ИНФОРМАТИКА

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COMPUTER SIMULATION OF HUMAN PSYCHOLOGICAL SYMBIOSIS
АДАМНЫҢ ПСИХОЛОГИЯЛЫҚ СИМБИОЗЫН КОМПЬЮТЕРЛІК МОДЕЛЬДЕУ
КОМПЬЮТЕРНОЕ МОДЕЛИРОВАНИЕ ПСИХОЛОГИЧЕСКОГО СИМБИОЗА ЧЕЛОВЕКА

Abstract. *In this paper, a mathematical model is proposed for assessing the mental symbiosis of a person associated with the power of so-called mental dependence adversely affecting consciousness. Such a model is based on the formalization of a person's mental potential, the power of this potential and mental energy. At the same time, it is argued that it is the potential of the psyche that determines the degree of symbiosis of dependence. Whenever there is a transaction between a person and the external environment, the order of our consciousness is disrupted, endangering the existing structure of mental potential, we find ourselves in a state of internal disorder or mental symbiosis. The outcome of which depends on the mental potential of the person involved in this transaction. Based on this definition, taking as a basis the relationship between the "Я-concept", fantasy Φ, and willpower C_B C_B, which characterize the potential of the individual's psyche, an analytical formula for estimating mental entropy (Π_C) is proposed. It is shown that by numerically evaluating these parameters and comparing them, it is possible to determine the degree of symbiosis. Based on the concept of mental power and energy, the minimum mental energy required by a person to minimize mental symbiosis is estimated. The practicality of the proposed relationships between the psychological parameters of an individual "I am a concept", fantasy Φ, and willpower C_B is proved.*

Keywords: *mental symbiosis, mental transaction, mental potential, mental energy, mental power, minimal mental energy.*

Аңдатпа. *Бұл жұмыста санаға кері әсер ететін психикалық тәуелділік деп аталатын күшпен байланысты адамның психикалық симбиозын бағалаудың математикалық моделі ұсынылған. Мұндай модель адамның ақыл-ой әлеуетін, осы әлеуеттің күшін және ақыл-ой энергиясын ресімдеуге негізделген. Бұл ретте тәуелділік симбиозының дәрежесін психиканың потенциалы анықтайды деген пікір айтылады. Адам мен сыртқы орта арасында мәміле болған кезде, біздің санамыздың тәртібі бұзылып, психикалық әлеуеттің бар құрылымына қауіп төндіреді, біз ішкі бұзылулар немесе психикалық симбиоз жағдайында боламыз. Оның нәтижесі осы мәмілеге қатысушы адамның психикалық әлеуетіне байланысты. Осы анықтамаға сүйене отырып, жеке тұлғаның психикасының әлеуетін сипаттайтын "Я-концепция", фантазия Φ және ерік күші C_B арасындағы байланысты негізге ала отырып, психикалық энтропияны бағалаудың аналитикалық формуласы (Π_C) ұсынылады. Осы параметрлерді сандық бағалау және оларды салыстыру арқылы симбиоздың дәрежесін анықтауға болатындығы көрсетілген. Ақыл-ой күші мен энергиясы тұжырымдамасына сүйене отырып, адамның ақыл-ой симбиозын барынша азайтуға қажетті минималды ақыл-ой энергиясы бағаланады. "Я концепция" жеке тұлғаның психологиялық параметрлері, фантазия Φ, ерік күші C_B арасындағы ұсынылған қатынастардың практикалық екендігі дәлелденді.*

Негізгі сөздер: *психикалық симбиоз, психика транзакты, психика потенциалы, психикалық энергия, психика күші, минималды психикалық энергия.*

