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Presence of the Characteristics of Scalable 'Potential Molecule' for in EEG Signal

Robert John Flower*, Dineshen Chuckravanen

Gilchrist Institute for the Achievement Sciences, Bronxville, USA

Email address:
drrflower@att.net (R. J. Flower)

*Corresponding author

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Abstract: It has long been posited that there is theoretically and qualitatively a type of manifestation that occurs when someone has the will to change completely their mindset to achieve their greatest potential. It is said that this manifestation happens owing to the permission for previously untapped cognitive neural cells to create new neuronal networks which leads to elevated cognition and human development [6, 7, 8]. Through his close observation of the cell development, Dr. Langham founded a model which consists of three distinct components that are the *(i) creative component*, *(ii) organizational component*, and *(iii)* the *functional component* of the cell development. Each of these components consist of various numbers of aspects that exhibit certain characteristics. Therefore, this research employed encephalography (EEG) data from healthy human participants to find out the characteristics of these aspects in the field of the human decision-making process or their thought processes. Analysis found that there was a strong presence of most of those aforesaid aspects in the brain signal data and subsequent research studies will analyze other types of physiological data or other types of nature data to ensure the veracity of these results.

Keywords: Cell Development, Potential Molecule, Human Understanding, EEG, Theory of Potential, Frontal Lobe

1. Introduction

There is ample scientific evidence for the ability to universally categorize data, beginning with the geometry of a cell [11]. By synthesizing the principles of cellular geometry into a precise, comprehensive behavioral language has led to a new theory known as Natural Thinking and Intelligence (NaTI) [6]. Past study of human intelligence has failed to consider human nature as a part of the whole [9, 19, 20, 13, 21]. The mission of NaTI is to consider a naturalistic approach to human intelligence, based on integrating psychological principles with cellular and developmental biology. This is in contrast to past theories of intelligence as shown in Figure 1. This research serves to execute empirical investigation of the NaTI principles reflected in cellular development, reviewing the principles as witnessed in EEG data of human cognition.

One important dynamic general systems theory model that has been researched is a Natural Systems concept [6, 7, 8] who created the Science of Potential and Natural Thinking and Intelligence. Langham discovered a model which was based on the creation of a cell and this model consists of three distinct parts [11]. The concept of the model is based on the structure, the principles as well as the relationships that he observed as operating in the cell's development. The three main parts of the model are (1) creative component, (2) organizational component, and (3) functional component. These three components break down into segments as follows: three creative segments, six organizational segments and four functional segments which give a total of thirteen segments. After a thorough pursuit of the Langham theorem, it is suggested that it is feasible that the principles of 'cell development' can be applied to *human understanding* [6, 7, 8].

Detailed research supports the development of this philosophical behavioral theorem forming the basis for a powerful and valid methodology for cognition, problem-solving and conflict resolution. Using a multidisciplinary approach, NaTI theory demonstrates scientific and philosophical evidence which support universal structuring of

data categorization. This has made it possible to synthesize a concrete behavioral/ cognitive language applicable to personal and interpersonal situations. NaTI embraces the idea of multiple intelligences, supporting that human intelligence is a product of nature and as such follows predictable patterns and systems as life on the smallest scale. NaTI considers psychological and behavioral principles to be reflected in various features of cellular geometry outlined in Langham's Genesa Concept [11, 12].

Langham's thirteen principles can provide a paradigm which is able to integrate various disciplines pertaining human understanding using a common biological focus ground. Langham's model can decode as well as clarify information. Moreover, information can be expressed as dual-type responses such as *yes* or *no*, on or off, up or down similar like yin-yang energy flow. This is the universality of the Langham model which represents a system of the whole and parts as well as polarity. In addition to that there are currently no satisfactory processes that explain changes that occur physically, mentally, emotionally and spiritually but there is the potential science possible theory that can address all of these. This theory of potential science has its basis in biology [6, 7] and it is related to the aspect of cellular development which was discovered by the geneticist Dr. Langham and the cosmological aspect of the science of potential was created by the Gilchrist Institute through the implementation of concepts of Leibnitz, Descartes, Spinoza, Einstein and Aristotle [6, 7, 8].

