

Thought: How Happy Are You?

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I like to find solutions to [Daily Optimization](#) problems, but ultimately the reason I want to do this is to increase my happiness. By finding out the optimal time to leave in order to [minimize the time I spend waiting for the subway](#), the less time I have to spend in an unpleasant state, which is one way of making myself happier.

But *how* much happier am I? How do you measure how happy you are in the first place?

I'll try not to get too philosophical here, so just ask yourself this: on a scale from 0-10, how satisfied are you with where you are in your life right now?

On average, people in the United States say they are at a 6.99, according to a [2016 Gallup report](#). Norway was the highest at 7.54 and [Central African Republic \(CAR\)](#) was the lowest at 2.69. Syria was a low 3.46, less than half the US average.

Now ask: If you had to rate how happy you feel *right now*, on a scale from 0-6, what would you say? In the United States, the average response was 4.32.¹

These are two simple ways to get an idea of how happy people are. The 0-10 life satisfaction scale ([often called the "Cantril Ladder"](#)) gives a measure of how satisfied people are with their lives overall. This measure depends heavily on the "remembering self" – it relies on a global evaluation of your entire life. In contrast, you can also think about an "experiencing self", which relies on your subjective evaluation of how you feel in a particular moment. This is what the 0-6 scale measures.

Using this framework, if you want to make yourself happier, you could have two goals, which may or may not be at odds with each other:

- 1) Increase your overall life satisfaction (make the remembering self happy)
- 2) Improve your moment-to-moment experiences (make the experiencing self happy)

Ideally I think you would want to accomplish both, but first you need some way to measure each type of happiness – one measurement that captures the sort of overall life satisfaction that the remembering self thinks about, and another that captures the moment-by-moment feelings that the experiencing self enjoys. If these measures have a high degree of validity (i.e. if they measure what we want them to measure), then you can become happier by tracking and improving them.

¹ Author's calculations, [American Time Use Survey Well Being Module](#) (2010, 2012, 2013).

I'll come back to the broader life satisfaction measure in the future. For now, I want to focus on the moment-to-moment, "experiencing self" measure of happiness, because I think there is a really good way to measure this and potentially use it to help make us happier.

Happiness Ratings and the U-Index

My favorite approach to measuring the emotions of the experiencing self was developed by psychologist Daniel Kahneman and the economist Alan Krueger. They've [written a paper](#) as well as [a book](#) (with additional coauthors) that explains many of the conceptual issues surrounding the measurement of subjective well-being and happiness. Much of the following discussion comes from their work.

In their research, they first survey people and ask them to "reconstruct" everything they did the previous day – e.g., "first I woke up, then I took 30 minutes traveling to work, then I worked for a couple hours, then I spent an hour at lunch, etc., etc." Next, for each activity mentioned, they ask the person to rate their subjective experience of happiness, tiredness, stress, sadness, pain, and meaningfulness, *at the time they were participating in the activity*. So, if they said they had a meeting with their boss in the afternoon, they would have to rate how happy they felt in the meeting, how sad they felt in the meeting, how stressed they were in the meeting, and so on. Using the survey results, they were able to get estimates of how certain activities affect people's subjective well-being.

There are a bunch of interesting and fun things you can do with this data. The Census recently collected this type of data using a survey – the [Well-Being Module of the American Time Use Survey](#) – which asked the same emotional affect questions to a bunch of Americans. Table 1 shows the average responses, on a 0-6 scale, for men and women in the United States, for 2010, 2012, and 2013:

Table 1 - Affect and Subjective Well Being, All Ages, USA

	Men	Women	All
Happy	4.24	4.38	4.32
Tired	2.13	2.43	2.30
Stressed	1.39	1.54	1.47
Sad	0.60	0.66	0.63
Pain	0.88	1.03	0.96
Meaningful	4.18	4.40	4.30
U-index	0.13	0.15	0.14
Cantril Ladder	7.03	7.23	7.14
N	45,524	57,272	102,796

All emotional affect ratings are on a 0 – 6 scale. U-index is bound between 0 and 1. Cantril Ladder measure is on a 0-10 scale. Source: American Time Use Survey, Well Being Module (2010, 2012, and 2013) and Krueger (2016) "Where Have All The Workers Gone?" Boston Fed Conference Paper

The "Cantril Ladder" row in Table 1 is the 0-10 life satisfaction rating mentioned earlier.

