



Chaos Theoretical Explanation to Each Development of Evolution Theory, Psychology, Physics, and Philosophy

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I hold time to be an order of successions.

Gottfried Wilhelm Leibniz

Summary

Three or more variables and continuous covariation are required to have a chaotic equation. Except for mathematical principles and historical facts, all-natural phenomena, including the existence and direction of time, obey chaos theory. Therefore, views on natural phenomena that do not consider the course of time must be corrected. Chaos theory comprises both a fixed state and a chaotic state and two different increasing and decreasing entropy directions. Entropy increases in all-natural phenomena except in evolution and a part of thinking. Total academic entropy increases if each academic field does not obey chaos theory. Each development of evolutionary theory, psychology, physics, and philosophy can be determined as myth, fixed (assertive) thinking, chaotic (non-assertive) thinking, and decreasing entropy thinking. Gene's learning evolution theory and Rogers' counseling are equivalent to reducing entropy thinking. Here, the Big Bang, dark matter, and dark energy theories do not obey chaos theory because the

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energy of the electromagnetic wave and the gravitational wave is considered no change during transmission. Therefore, a new gravitational equation considering the course of time is reported. A unifying style of thinking, considering time, may be equivalent to the new academic fields.

1 Introduction

Leibniz said, “*I hold time to be an order of successions.*” However, Newton’s absolute theory of time is more popular than Leibniz’s idea with no equation. Here, all-natural phenomena obey chaos theory with continuous covariation. In chaos theory, Leibniz’s idea is correct, and Newton’s theory of time is wrong. In this book, a definition of time according to Leibniz’s idea is reported with an equation. And all academic fields will be corrected with the new definition of time obeying chaos theory. Current academic disciplines and religion are divided into many fields.

Given that a subject’s relation to another is premitted with analysis, abuse and war may arise. Research and academic disciplines without decreasing total entropy would harm living creatures. In contrast, a unifying style of thinking considering time is greatly beneficial to living creatures because of decreasing total entropy. It will become a standard in all academic fields, including each religion. By educating this mathematical standard, human thinking will be unified in the correct direction.

Therefore, abuse and war caused by separation will decrease in each field. Three variables are adequate in forming a chaos condition [1, 2]. The current cosmology accepts the Big Bang [3], dark matter [4], and dark energy theories [5] as correct. Such a condition does not allow us to draw a relation between the chaos condition and cosmology. However, chaos phenomenon can never exist without continuous covariation [6–13]. By this correction, theories on natural phenomena that do not consider the course of time must be corrected because, except for mathematical principles and historical facts, all-natural phenomena, including the existence and direction of time, obey chaos theory [12]. For example, the Big Bang, dark matter, and dark energy theories do not follow chaos theory because the electromagnetic wave (light) and the gravitational wave are considered no change during transmission. Therefore, a new gravitational equation considering the course of time was reported [12, 14, 15].

Theoretically, two modalities of thinking type can exist, a fixed type and a chaotic type. Thus, two are the directions with a change in thinking. One is direction increasing entropy, which destroys living creatures. The other is direction decreasing entropy, which is equivalent to evolution and a part of thinking [7–13, 16].

Entropy partially decreases for each academic field, while the entropy of academic fields is increasing as a whole because of specialization. Therefore, the common purpose of academia may be lost within each specialized field. In each academic field, the entropy change of the whole academia must be considered. Each development of evolutionary theory, psychology, physics, and philosophy can be determined as myth, fixed (assertive) thinking, chaotic (non-assertive) thinking, and decreasing entropy thinking. The theories of Copernicus, Darwin, Freud, Adler, Newton, Einstein, and Greek philosophers are equivalent to assertive thinking, while those of Imanishi, Jung, quantum mechanics, Russell, and Brouwer are equivalent to non-assertive thinking. Gene's learning evolution theory, Rogers' counseling, and the new gravitational equation are equal to decreasing entropy thinking.

Such a unifying style of thinking considering the course of time may be equivalent to the new academic fields.

2 Explanation of Chaos Theory

Here, we explain chaos theory, the relation between thinking and chaos theory, and some important preliminary results.

The contents of "Explanation of chaos theory" are similar to the author's articles [8, 11–13]. However, it is repeated in this report because of its importance.

2.1 Definition of Chaos Theory

The definition of chaos theory was reported as below [9]. Chaos theory can be defined as "*the qualitative study of unstable a periodic behavior in deterministic non-linear dynamical systems*" [17]. Chaos theory is a part of complexity theory that concerns itself with non-linear dynamic systems whose behavior does not follow clearly predictable and repeatable pathways. In linear systems, the relationship between an environmental factor and system behavior is predictable and easily modeled.

As the presence of an environmental factor increases, system behavior changes linearly in response to it. In contrast, behavior in chaotic systems might be perceived as unpredictable [18]. In this regard, such a chaotic state must not be confused with the term "random." In mathematical terms, "random" means the "statistics governed by or involving equal chances for each item" (New Oxford American Dictionary).

2.2 The Relation Between Continuous Covariation and Chaos Theory

Three or more variables and continuous covariation are required to have a chaotic equation [6]. In any chaos equation, fixed and chaotic solutions can be obtained that are continuous and have a bifurcation point between them, known as the Feigenbaum point [19].

For example, a chaos equation that is representative of chaos is expressed as follows:

$$Y(n+1) = p[1 - Y(n)]Y(n) \quad (1)$$

In Fig. 1, a schema near the Feigenbaum point is shown in parts *E*, *F*, and *G*, where the converging fixed (parts *C*, *D*, and *E*), localized (part *G*), and proliferating chaotic (part *H*) states are illustrated. The dotted line *F* is the Feigenbaum point. Except for mathematical principles and historical facts, all-natural phenomena obey chaos theory because of three or more variables and their continuous covariation between several phenomena, including matters and the mind.

