Animal Emotions

Christian Montag, Kenneth L. Davis

Published by Punctum Books

Christian Montag and Kenneth L. Davis.
Animal Emotions: How They Drive Human Behavior.

For additional information about this book
https://muse.jhu.edu/book/77430
Of Animal Emotions and the Happy Life

“Of all the things which wisdom provides to make us entirely happy, much the greatest is the possession of friendship.”

— Epicurus

Which country is happiest? Well, according to data from the Happy Planet Index (HPI), many industrialized and rich countries such as the U.S. or Germany are not really happy, to judge by their rankings in a list of 140 countries. In fact, the contrary seems to be true. The United States of America is ranked 108th. Germany ranks a bit higher, but still not great at 49th. In contrast, surprising results can be spotted in the top ten of this list: Here, you will find Colombia in the third spot, Mexico in the second one and Costa Rica coming in first. These top three happiest countries are followed by Vanuatu in fourth and Vietnam in the fifth position. Who would have guessed this order?

A closer look at the methods used to arrive at these results illuminates how this surprising ranking occurred. According to the Happy Planet Index website, the HPI is calculated by multiplying the self-reported (hence subjective) well-being measure of the country’s residents by their life-expectancy and by the inequality of well-being/life expectancy within the group of residents in the investigated country. This number is then divided by the ecological footprint, a measure assessing the renewable resources and CO₂ emissions required to support the country’s residents (Happy Planet Index 2016). Of special interest for our book on
animal emotions is the *subjective well-being measure* of the HPI. Here, humans are asked to indicate on a scale ranging from 0–10 how satisfied they are with their lives. Higher scores indicate higher life satisfaction. Although the use of the variable *overall life satisfaction* represents an important part of well-being/happiness research, it only provides us with a limited and likely more cognitive view on this topic.

Ed Diener may be the most consistent contributor to the study of well-being, along with his frequent collaborator Richard Lucas. In one of their seminal works (2003), Diener, Scollon, and Lucas summarize that a full picture of subjective well-being/happiness can only emerge through the inclusion of information in four areas of subjective well-being: two affective, and two cognitive (see Figure 7.1). Notably, the term happiness is hard to define, but given its importance in general public discourse, we also use it somewhat interchangeably with the term *subjective well-being*.²

According to the Diener article, we need to take into account the two cognitive well-being facets to understand if a person is really happy. In short, humans are asked how satisfied they are with their lives overall (“Global” in Figure 7.1), as well as questions dealing with their specific life domains, such as *leisure activities, family, or work* (“Domain” in Figure 7.1). In a recent study by Lachmann et al. (2018), we observe that, in Germany in particular, satisfaction with one’s own leisure activities was the best predictor of life satisfaction. Further, it should be mentioned that just adding up satisfaction levels of several life domains does not result in the overall life satisfaction of a person, because humans state different life domains to be of different importance to them. As a consequence, one would need to weigh each domain item before it could be added up, and it is not likely that all relevant life domains could be covered in a survey attempting to measure the overall life satisfaction of every person investigated.

1 Similar to the aforementioned 0–10 scale.
2 For further information on the origins of happiness research starting with the ancient Greek philosopher (Democritus) and problems in defining happiness, we refer to the cited work of Ed Diener.
The other large component in this happiness research model considers an emotional approach to studying the well-being complex. Here, human participants give researchers insights into their recently experienced positive and negative emotions. This indicates, as with the satisfaction measures, that well-being is not a stable trait, but fluctuates over one’s life. Aside from this fact, humans with a certain kind of personality structure tend to show higher or lower life satisfaction over the course of their lives. For example, neurotic people tend to more often report lower life satisfaction, and extraverted people report higher life satisfaction.³

A survey covering the emotional aspects of well-being would ask about positive emotions, such as how much laughing, smiling and enjoyment a person has recently experienced in his/her life. Naturally, participants in the survey would also need to be

³ See also Chapter 2 on personality and animal emotions for an introduction to the psychological constructs of personality; also, see the aforementioned work by Lachmann et al. (2018).
asked about negative emotions, such as how much they worried or how much anger/sadness was being experienced in their lives. Of tremendous interest, the emotional domains of well-being research originally presented in the Diener paper strongly overlap with many of the emotional terms used to describe animal emotions in the present book. In their article, Diener, Scollon, and Lucas (2003) use the terms “sadness, anger, worry, stress” as examples of unpleasant emotions, and the terms “joy, contentment, happiness, love” as examples of positive emotions. As these feelings arise from the activity of primal emotional neural networks deeply anchored in our brains, we presented the seven animal emotions as discussed in the present book instead of the original terms used by Diener in Figure 7.1.

