American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)
ISSN (Print) 2313-4410, ISSN (Online) 2313-4402

http://asrjetsjournal.org/

Men's and Women's Time: An Analysis of Biological Time of Man and Woman by Applying the Mathematics of Harmony

Ago M Omerbasic*

Department of Medical Physics and Biophysics, Faculty of Medicine, University of Sarajevo, 71000 Sarajevo, Bosnia and Herzegovina
Email: ago.omerbasic@mf.unsa.ba

Abstract

If we start from the fact that in the structure and function of the human body, the relations and functions that are in the golden ratio can be recognized, we in this article, extended this idea to the duration of human life. Based on the golden ratio, we divided human life into certain phases, bounded by characteristic numbers, and observed differences in the flow of physical and biological time in individual phases. We have shown that in certain phases, physical time, compared to biological time, flows at different rate. We have also shown that there is a difference in the points/numbers that determine the time phases of a man's and a woman's life: for example, a man enters the youth phase at the age of 21, and a woman at the age of 18; the males are in the mature stage at 34, the females at 29; a man enters the old age phase at 55 and a woman at 47. Because of these differences we conclude that the biological time of man and woman flows at different rates, so it is possible to speak of men's and women's biological time.

Keywords: golden ratio; Fibonacci sequence; Lucas series; biological male time; biological female time.

1. Introduction

By applying the mathematics of harmony [1,2] to the study of the human body, it has been observed that a number Φ (PHI), which expresses the harmonic proportions in the structure and function of the human body, is in fact, a measure of the human life harmony [3].

---

* Corresponding author.

The concept of the mathematics of harmony and the golden ratio led to creation of relation between aesthetic categories and exact scientific methods and analyzes [3,4,5].

1.1 Short historical clues

The first written traces of the number Φ are found in Euclid's *Elements* [1,2] as the *problem of division in the extreme and mean ratio* (DEMR).

Figure 1: division in the extreme and mean ratio

We divide straight line AC by point B so that the larger part of the line (AB=*x*) refers to the smaller part (BC=1) as a whole line to the longer part:

$$\frac{x}{1}=\frac{x+1}{x}$$

By solving this equation, we reach:

$$x^2=x+1 \Rightarrow x^2-x-1=0 \Rightarrow x_1=\frac{1+\sqrt{5}}{2};\ x_1=\frac{1-\sqrt{5}}{2}$$

the positive root of this solution [6] is number

$$\Phi=\frac{1+\sqrt{5}}{2}=1.6180339887...\approx 1,62$$

That this is a special, miraculous number is also shown by the fact that we can present a number Φ through the operation of rooting both the units themselves or the fractions and the units themselves [6].

$$\Phi=\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+...}}}}}}=1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+...}}}}}$$

1.2 Fibonacci and Lucas series of numbers

The number Φ is built into the Fibonacci series of numbers [7], very significant series in mathematics, which

satisfies the following two conditions:

1. each member of the series is equal to the sum of the two previous members ("*third member rule*")
2. each member of the series (except the first few) divided by its predecessor gives as result the number Φ

$$\lim_{n\to\infty}\frac{F_{n+1}}{F_n}=\Phi$$

Following the same logic [7], ($u_{n+2}=u_{n+1}+u_n$, $\lim_{n\to\infty}\frac{L_{n+1}}{L_n}=\Phi$) Lucas' series of numbers is determined, which satisfies the same conditions as the Fibonacci series, only it consists of other numbers. Our idea is to show that number Φ (golden ratio), a wonderfully beautiful number obtained by a purely mathematical operation *of division of the whole in the extreme and middle ratio*, a harmonious proportion woven into the structure and function of the human body, into its life and relationship with the environment. We will connect the Fibonacci series of numbers with the male organism, and the Lucas series with the female organism. The characteristic determinant of both series is the number Φ :

