valence at a given time (time  $t$ ) related to the types of activities people engaged in at a later time (time  $t+1$ ). While we found some cultural variation in the types of daily activities Japanese and American participants experienced as pleasant or unpleasant, time-lagged multilevel logistic regressions revealed that both groups displayed a remarkably similar propensity to engage in pleasure-enhancing activities when they felt bad and in less-pleasant activities that might promise longer-term payoff when they felt good. These results provide cross-cultural support for the *hedonic flexibility principle* of human motivation, according to which affective states help people prioritize between short- and longer-term well-being goals in their everyday life.

*Keywords:* hedonism, emotion, motivation, decision making, cultural differences

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It's 3:15 PM on a sunny Saturday afternoon. While you are steeling yourself to attack the pile of dirty dishes in your kitchen sink, a friend texts you to see if you'd like to check out the street food festival that just opened downtown. Which of these two activities would you choose? Would this decision depend upon your affective state? If so, does the link between your affective state and your choice depend upon whether you live in New York or Tokyo?

These questions reach to the heart of what motivates people to act as they do around the globe. There are of course many factors that influence how we decide to invest our time in any given context, yet recent research suggests that one surprisingly important driver of everyday decisions may be a person's affective state (Taquet, Quoidbach, de Montjoye, Desseilles, & Gross, 2016; Quoidbach, Taquet, Desseilles, de Montjoye, & Gross, 2019). In particular, according to what we have called the *hedonic flexibility principle*, we have found that people tend to engage in pleasure-enhancing behaviors (e.g., eating, seeing friends...) when they feel bad, whereas they tend to engage in less immediately rewarding behaviors that might promise longer-term payoff (e.g., working, chores...) when they feel good.

#### **The Hedonic Flexibility Principle**

From friends and food festivals to hobbies and naps, opportunities to indulge in short-term pleasure are all around us. And every day, human beings spend about 25% of their time experiencing some form of conflict between choosing to do something that makes them feel happy in the moment and something that will make them feel happy in the future (Hofmann, Baumeister, Förster, & Vohs, 2012). Over half a century ago, Herbert Simon (1967) suggested that one of the fundamental functions of affective states was to help people navigate such trade-offs. According to one version of this perspective—which we have labelled the “hedonic flexibility principle”—negative affect should drive people to seek

solace in short-term rewards, whereas positive affect should lead people to shift their priorities toward less pleasant activities that might be important for their longer-term goals.

Indirect evidence for the hedonic flexibility principle may be found in research that has shown that, in the general population, negative mood states typically motivate people to engage in “mood repair” behaviors<sup>1</sup> (e.g., feel good movie, seeing friends, playing sports...; Schaller & Cialdini, 1990; Thayer, Newman, & McClain, 1994), and often undermine self-regulation for longer-term goals. For example, people are more likely to break their diets, indulge in alcohol, or treat themselves with expensive purchases when they feel emotionally distressed (see Baumeister, Zell, & Tice, 2007 for review). There is also research that has shown that positive mood states may help people to accomplish tasks that have short-term costs but long-term benefits. For example, children in a happy (vs. unhappy) mood are better able to delay immediate gratification for a larger future reward (Moore, Clyburn, & Underwood, 1976; Schwarz & Pollack, 1977). Likewise, adults in a happy (vs. unhappy) mood are more attentive to negative feedback about their health or their performance (Das, Vonkeman, & Hartmann, 2012; Raghunathan & Trope, 2002; Trope & Neter, 1994), suggesting that positive mood may serve as a buffer against the immediate affective cost of threatening information and help the receiver perceive the long-term benefits of such feedback.

Recently, Taquet et al. (2016) provided more direct evidence for the hedonic flexibility principle by monitoring the activities and mood states of over 28,000 Europeans for a month using smartphone-based Experience-Sampling Method (ESM). Time-lagged analyses showed that the lower people’s moods were in a given moment, the higher the probability they would be engaging in a pleasant activity a few hours later, and vice versa. For example, if a

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<sup>1</sup> Note that extreme forms of negative affective states such as in the context of unipolar major depressive disorder actually tend to cause a loss of motivation in seeking pleasurable activities (i.e., *decisional anhedonia*; Dichter, 2010; Hershenberg, et al., 2016).

participant was particularly unhappy in the morning, she would be twice as likely to go for a walk to the park in the afternoon than if she was particularly happy. Likewise, if that person was particularly happy in the morning, she would be about 30% more likely to clean up her apartment in the afternoon than if she was particularly unhappy. Using comparable ESM smartphone designs, we've found that people's daily patterns of social relationships follow similar dynamics: People are more likely to engage in pleasant social relationships (e.g., talking to their best friend) when they feel bad and to engage in social interactions that tend to be less immediately rewarding (e.g., talking to a stranger) when they feel good (Quoidbach et al., 2019).

### **Determining the Role of Culture in Hedonic Flexibility**

The hedonic flexibility principle is rooted in an evolutionary perspective, according to which one of the functions of affective states is to help individuals prioritize appropriately among short- and longer-term goals (Carver & Scheier, 2013; Frijda, 1986; Simon, 1967). The key idea is that when in a negative emotional state, people's priority shifts towards getting into a positive emotional state, but when in a positive emotional state, people's priority shifts towards taking care of relatively unpleasant tasks that might be important for their long-term well-being. Therefore, we have proposed that while what constitutes a pleasant or unpleasant activity may differ across individuals and cultures, the overall dynamic that unites affect and decision-making should be evident across cultures (Taquet et al., 2016).