3 The Relation Between Entropy Change and Chaos Theory

“Entropy” is a statistical word and was originally unrelated to any physical phenomena [20]. Entropy decreases when there is a change of direction from a chaotic state to a fixed state [6–13, 16], shown as the arrow *L* in Fig. 2. A schema of near

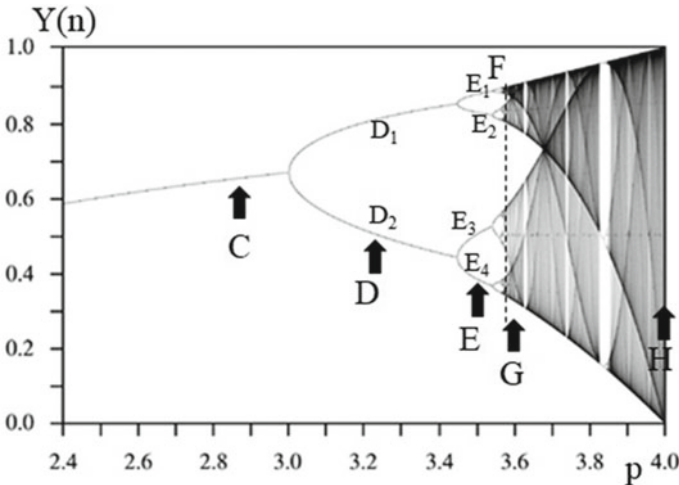


Fig. 1 Logistic map of Eq. 1. The converging fixed (parts *C*, *D*, and *E*), localized (part *G*), and proliferating chaotic (part *H*) states are illustrated

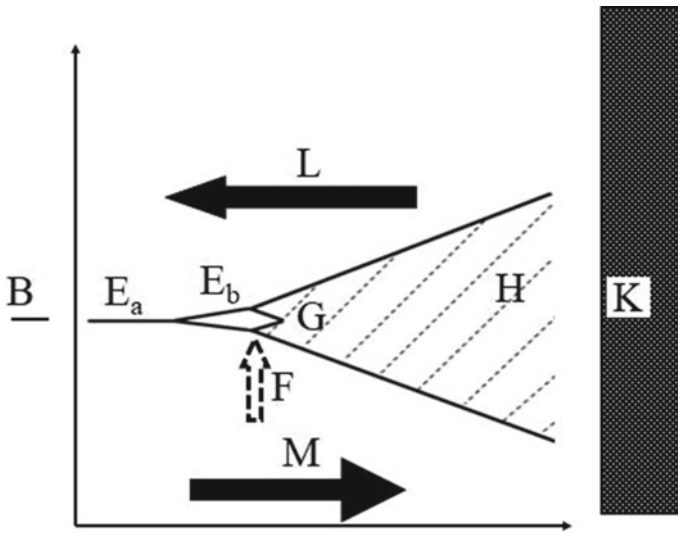


Fig. 2 Schema of complete fixed, incomplete fixed, chaotic, and random states. Each decreasing entropy and increasing entropy is shown as the arrows L and W

Feigenbaum point is shown as parts E_a , E_b , G , and H in Fig. 2. On the other hand, it increases whenever there is a change of direction from a fixed state to a chaotic state. This is shown as the arrow M in Fig. 2.

4 Mathematical Classification: Inside and Outside Chaos Theory

A chaos equation has either possible or impossible solutions. While impossible solutions are those with either no solution or with infinite solutions, possible solutions comprise complete fixed, incomplete fixed, chaotic, and random states [10–13, 16]. In complete fixed states, time is not required because no change occurs [21]. Examples are mathematical principles and historical facts, which do not change along with the environment. In chaos theory, a fixed state can become a chaotic state depending on the equation's variables, meaning that the state of a solution can also change as the environment changes. Therefore, in chaos theory, a fixed state is incomplete.

In Fig. 2, the extreme left side of parts E_a and E_b , (part B) is a complete fixed state and lies outside chaos theory. However, both the incomplete fixed (parts E_a and E_b) and the chaotic (part G and H) states are amenable to chaos theory. On the other hand, part H (part K) is a random state, not amenable to it. Since a chaos equation is based on mathematical principles, it is a complete fixed state, and it can be used to resolve incomplete fixed and chaotic states as well.

5 Relation Between Time and Chaos Theory

Isaac Newton [22] believed in the existence of absolute space and time despite all physical bodies disappearing in the universe. Conversely, Gottfried Wilhelm Leibniz [21] believed that space and time are logically and metaphysically related to physical bodies or events [23, 24]. Because Newton's time can never be scientifically proven, it is considered a myth.

Current science defines a second as the time it takes for an electromagnetic wave of a Krypton lamp to travel 299,792,458 m. Also, the length that the electromagnetic wave of cesium travels each second is set at 299,792,458 m. An absolute atomic clock presupposes the presence of absolute length, and an atomic absolute telemeter presupposes the presence of absolute time. Both definitions assume the constant speed of light; therefore, a "chicken and egg" contradiction exists in them. Since the relation between absolute distance and absolute time is contradictory in current science, a new definition of time is presented by this author [12, 25].

$$t = \frac{\log \frac{E(t)}{E(0)}}{k} \quad (2)$$

Here, t , $E(t)$, $E(0)$, and k are the time, the quantity of energy at time (t), the quantity of energy at time (0), and constant. Equation 2 was deduced from a stress equation.

$$\frac{dE}{dt} = kE \quad (3)$$

Here, E is the quantity of energy. This author considers that the definition of Leibniz's time is correct and that the existence and direction of time can be explained by chaos theory with continuous covariation [12].

