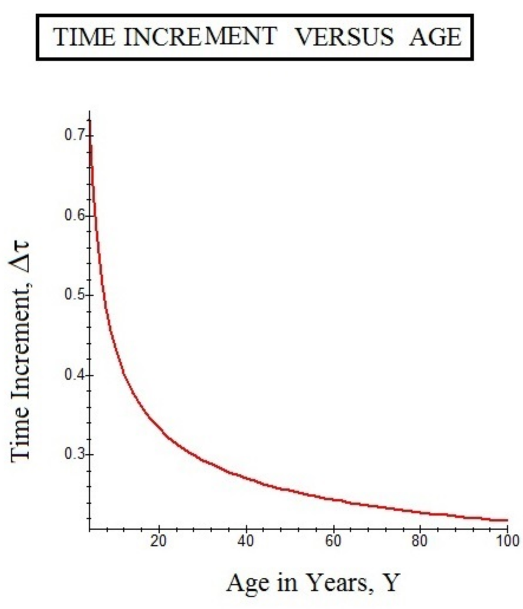
PERCEPTION OF TIME INTERVALS AS A FUNCTION OF THE OBSERVERS AGE

It is well known that as people age their perception of time-intervals such as the time of one year seems to shorten while for youngsters the time from one birthday to the next appears to be an eternity. What is the cause for this subjective phenomenon when we all know that the time of one year is fixed as 365.2425 days? In thinking about this observation a bit it became clear to me that what I call the **subjective time interval** ($\Delta\tau$) involves the **age** (Y) of the individual making the observation. A reasonable postulate is that $\Delta\tau$ is proportional to the inverse of the logarithm of a person's age in years (Y). That is-

$$\Delta\tau = \frac{Const.}{\log(Y)} = 2.3025\frac{Const.}{\ln(Y)}$$

The constant in the numerator is still be determined by tests conducted by physiologists. It will involve a recognition that individuals have the tendency to judge time intervals relative to their own age. Here 2.3025=ln(10) relates the Briggs Logarithm (base 10) to the Natural Logarithm (base 2.71828). Thus ln(100)=log(100)x(2.3025)=4.605. A plot of $\Delta\tau$ versus Y in the range 4 to 100 years for 2.3025 Const. =1 follows-



Consider now two individuals of age Y=A and Y=B with A<B. There we find that the Time Perception Ratio equals-

$$R(A,B) = \frac{\Delta\tau(A)}{\Delta\tau(B)} = \frac{\ln(B)}{\ln(A)}$$

That is, the Ratio R(A,B) equals the difference in the natural logarithm of B minus the natural logarithm of A.

If we now take a 9 year old child and compare his time interval perception with that of a just retired 65 year old senior, one finds-

$$R(9, 65)=\ln(65)-\ln(9)=4.1743-2.1972=1.98$$

Although this doubling of time perception seems reasonable from my own experience, tests will need to be conducted involving a much larger group of subjects to see if the logarithmic relationm continues to hold.

As another example consider a 4 year old waiting for his next birthday compared to a long retired individual of 80 years of age not particularly looking forward to his next birthday. The ratio here leads to the large value of R(4,80)=2.9957. So it's a really long subjective wait for the four year old to reach his 5th birthday while the oldster will wonder why the year has flown by so fast.

My wife keeps complaining that the weeks are getting shorter and shorter. This is the same phenomenon we are discussing here except that A and B refer to the same person at different ages. Another manifestation of this phenomenon occurs when we all agree during our weekly lunch meetings of senior and retired faculty at a local sports bar, that our freshman students are getting younger and younger every year. Of course they will by any subjective time measure since we are all getting older while they stay at a perpetual 18 or 19 years of age.

A related phenomenon has to do with the subjective decrease in size of things like the size of one's school playground when revisiting many years later. This observation results from the fact that one stores in one's memory sizes proportional to one's height at the time of the observation. That is, a small child has a much larger size perception than when he or she becomes an adult.

The above discussions have led us to suggest the following law-

> *Subjective time increments, as judged by an observer, are inversely proportional to the logarithm of the observer's age*

A shortened version of this law states that –

Time Increments are perceived Logarithmically

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