However, emotional experiences are embedded within culture-specific norms, lay theories, and behavioral routines (Kitayama & Markus, 2000). For example, in Western cultures like the U.S. where independent cultural norms (Markus & Kitayama, 1991) and non-dialectical beliefs (Peng & Nisbett, 1999) are more prevalent, most view the pursuit of positive affective states as a fundamental right and prioritizing happiness through one's everyday choices is culturally approved (Miyamoto & Ma, 2011). Negative affective states

are typically construed as internal entities for which the individual is responsible (Chentsova-Dutton & Tsai, 2010; Kitayama, Mesquita, & Karasawa, 2006; Uchida, Townsend, Markus, & Bergsieker, 2009) and that should be actively regulated to avoid social sanctions (Bastian et al., 2012). In contrast, in East Asian cultures like Japan where interdependent cultural norms (Markus & Kitayama, 1991) and dialectical beliefs (Peng & Nisbett, 1999) are more prevalent, norms regarding the pursuit of positive affective states can be more complex. For instance, these cultures often discourage strong positive affect based on the belief that emotional states typically change in valence over time and that too much positivity can be a bad omen (Miyamoto & Ryff, 2011; Uchida & Kitayama, 2009). Likewise, prioritizing positive affective states through one's everyday choices may elicit the fear of being perceived as selfish or insensitive to others who are less fortunate (Uchida, Norasakkunkit, & Kitayama, 2004). Negative emotional states in these cultures are typically construed as inevitable, transient, and situationally-based entities for which the individual is not responsible (Chentsova-Dutton et al., 2010; Kitayama et al. 2006; Uchida, et al., 2009) and that may not need to be actively regulated (e.g., Peng & Nisbett, 1999). These important cultural differences related to emotion raise the possibility that affective states may actually exert a different influence on people's daily choices of activities depending on their cultural backgrounds. Specifically, if the dynamic that unites affect and decision-making reflects cultural rather than evolutionary considerations, one would expect, based on this literature, American people to show a greater propensity than Japanese people to engage in pleasant, mood-repair activities when they feel bad. Conversely, Japanese people may show a greater propensity than American people to engage in unpleasant, mood-decreasing activities when they feel good, as a way to maintain emotional balance. In contrast, if the dynamic that unites affect and decision-making do not differ across cultures, this would lend support to the idea

that the hedonic flexibility principle reflects an evolutionary-rooted fundamental property of human motivation.

### **The Present Study**

The goal of the present study was to test the hedonic flexibility principle in a cross-cultural context. In particular, we examined the links between affective states and everyday choices of activities by assessing the daily activities and affective fluctuations in a diverse sample of Japanese and American adults. We used the Day Reconstruction Method (DRM; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004) to test, in both countries, whether participants' current affective states (affect at  $t$ ) relates to the type of activities they engage in a few hours later (activities at  $t + 1$ ), and how these activities influence their subsequent affective states (change in affect from at  $t$  to  $t + 1$ ).

Based on an evolutionary perspective of affect-activity links, we predicted that Japanese and Americans would show a relatively similar propensity to engage in pleasure-enhancing activities when they feel bad, and less pleasant—yet necessary—activities when they feel good.

## **Method**

### **Participants and Design**

**Participants.** Our Japanese sample consisted of 245 participants born and currently living in Japan (53.1% female) between 20 and 55 years of age ( $M_{age} = 38.0$ ,  $S.D._{age} = 9.8$ ) recruited from a stratified market research panel to ensure a diverse age range. Our American sample consisted of 229 American participants born and currently living in the United States (64% female) between 20 and 55 years of age ( $M_{age} = 38.8$ ,  $S.D._{age} = 10.9$ ) who were also recruited from a stratified market research panel. All participants answered the questionnaire online. With the exception of the language (i.e., Japanese or English), the surveys were identical. Note that we originally recruited 300 participants in each sample. However, in line

with previous research, we excluded participants who failed to provide at least three episodes for their day or whose DRM records clearly indicated they did not complete the survey seriously (Gruber, Kogan, Quoidbach, & Mauss, 2013; Nelson-Coffey, Borelli, & River, 2017).

**Measures.** Participants were asked to report what they did and how they felt on the previous day following the DRM protocol (Kahneman, et al., 2004). The DRM is a widely used instrument to measure people's everyday activities and emotions, which has been shown to minimize recollection biases and provide reliable estimates similar to other ecological momentary assessment measures (Dockray et al., 2010; Krueger & Schkade, 2008). Participants were first asked to reconstruct their previous day as a sequence of episodes from the moment they woke up to the moment they went to bed.