Аннотация. *В данной работе, предлагается математическая модель оценки психического симбиоза человека, связанной с силой неблагоприятно воздействующего на сознание, так называемого, психической зависимости. Такая модель, строится на основе формализации психического потенциала человека, мощности этого потенциала и психической энергии. При этом утверждается, что именно потенциал психики определяет степень симбиоз зависимости. Всякий раз, когда происходит трансакт, человека с внешней средой нарушается упорядоченность нашего сознания, подвергая опасности существующей структуры психического потенциала, мы оказываемся в состоянии внутреннего беспорядка или психического симбиоза. Исход, которого зависит от психического потенциала участвующей в этом трансакте. Исходя из этого определения, принимая за основу связи между «Я-концепции», фантазии Φ, и силы воли C_B характеризующие потенциал психики индивида, предложена аналитическая формула для оценки психической энтропии (Π_C). Показан что,*

численно оценивая эти параметры и сравнивая их, возможность определить степень симбиоза. На основе понятия мощности и энергии психики, оценивается минимальная психическая энергия, требуемая человеку для минимизации психического симбиоза. Доказывается практичность предложенных соотношений между психологическими параметрами индивида «Я-концепция», фантазия Ф, и силы воли C_B.

Ключевые слова: психический симбиоз, трансакт психики, потенциал психики, психическая энергия, мощность психики, минимальная психическая энергия.

Introduction

Symbiosis (from the Greek - "living together") as a psychological concept, it appeared in transactional analysis, developed by the American psychologist and psychiatrist Eric Bern in the 1960s-70s of the last century [1]. The proposed concept referred to biological symbiosis. Let's say that when two people interact, live or work together, they have ego states. And when a symbiosis occurs, in both people, one of their own ego states is devalued and excluded. Thus, one psychological personality structure is built for two people - this is called psychological symbiosis. This psychological process is referred to as Π_C. The beginning of a transaction between two people is defined as the beginning of a symbiotic state and denoted as Π_C^c.

One of the main factors adversely affecting consciousness is the so-called mental uncertainty, information that conflicts with pre-existing intentions and distracts us from fulfilling them. We call a similar situation in different words depending on what we are going through. Pain, fear, anxiety, and jealousy. In this case, the mental potential loses its mobility, becomes ineffective, and some information appears in the mind, and the goal already existing in the individual comes into conflict. Whenever incoming information disrupts the order of our consciousness, endangering the existing structure of goals and priorities, we find ourselves in a state of uncertainty to accept the ego of the transacting person or not. We will call this state before the symbiotic state. Prolonged exposure to this state can weaken us so much that a person loses the ability to control their attention and achieve their goals. And gradually succumbs to the ego of the person with whom he entered into the transaction. It is at this point that the process of psychological symbiosis begins, i.e. Π_C^c. Naturally, the question arises how to evaluate this energy.

Psychology has accumulated a lot of material that allows us to trace and evaluate the main stages of personality formation, confirmed throughout life by a variety of influencing factors that generate Π_C^c, of which three are important. It is clear that such a division is conditional [2]. The first is the biological factor. It includes the laws of biological maturation and aging. This factor affects a person's willpower (C_B). The second factor is the social environment, which unites all types of social influences: both the influence of our close friends and relatives, and the entire state structure. It is in the "Я"- "Я-concept" of a person that these factors are reflected. The third is a factor, a factor within a person's personal activity determined by his fantasy (Φ). Apparently, these factors determine the energetic properties of the human psyche, which are opposed, i.e. Π_C^c and they determine his life activity. Activity is the internal (mental) and external (physical) activity of a person, regulated by consciousness through the psyche. In order to be able to talk about activity, it is necessary to identify the presence of a conscious goal in a person's activity. Precisely, the goal reflects a person's sociality and shapes his Self. In the process of the transaction, the Π_C^c interferes with awareness of the other aspects of the activity - its motives, methods of execution. The results of such a transaction may be realized, or they may not be realized, they may not be fully realized or even not correctly. This is the role, i.e. Π_C^c. All this is reflected in the process of the individual's psychological interaction not only with the elements of society [3]. The results of such mutual influence depend on how developed his Φ - fantasy is. Whatever this level of conscious activity may be, goal awareness always remains a necessary attribute of resistance on Π_C^c. And for this you will need to spend a certain amount of mental energy. All this is regulated by C_B, the human willpower.