6 The Relation Between Thinking and Chaos Theory

6.1 The Relation Between Entropy Decrease and Human Life

Through evolution and thinking, living creatures experience a decrease in entropy from a proliferating chaotic state (Part H) to a localized chaotic (Part G) or an incomplete fixed state (parts E_a and E_b) in Fig. 2.

Rearranging human thinking so that entropy decreases will lead to human satisfaction; moreover, humans may feel omnipotent when passing through the Feigenbaum point [19] (arrow F in Fig. 2). However, entropy does not decrease naturally in humans unless their thinking patterns are rearranged.

6.2 The Relation Between Counseling and Chaos Theory

It has been reported that the process of counseling equals that of solving scientific problems concerning chaos theory [9]. Here, the counselor, the client, and the information are equivalent to three or more variables and continuous covariation. During counseling, the counselor pays close attention to the client's thinking without referencing any objective standards. Because the counselor's focus is on the client's thinking pattern, their thinking must become the chaotic type. The counselor may not correct the client's ignorance regarding a particular objective standard; however, if the counselor merely repeats the client's expressions, then the counselor's thinking differs from the fixed type of thinking—merely parroting the client's expressions because of poor continuous covariation. Consequently, the counseling will fail because the client's thinking is unclear or because the client is confused.

During counseling, the counselor's primary skills involve listening closely, using reception, and synesthesia. The second skill allows counselors to confirm incomprehensible points by putting themselves in the clients' shoes. This confirmation process, which is equivalent to discovering a new theory or equation in science, is crucial to counseling and can be achieved professionally using a fixed type of thinking. Conversely, a chaotic type of thinking does not need to clarify incomprehensible points [9–13].

People who demonstrate a chaotic type of thinking cannot act autonomously due to dependence or lack of reference to objective standards. Therefore, merely listening closely, using reception and synesthesia, is (in and of themselves) insufficient to conduct counseling because, under such situations, there would be no decrease in entropy. This is further discussed in Sect. 7.4. Moreover, if entropy does not decrease, both the client and the counselor would never manage to achieve any form of lasting mental stability and, therefore, never be joyous.

6.3 The Relation Between Chaos Theory and computer's Human Face Recognition

Human face recognition by computers was developed by exchanging information between two computers [26, 27]. Here, the two computers and the information exchanged are equivalent to three or more variables with continuous covariation. Therefore, the relation obeys chaos theory, and entropy decreases because the two computers have a common purpose. It is equal to the counseling process and is similar to the dialectic process illustrated in Sect. 9.2 [12, 28].

7 The Relation Between Chaos Theory and Development of Evolution Theory

7.1 The Relation Between Evolution Theory and Myth

Before Darwin's theory of evolution was published and widely disseminated [29], it was believed that God had made all species. A new species is shown with arrow B against the previous species (arrow A₂) in Fig. 3 based on myth. The schema of each evolutionary theory is shown in Figs. 3, 4, 5 and 6. The horizontal axis represents time, and the vertical axis represents the different species. Because myth is ill-founded, the process that a new species B was born is not clear in it; therefore, myth is equivalent to part K (random state) in Fig. 2. However, it obeys chaos theory because humans considered it; thus, its position is not part K but the far-right

Fig. 3 Schema of mythic thinking. A new species is shown with arrow B against the previous species (arrow A₂)

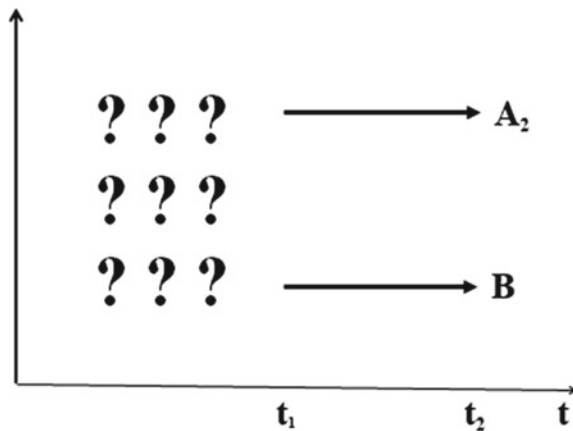


Fig. 4 Schema of assertive thinking. A new species separated from the old species (arrow A₁-A₂) is at the time t_1

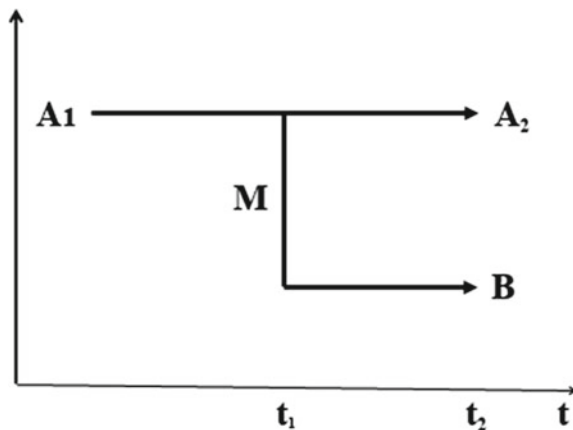


Fig. 5 Schema of non-assertive thinking. The non-assertive phenomena are shown as the rectangle box part on the right side of the time t_2