For each episode (Japan:  $M_{episodes} = 8.42$ ,  $S.D. = 4.75$ ; U.S.:  $M_{episodes} = 10.03$ ,  $S.D. = 4.19$ ), participants reported how they felt on an affective valence slider scale from 0 to 100, which relied on graphic anchors from a sad emoticon to smiling emoticon to facilitate cross-cultural comparison (Betella & Verschure, 2016; see Supplementary Materials)<sup>2</sup>. Participants were then asked to indicate what they were doing on a non-mutually exclusive list of 21 activities. On average, American participants reported slightly more positive affective states than Japanese participants ( $M_{Japan} = 63.61$ ,  $S.D._{Japan} = 24.07$ ;  $M_{U.S.} = 65.72$ ,  $S.D._{U.S.} = 26.12$ ;  $t(3824) = 2.59$ ,  $p = .01$ ,  $d = .08$ ). In order to maximize the range of activities participants would be engaging in, we launched both surveys on a Sunday—making weekend days our primary focus (87% and 84% of observations in Japan and U.S., respectively). Materials are available on the Open Science Framework (<https://osf.io/bhdz2>).

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<sup>2</sup> We originally collected an additional measure of arousal on a similar affective slider. However, as detailed in Supplementary Materials (Note #2), it appears that this measure has been largely misinterpreted by participants and, therefore, we have not included it in the primary report.



Some activities were very rarely reported (e.g., sex, concert/museum, praying), whereas others were reported much more frequently (e.g., eating, housework, relaxing). Because we did not feel confident estimating how affect relates to activities for which we only have a handful of data points, we limited our analyses to activities that were reported at least 5% of the time. Note that using a more lenient cutoff (at least 1% of the time) led to results that were virtually identical to the ones we report (Supplementary Materials, Note #3).

### **Analytical Strategy**

**From affect to activities.** The hedonic flexibility principle postulates that people's current affective states influence their decisions to engage in various types of activities. Therefore, we first assessed, separately for each country, whether participants' current affective valence (valence at time  $t$ ; standardized at the person-mean level; Curran & Bauer, 2011) relates to the odds they later engage in each of our 21 activities (activity at time  $t+1$ ) using a series of mixed models binary logistic regressions with a random intercept to account for the nested structure of the data. We included the potential confounds of day of week (e.g., people are more likely to be working on a weekday than during the weekend), the time of day (e.g., people are more likely to be eating at noon than at 3:00 PM), and latency effects (e.g., some activities span a period that is longer than the time between two measurements) as covariates. The day of the week was entered as a series of dummy variable specifying whether the observation took place on a weekday, a Saturday, or a Sunday. We represented the time of day as a categorical variable by binning the time in 12 periods of 2 hours (from 0:00 AM–1:59:59 AM to 10:00 PM–11:59:59 PM). The latency effect was represented by adding a dichotomous variable indicating whether participants were already engaged in the activity in question at the previous measurement time (activity at  $t$ ). These analyses were performed using the *lmer* package for R.

**From activities to affect.** The hedonic flexibility principle further postulates that people's propensity to engage in various types of activities is related to how good or bad these activities might make them feel. Therefore, we next estimated, separately for each country, the change in affective valence from time  $t$  to time  $t+1$  ( $\Delta_{\text{valence}}$ ) if participants engaged in each of the 21 activities at time  $t+1$ . We used a series of mixed models with a random intercept to account for the nested structure of the data, with multiple moments nested within individuals. In the regression models, we controlled for the day of week, the time of day, and whether participants were engaged in the different other activities at time  $t$ . These analyses were performed using the *lmer* package for R.

**Determining the Role of Culture in Hedonic Flexibility.** As a last step, we combined, separately for each country, the estimates obtained in the two previous steps (i.e., how affective valence relates to the propensity to engage in each activity and how people feel as a result of engaging in each activity) and computed the correlation between the two as a measure of the strength of the hedonic flexibility principle. A large correlation would suggest a strong hedonic flexibility principle, while a correlation close to 0 would suggest that hedonic considerations do not guide people's pattern of everyday activities.

Finally, to test the null hypothesis that the magnitude of the hedonic flexibility principle does not differ between Japanese and American participants, we repeated the analyses outlined in the three steps above in 10,000 bootstrap resample of our data, computing each time the difference between the hedonic flexibility coefficient in Japan and in the U.S. The data and code for the different analyses we report is accessible on the Open Science Framework (<https://osf.io/bhdz2>).

## Results

### Primary Results

As depicted in Figure 1, our analyses strongly supported the hedonic flexibility principle: While we found some cultural variation in the types of daily activities Japanese and American participants experienced as pleasant or unpleasant, both groups displayed a remarkably similar propensity to engage in pleasure-increasing activities at time  $t+1$  when they felt bad at time  $t$ , and to engage pleasure-decreasing activities when they felt good at time  $t$ . Specifically, the correlation between (1) the Odd Ratios [ORs] estimating how feeling positive (i.e., 1 S.D. above one's mean level of affective valence) relates to subsequent engagement in different activities and (2) the regression coefficients estimating how engaging in different activities relates to change in affective valence was  $r = -.80$ , 95% CI[-.94, -.55] and  $r = -.72$ , 95% CI[-.88, -.44] in Japan and the U.S., respectively. These two correlations did not significantly differ from each other ( $\Delta = .08$ , 95% CI [-.22, .40]).