Table 1. *Comparative multi-intelligence Chart.*

Components	Gardner (8)	Sternberg (4)	NaTI (13)
1. Multi- Intelligences	1. Linguistic 2. Logical 3. Music 4. Spatial 5. Kinesthetic 6. Intrapersonal 7. Interpersonal 8. Interactive	1. Tribrachic 2. Componential (interior) 3. Contextual (exterior) 4. Experiential (interactive)	1. Awareness 2. Concepts 3. Communication 4. Models 5. Procedures 6. Assessments 7. Feedback 8. Integration 9. Details 10. Physical 11. Emotional 12. Mental 13. Intuitive (wisdom)
2. Systems	1. Academic 2. Personal	1. Practical 2. Personal 3. Creative	1. General 2. Mechanistic 3. Organismic 4. Specific 5. Integrative 6. Incidental 7. Open 8. Closed 9. Self-Organized 10. Cross-Disciple 11. All-encompassing
3. Dynamics	Twelve Static	Eight Static	Unlimited- interactive
4. Models (background)	1. Observation 2. Theoretical 3. Empirical	1. Observation 2. Theoretical 3. Empirical	1. Observation 2. Theoretical 3. Empirical 4. Science-based (Nature Sciences) 5. Intuitive
5. Objective	1. Success 2. Comprehension	1. Practical 2. Creative 3. Intelligence	1. Purpose Driven 2. Mission Oriented 3. Potential Achievement 4. Creative 5. Organizational 6. Assimilate

1.1. Development of the Concept of Potential Molecule from the Cellular Creation Process

Deeper explanation of cell development phases

A geneticist working with plant cells discovered what he called the living geometry of a cell [11]. His geometrical model was based on title-specific principles identified during the creation of a cell. This model contains three parts, which are pulse, wave, and spiral. The pulse, wave, and spiral motions exhibited during cellular development produce thirteen polar motions corresponding to X, Y, and Z axes [11]. These thirteen aspects of cell development and their polarities have been shown to be present in both the whole and parts within any hierarchy or level of existence, and in this case are being extrapolated to understand patterns of human behavior. We start from the basis that there are 3 specific phases of development of the cell, creative, organizational, and functional phases. It is posited that each

phase has specific characteristics or features. The Pythagorean theorem is a basic mathematical principle that can be thought to be mirrored in the three creative principles, x, y, and z, representing respectively the will, the belief, and the expression. The four functional principles are described as being represented in the four elements, which are ancestrally associated with domains as physical (Earth), mental (air), emotional (water) and spirit/intuition (fire).

On a more germane level, it is vital that we recognize that the cited four functions are the only methods by which humans function. The Creative phase is controlled by the pulse which in turn comprises 3 aspects (the first initial pulse emanates from the North pole of the cell to the South pole of the cell. In addition to that, the second pulse emanates from the east of the cell going to the west of the cell. The third pulse comes from the front part of the cell to the back part of the cell. The next phase is the organizational phase which comprises waves that expand in all 3 directions of the X-axis, Y-axis, and the Z-axis. These waves expand on all sides, being why when we consider the positive x-axis, the negative x-axis, the positive y-axis, the negative y-axis and the positive z-axis and the negative z-axis, which all sum up to 6 directions. The last phase of the development of the cell is the functional phase, which consists of four aspects being the 4 distinct points found along the corners of the cell that are the North, South, East and West. When we sum up those aspects, we have in all 13 aspects and these represent the key important aspects for the development of the cell.

The Genesa Model operates on similar universal principles, first outlining that cell development first begins with 180 degree polar pulses within the seed. The initial pulse is oriented north to south, followed by an east to west pulse at ninety degrees to the original pulse, forming the classic X/Y axes of the Cartesian coordinate system. The final pulse is a front-to-back motion, forming a three-dimensional Z axis. This completes the cell's Creative Phase of development. The cell then explodes into a wavelike motion, attaining a maximum radius, or expansion point, in each direction of the three axes. The six wave motions complete the Organizational Phase of cell development. The third and final stage of cell development is the Functional Phase, in which the cell begins to spiral, specifically at its corners. The spiraling impacts four points within the cell, best envisioned as a neutron spiraling around the earth, touching both poles and two opposite points along the equator. These thirteen aspects of cell development and their polarities can be extrapolated to be universal motions that can ultimately be used to describe the behavioral technology of understanding known as NATI.

By virtue of the development of the cell, it is found that the process of the creation has three components or phases: (1) creative phase, (2) organizational phase and (3) a functional phase. These three aspects break down into 13 aspects. This potential molecule contains these 13 aspects and these can build-up to solid natural/physical reality which is in a sense 'pantheistic'.

