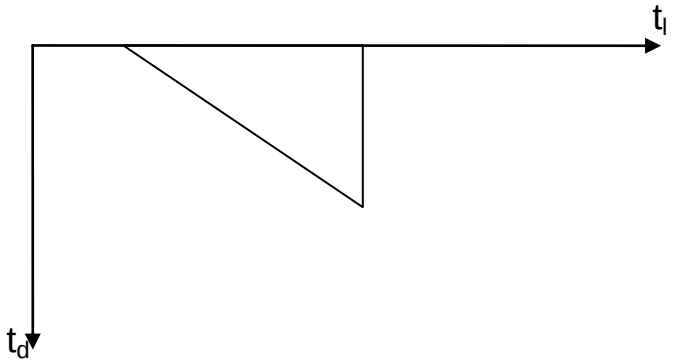
How fast does time fly?

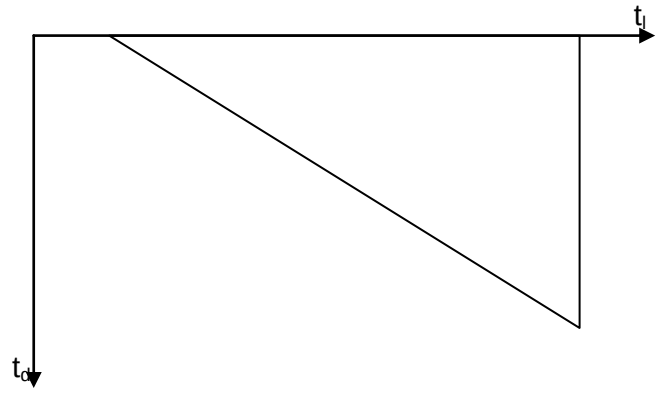
How does a human being – sensitive creature – experiences time? By duration and succession of impressions. An impression lasts *so* long. You register *this* after *that*. If you would not register any impressions, you would have no clue of time.

The longer an impression lasts, the deeper it presses into your mind, like a stamp, and that's how you register the *duration* of an impression. In addition to the length of time (t_l), I would like to introduce the depth of time (t_d), which is the depth to which the stamp of time is pressing. The longer time is running, the deeper it is pressing. Now I can draw *an impression* as follows.

Short impression:



Long impression:



The *value of an impression* is the product of its length and its depth. I call this the *mental distance* d_m; it is *the extent to which time has changed something in our head*. This could be represented by the surface of the triangles here above.

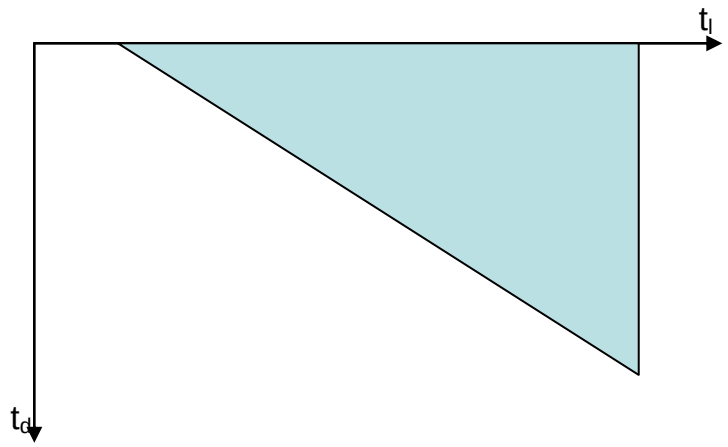
$$d_m = (t_l \times t_d)/2$$

Or – if the depth of time is running just as fast as its length:

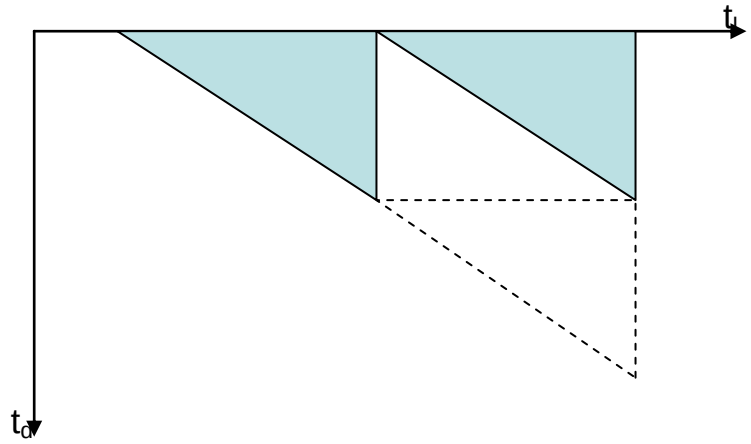
$$d_m = t^2/2$$

If you are on the move, impressions are all the time changing. So what is the difference between registering one impression or two impressions on a certain time span t_l?