In sum, Diener’s work on happiness/well-being not only considers cognitive facets, but also emotional facets to understand well-being. In order to be truly happy, one needs, on the one hand, high overall life satisfaction and high satisfaction in several domains of life. On the other hand, a more positive emotional experience, together with fewer experienced negative affects, would typically be reported by a happy person.

Returning to the previously mentioned results from the HPI, we would like to briefly shed some light on the links between happiness and income. For quite some time, it has been put forward in the psycho-economic literature that the association between emotional well-being and yearly income is not strictly linear. Instead, a certain amount of money is needed to achieve a certain amount of emotional well-being, whereas surpassing such an amount of yearly income is not followed by a further increase in emotional well-being. Meanwhile, so-called Happiness Income Benchmarks have been established. These describe thresholds of U.S. dollar income per year; that is, thresholds above which “happiness” does not further increase. The Huffington Post website (Short 2017) depicts a map of the U.S. showing that earning, for example, more than $65,850 U.S. dollars a year in the state of Mississippi does not lead to further increases in emotional well-being. These numbers were based on a study by Nobel Prize laureate Daniel Kahnemann and his colleague Angus Deaton. Their study demonstrated that, across the U.S., an income higher than $75,000 U.S. dollars did not result in a higher increment of emo-
tional well-being. In contrast, the cognitive facet of well-being/happiness (hence overall life satisfaction) seems to increase further with higher income (Kahneman and Deaton 2010).

Despite the interesting links between income and well-being, many other factors beyond income must also play an important role in fully understanding happiness. Otherwise, one could not explain why countries comparably poorer than the U.S. or Germany are leading the list of countries in the HPI. Simply living in a rich country (or having lots of money for oneself) does not lead to a super happy life, particularly when it comes to the emotional aspects of happiness. Somehow, it seems that many countries with far fewer economic resources are better able to take care of their basic needs, understood as those needs arising from our animal emotions.

In line with these insights, the importance of economic pathways to well-being is being challenged in our modern times. This was already emphasized in 1972 in a small country in the Himalayan region. Druk Gyalpo, the fourth Dragon King of Bhutan, decided to measure the success of his country by relying upon an index called gross national happiness (instead of relying on the common gross national product). By this he meant that becoming and staying happy represents the most important goal for the citizens of his country. That might, in part, explain why Bhutan is often described as the happiest nation in the world, although this is challenged by its ranking as 56th on the HPI. Nevertheless, one can ask why an economically poor country such as Bhutan has a better position than the United States of America on the HPI. Perhaps we may find an answer in the high spirituality of the Drukpa (who mostly follow a Buddhist lifestyle) and their strong family bonds, together with a strong sense of care for each other. Finally, they live in a wonderful, green, Himalayan environment. It is well known that mega-cities with their loudness and environmental pollution exert a great deal of

---

4 A more recent work by Kushlev, Dunn, and Lucas (2015) is also highly interesting, providing evidence that higher income might be better at reducing sadness, instead of enhancing happiness.

5 The residents of Bhutan call themselves the Drukpa or “dragon people.”
stress on their inhabitants, which also results in higher susceptibility to mental disorders such as schizophrenia (Vassos et al. 2012). However, we would nevertheless like to point to recent work from Christian’s group that unexpectedly shows that growing up in urban areas has a (very small) positive effect on shaping primary emotions: For females, growing up in (Chinese) urban mega-cities was associated with lower FEAR/SADNESS scores on the Affective Neuroscience Personality Scales in adulthood, whereas in males, it was associated with higher PLAY scores. For more detail, please see the paper by Sindermann et al. (2017).

Druk Gyalpo’s idea to put happiness – hence psychic well-being – on the political agenda is revolutionary compared to our ever more hectic and stressful lives in industrially developed Western countries, as well as in some Eastern countries such as Japan and China. Interestingly, the founders of the United States of America had formulated similar thoughts much earlier, when they envisioned the right of every American citizen to the pursuit of happiness. This is something that we might need to remember and consider more often in an accelerating, globalized world, increasingly dominated by technological revolutions.