Creative phase

Langham discovered the living geometry of a cell [11]. His geometrical model was based on title-specific principles identified during the creation of a cell. The model contains three parts which are pulse, wave and spiral. Cell development starts with 180 degrees polar pulses within the seed, and this initial pulse starts from North to South followed by an East to West pulse at 90 degrees to the original pulse which forms the X-Y axes of the cartesian coordinate system. The final pulse of the creative phase is a front-to-back movement forming a 3-dimensional Z-axis. This completes the cell's creative phase of development.

Organizational phase

For the organizational phase of the cell development, the cell then explodes into a wave-like motion attaining a maximum radius or expansion point in each direction of the three axes. The organizational phase consists of waves owing to the expansion (explosion) of the cells emanating from the 3 axes (*X*, *Y*, and *Z*) and therefore it consists of 6 aspects based on the directions of these 3 axes (3 x 2). The six wave motions actually complete the organizational phase of the cell development.

Functional phase

The third and final stage of the cell development is the Functional phase, in which the cell begins to spiral, specifically at its corners. The spiraling impacts four points within the cell which best illustrated as a neutron spiraling around the earth, touching both poles and the two opposite points along the Equator line. These represent points that are found on the corners of the cell (North (N), South (S), East (E), and West (W).

The result gives 13 aspects of the cell geometry: three in the creative phase, six in the organizational phase and the four in the functional phase and these 13 aspects are important in cell development. One important principle of the model is that each phase shows clearly the property of polarity in the 180-degree movements of the pulse, wave as well as the spiral patterns.

1.2. Theory of EEG Signal and Analogous to 'Cell Development'

Encephalography is an electrophysiological monitoring technique to measure electrical activity of the brain. The EEG measures voltage fluctuations that come from the ionic current within the neurons of the brain [14]. In fact, when a person does rapid visual processing task, the person has to think and therefore these thought processes cause change in the amplitude of EEG signals and this change is caused by the birth or creation of neuronal links in order to achieve the desired response. In this way, this process mimics the processes that are involved in 'cell development' as the EEG signal is a non-stationary and stochastic (appear random) biological signal. The research methodology that was employed in this study is elaborated in the following section.

2. Materials and Methods

In this research, brain signals from 75 healthy human participants while performing visual cognitive tasks were employed to analyze the characteristics of their brain signals in terms of the presence or absence of the characteristics for the aspects associated to each component (creation, organizational and functional). The EEG full dataset is open source and reliable as previous research conducted analyses on those data but for different purposes [17]. This research analyzed brain signal data from 75 healthy human participants.

The reason for the use of this type of brain signals is that the human participant, every time, has to make quick decision based on cognitive tasks that they have never performed before and by making quick decision, specific neural pathway should be in place or created so as the human participant can perform well in that particular cognitive tasks or there is a change in neural pathway depending on the rapidly changing visual task and the associated actions that are required to respond to such task [3, 4]. Therefore, these 13 concepts were applied on healthy human subjects' electroencephalogram (EEG) data while the human participants perform cognitive tasks [10].

2.1. EEG Data Collection and Characteristics

The EEG data was recorded from 75 healthy human subjects and the EEG data, of size 701MB, were downloaded and they were called 'EEG_Full.tar'. After decompressing the file using 7z1900-x64.exe software, it consists of the human subjects' EEG data and also all data were initially in compressed *.tar format. Data contains EEG measurements from 64 electrodes placed on the human subjects' scalps which were sampled at 256 Hz (3.9-msec epoch) for 1 second.

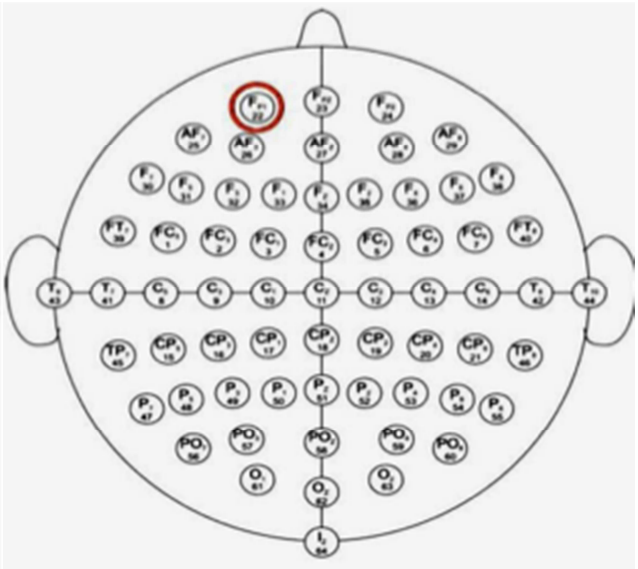

Figure 1. *The position of the FP1 electrode (circled in red) in the 10-20 international system of electrode placements.*