One impression:



Two impressions (d_m = blue):



If you experienced two impressions, you have covered only half of the mental distance compared to the one who experienced only one impression in the same time span. You have the feeling that time goes fast if a lot is happening. "Time flies": this means that the time span t_l that passed is big compared to the mental distance d_m covered in that time. Time goes fast, relative to d_m. Time passed by and you stayed largely the same.

Reversely, if you did concentrate for a while on one and the same thing, you will sometimes also claim that "time was flying!" During your occupation, you have been more aware of the depth of time than of its length. Once you stop concentrating, it

suddenly strikes you that t_l did continue to run, even though you had the feeling to be out of time for a while. So now you say that "time did fly" because you covered a large mental distance, you changed a lot, and the moment before your occupation seems to be "far away".

In general, the following rule applies: the more impressions you have to process in a short time, the less mental distance you will cover.

With:

i = number of impressions / time span

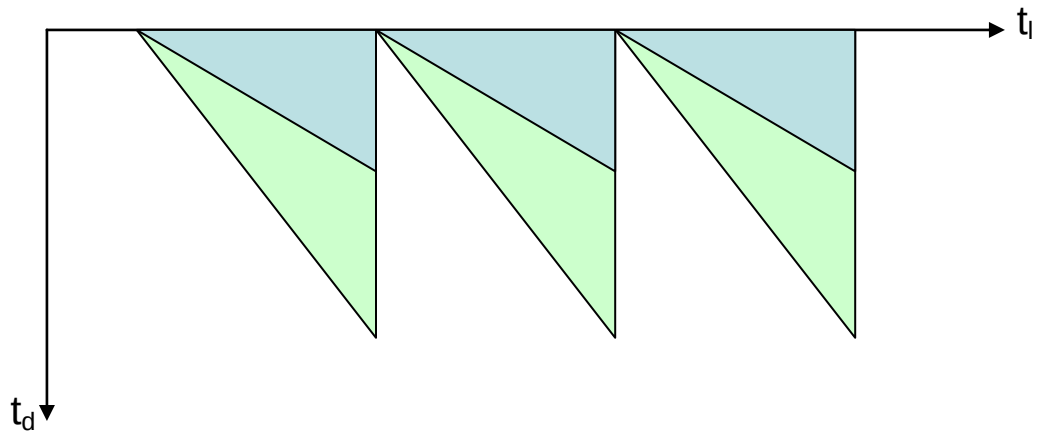
the following applies, as you can deduct from the graphs above:

$$d_m = t^2/(2 \times i)$$

It is of course a rough simplification to suppose all impressions to be of the same kind. A short impression can sometimes make a deep impression and some long impressions don't leave any impression at all. A first refinement of the model could be to make the speed at which an impression penetrates your mind variable. For instance, if an impression is new or emotionally charged, it will penetrate faster. I will call this *the emotional commitment e*. For i = 1 applies:

$$d_m = (e \times t^2)/2$$

The older you grow, the less you are "impressed" by experiences. Suppose the average emotional commitment for an older person (blue) to be e = 1 and that for a younger person (green) to be e = 2. In that case it proves that, even if the succession of impressions are the same for both persons, the mental distance covered by the younger person will be twice as big as that covered by the older person. For the older person, time "goes faster":



Similarly, if you arrive in a foreign country, even though you receive many impressions in short time, the first day seems to last very long; after your first day in China, home seems to be an eternity away. The many impressions on such a day are short, but penetrate fast into your mind, and in this way they create a large mental distance after all, just as if you became young again.

How to create as much mental distance in as little time as possible? By concentrating very strongly (with high commitment, without the interference of other emotions or impression) on one thing. Meditation is based on this principle.