The aim of the work is to numerically assess the degree of mental symbiosis and to assess the necessary mental energy to escape from mental symbiosis.

Research method

The work [4] states that by its nature the human psyche has strength and resilience, based on these properties it affects its environment. It is these two properties of the human psyche that are expressed through its potential. Then the parameters of the potential of the human psyche are interconnected as follows:

$$U \approx "Я" \cdot (C_в + Ф) \qquad (1)$$

where: U is the potential of the psyche, "Я"-"Я concept", $C_в$ is willpower, $Ф$ is fantasy.

In terms of its content $(C_в + Ф)$ - expresses the resistance of the psyche to $П_С^с$, "Я" - expresses the strength of the human psyche. As you know, the social content of an individual is expressed in his goals, and the content of a person's goal is concentrated in the "Я", then, undoubtedly, the "Я" expresses the power of the human psyche. On the other hand, in order to achieve his goal, a person, with the help of his $Ф$ imagination and his $C_в$ willpower, eliminates the influence of $П_С^с$. Therefore, $(C_в + Ф)$ - expresses the resistance of the human psyche to the influence of $П_С^с$.

What is interesting in formula (1) is that when the human psyche is fractal [5], [6], the potential of the psyche has a fractal dependence on the Я-concept, i.e. in this case, the dependence of the potential of the psyche on the "Я-concept" will be gradual.

$$U(r) \approx Я^{1-D} \cdot (C_в + Ф) \qquad (2)$$

where: U is the potential of the psyche; r is the social environment where the individual's transaction takes place; D is the fractal dimension; "Я" - "Я concept"; $C_в$- willpower; $Ф$ –fantasy.

Here, D expresses the fractal dimension of the potential of the psyche and the speed of the psyche to respond to the influences of $П_С^с$. On the other hand, this dimension characterizes the measure of resistance on the $П_С^с$ using "Я", ego and self. When D=1, we arrive at formula (1). This corresponds to a stable mental state. A person's uniqueness can be distinguished using D. Formula (2) is similar to the formula of Mandelbrot B.B. [5].

When conducting an experiment [7], [8] with formula (2), it turned out that a person with fractal mental potential is resistant to the influence of $П_С^с$.

For a more local explanation of the proposed concept, we introduce the following notation:

In the case when $C_в = Ф$, the resistance $(C_в + Ф)$ is denoted by the letter R.

In the case when $C_в > Ф$, the resistance $(C_в + Ф)$ is denoted by the letter L.

In the case when $C_в < Ф$, the resistance $(C_в + Ф)$ is denoted by the letter C.

The expression U>"Я" is read as "the potential of the psyche is ahead of the content of its "Я".

U<"Я" is read as "the potential of the psyche lags behind the content of the "Я".

U≈"Я"is read as "in terms of content, the potential of the psyche corresponds to the content of the "Я".

That is, the resilience of the psyche can be formally designated as:

$$T = (C_в + Ф) = \begin{cases} R - when \quad U = "Я" \\ L - \quad when \quad U > "Я" \\ C - \quad when \quad U < "Я" \end{cases} \qquad (3)$$

It can be seen from formula (3) that the resistance of the human psyche has three types.

When $T = R$ is a balanced, prudent person, and his activities are always productive. Such people achieve fantastic results in life.

If $T = L$, the person is too modest and easily gives up his position, hoping to win back later. In most cases, they succeed.

When $T = C$, this person's mental strength is very strong and, thanks to this, he promptly eliminates Π_C^c and, by winning difficult situations, dramatically enhances his mental potential. This is common among political leaders.