2.2. Visual Stimulus for Cognitive Activity

The human participants were exposed to either a single stimulus (S1) or to two stimuli (S1 and S2) which represented pictures of objects chosen from the 1980 Snodgrass and Vanderwart picture set. When two stimuli were shown, they were presented in either a matched condition where S1 was identical to S2 or in a non-matched condition where S1 differed from S2.

2.3. Software Analysis of EEG Signals

In this research, Matlab R2009a software was used to conduct the analyses in terms of finding characteristics in the brain signal data which conform to the characteristics of the 13 aspects that exist for each component type of the cell development or the 'potential molecule' development.

2.4. Analysis Methodologies Applied on the EEG Datasets

In order to maintain consistency on the analysis, the following set of analysis methods are applied sequentially on each EEG dataset recorded from each human participant. The following variables were created and then described. Most of these variables represent dichotomous data and these variables are based on the aspects that were defined by researchers [6, 7, 11]. These 13 variables look at the 13 aspects of the NaTI theory. Additionally, Dr. Chuckravanen introduced a new variable to this field known as eccentricity of the polar plot. That is usually applied on ellipse or elliptical objects to see how flatten the ellipse formed by the 4 variables (F10, F11, F12, and F13) [4]. This variable may give a further insight into the characteristics of the functional phase of the 'cell development'.

F1: Let F1 be a variable representing the North to South movement for the creative phase of the 'cell development'. Observation: If it is observed to occur on a particular EEG signal, then a word 'yes' will be inserted in the summary table and if it does not appear on that particular signal, then a word 'no' will be inserted in the summary table. (Yes/No). The presence of this variable is very strong with a percentage of 98.6%.

F2: Let F2 be a variable representing the East to West movement. Observation: The observation of a second pulse that happens at a phase difference of $\pi/2$ for the creative phase of the 'cell development'. The scalar product of the direction of the tangent at the minimum of a signal and the slope north to south of a signal should be able to approximately equal to the $\pi/2$ – phenomenon. (Yes/No). The presence of this variable is very strong with a percentage of 98.6%.

F3: Let F3 be a variable representing the Front to Back movement. Observation: There is a kind of movement when one looks from the front of the signal to the tail of the signal for the creative phase of the 'cell development'. There is a shift in sign value of EEG data from positive to negative. In order to notice this, we will do plots (direction field of the EEG data) based on first order differentiation of the data (Yes/No). This variable presence is very weak because there is a breaking trend as per the illustrative results and hence

this does not show clearly the movement from front to back in the creation stage of the cell development.

F4: Let F4 be a variable which represents the motion of the signal in the *x-direction* for the organizational phase of the 'cell development'(Yes/No). The presence of this variable is very strong with a percentage of 97.3%.

F5: Let F5 be a variable which represents the motion of the signal in the *y-direction* for the organizational phase of the 'cell development' (Yes/No). The presence of this variable is very strong with a percentage of 97.3%.

F6: Let F6 be a variable which represents the motion of the signal in the *z-direction* for the organizational phase of the 'cell development' (Yes/No). The presence of this variable is very strong with a percentage of 97.3%.

F7: Let F7 be a variable which represents the motion of the signal in the *x'-direction* for the organizational phase of the 'cell development' (Yes/No). The presence of this variable is very strong with a percentage of 97.3%.

F8: Let F8 be a variable which represents the motion of the signal in the *y'-direction* for the organizational phase of the 'cell development' (Yes/No). The presence of this variable is very strong with a percentage of 97.3%.

F9: Let F9 be a variable which represents the motion of the signal in the *z'-direction* for the organizational phase of the 'cell development' (Yes/No). The presence of this variable is very strong with a percentage of 97.3%.

F10: Let F10 be a variable which represents the presence of the corner North of the functional phase of the 'cell development' by looking at the polar plot of the normalised and modelled complex EEG signal (Yes/No). The presence of this variable is strong with a percentage of 88%.