If you travel, time (t) is related to the physical distance that you are covering (d_p) and this relation is called speed (s):

$$s = d_p/t \text{ of } t = d_p/s$$

The faster you go, the more impressions you have to process in a short time. In other words, the number of impressions per time span increases linearly with the speed:

$$i = c^{ste} \times s$$

Or normalized ($c^{ste} = 1$): $i = s$

Now suppose that t_l runs just as fast as t_d. Then we can calculate the mental distance d_m, for standard emotional commitment (e = 1), as follows:

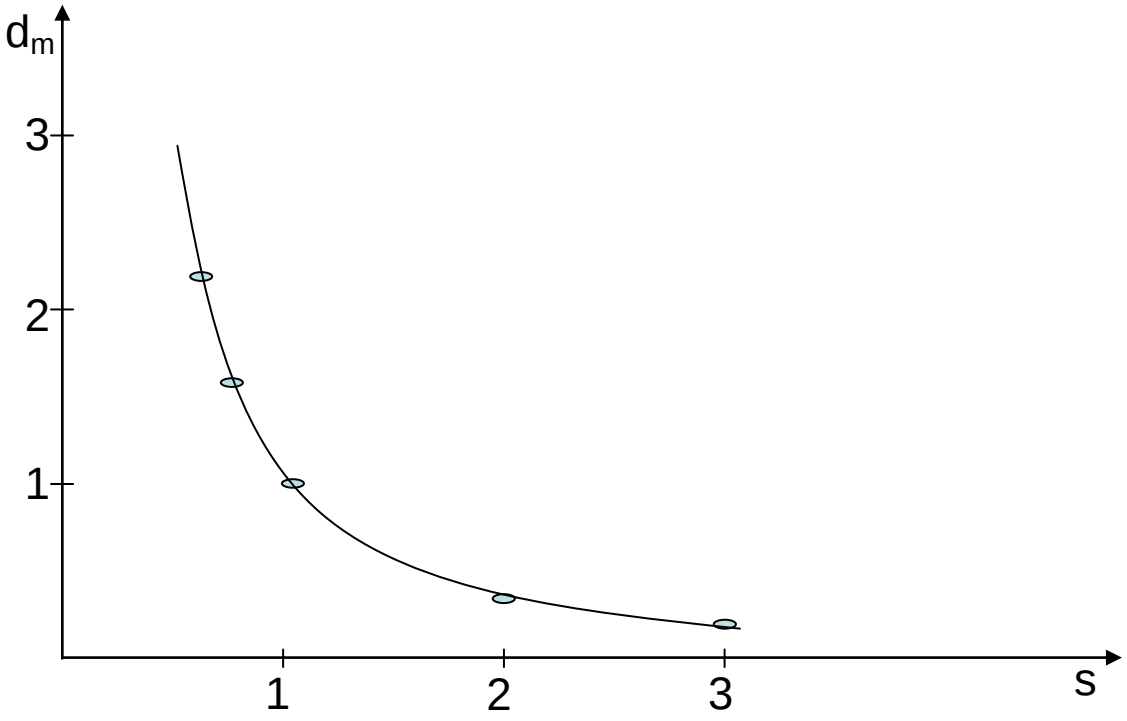
$$d_m = t^2/(2 \times i) = t^2/(2 \times s) = d_p{}^2 / (2 \times s^3)$$

We can conclude that, for one unit of distance ($d_p = 1$), the mental distance (d_m) is inversely proportional to the third power of the speed (s):

$$d_m(\text{distance}) \sim 1/s^3$$

Or: the slower you cover a certain physical distance, the larger the mental distance that is created on this journey.

In a graph:



I will normalize the speed v to the average human walking speed – to what else? During millions of years, people have travelled mainly at walking speed. Therefore, s = 1 means 4 kilometer an hour. What do we observe? For a speed larger than 8 kilometer an hour, the mental distance varies little with the speed. Whether you drive 100 kilometer in one hour by car or in twenty minutes by a high speed train does not make a big difference for the mental distance that you will cover, just a little bit. But once you start to go slower than 8 kilometer an hour, the mental distance suddenly starts to rise drastically with decreasing speed. Because of this, the hiker will be surprised how fast he feels far away from his/her starting point, even more than the biker. The graph also shows that once you decrease your speed below the normal walking speed, like is done in certain processions (the procession of Echternach, certain Buddhist processions in which the distance is covered on the knees), the mental distance that is covered rises to a multifold.