What is interesting here is that γ expresses the degree of susceptibility of the human psyche to external energy-informational influences. The value of γ is called the frequency of susceptibility.

$$\gamma = {1}/{\sqrt{Я \cdot T}} \qquad (3a)$$

This formula was found heuristically [4]. Psychological experiments conducted by people aged 20-22 years have shown that it is this psychological parameter that determines the generation of psychological symbiosis during the transaction of two people.

To create uniform samples of measures (standards) and bring all measurements in Russia into line with them, L.Euler proposed the decimal principle of division of units and the metric system of measures. It was Euler who put forward the concept of creating standards based on physical constants. This approach can be used to develop the metrology of the human psyche.

If we analyze the formal representations of mental processes, there is a formed opinion that Gustav Fechner was one of the founders who modeled the psychological process. Thus making psychology "scientific". Fechner realized that the law of the relationship between mind and body can be expressed as a quantitative relationship between sensory perception and a material stimulus [9]. Soon this formulation became known as Fechner's law: S = Klog I (the intensity of sensory perception is proportional to the logarithm of the material stimulus). Even Wilhelm Wundt insisted [10]: "It will never be forgotten that it was Fechner who first introduced scientific methods, precise principles of measurement and observation into psychology for the study of mental phenomena, thereby opening up the prospects of psychological science in the strict sense of the word."

In [11], [12], metrology was proposed for numerical evaluation of the psychological parameters described above.

1. For the strength of the human psyche, *Я* can enter the «*Ha*» dimension if the person correctly typed 10% of the correct answer. Then his mental strength will be 1 *Ha*.

2. Also, for the parameter *T*, resistance is measured by «*Ka*», according to the *Ф* and $C_в$ test, if a person scored 10% of the correct answer, then

$$1Ha \cdot 1Ka \approx 1Ep \qquad (4)$$

This formula reads as: a person has 1 *Ep* of mental potential if he guessed 10% of the correct answer for *Я, Ф* and $C_в$ on the test. The expression of formula (4) will be the basis of the metrology of the human psyche.

Now we introduce the function $F_{\alpha,\beta}$ – the transactional force of α -psychology on β-psychology, U_α U_β_b potential of the corresponding psychology.

$$F(\omega)_{\alpha,\beta} = \begin{cases} 1, if\ U_\alpha > U_\beta \\ 0, if\ U_\alpha = U_\beta \\ -1, if\ U_\alpha < U_\beta \end{cases} \qquad (5)$$

When $F(\omega)_{\alpha,\beta} =1$, say α - psychology is stronger than β psychology, then $\Pi_C \neq 0$. When $F(\omega)_{\alpha,\beta} =0$, say both psychology is equal, in this case $\Pi_C=0$. When $F(\omega)_{\alpha,\beta} = -1$, say psychology is stronger than α, then $\Pi_C \neq 0$.

Transaction (mutual influence)

Now let's consider the process when two (α,β) mental fields of individuals influence each other. Since this process is the basis for estimating the minimum mental energy for generating Π_C^c.

As already noted, the potential of the human psyche is $U = "Я" \cdot (C_в + Ф)$. When a person mentally influences another person, he gives a certain mental energy to the person he influences. Then this process is described by the following equation [1]:

$$U = U' + \frac{d\psi}{dt} = "Я"(C_в + Ф) = U' + \frac{d\psi}{dt} \tag{5a}$$

where U' is the potential of the individual being influenced.
If in (4) we multiply both parts by "Я" dt:

$$("Я")^2 \cdot (C_в + Ф)dt = U'"Я" \, dt + "Я" d\psi \tag{6}$$

The left part of equation (6) represents the psychological energy of the influencing individual, and the right part expresses the potential of the human psyche to be influenced and plus the mental energy - "Я" $d\psi$ given to influence, during dt, obtained from $("Я")^2 \cdot (C_в + Ф)dt$.