Because the survey asks about specific activities, you can also estimate how happy people are while they do different things. Table 2 shows people’s emotional affect ratings, conditional on which type of activity in which they were participating.

Table 2 - Average Affect by Select Activities

<i>Activity</i>	<i>Happy</i>	<i>Sad</i>	<i>Stressed</i>	<i>Tired</i>	<i>Pain</i>	<i>Meaningful</i>	<i>U-Index</i>
<i>Religious</i>	5.08	0.72	0.69	1.43	0.85	5.57	0.060
<i>Sports and Exercise</i>	4.97	0.31	0.77	2.19	1.22	4.98	0.040
<i>Eating and Drinking</i>	4.68	0.47	1.04	2.04	0.78	4.54	0.074
<i>Relaxing and Leisure</i>	4.26	0.68	1.07	2.44	1.05	3.64	0.107
<i>Socializing</i>	4.96	0.54	0.98	2.09	0.77	4.98	0.068
<i>Watching TV</i>	4.22	0.72	1.07	2.52	1.09	3.55	0.114
<i>Housework</i>	3.97	0.71	1.41	2.36	1.08	4.18	0.133
<i>Education</i>	3.75	0.62	2.47	2.89	0.57	4.37	0.265

All emotional affect ratings are on a 0 – 6 scale. U-index is bound between 0 and 1. Source: American Time Use Survey, Well Being Module (2010, 2012, and 2013) and Krueger (2016) "Where Have All The Workers Gone?" Boston Fed Conference Paper

Kahneman and Krueger also define a measure called the “U-Index”, where “U” stands for “unpleasant” or “undesirable”. It measures the proportion of time in which a person or a group of people spend in a negative emotional state. In practice, this is calculated by creating a variable equal to one if a negative emotion is the dominant emotion at a particular time, and equal to zero otherwise. In this case, it’s equal to one if sadness, stress, or pain is higher than self-reported happiness. Averaging this indicator variable over all time spent gives the percentage of time where a negative emotion is the dominant emotion. In general, I think it’s fair to assume that people would like for their U-index to be as low as possible.

Table 1 above shows the U-index for the US population. It can be interpreted as: men spend 13% (U-index = 0.13) of their time in an unpleasant state, whereas women spend 15% (U-index = 0.15) of their time in an unpleasant state. Table 2 shows the U-index for different activities – education has the highest U-index out of this subset of activities, with about a fourth of the time spent doing educational activities being rated as unpleasant. From the table, it looks like this comes from the relatively low happiness and high stress ratings for education.

The point of this research, as stated in related work by [Krueger et al.](#), is to help people measure society’s subjective well-being. It provides alternative measures to traditional economic indicators, like GDP per capita, which can [miss important trends](#). Many countries now collect time-use data, and many are working on incorporating this and related [well-being measures](#) into their policy evaluations. Generally, the idea is that you could look at or whether the U-index of certain groups has been changing over time, and [explore how these trends have implications for policy prescriptions](#).

I believe it can also be used by *individuals* to track their own happiness. Instead of surveying a lot of people about a single day, you could just survey yourself every day and track how happy you were, how sad you were, how much pain you felt, etc., and even calculate your own personal U-indexes for all your activities. To make it easier, instead of reconstructing your entire day and rating your emotions for each activity, you could sample with randomly timed self-surveys throughout the day to produce the relevant statistics

(if you did this for enough days, of course). If you collected this data consistently for a long enough time, you could create a table of your own personal emotional affect.

In the classic [Thoughtburner self-experiment style](#), I've been administering exactly these randomly-timed surveys to myself for over half a year. I have an app buzz me randomly throughout the day (on average, once an hour), and then I fill out a shortened version of the well-being module survey that was administered by the Census Bureau and Krueger et al. This method has the added benefit of being even more accurate at capturing the moment-by-moment emotional affect (experiencing self) than the Census well-being module, since my emotional reports literally take place in the moment whereas the well-being module asks people to recall their emotions from the day before.

Table 3 compares the US average emotional affect to my own personal averages, and the last column shows the difference between the two:

Table 3 - Affect Comparison

	US Average	Me	Difference
Happy	4.32	3.73	-0.59
Tired	2.30	1.25	-1.05
Stressed	1.47	0.66	-0.81
Sad	0.63	0.15	-0.48
Pain	0.96	0.24	-0.72
Meaningful	4.30	3.04	-1.26
U-index	0.14	0.04	-0.10

All emotional affect ratings are on a 0 – 6 scale. U-index is bound between 0 and 1. Source: American Time Use Survey, Well Being Module (2010, 2012, and 2013) and author's personal data (2016-2017).