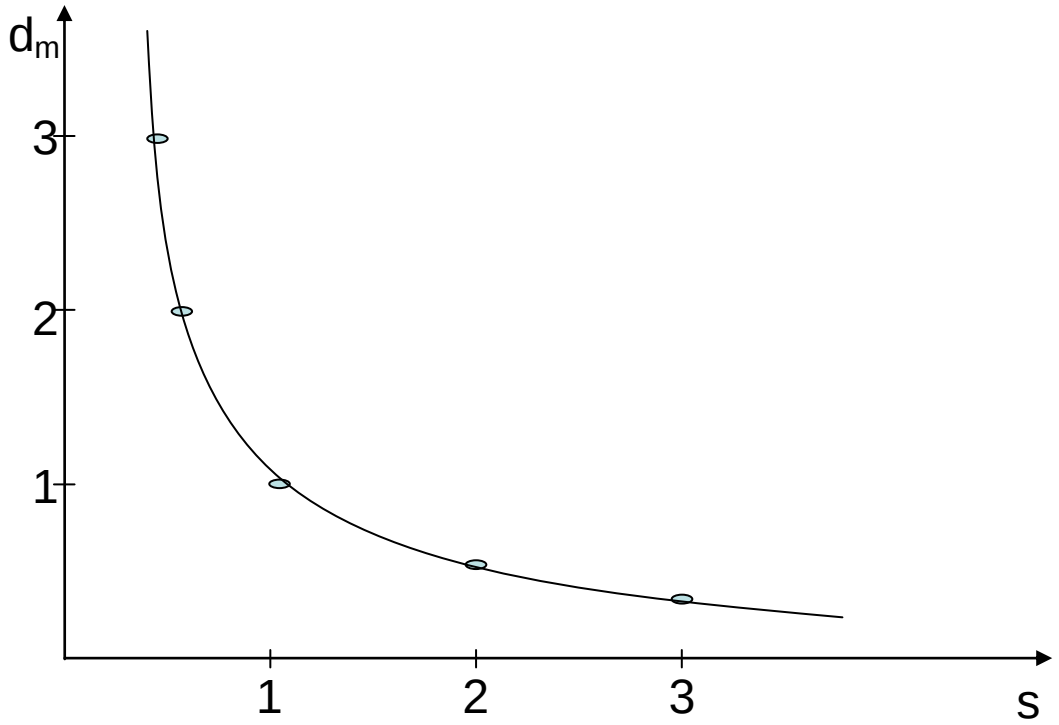
This theory could also be interpreted in a more symbolic way. You could read *speed* as the *speed of life*. In this case, the intensity of life could be defined as *the extent to which you are covering mental distance*. In a human life, the distance that you are covering is not constant, but the time that you spend on earth. By normalizing the time t_l to the average life span of a human being, we can derive the following relations, for a standard emotional commitment (e = 1):

$d_m(life) \sim t^2/i$

and with t = 1 and i = s

$d_m(life) \sim 1/s$

For a given time span ($t_l = 1$), the mental distance that you cover is inversely proportional to your speed:



The faster you live, the lower the intensity. Haha!

Is it your goal to maximize the intensity of your life? In the light of the theory above, this is an appealing idea, but it is a rather absurd aspiration in real life. Firstly, why would you? And secondly, the model that I presented here is a very rough simplification of things; life is more complex than that, fortunately. Nevertheless, I do sometimes hear people postulating similar statements about their goal in life. They talk about "quality time" – a concept that suggests that you can spend time with more or with less quality. People who speak about quality time often tend to jump around from here to there, to avoid that pieces of time with lower quality would appear into their life. As a thought experiment, you could equate this "quality" with the intensity of life as defined above. What do we conclude? Those people are doing the opposite of what they should do to reach their goal. By fear of spending time of lower quality, they start to live faster, by which the intensity of their life decreases. Their time is in constant acceleration and they have the feeling that "true life" is escaping them. Their age is rising, but they still feel young – in other words they still have the feeling they did not experience real life yet. One evening in a pub, they start complaining about this feeling to a friend. "You should slow down", this friend says, and he is right, but it is hard to slow down, because speed is a relative concept. The speed that we were using in our theory is actually the difference between your own speed and the speed of the world around you. Even if you go as slow as a snail, if the world around you is driving forward at breakneck speed, you cannot reach any depth in life. In other words, to slow down, you should be half blind and stubborn and ignore the hectic world around you.

Is it really that simple: who lives slower, lives with more intensity? Is the life of a Hindu visionary sitting against a tree for years and years, meditating, the most intensive life possible? Not necessarily, because I forgot to take into account that all those impressions in our head will also *interact* with each other. You could, for instance, postulate that the value of an impression increases to the extent that it relates to other impressions from the past. The more you experience, the more impressions you will have, the higher the chance that those impressions in your head will interact with each other and create something new. You could try to represent this in mathematical formulas just like I did with the basic theory before, but I'm afraid this would grow very complicated very soon.

After my illusion to represent our feeling of time in simple formulas has evaporated, I keep the following residue: not only the content of what you do will determine the intensity of the experience, but just as well the rhythm at which you do it. Poetry, people say, relates to prose by having a more rhythmical coherence, instead of coherence merely by content. Our life is not only prosaic, but also poetic.

Bruno De Wachter