Now let's numerically evaluate the psychological energy to eliminate $\Pi_С^с$. We will denote it as:

$$dw_M = "Я"d\psi \tag{7}$$

Then

$$w_M = \int_0^{\psi_w} "Я" \, d\psi \tag{8}$$

where ψ_w is the maximum energy to eliminate $\Pi_С^с$.
Let's introduce the coefficient of psychological susceptibility of a person – ω.
The variability of the potential U depends on the "$Я$", such a relationship is denoted as:

$$\psi = \omega Я", \quad d\psi = \omega d"Я" \tag{9}$$

Then the psychological energy to eliminate $\Pi_С^с$ is estimated as:

$$w_M = \int_0^1 "Я" \, dЯ = \frac{\omega("Я")^2}{2} \tag{10}$$

The limit of the integral expresses in which psychological interval the process of eliminating $\Pi_С^с$ occurs. The coefficient ω expresses how amenable an individual is to $\Pi_С^с$. This coefficient is inversely proportional to the isotropy of a society, i.e. the higher the isotropy of a society, the less likely it is to generate a $\Pi_С^с$.

Thus, so that you do not fall under the influence of $\Pi_С^с$, you need to have at least the following psychological energy:

$$w_M = \frac{(C_в \cdot Ф) \cdot (Я)^2}{16\pi} \approx 0.02(C_в + Ф) \cdot (Я)^2 \tag{11}$$

If we denote it as $\omega \approx 0.02(C_в + Ф)$, then formula (11) can be rewritten as follows:

$$w_M \approx \omega \cdot (Я)^2 \approx 0{,}02 \cdot Ка \cdot На^2 = 0{,}02 \cdot (13{,}2) \cdot 16 \, Ка \cdot На^2 = 0{,}264 \, Ка \cdot На^2 \tag{12}$$

Based on formula (12), we can write $0{,}264 \, Ка \cdot На^2$ is equivalent to 1J , i.e. $0{,}264 \, Ка \cdot На^2$ psychological energy equals 1J.

This is the minimum psychological energy of a person to be connected to the process of psychological symbiosis.

Discussion of the results

In terms of content, γ–expresses a person's ability to fall under the influence of Π_C^c. The greater the γ, the more psychic energy is required to eliminate Π_C^c. On the other hand, with the help of this coefficient, it will be possible to assess an individual's ability to resist Π_C^c.

w_M is the minimum mental energy needed to influence another psyche. Figure 1 shows the dependence of generation.

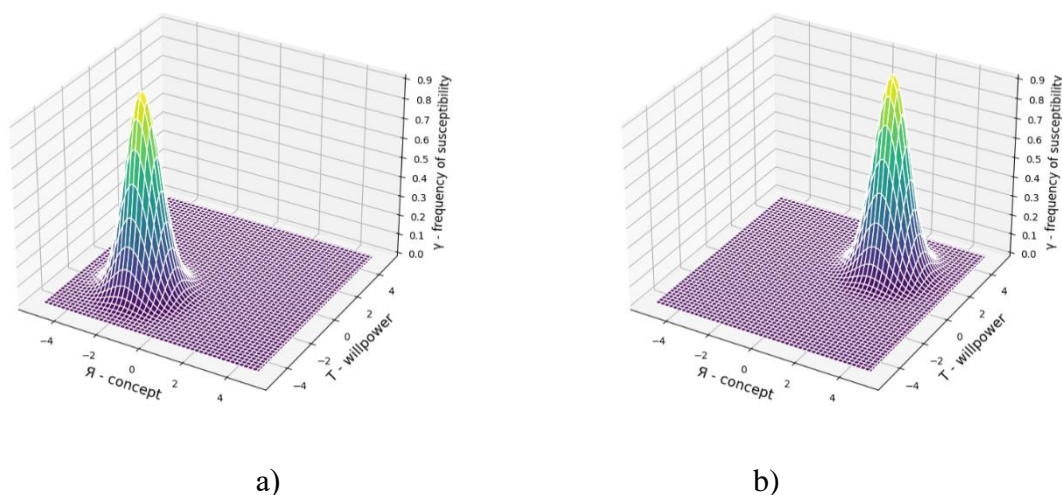
a)   b)