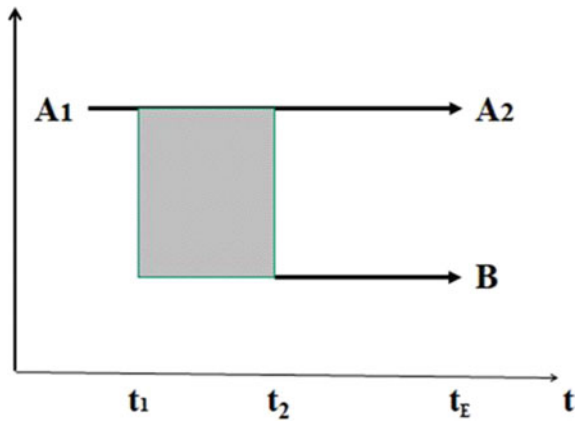
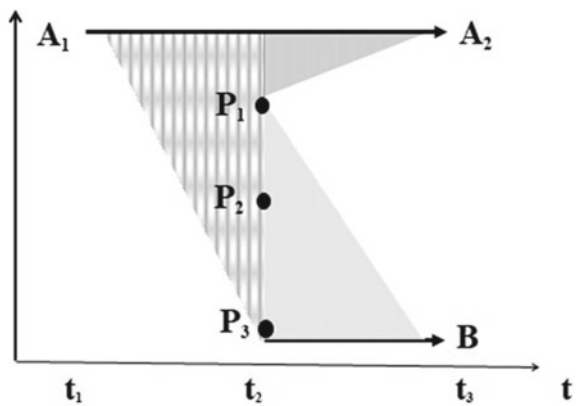


Fig. 6 Schema of decreasing entropy thinking. The birth of the new species is shown as a narrowing triangle



side of part H . This positioning is similar to that of myth in psychology, physics, and philosophy.

Creationism is similar to myth, and proof of evolution can be found in human embryos [16]. All humans repeat the same evolution process of 3.5 billion years by eight weeks after fertilization; the human heart cannot develop instantly with two atriums and two ventricles. As it is made by two atriums and one ventricle from one atrium and one ventricle, meaning that all humans evolved through the amphibian form from fish. If the repeating process stops at an incomplete state, a neonate with an anomaly or heart disease will be born. All humans experience the evolutionary process of fish, amphibians, reptiles, and mammals. Therefore, embryology denies that another entity has created each species.

7.2 The Relation Between Assertive Thinking and Darwin's Theory

Evidence separates Darwin's theory from myth [29]. Its schema is shown in Fig. 4. A new species separated from the old species (arrow A_1-A_2) is at the time t_1 . It is considered that a new species B is born with mutation and therefore shown as a solid line M .

In the neutral theory of evolution [30], not one but many mutational changes are considered the center of evolution itself. Each species does never change overtime except in the moment of mutation. It means that there is no time of species except mutation; therefore, both theories are assertive (part E_b of Fig. 2). This positioning is similar to assertive thinking in psychology, physics, and philosophy.

7.3 The Relation Between Non-assertive Thinking and Imanishi's Theory

A schema of Imanishi's theory [31] is shown in Fig. 5. Imanishi stated, "*The species changes on the time that it must change.*" His theory is non-assertive because it does not deny that species change with time and because it relates to some evidence. The central ability of evolution in living creatures is not mutation. Its non-assertive phenomena are shown as the rectangle box part on the right side of the time t_2 . It is equivalent to the chaotic state in chaos theory, such as part G or H in Fig. 2. Because it obeys some evidence, its position is nearer the fixed state than the myth. This positioning is similar to non-assertive thinking in psychology, physics, and philosophy. However, the process with decreasing entropy that created a new species B is not clear.

7.4 The Relation Between Decreasing Entropy Thinking and Gene's Learning Evolution Theory

The thinking of living creatures relates to evolution because thinking is the same phenomenon with decreasing entropy as evolution, chaos theoretically. Your DNA will change with your exertions being decided by your thinking. It was proved that a father's experiences are transmitted to his children through sperm [32].

The blood pressure of adult giraffes is over 300 mmHg because of their long neck. Giraffes developed a complex pressure-regulation system in their upper neck, which only exists in their species, through the evolutionary process. This author thinks this system was hoped for by giraffes to protect their brains from a cerebral hemorrhage. In pregnancy, hypertensive information with medicine is transmitted to an embryo from the mother; this is equal to the heredity of diabetes mellitus with medicine. Receiving such medicine or not is the mother's will.

Thus, the child's DNA will change with the parent's experiences and thoughts. This fact can be explained by genetically transmitting adaptation information from

one generation to the next. As for the explanation of embryology, the process of evolution is memorized in our genes and repeated in individual growth. True evolution is active and independent according to the will of the living creature [12, 16].

A schema of a new evolution theory is shown in Fig. 6. In gene's learning evolution theory, living creatures adapt to transformed environments and become new species with the gene's learning function [12, 13, 16]. This is shown as an expanding triangle, with the time that the old species adapt to a changing environment from t_1 until time t_2 . The adaptive ability of Lamarckism [33] is a part of this theory. The new species' birth is shown as a narrowing triangle, with the time that the new species B is born with decreasing entropy [12, 13, 16, 34] from the time t_2 till the time t_3 . This positioning is similar to decreasing entropy thinking in psychology, physics, and philosophy. The change representing decreasing entropy over the course of time can be explained with the arrow L in Fig. 2. Thus, the time of species clearly exists in this theory. Chaos theory can also demonstrate that a half-species does not exist; a species is equivalent to an incomplete fixed state such as the parts E_{1-4} in Fig. 1. In chaos theory, these are fragmentary.

8 The Relation Between Chaos Theory and Development of Psychology

8.1 The Relation Between Psychology and Myth

Freud [35, 36] separated psychology from myth. Myth is shown as many question marks of Fig. 7 because its range and theoretical grounds are unclear. In Figs. 7, 8, 9, 10 and 11, the horizontal axis represents time and the vertical axis represents the different theories. Until Freud distinguished conscious and unconscious, psychology had not been considered an academic field.