In order to focus more closely in this chapter on the primary emotional systems, we provide the reader with some new unpublished data sets from our group, in which participants filled in the Affective Neuroscience Personality Scales – Adjective Ratings (ANPS-AR) to assess individual differences in primary emotional traits and overall life satisfaction (see Table 7.1). We see a pattern: positive emotions (SEEKING, CARE, PLAY) are positively linked to overall life satisfaction and negative emotions (FEAR, SADNESS, ANGER) are inversely linked to overall life satisfaction.

To readers unfamiliar with statistics, the $r$ (a correlation coefficient) can range between $-1$ and $+1$. The more positive the $r$, the stronger the positive association between two variables. For example, the taller a person, the more they weigh. Negative numbers would indicate, in our case, that higher negative emotionality goes along with lower overall life satisfaction. Numbers around zero speak for no association between two investigated variables. One of the problems of using correlations is the fact that they do not give insights into causal mechanisms underly-
ing a potential association. Hence correlations cannot answer: Which came first, the chicken or the egg?

In the context of our present data, it is noteworthy that primary emotional systems as assessed by the ANPS are known to be fairly stable\(^6\) and life satisfaction measures are known to fluctuate more. As a consequence, it is likely that individual differences in primary emotional trait system levels (seen as a relatively stable disposition to act more or less in a certain way) influence overall life satisfaction.\(^7\) Ergo, our emotional traits arising from our ancient animal neural circuitries likely influence the cognitive facets of well-being. Along these lines, we collected data from 3,976 people from the general population (2,414 males and 1,562 females; mean age: 32.40 with a standard deviation of 12.12) via a German website investigating, among other things, technology use and personality. Here, participants filled out a slightly different German short version of the English ANPS-AR\(^8\) as well as Diener’s 5-item well-being scale (see upper half of Table 7.1 below). The second sample in the lower half of Table 7.1 consisted of 4,049 English speaking gamers (1,942 males and 2,107 females; mean age: 26.88 with a standard deviation of 7.26) who filled in the English version of the ANPS-AR together with one item assessing life satisfaction/subjective happiness taken from a longer scale as presented in Lyubomirsky and Lepper (1999). This gamer sample is characterized in more detail in the self-test appendix, where you will also find the English version of the ANPS-AR alongside data against which you can compare yourself. In general, we believe both samples to be of interest, because data were collected online from the general population and not only from students. This is an important and frequent critique. It has even been said that most psychological research

\(^6\) Most people respond to questions in the ANPS in the same way they did four years ago when completing the questionnaire (Orri et al. 2018). Note that here version 2.4 of the ANPS was used.

\(^7\) Again, see Chapter 2, in which we indicate that the primary emotional traits influence personality bottom-up.

\(^8\) The English version of the ANPS-AR as published in Montag and Davis (2018) is presented in the Appendix. Note, however, that a four Likert scale was used in the German sample.
Table 7.1: Positive primary emotional systems are linked positively to life satisfaction/subjective well-being, and negative primary emotional systems are negatively linked to life satisfaction/subjective well-being. Although the results appear to be highly robust, see these results from the upper half as preliminary. (The German version of the ANPS-AR used in this study in the upper half is still undergoing psychometric testing and will need to be further improved.) For the cognitive facet of Subjective Well-Being, life satisfaction was assessed with a scale developed by Diener et al. (1985). For the Subjective Happiness Measure, we assessed life satisfaction with one item from the Subjective Happiness Scale by Lyubomirsky and Lepper (1999).

<table>
<thead>
<tr>
<th></th>
<th>SEEKING</th>
<th>CARE</th>
<th>PLAY</th>
<th>FEAR</th>
<th>ANGER</th>
<th>SADNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective</td>
<td>r = .46</td>
<td>r = .17</td>
<td>r = .12</td>
<td>r = -.43</td>
<td>r = -.11</td>
<td>r = -.48</td>
</tr>
<tr>
<td>Well-Being</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
</tr>
<tr>
<td>Subjective Happiness Measure</td>
<td>r = .32</td>
<td>r = .18</td>
<td>r = .25</td>
<td>r = -.47</td>
<td>r = -.14</td>
<td>r = -.57</td>
</tr>
<tr>
<td></td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
</tr>
</tbody>
</table>

is carried out on **WEIRD** participants (Henrich, Heine, and Norenzayan 2010). This acronym describes participants usually stemming from Western parts of the world, being Educated with an Industrialized, Rich, and Democratic background.