Figure 1. Dependence of the generation of Π_C on $Я$ and T

The psychological symbiosis of Π_C from the $Я$-concept a) and from the psychological resistance $T=(C_B + \Phi)$ and c) shows the light contrast of the psychological process of generating Π_C symbiosis. It is clear that before the generation of Π_C, the human psyche passes through a symbiotic state of Π_C. During this period, the human psyche experiences and overcomes a lot of uncertainty, which swallows a certain amount of psychological energy w_M. Passing through each stage Π_C^c (1,2,3,...) requires a lot of psychological energy from a person. In principle, such energy is generated by the potential of the psyche of $U(r)$ and from what social environment r he is in. On the other hand, the very process of generating Π_C depends on the γ psyche of the person who participates in the transaction, i.e. $\vec{\gamma}(Я, T)$. It is clear that the changes in γ also depend on the changes in $Я$ and T in time t and on $\frac{\partial Я}{\partial t}$ and $\frac{\partial T}{\partial t}$, which is shown in Figure 2. It can be seen from the figure that the symbiosis of the two psychology will occur when $\gamma_1 \approx \gamma_2$.
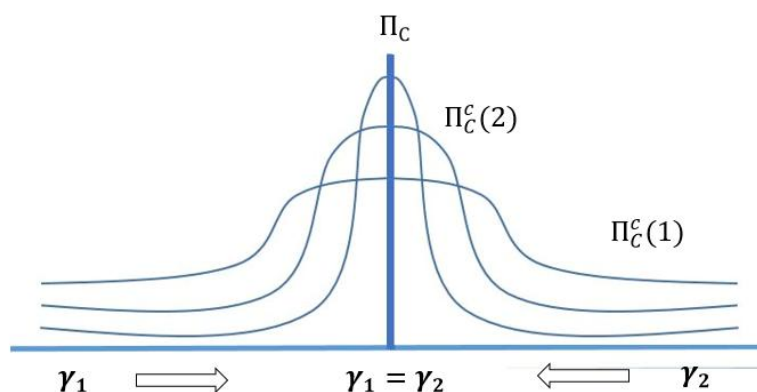