The table shows that my own ratings are lower than the US averages – both positive and negative emotions. I'm not too intense of a guy when it comes to emotions, so I think this is a reasonable result.

It's also possible to break down the U-index into its component parts using this data. I can see how much of the time I spend in an unpleasant state is due to stress vs. pain vs. sadness.

Table 4 - U-index Breakdown

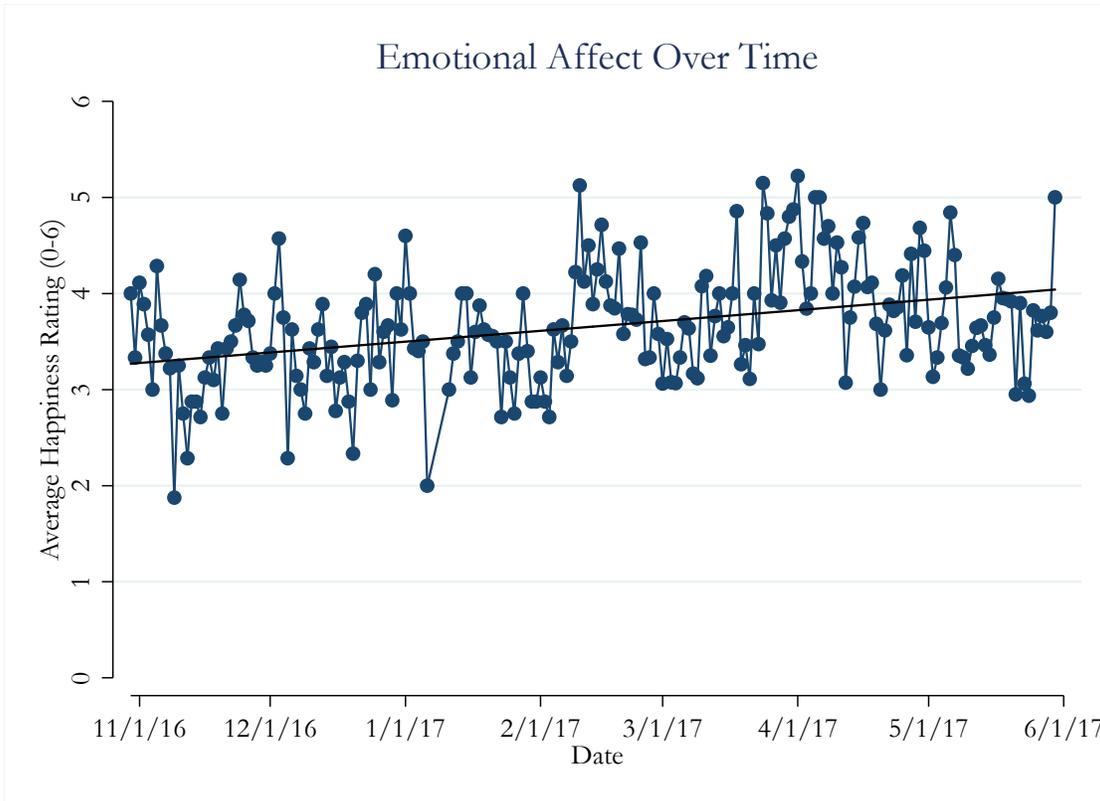
	U-Index
Sad > Happy	0.011
Stress > Happy	0.038
Pain > Happy	0.001
Overall U-index	0.0405

Source: Author's personal data and calculations (2016-2017).