### **Robustness Checks**

*Natural fluctuation in daily activities.* These findings are consistent with the notion that, both in Japan and in the U.S., affective valence may relate to the decisions people make about what type of activities to engage in the next few hours and that, in turn, these activities influence how good they feel. However, pleasant and unpleasant activities are likely to alternate in daily lives for functional and mundane reasons, which could have contributed to the association we observed between valence and subsequent activities. For example, people are more likely to eat dinner (i.e., pleasant activity) then do the dishes (i.e., housework; unpleasant activity) rather than the other way around. If daily activities followed a natural sequence that was not affected by affective valence but caused corresponding changes in affective valence (e.g., eating dinner makes people feel good, doing the dishes makes people feel bad, and people typically eat before doing the dishes), then one might expect to observe similar associations between affective valence and types of activities as the ones we observed, even if affective valence actually does not lead to any change in people's choice of

activities. In that case, valence at time  $t$  would not by itself be a valuable predictor of activity at time  $t+1$ . To rule out this alternative explanation, we ran in the two countries and for all activities, a permutation test in which we shuffled at random in 10,000 bootstrap resamples our independent variable (valence at time  $t$ ) within each participant, while keeping all the other variables unchanged. Results detailed in Supplementary Materials (Note #4) revealed that, in this case, the average magnitude of the hedonic flexibility principle was  $r = .00$ , 95% CI[-.65, .65] and  $r = .00$ , 95% CI[-.58, .59] in Japan and the U.S., respectively. These results cast doubts on the hypothesis that natural sequences of daily activities could explain our pattern of results.

***Circularity in the data.*** We chose to estimate the affective impact of activities based on difference scores from time  $t$  to time  $t+1$  because we believe it highlights the dynamic, regulatory nature of the hedonic flexibility principle: When in an unpleasant affective state, people are more likely to do something that makes them feel *better*; when in a positive affective state, people are more likely to do something that has a short-term hedonic cost (effectively making them feel *worse*). However, could using current affect twice (as a predictor of subsequent activity and in the difference score to estimate the affective impact of activities) lead to artifactual associations between the level of affect experienced during the previous activity and the pleasantness of the subsequent activity? To rule out such endogeneity concerns, we randomly split our dataset in two and estimated the impact of affect on activities in one half of the sample and the impact of activities on affect in the other half of the sample. These analyses, detailed in Supplementary Materials (Note #5), yielded results that were virtually identical to the ones using the whole sample, ruling out the possibility that circularity somehow explained our main findings.

## Discussion

Decisions we make every day about how to invest our time have crucial consequences both for our lives and for society at large. Providing evidence for the notion that the hedonic flexibility principle may reflect an evolutionary-rooted fundamental property of human motivation, we found that daily patterns of activities of both Japanese and American adults seem to be guided by affective considerations in a remarkably similar way. Specifically, while we found some cultural variations in the type of activities Japanese and American people experienced as pleasant or unpleasant, both groups displayed the same propensity to engage in pleasure-enhancing activities when they felt bad and to engage in less-pleasant activities that might promise longer-term payoff when they felt good. While situational factors, from life circumstances to current weather, inarguably shape and constraint our daily choices of activities, our study suggests that incidental connections between affect and activities such as time of the day, day of the week, and natural fluctuations in the sequence of daily activities are unlikely to explain our pattern of findings.

Taken together, these findings provide further evidence for the hedonic flexibility principle and suggest that affective states may help people to navigate between short-term rewards and longer-term welfare. This notion is also consistent with the broaden and built theory of positive emotion (Fredrickson, 1998, 2001), which posits that one of the functions of positive affective states is to help individuals build resources that might, in turn, increase their longer-term well-being. We note that our results, which are based on what people actually do in their everyday life, contrast with previous results from laboratory studies, which are based on what people say they want to do after a mood induction. In such studies, individuals typically report wanting to engage in pleasant (vs. unpleasant) activities in order to repair their negative mood or maintain their positive mood (see e.g., Cunningham, 1988; Saavedra & Earley, 1991; Wegener & Petty, 1994)—at least when positive emotions do not get in the way of specific utilitarian concerns (Tamir, 2009). Whereas a large body of

research has highlighted a general gap between what people think they will do and what they actually end up doing—from buying a yearly membership to the gym to starting a diet “tomorrow” (see e.g., Vazire & Mehl, 2008), other factors that could explain the discrepancy between laboratory and everyday life findings would be important to explore. For example, one might hypothesize that temporal elements might play a role in people’s decisions. A few minutes after a positive mood induction, people might crave for more enjoyment. A few hours after a positive emotional episode, people might feel like they have the emotional resources to take on a challenging task. Consistent with this idea, Snippe and colleagues (2018) that found that participants who were in a good mood in the morning were more likely to report having “made a difference to someone” over the next few hours, which in turn was associated with higher positive affect in the afternoon. Arguably, prosocial behaviors are typical examples of tasks that have short-term costs but might feel great afterwards. It is also possible that the type of activities used in laboratory studies may not have been perceived as equally relevant to one’s future well-being than working towards personal goals.

While we found few cultural differences in the way affective valence related to people’s choices of activities, the current data did not allow us to examine potential interactive effects of valence and arousal. However, research suggests that people tend to seek out situations that elicit “ideal” affect, and that such ideals may differ between cultures (Tsai, 2007): Americans tend to prefer high arousal positive states (e.g., excitement), whereas East Asians tend to prefer low arousal positive states (e.g., contentment). For instance, survey research suggest that North Americans are more likely to seek out fast-paced physical activities (e.g., running), up-beat music, and stimulant drugs than East Asians, who are more drawn to low-paced physical activities (e.g., sightseeing), calmer music, and sedative drugs (Gobster, 2002; Tsai, 2007). If cultures differ in prevalent ideal affect, and if ideal affect drives everyday decision making, one might hypothesize that choice of activity to be mainly related to low-

arousal affective states among Japanese people and high-arousal affective states among American people. Future research should test this hypothesis by measuring a larger set of activities that would widely differ in how much pleasure *and* arousal they generate.