$$\lim_{n\to\infty}\frac{F_{n+1}}{F_n}=\Phi;\ \lim_{n\to\infty}\frac{L_{n+1}}{L_n}=\Phi$$

which tells us about the possibility of a unique approach to the study of man and woman: both man and woman are human beings, and the study of their characteristics is performed by the same method. However, the numbers that determine these two series are different, so the turning points in development that determine the stages of development will be different. This, in turn, indicates that there are certain differences in the body structure of a man and a woman, their lives, their relationship with the environment [8]. The body structure of a man is quantitatively different than the body of a woman, which, for example, leads to differences in load bearing and work performance. This is totally acceptable and confirmed in practice: competitions in sports are, without exception, separate, individually men, individually women. In biomechanics and mechanics of the locomotor system, all tables are made separately for men and women (BMI, body surface area, ...) [9].

Table 1: Fibonacci series of numbers (related to the characteristics of a male body)

n	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
F_n	0	1	1	2	3	5	**8**	**13**	**21**	**34**	**55**	**89**

Table 2: Lucas series of numbers (related to the characteristics of a female body)

n	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
L_n	2	1	3	4	**7**	**11**	**18**	**29**	**47**	**76**		

2. Results and Discussion

One of the main features of the human organism is its organization and harmonization with the environment in space and time. At describing any change in the state of the human organism, spatial or temporal, we use objective, real, physical time which we express in units of seconds, minutes, hours, years, etc. The foundation of any measurement procedure of physical time is a periodic process, which is brought down to a circular motion and the return of the system to the starting point. Using this time, we measure some important parameters that determine a person's place in the world. However, along with this physical time, there is also biological time that is bound and that determines biological processes. It has been experimentally established that in different stages of human's life time flows at different rates. According to Whitrow, *"Biological time is internal time, connected to the part of space occupied by the living cells of that organism, and it is relatively isolated from the rest of the Universe."* [10]. Man lives and develops in a logarithmic world, in which space and time are expressed by logarithmic functions [11]. This has led to the idea that the study of the human organism (as well as other living organisms) uses special units of time flow, which are determined on the basis of a process characteristic for a human (or another organism). Thus, the duration of a given characteristic process of that organism will determine (define) the unit of biological time of that organism. For example: unit of evolution rate - Darwin time for which mitosis occurs during cell division of that organism - detail, percentage of embryonic development time -% DT, etc. Various processes take place in the human body that have a periodic character and can be used to measure time. However, the periodicity of the process in the human body *cannot be* reduced to a simple circular motion. Rather, it could have been presented as a movement in a spiral, where we again have a circle (oscillatory process), but after a full circle we wouldn't arrive to the same point, *but we are above it, at a higher level*. The aim of this paper is to show that the heights of individual levels of this time spiral are different and that we can connect this with the flow of time: individual stages of human development correspond to spirals of different heights expressed in units of physical time. One full circle in this interpretation would represent one phase of human life to which the biological time of man corresponds. In this figure, each phase of human life is represented by one circle (360°), which means that the *biological time in each phase of the organism is the same*. In humans, the processes of exchange with the environment have an irreversible character, and according to the mathematics of harmony, they must be labeled by numbers that are members of the Fibonacci series [12]. We want to show that for men, for the passage of time in certain phases of his life, the numbers of the Fibonacci series are characteristic, and for women the numbers of the Lucas series. Both man and woman are "humans", a human being, and their common characteristic is the golden ratio (PHI). However, there are certain differences in the male and female organism, in structure and function, in interaction with the environment, in development, etc., which is reflected in various characteristic numbers: for a man they are members of the Fibonacci series, and for a woman member of the Lucas series. Following this idea, the lives of man and woman can be divided into phases determined by the characteristic numbers of the Fibonacci and Lucas series. According to the authors of the mathematics of harmony, human life from the stage of maturation (puberty) to the stage of old age is determined by four characteristic points that distinguish 4 different phases in the development of an adult. For a man these are members of the Fibonacci series 13, 21, 34, 55 (**Table 1**) and for a woman these are members of the Lucas series 11, 18, 29, 47 (**Table 2**). The first phase determined by these