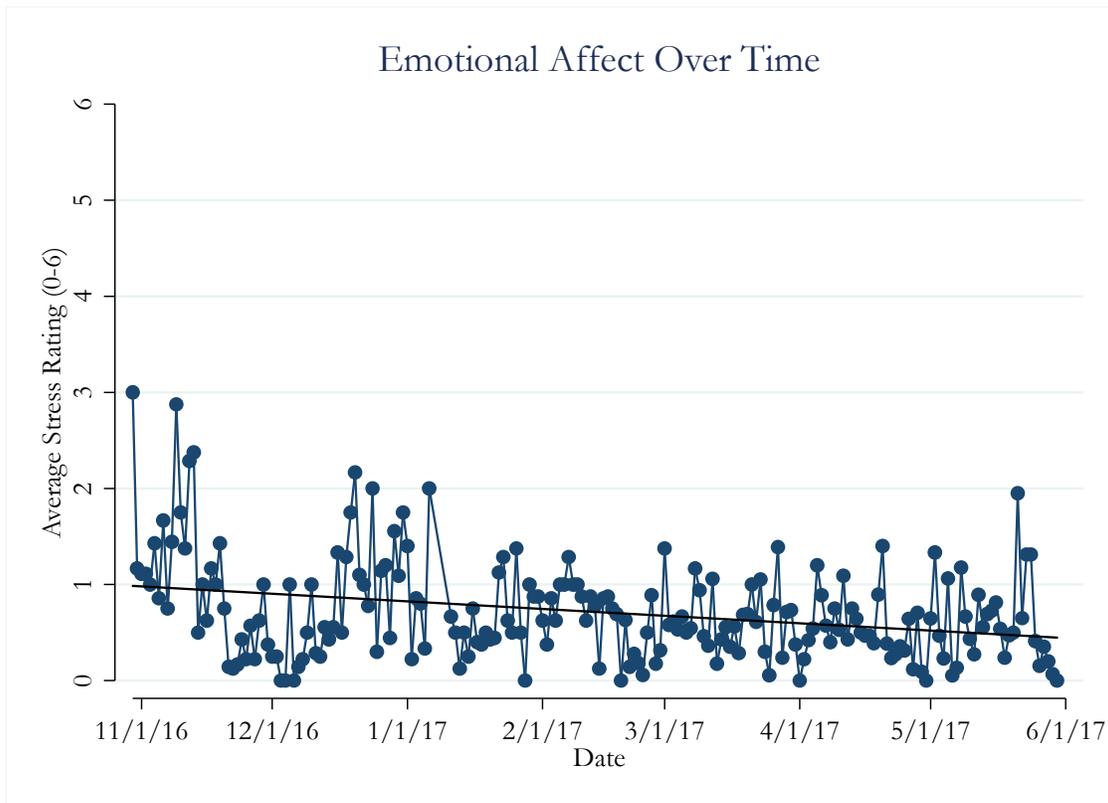
Clearly a lot of my unpleasant experiences came from being stressed out, and almost none of it came from being in pain (it's nice to be young and healthy). If I really want to lower my U-index, probably the best thing to do would be how to either reduce the time I spend in stressful situations or do something to make those situations less stressful. (The reason that the three categories don't add up to the overall U-index is that there is some overlap between the different criteria).

Since I've been doing this for a while, another cool thing we can look at is any trends over time in these emotional affect results.

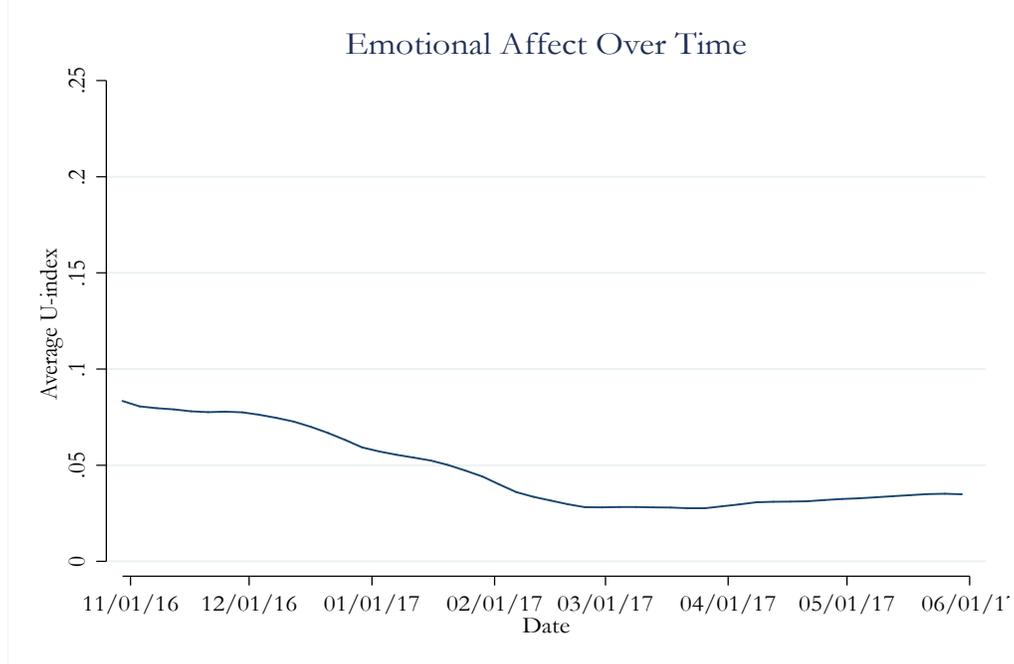
Happiness over time:



Stress over time:

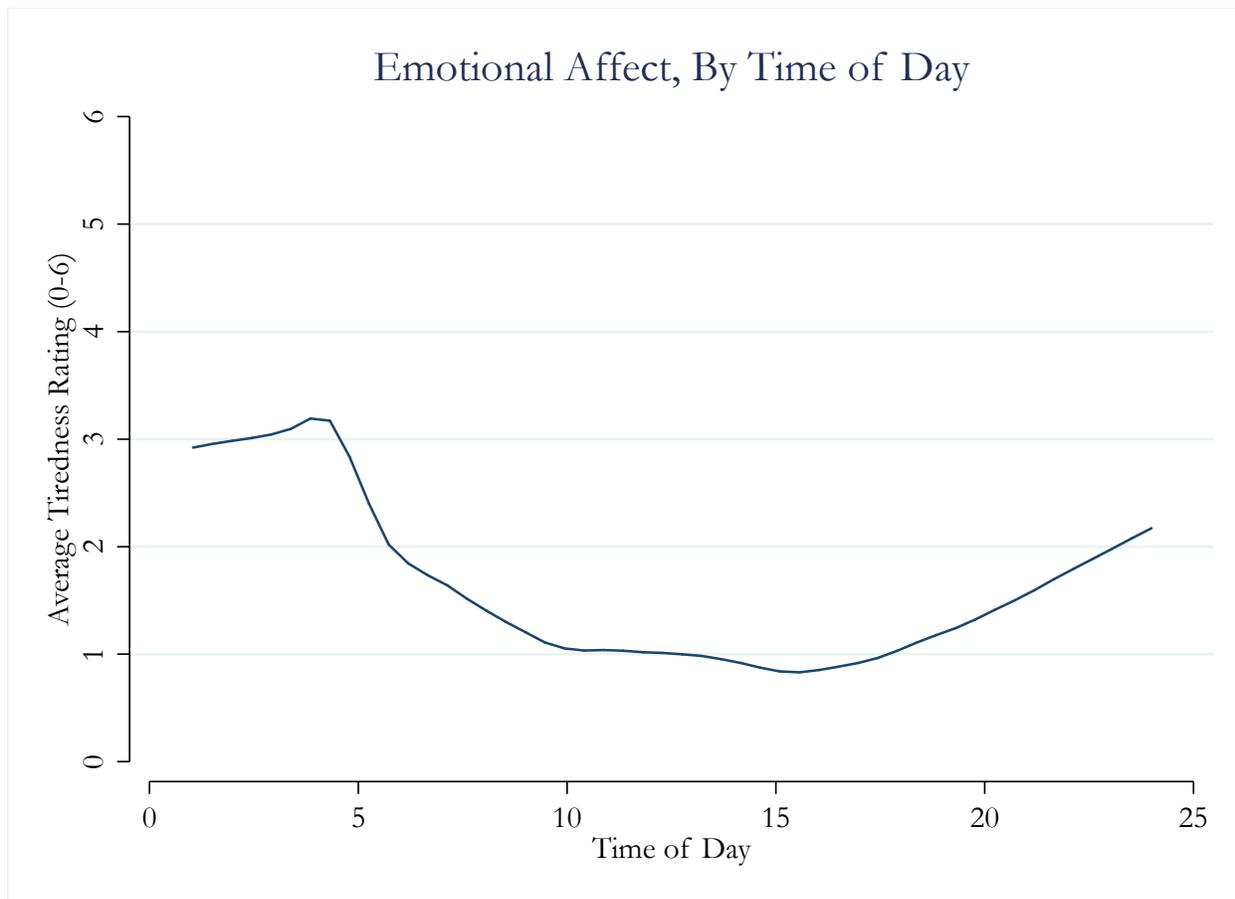


Most of the other emotions had no trend over time for me. The gradual increasing of my happiness rating combined with the gradual decreasing of my stress rating suggests that my U-index might also be decreasing. Looking at the U-index, the data shows that it decreased a fair amount:



This trend comes from a few things. First, I was working on graduate school applications in November, and their deadlines were all around December 1st, which is when my U-Index begins its gradual decline. Second, I took vacation towards the end of December/beginning of January, which probably helped to lower my U-index. And then I was accepted to graduate school in early February, which is part of why I think it stayed low despite returning to work.