Fig. 7 Schema of mythic thinking. Myth is shown as many question marks

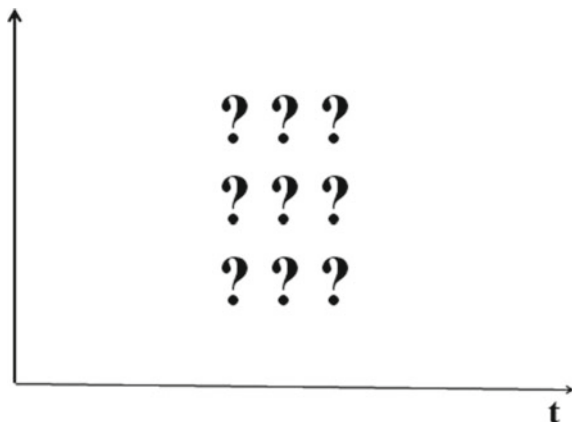


Fig. 8 Schema of assertive thinking. The theory of assertive thinking is shown as an arrow P_1

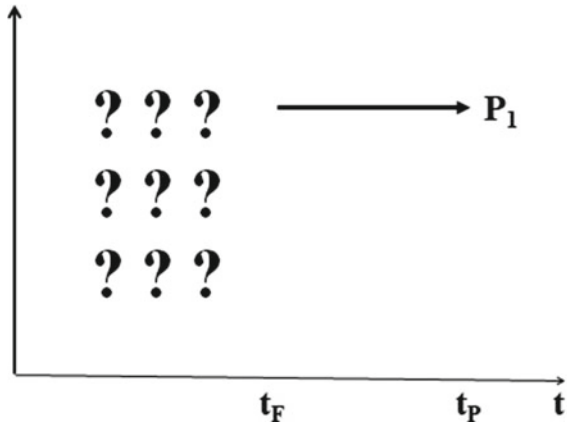


Fig. 9 Schema of assertive thinking. A new theory of assertive thinking is shown as a separate arrow P_2 from P_1 on time t_A

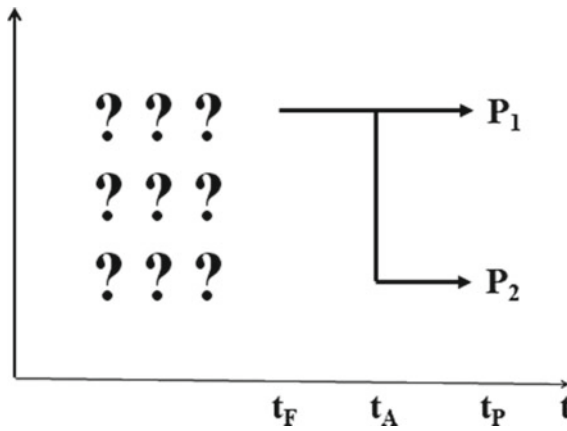


Fig. 10 Schema of non-assertive thinking. A theory of non-assertive thinking is shown as the rectangle box

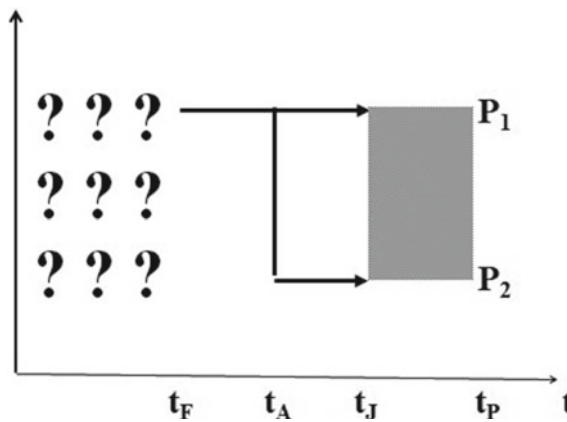
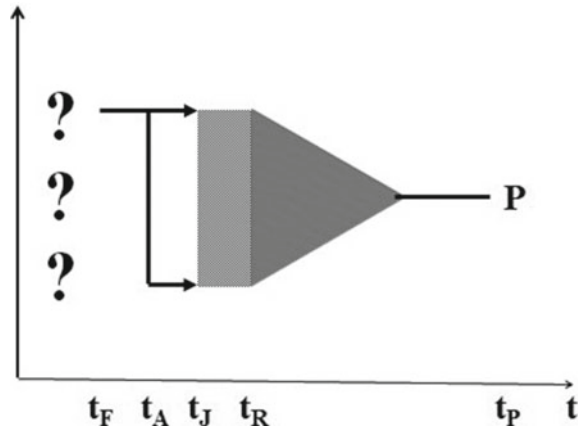


Fig. 11 Schema of decreasing entropy thinking. A theory of decreasing entropy thinking is shown as a triangle on the right side of time t_R



8.2 The Relation Between Assertive Thinking and Freud's Psychology

Because Freud [35, 36] first led psychology to become an academic field, his theory's schema is shown as an arrow P_1 in Fig. 8. He noticed the existence of unconsciousness on time t_F . However, he attributed all phenomena of human mentality to causes related to sex. He was not able to solve the problems of almost all patients because his theory is assertive.

8.3 The Relation Between Assertive Thinking and Adler's Psychology

Adler [37] considered human mentality to be the weak person's place; in other words, a person needs psychology because of their weak mind. His psychology was opposed to Freud's; however, its schema is shown as a separate arrow P_2 from P_1 on time t_A (Fig. 9) because it made its considerations based on Freud's psychology. However, his psychology could not provide an explanation for schizophrenia nor decreasing entropy.