F11: Let F11 be a variable which represents the presence of the corner South of the functional phase of the 'cell development' (polar plot) (Yes/No). The presence of this variable is very strong with a percentage of 88%.

F12: Let F12 be a variable which represents the corner East of the functional phase of the 'cell development' by looking at the polar plot (Yes/No). The presence of this variable is very strong with a percentage of 85.2%.

F13: Let F13 be a variable which represents the corner West of the functional phase of the 'cell development' by looking at the polar plot of the complex EEG signal (Yes/No). The presence of this variable is very strong with a percentage of 85.2%.

F14: Eccentricity variable (a value ranging from 0 to 1) (See illustrations in Figures 2 and Figure 3). Eccentricity variable (a value ranging from 0 to 1) Here the average results may be misleading with a mean value of 0.8502 but if we do not take into consideration those cells that are denoted by N/A, one can clearly observe that at all the cases, the eccentricity value is above 0.99. This value shows that the characteristic movements of the organizational phase are mostly elliptical and near to parabolic motion (for parabola e=1). Some examples of some elliptical shapes and the corresponding values of eccentricity *e*.

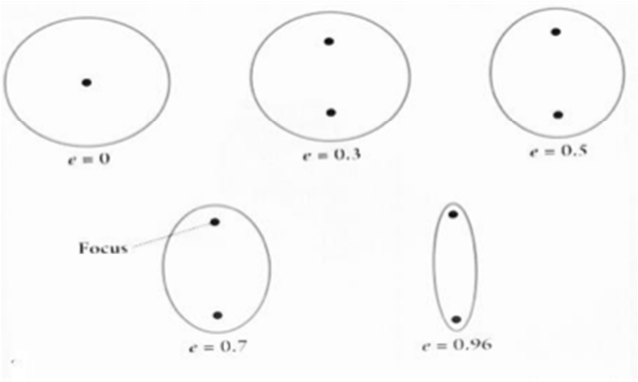

Figure 2. *Effect of changing the value of eccentricity and the shape of the ellipses.*

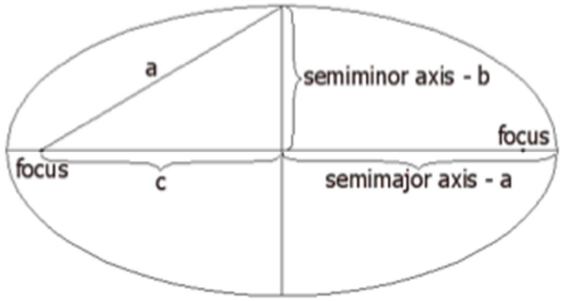

Figure 3. *Definition of the variables a and b to compute the eccentricity e. The computation of eccentricity, e, is computed using the following equation (1).*

$$e = \sqrt{1 - \frac{b^2}{a^2}}$$

Figure 4. *Equation (1).*

3. Results & Discussion

An example of one particular participant's EEG data is shown below (participant ID: co2c0000337). The duration of the EEG data is 1 second and it is sampled at 256Hz. In this brain signal, one can clearly observe that there are frequent changes through time and it is not a clean sinusoidal curve. Moreover, the EEG data emanated from the prefrontal part of the brain (FP1), an area of the brain which governs decision-making processes [3]. It is commonly understood that decisions based on logic are normally conducted at the frontal lobes or pre-frontal lobes. In order to make a decision, there are neural pathways that connect the frontal lobes to the occipital lobes for appropriate decisions to be made based on what the participant observed or perceived on the screen. In Table 1, the notation No* means that the data observation is not clear and a decision cannot be made. N/A means not applicable or observation of the respective variable is not clear as well.