We can also look at how certain emotions change depending on the time of day. I wish this were more interesting, but the only sort of cool result is the rating for “tired”, since the rest don’t have much variation. The time of day is military time (0-24 hours), and my average tiredness rating follows the pattern you’d probably expect:



A Simple Application

There’s still a question as to how this data can be useful. Some people (like myself) may find it interesting on its own, regardless if there is another need for it. But others will want something more concrete.

One simple exercise we can do is to estimate how a re-allocation of time would affect my well-being. Let’s say I want to estimate how reducing my commute time by 50% would affect my average level of happiness, *ceteris paribus*. To do this, we need to know 1) the percent of my time I spend commuting, 2) the average emotional ratings for happiness while I’m commuting, and 3) the average emotional ratings for happiness during the activity to which I reallocate my commute time.

All of these factors can be easily computed using the data I've collected from my random sampling. Table 5 below shows the necessary stats:

Table 5 - Commuting and Well-Being

	Commuting	Not Commuting	Average
Percent Time Spent	16.2%	83.8%	
Happy	3.42	3.79	3.73

Source: Author's own data and calculations (2016-2017).

(I used to commute a lot, so if the percentage seems high, well, it is)

I'm not as miserable commuting as I thought I would be. I think it's because I listen to [\(interesting and funny\) podcasts](#) on my commute, which apparently keeps my happiness rating fairly high. To calculate how a 50% reduction in commuting would affect my happiness, simply reduce the percentage of time I spend commuting by 50% and then recalculate my average happiness rating (for simplicity, I will assume that the average emotional ratings for "not commuting" is what my emotional ratings will be for the time that I no longer spend commuting in this hypothetical scenario):

Table 6 - New Commuting and Well-Being

	Commuting	Not Commuting	Average
Percent Time Spent	8.1%	91.9%	
Happy	3.42	3.79	3.76

Source: Author's own data and calculations (2016-2017).

Which is an increase of my average happiness rating from 3.73 to 3.76 (+0.03), or less than 1%. This was surprising to me, since I really don't like commuting. But given that my happiness rating while commuting was already close to the average happiness rating, it makes sense in hindsight that reducing my commute time wouldn't affect my overall happiness rating much.

One possible explanation is that when I think about the overall experience of commuting, I don't like it because it seems super inefficient and boring, but in my moment-to-moment experiences of it I tend to be doing OK (i.e., a difference between my remembering and experiencing selves).

Being Cautious

While the previous demonstration shows how the emotional affect data could be used to estimate certain counterfactuals, the assumptions behind this type of estimation are very strong. I would feel best predicting changes in well-being when the changes in your life are relatively small.

Even then, it's hard to know exactly how your time use will change, and how the new *combination* of time use will affect your overall emotions. Reducing your commute time might lower your stress level since commutes are stressful, or it might raise it if it means you end up spending more time at a stressful office.

Another thing to remember is that people are notoriously good at adapting to new levels of "normal", so that even after major life events (both good and bad ones) they return to similar baseline levels of well-being measures. That is to say, I think there are strong individual fixed effects when it comes to subjective well-being.

Lastly, the amount of time you spend doing an activity will also most likely affect your overall rating of the activity. Things can become more or less enjoyable depending on how much time you spend doing them. Doing sport activities² might be fun and exciting at first, but after a while it can become tiring and stressful. Using the commuting example, maybe in addition to the effect of spending less time commuting, I would also become happier while I was commuting, which would imply that the effect on my overall happiness would be larger than +0.03.

These considerations make the well-being data more difficult to incorporate into your decision making, but not impossible. Ultimately, I think individuals with lots of private knowledge about themselves are best equipped to judge when these types of hypotheticals would be a valid thing to take into consideration. They just need to collect the data first.

Now that I'm in grad school, it'll be interesting to see 1) how the allocation of my time changes, and 2) how it affects my emotional ratings and subjective well-being.

² Can you tell I'm super sporty?

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