8.4 The Relation Between Non-assertive Thinking and Jung's Psychology

Jung reported that schizophrenia could not be explained with assertive thinking [38, 39]. Assertive thinking is an incomplete fixed state, such as parts E_a and E_b in Fig. 2, while schizophrenia is similar to the proliferating chaotic thinking near the

random state such as parts H or K in the same Figure [12]. Because Jung could never know chaos theory [17], he could not consider both fixed thinking and chaotic thinking. When the incomplete fixed (assertive) state cannot be considered, part G or H of Fig. 2 will be understood as non-assertive states with limited range. Therefore, Jung's psychology schema with some evidence is shown in Fig. 10 as the rectangle box. Jung noticed his theory on time t_j . Because it can only be explained with non-assertive thinking, Jung's theory was similar to quantum mechanics [40]; however, his theory could not explain all issues related to human mentality. It was reported that depression could be presented with the incomplete fixed state (parts E_a and E_b in Fig. 2) [12], and it can never be explained with non-assertive thinking—the human mind always changes. Finally, Jung's psychology did not explain decreasing entropy.

8.5 The Relation Between Decreasing Entropy Thinking and Rogers' Psychology

Rogers considered his counseling method [41]. It is a feature of his counseling that only the client knows the correct answer. Before Rogers' counseling, psychologists tried to correct the patients according to each theory. As a result, most of the patients' intentions were ignored. However, Rogers assisted in shifting the direction toward the clients, never controlling their minds. It was explained in Sect. 5.2 that human thinking can understand both incomplete fixed (parts E_a and E_b) and chaotic states (part G and H), as represented in Fig. 2; further, it is human development that allows rearranging thinking from chaotic to fixed states quickly. Rogers' counseling is equivalent to it; a schema of its process is shown as a triangle on the right side of time t_R in Fig. 11. The chaotic state of the client's thinking shifts to the fixed state with counseling.

Theoretically, entropy decreases in the client's thinking only through counseling. However, the client must have the ability to understand his/her problem and the hope to change his/her present condition. In other words, the effect of counseling is weak on patients with severe mental diseases because they cannot hope for their conditions to improve; therefore, they must not be treated only with counseling. Severe depression and schizophrenia are similar to the incomplete fixed state near the complete fixed state (part B) and the proliferating chaotic state near the random state (part K) in Fig. 2 [12]. Counseling must be used only with clients who can understand both incomplete fixed states and chaotic states; thus, it is better to implement counseling in the localized chaotic state (part G of Fig. 2). In short, counseling must be used to treat neurosis and so on.

9 The Relation Between Chaos Theory and Development of Physics

9.1 The Relation Between Physics and Myth

Until the emergence of Copernican theory [42], the Ptolemaic geocentric system theory [43] had been believed in medieval Europe de facto. The Ptolemaic theory was equivalent to a mythical theory based on poor observations; its schema is here equivalent to Fig. 7. In Figs. 7, 8, 9, 10 and 11 of physics, the horizontal axis represents time, and the vertical axis represents the different theories discussed.

9.2 The Relation Between Assertive Thinking and Newton's Equation

Both Copernicus and Newton [22] presented the Copernican theory and Newtonian gravitational equations based on many observations. In their equations, the energy change of a gravitational wave was not considered; thus, energy change over time does not exist. Therefore, all theories and equations are assertive and do not obey chaos theory because continuous covariation was not considered. A schema of their theories is shown in Fig. 8, where they are represented as the arrow P_1 and reported at the time t_F . Newton believed in the existence of absolute time that does not change with the environment. All phenomena could not be explained with his theories because Newton's opinion and subconscious psychodynamics [12] were mixed in with his equations. Thus, these were approximate equations describing a part of all phenomena within the totality of the cosmos.

9.3 The Relation Between Assertive Thinking and Einstein's Equation

Einstein [44] never considered Newton's equations nor many observations in the movement of heavenly bodies. As a result, he proposed a gravitational equation based on the constant speed of light. An observation from the opposite side of the movement was considered in his relative theory. The schema of his equation (arrow P_2) is different from that of Newton's equation (arrow P_1) in Fig. 9. In Einstein's theory, the energy change of an electromagnetic wave and of a gravitational wave could be considered. However, he denied this change, which made his theory assertive because the time of an electromagnetic wave and a gravitational wave does not exist. Einstein's equation thus presented a defective part [14, 15].

9.4 The Relation Between Non-assertive Thinking and Quantum Mechanics

It became clear that all phenomena with more detailed observations could not be explained with assertive theories such as those represented by Newton's and Einstein's equations. Quantum mechanics [45] was then born as a non-assertive theory. It is representative that the uncertainty principle was developed by Heisenberg [46] and that it relates an uncertain phenomenon to elementary particles. The observed state changes with observation and with the observation side. Because of this covariant relation, the uncertainty principle is part of chaos phenomena. However, the consideration given to "continuation" was insufficient. In quantum mechanics, all phenomena are presented by stochastic means. Because quantum mechanics relates to some evidence, it is closer to a localized chaotic state than the myth. Its schema of non-assertive phenomena [6, 10, 12, 13, 16] is shown as the rectangle box part on the right side of time t_j in Fig. 10. It is not random but localized because it is based on some evidence. However, quantum mechanics is an approximate theory; it does not explain the existence and direction of time [12].

9.5 The Relation Between Decreasing Entropy Thinking and New Gravitational Equation

In current cosmology, the Big Bang [3], dark matter [4], and dark energy theories [5] are believed to be correct. Because all-natural phenomena are amenable to chaos theory, each energy state of light (electromagnetic wave) and of a gravitational wave always changes in their environment. However, it is a precondition of the Big Bang theory that the energy state of light does not change; according to it, a cause of redshift is the Doppler's effect the moment that light was emitted from the heavenly body. Time cannot exist in light because its energy after being emitted never changes [12, 21]. It exists only when light is emitted and received. The energy state of light has a continuous covariant relation to its environment because it is related to gravitation [44]. Therefore, it must obey chaos theory. Because chaos theory can explain time [12], it denies the Big Bang theory, which ignores the time course of light (electromagnetic wave). Moreover, the energy state of a gravitational wave is similar to that of light.