Another important avenue for future studies is to examine whether the hedonic flexibility principle also applies to specific emotional states such as fear, anger, or gratitude – as opposed to a broad measure of affective valence. Indeed, a large body of literature suggests that specific emotions of similar valence (e.g., fear and anger; happiness and gratitude) can have different or even opposite behavioral consequences (DeSteno, Li, Dickens, & Lerner, 2014; Lerner & Keltner, 2001).

The present work shows that, on average, affective valence tends to relate to people's choices of activities. However, it is very likely that important individual differences exist in the extent to which affective considerations guide people's decisions. In turn, these individual differences may have profound consequences for well-being and adjustment. For example, people suffering from depression may systematically fail to seek pleasant activities that would repair their negative affective states, whereas people with manic tendencies may systematically avoid necessary yet unpleasant activities that would threaten their positive affective states. Other phenomena like procrastination or burnout could also be linked to dysfunctional everyday affect regulation. Beyond exploring these exciting questions, future studies should also establish the causal impact of affective states on daily decisions. Indeed, many factors are likely to contribute both to the occurrence of activities and affect—form habits to life circumstances. To rule out these potential confounds, one could, for example, manipulate emotions by sending affective stimuli on people's smartphone and measure whether it impacts their subsequent choices of activity.

While future experimental research is needed to examine individual differences in daily affect regulation and document how specific affective states (e.g., contentment vs.

excitement) relate to everyday choice, our results add to the growing body of evidence supporting the notion that the hedonic flexibility principle may lie at the heart of human motivation.

### **Compliance with Ethical Standards**

#### **Ethical approval**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

#### **Informed consent**

Informed consent was obtained from all individual participants included in the study.

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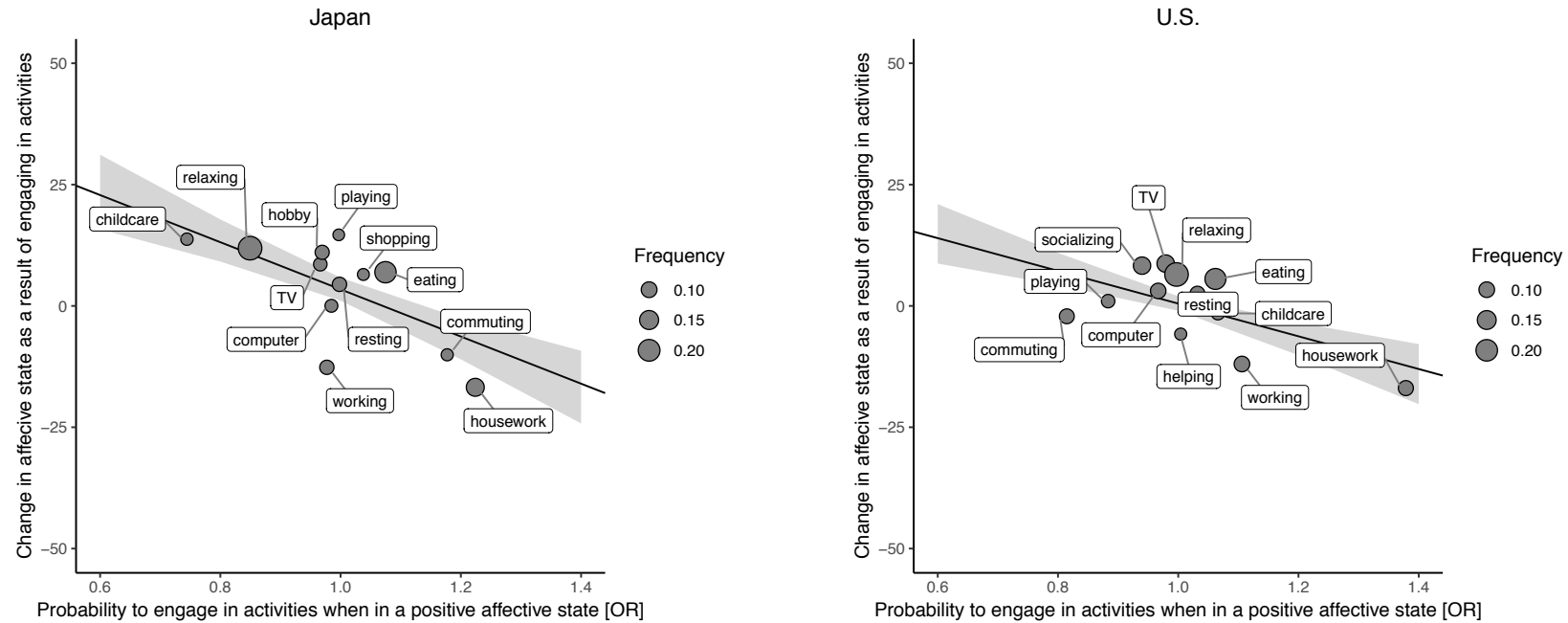
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*Figure 1.* The association between affective valence and daily activities follows the hedonic flexibility principle both in Japan and in the U.S. (On the X-axis) Relationship between participants' current positive affective state (when valence at  $t$  is 1 S.D. above participants' personal average) on their propensity to later engage in different activities (activity at  $t+1$ ). (On the Y-axis) Relationship between participants' current activity (activity at  $t+1$ ) and their change in affective state (difference between valence at  $t$  and valence at  $t+1$ ). These two sets of estimates are strongly related to each other as indicated by the regression line and its 95% Confidence Interval based on 10,000 bootstrap resamples. The size of the dots depicts the frequency at which the different activities were reported.