Participants in the sample recruited from the general German-speaking population presented in the upper half of Table 7.1 reported high well-being (M = 24.86 with a standard deviation of 6.15; the lowest score could be 5 and the highest score on this well-being scale was 35). The English-speaking sample in the lower half of the Table scored a mean of 4.87 points (standard deviation: 1.50) on the life satisfaction item ranging from 1–7. Answer option 1 means “In general, I consider myself not a very happy person” and answer option 7 means “In general, I consider myself a very happy person.” Contrasting the results from the upper and bottom halves in Table 7.1, it becomes apparent that correlations are highly consistent. This is noteworthy, as the life satisfaction measures differed. The observation that positive primary emotions are positively linked to well-being, and negative primary emotions are inversely linked to well-being, appears to be quite robust. The most pronounced effects can be observed.
for seeking (+), fear (−), and sadness (−), with correlations all about .30 or higher. In general, we believe it safe to conclude that taking care of one’s needs linked to the positive and negative primary emotions seems a good way to heighten one’s own well-being and life satisfaction. While this data is not causally linked to outcomes, there are hints that the anxieties associated with physical dangers (fear) and the anxieties associated with social separation distress (sadness) are likely to limit one’s capacity to experience positive emotions.

Taking a further look at the correlations, we also find it interesting that the trait playfulness is positively associated with overall life satisfaction (notably much stronger in the lower half of Table 7.1). This positive association also makes sense in the light of the earlier presented data stating that: a) play influences extraversion bottom-up and; b) extraversion is positively linked to life satisfaction. Unfortunately, we know that play behavior is fragile. Humans (children in particular) play when no danger is near and the human mind is in a positive mood. As Jaak Panksepp reported in his book Affective Neuroscience (1998), and as his student Stephen Siviy, working with his own students, later expanded upon (Siviy, Harrison, and McGregor 2006) there is animal research evidence supporting this observation. The presence of cat hair (instinctively eliciting fear) was enough to stop the play behavior of rats that had never experienced a cat, showing a strong link between the play and fear systems, which supports the idea presented above that negative primary emotions can interfere with the experience of positive emotions. Initiating play behavior in order to achieve higher well-being is a good strategy to enhance well-being. However, in a fearful emotional mindset, play activity will likely not be observable. Play also decreases if one of the partners becomes too aggressive and starts winning all the time. And, although difficult to test, “homesick” puppies taken away from their homes and their littermates are not likely to be eager playmates. However, it would be difficult to test with young puppies because they are so resilient and will soon start playing with children and even adults if other puppies are not around. This animal research is also reflected in the negative correlations between all negative emotional systems and overall life satisfaction.
The last section of this chapter about well-being and animal emotions deals with a famous construct called flow from the realm of positive psychology. As mentioned in an earlier chapter, the psychologist Mihaly Csikszentmihalyi introduced this concept (Csikszentmihalyi 2008). Flow describes a state of mind in which we are totally focused on an activity, which could be anything from climbing a mountain, becoming immersed in the latest computer game, a deep conversation with a beloved person, but also work (yes!). While in the “zone,” in the flow channel, we forget about time and space. In order to understand how we can get into the flow channel, we provide you with Figure 7.2, which we explain in the following paragraphs.

As depicted in the figure adapted from Czikszentmihalyi’s work, one sees that a perfect match between one’s own abilities and the difficulty of a task define the flow channel. To explain this: Imagine yourself being new at a job. In the beginning, things might be a bit overwhelming, leading, in the worst case scenario, to activity in the FEAR circuitry (fearing you won’t excel in the job), SADNESS circuitry (not satisfied with your performance and concerned about critical rejection from peers and supervisor), or ANGER (if you have the feeling of being treated
unfairly on the job or being frustrated by your failure). Hence, activity in our negative primary animal emotions is likely when our skills do not match the difficulty of the task.