There are six fatal contradictions in the Big Bang, dark matter, and dark energy theories.

1. Cyanobacteria of 3.5 billion years ago are now living [47]. A living creature always evolves due to some environmental changes. Therefore, cyanobacteria's existence means that the present inertia force is almost the same as 3.5 billion years ago. If the universe is expanding according to the Big Bang theory, inertia force must decrease greatly;
2. The Big Bang's time had been previously changed from 12.7 billion years ago to 13.7 billion years ago [12]. In 1995, this author reported that the Big Bang's

time would be pushed back according to observations of more distant heavenly bodies [48];

3. The existence of heavenly bodies 14.46 ± 0.8 billion light-years away from earth was discovered [49], and the existence of carbon or oxygen in these bodies 13.3 billion light-years away was confirmed [50]. In the Big Bang theory, it is explained that all elements except hydrogen and helium were made by a supernova explosion. Therefore, six processes were required before their heavenly bodies emitted light;

First, hydrogen and helium, being scattered with the Big Bang, had gathered with their gravitation.

Second, many supernovae were born.

Third, their supernovae exploded.

Fourth, carbon, oxygen, and so on were made with the supernova explosions and subsequently scattered.

Fifth, they gathered with their gravitation.

Sixth, the heavenly bodies (13.3 billion light-years away), having emitted light, were made.

In the Big Bang theory, the time for the six processes took only 0.5 billion years.

4. If scientists measure the Hubble constant in five different ways, they will get five radically different values for it [51];
5. Galaxy size can become infinite according to the old gravitational equations. However, all galaxy sizes are limited, and limited galaxy size can never be explained with dark matter and old gravitational equations [52]. For this explanation, a sudden change of gravitation is required in the new gravitational equation [24].
6. The force of dark matter is attractive on a galaxy radius level; however, it is repulsive on a universal level. When the attractive force of dark matter in the Milky Way galaxy is observed in a very distant galaxy, it must be considered as a repulsive force of dark energy [15]. It means that dark matter must change to dark energy according to the position that it is observed from. This is not scientific.

This author reported that Hubble's law is a phenomenon according to Eq. 3 [12, 48] and that the relation between music, picture, and fluctuation ($1/f$) [53] can be explained with Eq. 3 [54]. From Eq. 3,

$$E(t) = E(0)e^{kt} \quad (4)$$

Here, α is the Hubble's constant.

$$e^k = 1 - \alpha. \quad (-1 \ll k < 0) \quad (5)$$

From Eqs. 4 and 5,

$$E(t) = E(0)e^{kt} \approx E(0)(1 - \alpha t) \quad (6)$$

$$E(t) = E(0)(1 - \alpha t) \quad (7)$$

Equation 7 is equal to Hubble's equation that the Big Bang theory is explained with. Thus, the Big Bang theory can be explained with an approximate equation of Eq. 3. This author reported that dark matter, dark energy, and limited galaxy size can be explained with the ignored energy deduced from this equation [14, 52]. The entropy of total academic fields decreases because the Big Bang, dark matter, and dark energy theories are unified with the new equation.

Figure 11 shows the Big Bang, dark matter, and dark energy theories as different academic fields on time t_R . The unification of such theories is shown as the triangle on the right side of time t_R , and the new gravitational equation is shown as arrow P .

10 The Relation Between Chaos Theory and Development of Philosophy

10.1 The Relation Between Philosophy and Myth

Before Greek philosophy [55], theories and opinions with no argument and rationale were considered relevant to society's philosophy. Because myth is ill-founded, its schema is shown in Fig. 7. In Figs. 7, 8, 9, 10 and 11, with the development of philosophy, the horizontal axis represents time, and the vertical axis represents the different theories.

10.2 The Relation Between Assertive Thinking and Greek Philosophy

In Greek philosophy, words were defined, and theories were clarified with arguments and rationale. They are assertive because they do not change over time. Their schema is shown as the arrow P_1 in Fig. 8. Hilbert's formalism [56] is an assertive type, too, as formalism applies thinking and opinion to fixed expressions.

In Greek philosophy, dialectics obeying chaos theory were considered. In some cases of dialectics, entropy may surely decrease [12, 28]; however, dialectics demanded not correct solutions but moderation ("synthesis") [57]. If "antithesis" is almost automatically decided by "thesis," a relation between "thesis" and "antithesis" is not a covariation, and dialectic is not always continuous. Such cases do not obey chaos theory, and entropy does not decrease with dialectic if the parties share no common purpose.

Therefore, most philosophers now think that "dialectics is wrong" [12, 58–60].

10.3 The Relation Between Non-assertive Thinking and Russell's Philosophy

Non-assertive theories were considered by Russell [61], Brouwer [62], and so on. Russell's phenomenology and Brouwer's intuitionism recognized changes over time. However, the process of decreasing entropy in them is not clear. Because they relate to some basis, they become localized rather than random; therefore, a schema of their thinking is shown as the rectangle box part on the right side of the time t_j in Fig. 10. It is equivalent to quantum mechanics and Jung's psychology.

Phenomenology is almost explained with only a chaotic state. All phenomena always have some continuous covariant relation to the others. Here mathematical principles and historical facts are excluded from phenomena because they never change with time. Thus, all phenomena obey chaos theory, and most phenomena relating to time are equivalent to the chaotic state. The contents, such as law, are equivalent to an incomplete fixed state (parts E_a and E_b). However, they can change to a chaotic state (parts G and H) with environmental changes. They are different from the product description equivalent to a complete fixed state (part B) with the impossibility of change. Therefore, most phenomena within reality can be explained with/by the chaotic state.