## Supplementary Material

### 1. Affective Sliders

For each episode, participants were asked to indicate how they felt on the following two affective sliders.

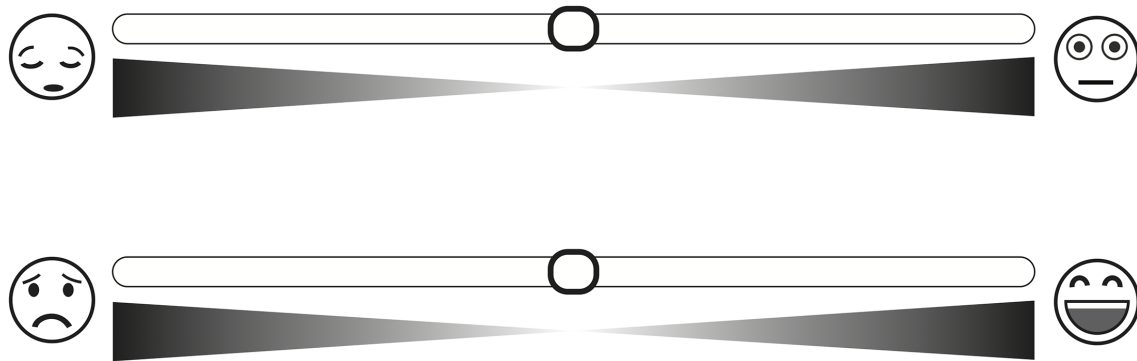


Figure S1. Affective Sliders used in the study (Betella & Verschure, 2016).

## 2. Disentangling Valence from Arousal

**Motivation.** While decades of research suggest that emotional experiences vary along two primary dimensions, namely valence and arousal (e.g., Russell, 1980; Carroll, Yik, Russell, & Barrett, 1999; Kuppens, Tuerlinckx, Russell, & Barrett, 2013), evidence to date for the hedonic flexibility principle has solely relied on a global measure of mood. This is potentially problematic because (1) previous research has demonstrated consistent associations between valence and arousal (see Kuppens, et al., 2013 for review) and (2) several researchers have proposed that human behavior may be driven by the need to regulate arousal levels to an optimal balance (e.g., Berlyne, 1960; Davydov, Shapiro, Golstein & Chicz-DeMet, 2007; see also Zuckerman, 1979). It is therefore possible that states of arousal and the arousal-related impact of activities – in addition to or instead of states of valence and the valence-related impact of activities – play a key role in everyday decision making.

**Warning note.** We originally collected measures of both valence and arousal in order to examine the potential confounding effect of arousal. However, it appears that our arousal measure has been largely misinterpreted by participants. First, while the associations between valence and the different activities all made intuitive sense (e.g., leisure being rated a lot more pleasurable than working), many associations between arousal and activities did not (e.g., relaxing being rated a lot more arousing than housework). Second, after taking a closer look at the participants open-ended comments at the end of the study, we realized that several participants explicitly mentioned being confused by the arousal measure. For example, one participant wrote: *“I didn't understand the question about arousal. I associate the word arousal with sexual arousal. Therefore, I always answered this question neutral.”* Another participant wrote: *“The [arousal] photo questions did not make sense and the instructions were unclear, I didn't know what I was supposed to do.”* Indeed, there was over 10 times



more missing values for arousal than valence (57 vs. 5), and more than 10% of all valid observations were rated as 0 in arousal (vs. 2.8% of 0s for valence).

For all of these reasons, we were unsure the analyses and results for arousal could be trusted and have elected to relegate them hereafter in Supplementary Materials.

**Analyses.** Can our pattern of results be explained by the regulation of arousal rather than the regulation of affective valence? To rule out this potential confound, we ran similar models as the ones detailed in the primary results section of our article but entering simultaneously both within-person centered arousal and valence levels at time  $t$  as predictors of the likelihood of engaging in each of the 21 activities at time  $t+1$ . We then estimated both the change in arousal ( $\Delta_{\text{arousal}}$ ) and the change in valence ( $\Delta_{\text{valence}}$ ) from time  $t$  to time  $t+1$  if participants engaged in each of the 21 activities at time  $t+1$ .

Next, we entered the first set of estimates (i.e., how arousal relates to the propensity to engage in each activity) into a regression predicting the second set of estimates (i.e., how aroused people feel as a result of engaging in these different activities) and computed the magnitude of the slope as a measure of the strength of an *arousal flexibility principle*. We did the same with the estimates related to affective valence and computed *the hedonic flexibility principle*.

We repeated these analyses in 1,000 bootstrap resamples of our data and compared, each time, the magnitude of the slope of the arousal flexibility principle with the magnitude of the slope of our hedonic flexibility principle.