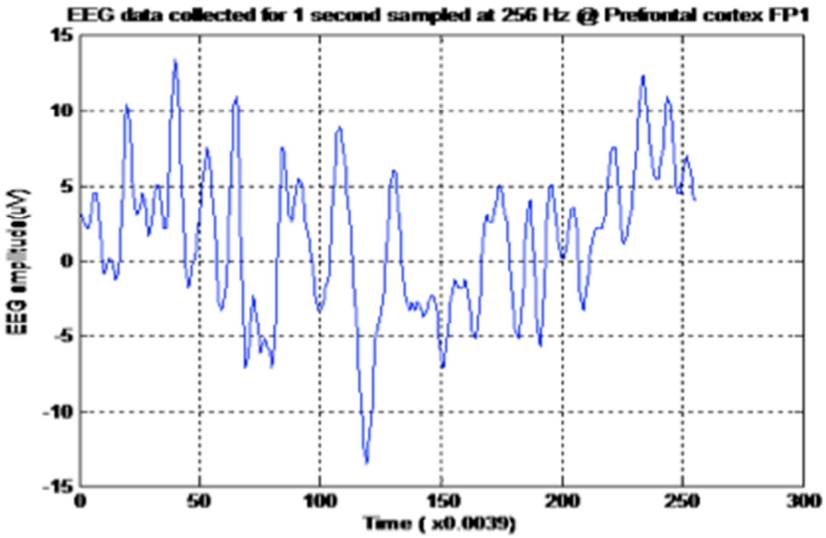

Figure 5. *EEG data at prefrontal lobe of the human brain (sampled at 256 Hz for 1 second duration).*

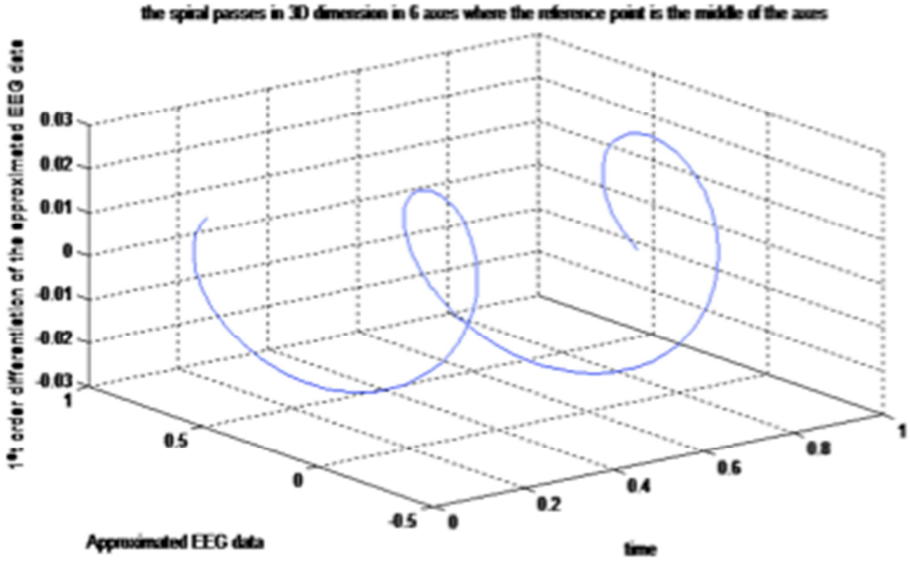

Figure 6. *Spiralling effect in the data when illustrated in 3D dimension (x-axis is time, y-axis is approximated EEG data and z-axis is the first order differentiation of the approximated EEG data.*

Table 2. *Results based on the EEG analysis of the 75 participants' data (yes indicates presence of a variable and no indicates the absence of the respective variable).*

Participant	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14(e)
1	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9975
2	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	N/A
3	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0.9987
4	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0.9988
5	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
6	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
7	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
8	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987
9	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	N/A
10	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
11	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9985
12	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987
13	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
14	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
15	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9983

Participant	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14(e)
16	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
17	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9994
18	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
19	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
20	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987
21	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9991
22	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	N/A
23	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
24	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9985
25	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
26	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	N/A
27	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
28	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
29	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
30	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	N/A
31	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987
32	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	N/A
33	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
34	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9983
35	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
36	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
38	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
39	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987
40	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	N/A
41	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
42	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9985
43	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987
44	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
45	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
46	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9983
47	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
48	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9994
49	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9985
50	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
51	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	N/A
52	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9991
53	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	N/A
54	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
55	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9985
56	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
57	Yes	Yes	No*	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	N/A
58	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
59	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
60	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9982
61	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9991
62	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
63	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9988
64	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9986
65	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987
66	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	N/A
67	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
68	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9975
69	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987
70	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9977
71	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9979
72	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9994
73	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9989
74	Yes	Yes	No	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9981
75	Yes	Yes	No*	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	0.9987

Table 3. *Summary of the overall results of each variable.*

Variables%	Presence in the EEG signals
F1	98.6
F2	98.6
F3	32
F4	97.3
F5	97.3
F6	97.3
F7	97.3
F8	97.3
F9	97.3
F10	88
F11	88
F12	85.3
F13	85.3
F14	0.8502 ± 0.3553 (mean±SD)