Figure 2. Graphical view of the generation of Π_C

Figure 3 shows the transition from $\Pi_C^C(1,2,3,\dots) \rightarrow$ PC during the transaction. It can be seen from the figure that the process of generating a symbiosis of two psyches consists of several stages. In the first stage, Figure 3-a) $\Pi_C^C(1)$ stage are generated before the symbiotic state. At this stage, signs of symbiosis appear on the slave psyche. Figure 3-b), $\Pi_C^C(2)$ the last stage of symbiosis generation. At this stage, the two psychics reflexively coordinate the potentials of the two psychics $U_1 \cong U_2$. Figure 3-c), generating a complete symbiosis of the two psychics. At this stage, $U_1 \equiv U_2$ occurs, that is, two psychics merge into one - this is a symbiosis.
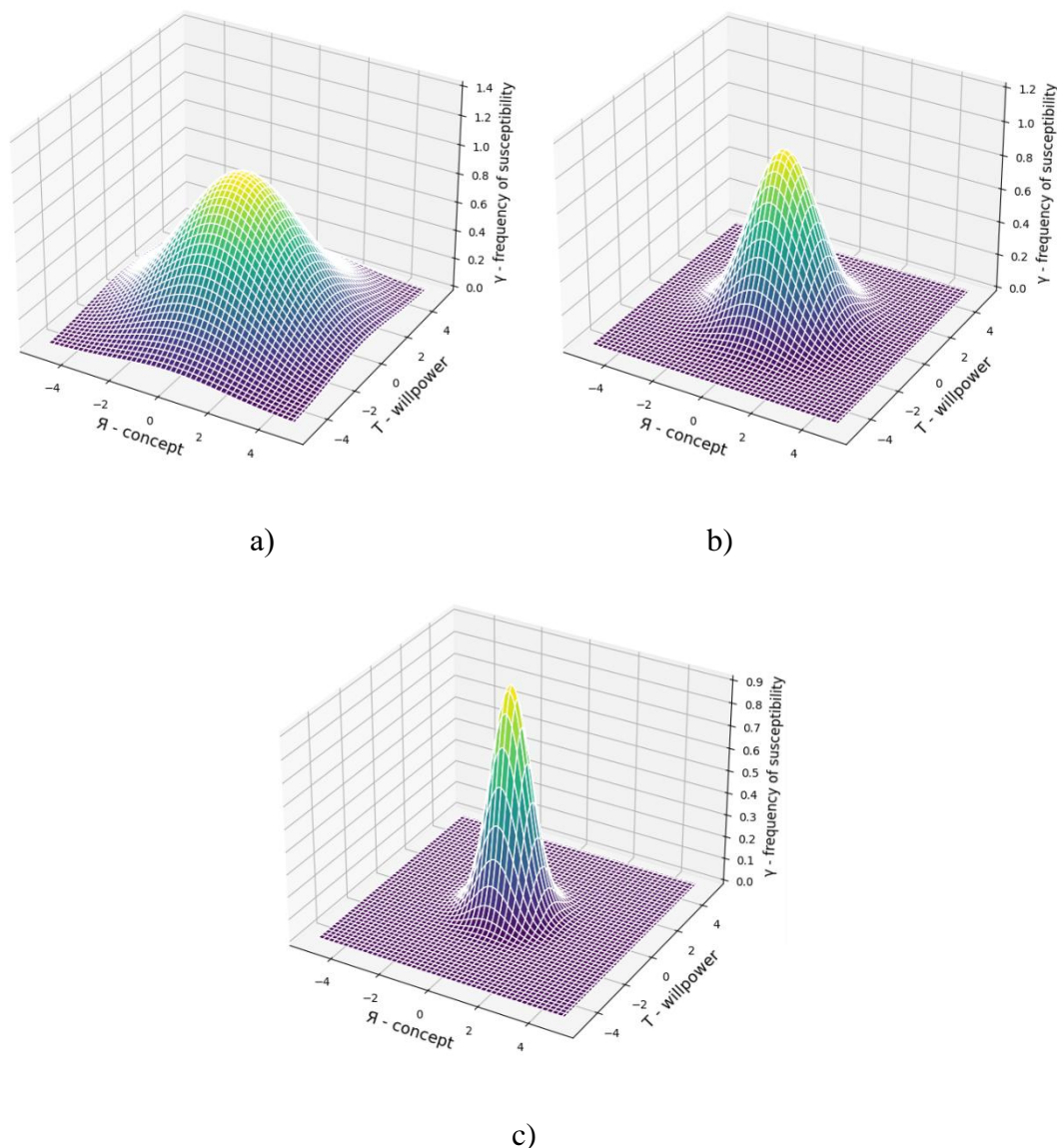

a)

b)

c)

Figure 3. Stages of the generation of psychological symbiosis of Π_C

The volumes of these figures show the stages of reflexive coordination of the potentials of the psyche involved in the process of the transaction. And the colors show the degree of reflexive agreement of the potentials of the two psyches.

Conclusions

Summarizing the work, we can say the following:
- with the help of the psychological parameters of the "Я-concept", the willpower of $C_в$ and Ф, many psychological problems can be solved;
- The potential of the human psyche U determines the structure of human psychology;

- Using the U potential of the psyche, it is possible to evaluate the results of a transaction between two psychics.;
- the process of symbiosis, i.e. the merging of two psychics into one, occurs in stages during a transaction (verbal, verbal, physical, etc.);
- the process of generating two psychics can be assessed using γ.

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