Now imagine yourself having done the same job for years. Nothing has changed in your daily work routine. You know every aspect of what to do, starting from 9 a.m. to the end of the workday at 5 p.m. This “being under-challenged” leads ultimately to boredom (an under-arousal of the seeking system), which also kills the flow experience. Again, we are not in the zone! So where can our positive animal emotions be anchored in the flow model now?

As being in the flow channel represents a very positive state of mind in which we work through things with ease, it is obvious that enthusiasm stemming from activity in the seeking and play systems is likely happening in the flow zone. Given that different settings where flow can happen are possible (e.g., an intimate discussion with a beloved person), it is also imaginable that the care circuitry might be activated in the flow zone, but only in social settings. We explicitly mention that the thoughts proposed here about associations between primary emotions and flow are of a theoretical nature and need to backed up by empirical findings.

Considering the needs arising from our heritage of animal emotions in our modern times: what makes us happy? Before exploring the answer through Pankseppian AN theory, we would like to briefly revisit an often cited theory called Maslow’s “hierarchy of needs” (Maslow 1943). According to the study of biographies of prominent and highly successful people, Maslow came up with the idea of his pyramid (see Figure 7.3, left side). You have probably stumbled upon it already in a textbook, as it is still very popular in many disciplines.

Maslow argued that the lower needs of the pyramid have to be fulfilled first, before higher needs can be satisfied. Hence, only after meeting the needs of hunger and thirst can a person strive to satisfy the next higher need: safety. The higher you go up on the ladder, the more cognitive in nature the needs are. According to Maslow’s early version of his theory, the highest goal to be achieved would be self-actualization. This means that to become a truly happy – here satisfied – person, one has to live up to one’s
own full potential. In as yet unpublished data, we observed that higher scores in fear and sadness as emotional personality traits seem to counteract fulfillment of all of Maslow’s needs, whereas higher scores in play might be helpful to fulfill the different needs presented in Maslow’s pyramid. What we found most interesting was the answer given by the participants about the importance of each of Maslow’s needs in their lives. Here they were asked to rank the five terms in an order of 1 to 5, with 1 being of lowest importance and 5 of highest importance. As you can see from the alternative pyramid resulting from the empirical data of this study (Figure 7.3 on the right side), self-actualization was ranked last on the pyramid by the participants, whereas belonging and safety came in first. We believe that these data support Jaak’s theory and show how our evolutionary heritage strongly resonates within us. Despite our cognitive abilities, we are emotional beings influenced by primary emotional systems.

According to Jaak, finding happiness might be simply answered with the following: Engage more in seeking (energetic exploration of the world, which is why a lot of people love

9 Please note that the study is of correlational nature.
to travel), care and play. Notably, both careing for others and being cared for feel good. Particularly important is the power of touch; being embraced by your beloved partner is a wonderful experience that down regulates sadness. The same is true for engaging in play behavior. Again, this is a joyful activity we are sharing with another play partner. Hence, social interactions are a tremendous driver for experiencing happiness. Let’s not forget that we are social animals in need of companionship. Clearly, understanding our primary-process animal emotions is key to understanding ourselves.
Summary

The study of well-being is complex and many approaches have been taken to understand what makes us happy. The present chapter argues that taking care of our ancestral emotional heritage is ultimately the key to happiness and well-being.

So again, what makes us happy? It’s the energy derived from the activity of the seeking system (enthusiasm), the soothing effects of careing for each other (feelings of tenderness and comfort), and the joy of playing with one another. Engaging these pleasant primary emotions may also need to be augmented by the absence (or down regulation) of activity in the aversive primary brain systems: fear, anger, and sadness.

Finally, happiness is multi-faceted and can result from quite different affective experiences. In short: romantic love (lust), parental love (care), experiencing joyous fun (play), and engaging in a favorite interest or exploring a challenging problem (seeking), are four of the basic pleasures in our mammalian lives. Note that sensory affects (smelling the roses) can be associated with improved well-being, as in aromatherapy and the use of perfumes. Perhaps more fundamental to happiness, homeostatic affects such as hunger or thirst can be stilled via activity of the seeking system. Consuming a drink or food when thirsty or hungry is clearly also pleasurable, but note that these urges are also fulfilled by the common activation of the motivational seeking system.