numbers is the phase of puberty and early youth, in men it lasts 8 years of physical time, from age of 13 to 21 years, and in women for 7 years of physical time, from age of 11 to 18 years. The second phase is the phase of youth, full of strength and rise, of maximum physical and intellectual abilities. It lasts 13 years for men (from age of 21 to 34 years), and 11 years for women (from age of 18 to 29 years). History shows that people in this age have made the greatest contribution to humanity: the greatest warriors, inventors, artists. The third phase is the phase of maturity, in which a person has a lot of knowledge and is a good teacher who passes on their knowledge to younger people, but due to excessive caution and fatigue there are no big new steps and ideas. In men, this phase lasts for 21 years (from age of 34 to 55 years) and in women for 18 years (from age of 29 to 47 years). The fourth phase is the phase of old age, slower reactions, wise counseling, philosophical and religious approach to life. In men, this phase occurs at the age of 55, and in women at the age of 47. The turning points that limit the phases of human life are the numbers of the Fibonacci or Lucas series that satisfy the golden ratio:

13, 21, 34, 55 ($\rightarrow \quad \frac{55}{34} = \frac{34}{21} = \frac{21}{13} = 1,62 \approx \Phi$)

11, 18, 29, 47 ($\rightarrow \quad \frac{47}{29} = \frac{29}{18} = \frac{18}{11} = 1,62 \approx \Phi$)

The life of every human being is determined by these turning points, the human organism itself recognizes these points and performs the restructuring of certain functions, so that the human organism changes from phase to phase of development, reaching a qualitatively new state. It is very important that everyone recognizes these turning points in their development and aligns their activities, aspirations and desires with a given stage of development. The mismatch of activities and desires with the phase of development leads to a violation of the golden ratio, which manifests itself as disharmony, disorder, depression, stress (and even death). The development of the human organism is the arrangement, learning, formation of regular structures (*reduction of entropy*) which leads to order and harmony. At the phases of development of human life, as we have indicated and limited them to the members of the Fibonacci and Lucas series, we can apply the formula according to which the value of any breaking point is determined by the sum of the two previous points (Fibonacci and Lucas series characteristics)

$$F_{n+2} = F_{n+1} + F_n$$
$$L_{n+2} = L_{n+1} + L_n$$

If we divide the first equation with F_{n+2}, and second one with L_{n+2}

$$\frac{F_{n+2}}{F_{n+2}} = \frac{F_{n+1}}{F_{n+2}} + \frac{F_n}{F_{n+2}} \qquad \frac{L_{n+2}}{L_{n+2}} = \frac{L_{n+1}}{L_{n+2}} + \frac{L_n}{L_{n+2}}$$
$$1 = 0.62 + 0.38 = \varphi + \varphi^2 \quad , \quad 1 = 0.62 + 0.38 = \varphi + \varphi^2$$
$$\varphi = \frac{1}{\Phi} = \frac{1}{1.62} \approx 0.62 \qquad \varphi^2 \approx 0.38$$

Thus, we obtain an equation which some authors [5] call the equation of the manifestation of trinitarianism in human development

$$1-\varphi-\varphi^2=0$$

Table 3: Tabular presentation of individual phases of a man's life and the relationship between physical and biological time

Phases in development of a man	Life period (years)	Number of units of biological time (UBT)	Number of years of physical time
Phase of puberty and early youth	13 – 21	1	8
Adolescence phase	21 – 34	1	13
Mature phase	34 – 55	1	21
Old age phase	55 - 89	1	34

Table 4: Tabular presentation of individual phases of a woman's life and the relationship between physical and biological time