**Results.** When compared to each other across the 1,000 bootstraps, the magnitude of the slope for valence was bigger than the slope for arousal 98% of the times in the U.S. and 76% of the times in Japan. These results suggest that hedonic considerations seem to account for everyday choice of activities much more reliably than arousal considerations.

### 3. Results using a more lenient cutoff for activities

We limited our analyses to activities that were reported at least 5% of the time because we did not feel confident estimating how affect relates to activities for which we only had a few data points (e.g., praying, concert/museum, or sex). We note, however, that results were very similar to the ones we report when using a more lenient cutoff (at least 1%). Specifically, the correlation between (1) the Odd Ratios [ORs] estimating how feeling positive (i.e., 1 S.D. above one's mean level of affective valence) relates to subsequent engagement in different activities and (2) the regression coefficients estimating how engaging in different activities relates to change in affective valence was  $r = -.68$ , 95% CI[-.86, -.35] and  $r = -.63$ , 95% CI[-.84, -.37] in Japan and the U.S., respectively. These two correlations did not significantly differ from each other ( $\Delta = .05$ , 95% CI [-.37, .42]) (see Figure S2).

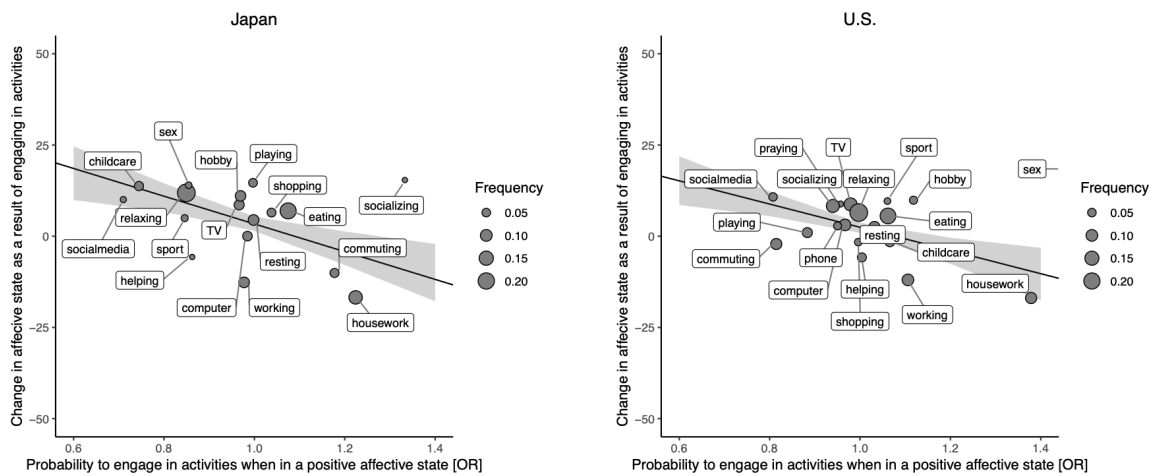
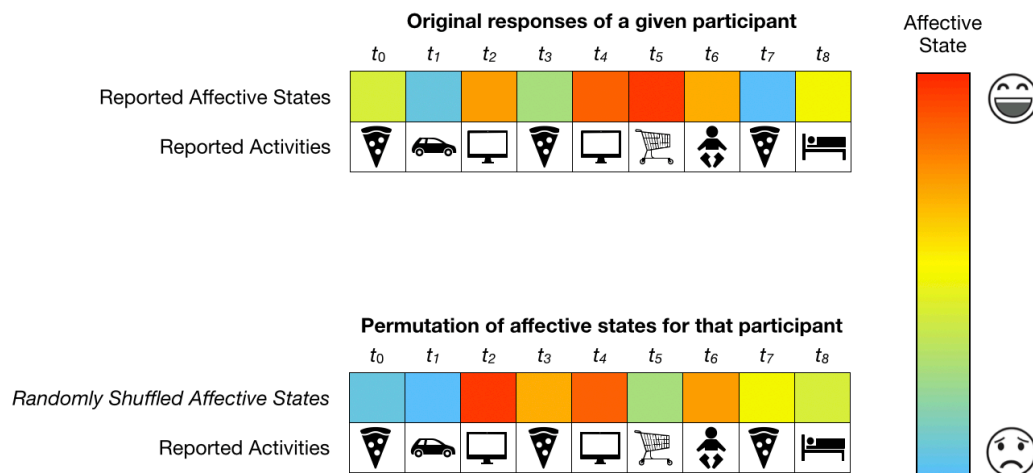


Figure S2. Main results when using a frequency cutoff of 1%.

