

The happiest time of life: Entropic and intuitive answers

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Ms. Kane Tanaka (who became 119 years old last month) is presently the world's record holder of longevity. At the time of registration ceremony to the Guinness record two years ago she was asked by a news paper man "It is a great honor for me to meet you here. Please let me know when in your looong life was do you remember the happiest time ?" Kane san instantly replied with clear voice "Now!"



Kane、20才・116才。Wiki

Kane san looks equally very charming at 20years old and 116 years old in wiki pictures. Wiki reports that one of her hobbies is to pass time thinking about mathematics although she sepent her young days as common merchant .

Here is a tryal of entropic (mathematical) examination of the happiest time of life in general and the comparison of the result with Kane's answer "Now!"

Every person lives his/her life in a limited length of time. The first step for the mathematical evaluataion of happiest time is to put the length of life time (be it long or short) as 1. Namely Everybody lives from time 0 to time1.

Let us now define this rest length of life to live as x . $x = 1$ at the time of birth and $x = 0$ at the end of life.

Then the time already lived for everyone must be $(1 - x)$. So that the life span is the sum of time to live and time already lived : $x + (1 - x) = 1$.

Now let us define the measure of degree of happiness at time x is inversely proportional to x . Which means the happy feeling when the time to live is x is proportional to $1/x$. The reason here may be understood as when x is near 1 (one is young and much time left to spend) the appreciation of time is small but when little time is left (x is small, old and near the end of life) the value of every moment becomes precious.

When the degree of happiness at the time x is proportional to $1/x$, total happiness for the part of life from $x = 1$ to $x = x$ must be calculated by the integration of $1/x$ from $x = 1$ to x . The answer will immediately be given by an ordinary high school students as:

$$S1 = \int_x^1 \left(\frac{1}{x}\right) dx = \log_n(1/x) = -\log_n x \quad \cdot \cdot \cdot (1)$$

The notation S refers to the symbol of entropy commonly used in energy science and information science. The eq(1) may be re-written as $x = n^{-S1}$. This way of writing the equation may allow us to understand that $S1$ is the so called "magnitude" or the "entropy " of number x .

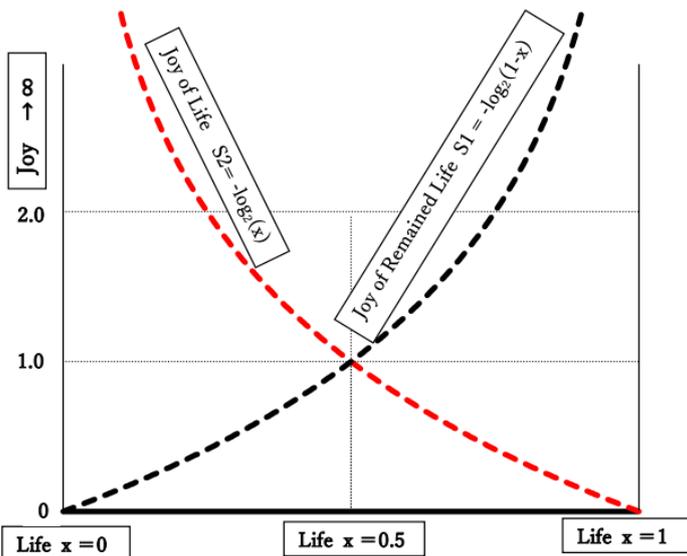


Fig.(1) Happiness of life to live (x), life lived (1-x)

The equation (1) tells the happiness of the partial length of total life 1 the remaining life from 1 to x. Then the happiness of life spent from (1-x) = 0 to (1-x) must be accessed in order to calculate the total happiness at x. The answer can be obtained following the same procedure as Eq.(1),

$$S2 = \int_{1-x}^1 \left(\frac{1}{1-x}\right) d(1-x) = \log_n(1/(1-x)) = -\log_n(1-x) \dots (2)$$

Eq.(2) tells that the the happiness of time lived is large when (1-x) is small since at young ages everything is new so that more movement of mind can be experienced. S1 and S2 calculated by Eqs (1) and (2) by putting n = 2 are shown in Fig.(1)

The total happiness at any time point is the sum of the happiness of life to live (x) and the happiness of life already spent (1-x).

Using the result obtained as S1 and S2, and by multiplying the each time length belongs to the these results out of whole life sapan 1, The total happiness for each time point x can be expressed as

$$S(\text{total}) = xS1 + (1-x)S2 = -(x\log_2x + (1-x)\log_2(1-x)) \dots (3)$$

This result is shown in Figure (2) by the blue line.

In short, the entropic evaluation of the happiest time in life span of 1 is at the half life time (x=0.5) as shown in blue line in Figure (2).

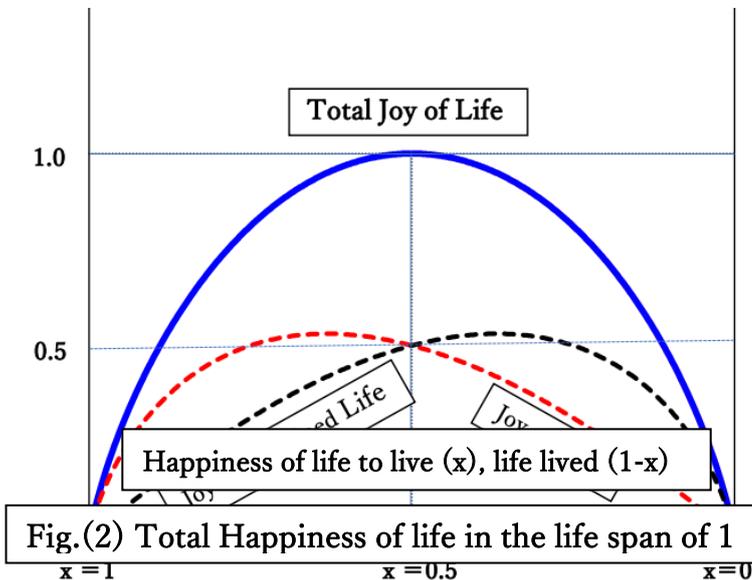


Fig.(2) Total Happiness of life in the life span of 1

Now, the purpose of this article is to examine the very moving utterance by Ms. Kane Tanaka that she feels now is the happiest time at the age of 116 !

When we think a bit deeply, it is clear that nobody knows one's own life length before one's death. Every older people knows in head that one's half-life has passed already.

Which means that everybody consciously knows that the happiest time is in the

past. However, that is the understanding in head according to the entropic (mathematical) commonsense.

However, Kane san taught us the God given nature of human beings that we all can live happily at any moment of life thinking, in mind, that present is only the half-time of our life !