Phases in development in a woman	Life period (years)	Number of units of biological time (UBT)	Number of years of physical time
Phase of puberty and early youth	11 – 18	1	7
Adolescence phase	18 – 29	1	11
Mature phase	29 – 47	1	18
Old age phase	47 - 76	1	29

Let us test (**Table 3, Table 4**) whether our characteristic numbers that determine the stages of life development meet these theoretically obtained results.

$$\text{(M)} \rightarrow \quad \frac{55}{55}=\frac{34}{55}+\frac{21}{55} \;\Rightarrow\; 1=0.62+0.38=\varphi+\varphi^2$$

$$\text{(F)} \rightarrow \quad \frac{47}{47}=\frac{29}{47}+\frac{18}{47} \Rightarrow\; 1=0.62+0.38=\varphi+\varphi^2$$

The durations of the individual phases must also satisfy this relation:

$$\frac{T_{n+2}}{T_{n+2}}=\frac{T_{n+1}}{T_{n+2}}+\frac{T_n}{T_{n+2}}$$

$$\text{(M)} \rightarrow \quad \frac{34}{34}=\frac{21}{34}+\frac{13}{34} \;\Rightarrow\; 1=0.62+0.38=\varphi+\varphi^2$$

$$\text{(F)} \rightarrow \quad \frac{29}{29}=\frac{18}{29}+\frac{11}{29} \Rightarrow\; 1=0.62+0.38=\varphi+\varphi^2$$

We reached a complete agreement of the results with the predictions of the theory. After this division of human life into phases, bounded by breaking points, members of the Fibonacci and Lucas series, let us make a comparison of the biological and physical time of man. If we take each developmental phase as 1 unit of biological time (UBT), we establish a correlation with physical time. The phase of puberty and early youth lasts for 8 years of physical time and corresponds to 1 unit of biological time (1 UBT (M) $\rightarrow$ 8 years), and in women one unit of biological time corresponds to 7 years of physical time (1 UBT (F) $\rightarrow$ 7 years). The old age phase, which lasts 34 years, also corresponds to 1 UBT (1 UBT (M) $\rightarrow$ 34 years) and in women (1 UBT (F) $\rightarrow$ 29 years). As we can see, biological time is the same in all phases but physical time is different, which is why man has the feeling that time in later life stages flows faster and faster (the expression "*in old age time flies*" is popular). It is also an interesting result considering the speed of time flow of men and women: in the later stages time passes faster in men than in women (1 UBT (M) $\rightarrow$ 34 years), (1 UBT (F) $\rightarrow$ 29 years). This approach of comparing biological and physical time is relative, we could fix the physical time, then the biological time would change so that it would flow more slowly in the later stages. This relationship of time, biological and physical, with the aging of the organism, has been experimentally proven in medicine by several examples: the speed of wound healing decreases with aging, a person gets tired faster with aging, regains strength more slowly, its working abilities decrease with age, etc.

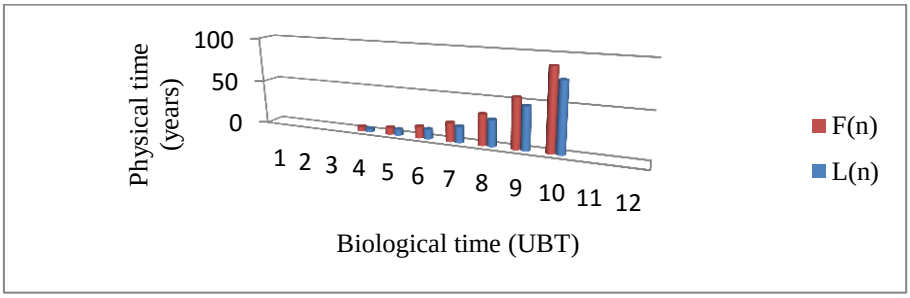

Figure 2: biological time of man and woman according to physical time in certain life phases