Intuitionism is explained with only a chaotic state. Intuition is not fixed and greatly changes over time. However, it is equivalent to the proliferating chaotic state because its process is not clear.

10.4 The Relation Between Chaos Theoretical Thinking and Russell's Five Postulates

Russell's five postulates [63] are explained via chaos theory. This author will summarize the key elements of this as follows:

- *"The postulate of quasi-permanence"* can be explained with the localized chaotic state, such as part G in Fig. 2. All solutions are similar in the localized chaotic state.
- *"The postulate of separable causal lines"* can be explained with the incomplete fixed state (parts E_a and E_b) to the chaotic state (parts G and H) in Fig. 2. Each different solution can be unified to a fixed solution according to condition change.
- *"The postulate of spatial-temporal continuity in causal lines"* can be explained with the relation between incomplete fixed state and chaotic state. There are four solutions in part E (points E_1 , E_2 , E_3 , and E_4) of Fig. 1. According to the change of variable p , they can change to a chaotic state, and the solutions in a chaotic state cannot be distinguished from each fixed solution.
- *"The postulate of the common causal origin of similar structures ranged about a center, or, more simply, the structural postulate"* can be explained with a relation between incomplete fixed state (parts E_a and E_b) and chaotic state (parts

G and H) in Fig. 2. The method of shifting a chaotic state to a fixed state in rearranging thinking is used multiple times [7–13].

- “*The postulate of analogy*” can be explained with the relation between the incomplete fixed state (part D) and the chaotic state (arrows G and H) in Fig. 1. In Eq. 1, two solutions of part D (points D_1 and D_2) cannot exist with only one side. In most chaos equations, pair solutions such as this can exist. The numbers of pair solutions in the arrow E or Eq. 8 are not two but four.

$$\frac{Y(n+1)}{Z(m+1)} = \frac{p[1-Y(n)]Y(n)}{p[1-Z(m)]Z(m)} \quad (8)$$

There is no part of two solutions in Eq. 8.

Thus, Russell’s postulates are similar to the characteristics of chaos theory. However, he could not have known it because it was not recognized as a common theory in the 1960s [17]. Russell’s postulates alone are insufficient to explain chaos theory. Therefore, his thinking cannot be positioned as chaos theory based theoretical philosophy.

10.5 The Relation Between Decreasing Entropy Thinking and Philosophy

This author does not know of a concrete example of philosophy with decreasing entropy according to chaos theory. A logical ground with decreasing entropy is required in a new philosophy that is amenable to chaos theory; thinking in most fields will be included in it. The continuous covariant relation is a necessary condition of chaos theory. As stated previously, the pattern of decreasing entropy with the process of dialectics is similar to chaos theory; however, the purpose of dialectics is moderate, and it is different from a common purpose of thinking in many fields. Chaos theoretically, dialectics is insufficient, and moderation is not always right.

On the other hand, Leibniz defined space and time [6, 12, 21, 24]. His definition that “*time course is born with change*” suggested that continuous covariant relations exist. Because time can become a common variable within reality, all phenomena with a time course obey chaos theory. However, a common purpose for decreasing entropy was not present in Leibniz’s philosophy, either. This author thinks that the common purpose of philosophy must be equal to that of a living creature. The new philosophy schema is shown as the arrow P on the right side of a triangle heading in Fig. 11. Times t_R is now.

The new philosophy must include the thinking of most academic fields, and it will become a chaos theory based theoretical philosophy.

11 Results

The parts being equivalent to the left side of Figs. 3 and 7 are equivalent to the far-right side of part H (near part K) in Fig. 2. The right sides of Figs. 3 and 8 are equivalent to part E_a in Fig. 2. Figures 4 and 9 are equivalent to part E_b in Fig. 2. Figures 5 and 10 are equivalent to part G or H in Fig. 2. Finally, Figs. 6 and 11 are equivalent to parts E_a , E_b , G , and H in Fig. 2. In this way, each schema presenting the developments of physics, evolution theory, psychology, and philosophy can be shown with the schema of chaos theory. Therefore, each of their developments can be explained with chaos theory.

12 Discussion

Chaos theoretically, two modalities of thinking type exist, a fixed type and a chaotic type. Thus, two are the directions with a change in thinking. One is direction increasing entropy, which destroys living creatures (e.g., natural selection). Indeed, species are selected in nature; however, they can never be created by natural selection. The other is direction decreasing entropy, equivalent to evolution (gene's learning evolution theory) and a part of thinking.

In all academic fields, each entropy partially decreases. However, the entropy of academic fields is increasing as a whole because of specialization. Therefore, the common purpose of academia may be lost with each specialization. In each academic field, the entropy change of the whole academia must be considered. This is similar to a relation between a conductor and many players in an orchestra.

Literature, music, and pictures can be explained with chaos theory; thus, human thinking obeys chaos theory [12, 64]. Such a unifying style of thinking considering time may be equivalent to the new academic fields.

13 Conclusion

Each development of evolution, psychology, physics, and philosophy can be explained with decreasing entropy as understood by chaos theory. The entropy of total academia increases with the specialization in each academic field. Such a unifying style of thinking considering time may be equivalent to the new academic fields. Its phenomenon with decreasing entropy is equal to a common purpose of living creatures.

Core Messages

- The existence and a direction of time are explained with chaos theory that fixed state and chaotic state exist in.
- Each development of evolutionary theory, psychology, physics, and philosophy can be determined as myth, fixed (assertive) thinking, chaotic (non-assertive) thinking, and decreasing entropy thinking.
- Because the time of light (electromagnetic wave) and a gravitational wave cannot exist in the Big Bang, dark matter, and dark energy theories, a new gravitational equation considering the course of time is reported according to chaos theory.
- A unifying style of thinking considering time may be equivalent to the new academic field.

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