4. Discussion

In this research, it was found that there is a very strong presence of F1 (one of the aspects of the creative phase of 'cell development') with a similar strong percentage of presence of the variable F2 which represents the East to West movement. This insinuates the presence of the $\pi/2$ – phenomenon. However, the third aspect of the creative phase of the ''cell development,'' the presence of the F3 variable was very weak because there were breaking trends in the signals which did not clearly show the movement from front to back within the suggested creation phase. Results from the first phase of this research study, that is the creative phase, demonstrate that there is in fact an initial pulse that occurs in the EEG signals as the significant peaks that were found in the EEG signal decrease subsequently from maximum values to minimum values. The phase differences between the maximum peaks and the subsequent minimum peaks are functions of π.

This finding is in line with past research which applied a similar concept testing NaTI principles on Financial time series data [6]. Therefore, the initial pulse for the creation of the thought process is a function that depends on π. This study also demonstrated that the second pulse of action manifests in by means of $\pi/2$ - phenomenon and this was proven using scalar product theory. The third pulse of the creative phase of the 'cell development' or the potential molecule was weakly observed, in general, using a 3D representation using spiral structures. The 3D-representation of the EEG data using the EEG data itself, its first order differentiation through time as well as time factor show how the thought process spirals through time. The famous mathematician and philosopher Pythagoras used the creative phase principles in terms of 3 points that are awareness, beliefs and communication. All the aspects of the organizational phase show strong presence in the illustrations of the brain signals and they were all above 97%. Apart from the presence of these aspects in brain signals, it has been posited that these aspects are also found in mathematical principles, in wave theories (physics) as well as philosophy [6, 7]. For example, in mathematics, the six aspects can represent identity, commutative, transitive, reflexive, distributive, symmetry while in wave property theories in physics, these six organizational aspects can represent refraction, transmission, attenuation, reflection, interference and diffraction. These six organizational aspects help us to observe the happenings in the world in detail (parts) as well as a whole.

As for the functional phase, all four aspects demonstrated a presence of over 85% and so they are also strongly present in the brain signals. It looks as if that the development of thought or the creation of thought process follows a distinct spiralling pathway. This thought process has to visit certain locations of the brain in order to achieve a successful thought process or a successful concretisation of the thought.

5. Conclusion and Outlook

This research study shows that there is strong presence of practically all thirteen aspects in brain signals. Although the presence of one particular aspect F3 (front to back movement) appears to be weak, which may be due to and depend on the type of data utilized. However, the other twelve aspects showed strong presence in the EEG signal data. The computed eccentricity e appeared to be very high with values above 0.99 and with such high values this demonstrates that the movement that occurs during the organizational phase of the 'cell development' is mostly elliptical that approaches the parabola. There is a strong presence of duality in all the phases and the manifestations are in function of π, as well as there is strong evidence based on this work that the cosine and sine functions are combined to produce complex 'living things' or thought processes or decision-making processes. The six organizational principles can be regarded as different aspects of the whole organization of the human decision making process and these principles are also found in mathematics as well as physics.

The justification for such a synthesis is empirically demonstrated by Holographic Theory and Quantum Theory, both theories revealing universal tensions being expressed as polarities, between the whole/ parts, the implicate/explicate orders, and the microcosmic/macrocosmic scales of measurement [1, 2, 15, 21]. Quantum theory reveals a basic oneness of the universe. We TEND, cannot) deconstruct the universe into small, independent units since the world of the subatomic clearly points directly at a web of various parts related to the whole. The fact that, as Bohr and Bohm stated, we cannot actually visualize the implicate order or the quantum interdependence of particle and wave (or an energetic electron cloud of potential energy) is of no consequence [1, 2]. We are dealing directly with the same integrative structure of whole and parts. The thirteen aspects/ intelligences have been shown to be present in both the whole and parts within any hierarchy or level of existence. It is not surprising, therefore, that NaTI, because of its holographic and quantum attributes, uses whole brain

thinking and holistic processes to address any and all issues that have a behavioral, cognitive foundation and application.

This research provides initial empirical support for the presence of the thirteen cellular principles in EEG brain signals, supporting this hypothesis of natural unity. Next steps are to further demonstrate his concept through application of NaTI principles to the development of a psychological inventory, similarly applying the three basic principles of Langham's model. This research will be followed up by an empirical study validating the validity and reliability of this paper.

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