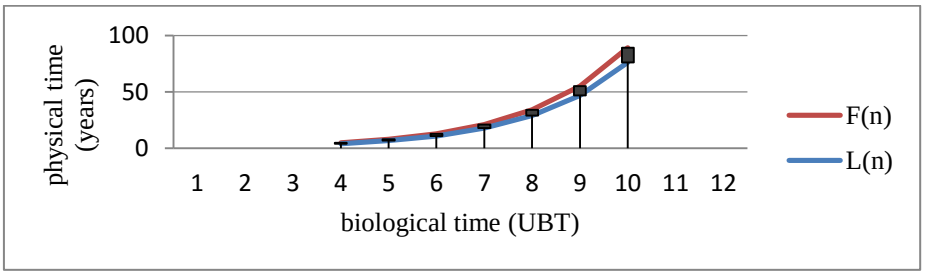

Figure 3: in the later stages time passes faster in men than in women

3. Conclusions

Using the concept of harmonic proportion and the golden ratio, we have divided the lives of man and woman by the natural turning points that are members of the Fibonacci, or Lucas series of numbers. The numbers that limit the phases in the life of a man and a woman, as well as the duration of individual phases, are in the golden ratio,

whose mathematical expression is a number Φ. We have shown the flow of time in a spiral, so that the radius of each circle of the spiral is equal and it corresponds to a unit of biological time of a man and a woman. The course of the spiral (the distance of the point after reaching full circle from the place of origin) is different for each phase, it is different for men and women, and it represents physical time. Establishing a quantitative relationship between the unit of biological time and physical time, we came to the conclusion that in old age (both in men and women) time flows faster, that biological processes are slowed down, and that the speed of time is different in men and women. From these results it follows that it makes sense to talk about male and female biological time. Two periods which stand out, and which indicate a different flow of time in men and women are the age of youth and the age of old age: in men the age of youth occurs at the age of 21, in women at the age of 18; a man enters at the old age at age of 55 and a woman at 47 years of age. These differences in the passage of time determine the differences between the male and female organism, and their relationship to the environment and the world in general.

4. Recommendations

It is of great interest for human health to harmonize the activities of the organism in certain phases of life with the charasteristic points that represent the boundaries of the stages in its development: in men they are members of the Fibonacci sequence (8,13,21,34,55), and in women Lucas series (7,11,18,29,47). The mismatch of activities and desires with the stage of development leads to a violation of the golden ratio, wich manifests itself as disharmony, disorder, illness, depression.

References

[1]. R. Fitzpatrick, Euclid's Elements of Geometry, 2008.
[2]. R. Fitzpatrick. [Online]. Available: http://farside.ph.utexas.edu/euclid/.
[3]. H. Huntley, The Divine Proportion, a Study in Mathematical Beauty, INC New York: Dover publications, 1970.
[4]. P. Hemenway, Divine Proportion. Phi in Art, Nature, and Science, US: Sterling Publishing Co., Inc., 2009.
[5]. A. Stakhov, The Mathematics of Harmony- from Euclid to Contemporary Mathematics and Computer Science, World Scientific , 2009.
[6]. M. Livio, The Golden Ratio, London: Headline Book Publishing, 2003.
[7]. R. Mankiewicz, The Story of Mathematics, Princeton: Princeton University Press, 2000.
[8]. A. Omerbasic, Golden Section the Biological Time of Human Beings, Technics, Technologies Education Menagement, Vol.6/ Number 1, pp. 218-221.
[9]. I. Herman, Physics of the Human Body, Berlin Heidelberg Springer- Verlag, 2007.
[10]. G. J. Whitrow, The Natural Philosophy of Time, Oxford: Oxford University Press, 1981.
[11]. T. P. Lolayev, Time- function of Biological Systems (in Russian), Moscow: Chronos, 2010.
[12]. I. A. Hasanov, The Phenomenon of Time (in Russian), Moscow, 1998.
[13]. G. J. Whitrow, What is Time?, London: Thames anh Hudson, 1985.