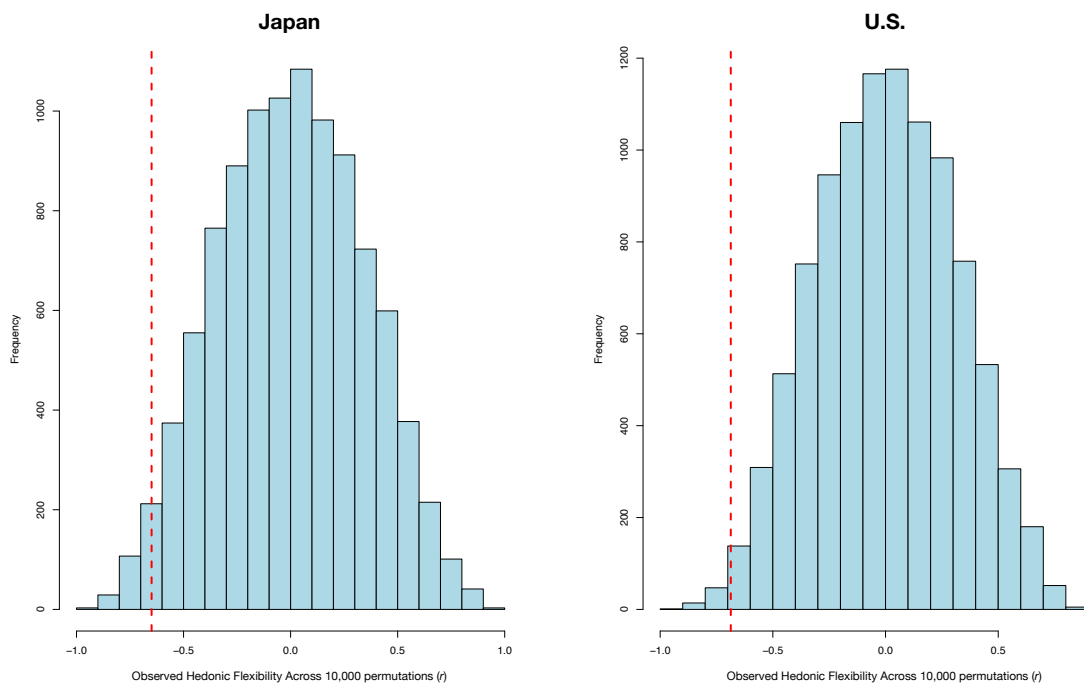
#### 4. Natural fluctuation in daily activities

The approach we used for our permutation test is illustrated in Figure S3: we created 10,000 surrogate datasets for each country in which we shuffled at random our independent variable (valence at time  $t$ ) within each participant while keeping all the other variables unchanged.



*Figure S3.* Illustration of the permutation test approach. We generated 10,000 surrogate datasets in which we shuffled at random affect at time  $t$  within each participant, while keeping the values for all the other variables similar to the ones in the original dataset.

We then ran the analyses detailed in the main article in each of these surrogate datasets to estimate how often one should observe results similar to the ones we report when affect is, by design, unrelated to subsequent activities. Frequent large negative correlation coefficients would suggest that participants' propensity to engage in pleasure-enhancing activities when they feel bad and in less-pleasant activities when they feel good might be an artifact of natural fluctuation in daily activities rather than affect regulation. As shown in Figure S4, natural sequences of daily activities alone are unlikely to explain our pattern of results. The magnitude of the hedonic flexibility principle in the surrogate datasets was normally distributed with an average of  $r = .00$ , 95% CI[-.65, .65] and  $r = .00$ , 95% CI[-.58, .59] in Japan and the U.S., respectively.



*Figure S4.* Distribution of correlation coefficients testing the magnitude of the hedonic flexibility principle in 10,000 surrogate datasets in which affect at  $t$  was randomly shuffled. The red line indicates the actual coefficient in the original data.

## 5. Circularity in the data

We chose to estimate the affective impact of activities based on difference scores from time  $t$  to time  $t+1$  because we believe it highlights the dynamic, regulatory nature of the hedonic flexibility principle, which is an important feature of the theory: When in an unpleasant affective state, people are more likely to do something that makes them feel *better*; when in a positive affective state, people are more likely to do something that has a short-term hedonic cost (effectively making them feel *worse*). In addition, one important advantage of using difference scores rather than affective ratings in the moment is that the *change* in affect effectively controls for various potential confounds that were not measured and hence not controlled for otherwise. These potential confounds relate to events, processes, or external conditions that might affect people's affective states over several questionnaires. For instance, most people mow the lawn on sunny days. Mowing the lawn does not make people happy but good weather does. Looking at the absolute level of affective valence when people mow the lawn could mislead us into believing that this is a pleasant activity. However, comparing lawn-mowing affect to the affect experienced a few hours before would most likely show that mowing the lawn is associated with a negative change in affective valence and is therefore a relatively unpleasant activity.

While we believe that an analytical approach based on affective change is the most appropriate to test the hedonic flexibility principle, we thought important to rule out the possibility that circularity in the data somehow contaminated our findings. Indeed, in our analyses, current affect is used twice: as a predictor of subsequent activity and in the difference score to estimate the affective impact of activities. Could this operationalization have led, by design, to an association between the level of affect experienced during the previous activity and the pleasantness of the subsequent activity?

To rule out such endogeneity concerns, we randomly split our dataset in two and estimated the impact of affect on activities in one half of the sample and the impact of activities on affect in the other half of the sample—effectively removing any possibility of circularity in the data. These analyses, which we replicated 10,000 times through bootstrap resamples yielded results that were virtually identical to the ones using the whole sample: Both Japanese and American participants were more likely to engage in happiness-increasing activities at time  $t+1$  when they felt bad at time  $t$ , and to engage in useful but happiness-decreasing activities when they felt good at time  $t$  ( $HFP_{\text{Japan}} = -.63 [-.84, -.36]$ ,  $HFP_{\text{U.S.}} = -.55 [-.83, -.27]$ ). The magnitude of this pattern did not differ between the two countries ( $\Delta = .08 [-.29, .40]$ ). These results rule out the possibility that circularity somehow contaminated our findings.

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