

THE STRUCTURE OF OUR KNOWLEDGE

N.I. Kolodina, M.N. Makeyeva

Department Foreign Languages, TSTU

Represented by a Member of Editorial Board Professor V.I. Kononov

Key words and phrases: cognitive process; information coding; model of mental process; knowledge units; notions; knowledge structure; moduses of perceiving.

Abstract: The paper focuses on the research of the structural adjustment of a man's knowledge. The man's structural knowledge is demonstrated as the collection of the knowledge units. The hypothesis about the simultaneous information coding through eye-sight, hearing, smelling and touching in the form of minimum units is checked by the experimental research. These units are the minimum units of knowledge, which structure is the building material of the cognitive combinations – notions in the process of comprehension. In the paper the knowledge structure organized according to the steady connections of the knowledge units and submitted to the logic coincidence as to moduses of perceiving (tactile, geometrical, graphical, smelling, touching) is shown.

The scientists who research the structure of consciousness have come to the conclusion that all structure of the individual's knowledge has the specific adjustment. This structure of knowledge is a cognitive model forming the man's consciousness [Kubryakova E.S., Babushkin A.P., Sternin I.A., Boldurev N.N.].

The structure of knowledge functions in the thinking process in such a way that allows the person to recognize and to comprehend the surrounding reality.

The thinking process of a man is limited by the psycho-physiological norms which look like a special program. This program is often called "submission to the claims of thinking as a social institute" [Rosin, 1997:19] or "the common principle of everybody's thinking to appreciate forms in which the things are given to everybody" [Kant, 1995:225].

Different people can have the different structural organizations of consciousness. Hence, the submission of consciousness can be done by different thinking programs. It is known, for instance, that Japanese have the different organization of consciousness structure. The perception of sounds and the emotions which are connected with the sounds are cultivated in the left hemisphere. The left hemisphere becomes the main one while the talking ability develops. The emotions and the sound perceptions are cultivated in the different hemispheres of west and east individuals.

As a result the thinking program of west and east individuals differs. At the same time the different persons of the same nationality can have the different levels of comprehension. In psychophysiology the different levels of comprehension are connected with the width or the narrowness of consciousness. "The width of consciousness is determined by the quantity of canals of the spreading local actuation which modulates the informative nets of neurons. The more local modulators are actuated the wider is the consciousness. The deactivation of a few local modulators leads to the narrowing of the

field of consciousness”[Danilova, 1998:30]. Probably the process of imagination deals with the width of consciousness.

The quantity of actuated local modulators does not depend on the man’s wish, it is connected with the psycho-physiological properties of every person, with his genetic structure, that is why it is impossible to demand from the man to comprehend something which he is not able to comprehend because of his psycho-physiological abilities.

While there are many theories about the adjustment and functioning of consciousness still it is not clear how the structure of knowledge is arranged and how the mechanism of man’s thinking activity functions.

In this article we suggest our own hypothesis of the structural adjustment of a person’s knowledge and for these purposes we will use the experimental researches of thinking activity.

The researches of the man’s structural adjustment of consciousness leads to the necessity to clear up what units compose the structure of knowledge and according to what rules all the units are adjusted.

In the article we propose the hypothesis according to which all the information the man receives is coded in the consciousness simultaneously through: eye-sight, hearing, olfactory organs (smelling), sense of touch, felt emotions. Everything is its completeness is submitted to the unique laws of people thinking process. These laws are called by A. D. Suliymenova: “the equal logic thinking base for all people” and she stresses that “the very fact of reaching understanding between people can be explained by only one condition – the equal logic thinking base for all people. The equal logic thinking base for all people has the foundation in the equal social experience and in the equal physiological nature of an every man...” [Suliymenova, 1989:127].

The perception of surrounding reality through the eye-sight, hearing, olfactory organs, and the sense of touching is accompanied by feeling emotions which are “melted” in the receiving information. V.I. Shakhovskij proved persuasively that “emotions have physiological (natural) and estimating parameters (that is the result of their comprehension) [Shakhovskiyi, 1987:39]. Hence, emotions are the central lever of controlling the categorization process. At the same time emotions are the part of man’s intellect.

In the structure of man’s knowledge we apportion some moduses corresponded to the canals of receiving information: **tactile modus, geometrical and graphical moduses, smelling and touching moduses**. All these moduses are connected closely and interact. The close connection between the sensation of taste and the smelling is not recognized by a man and only when he has got a cold he comprehends he does not feel smelling and does not feel the taste of food as well. For instance, while I am eating the apple the units of knowledge are being coded in the consciousness through eyesight, hearing, smelling, touching; while I am seeing the film the units of knowledge are being coded through eyesight, hearing, smelling, touching and at the same time emotions are entering into these units too, it may be pleasant or unpleasant. While I’m reading the book the units of knowledge are being actuated in accordance with the perception through the eyesight, hearing, smelling, touching. In the process like this something is realized and anything is not realized.

Perceiving information is coded in the man’s consciousness in the form of small units of knowledge which we call the **mnemo-units of knowledge (MUK)**.

The mnemo-unit of knowledge is the smallest unit of knowledge actuated in the operative memory, and this unit is integrated with other smallest units in the process of comprehension.

The word “mnemo” is used to show that the process which allows to form thinking representations (notions) in the operative memory.

The whole structure of a man’s knowledge is **the basic collection of knowledge units**.

The basic collection of knowledge units is the structural collection of knowledge units, acquired by a man in the process of any interaction with the surrounding reality.

In the process of comprehension mnemo-units of knowledge are integrated with each other forming thinking representations which we call here notions. In other words, combinations of these units provide the formations of bigger cognitive constructions – notions, which can be fixed in the thinking process with the help of introspection method.

The mnemo-unit of knowledge *can not be pronounced*, it can be explained. For example, it is impossible to visualize the green color only like the green color which is not connected with anything. The space can be green or any linen, leaf, thing can be green but it is impossible to visualize the only green color which is not conjunct with anything. The knowledge about the green color is the mnemo-unit of knowledge which is integrated with other units in the thinking process.

Shortly speaking, MUK is the building material for the formation of notions. In the thinking process the combination of the mnemo-units of knowledge becomes the notion.

The mnemo-units of knowledge are integrated with each other according to their close qualitative tokens which allow to form thinking notions. For instance, the person has the unit of knowledge about the form “round”, also he has the unit of knowledge about the form “square” but he can’t visualize the thinking notion such as “round square” because these two units of knowledge “round” and “square” don’t enter into the integration, don’t have close qualitative tokens. In the cognitive field the absurdness like that can be represented in the phraseology, for instance, “soft-boiled boots”(Rus.). The Russian person can visualize the thinking notion “soft-boiled boots” that is to say the boots which are worn out, which are brought on one side, very old boots, but it is impossible for the man to visualize the thinking notion “round square”.

In the structure of man’s knowledge we apportion the following units of knowledge: *MUK about visual tokens of people, things, different figures, marks, nature; MUK about felt emotions, some physical states, presence in different situations, about characters of people; MUK got in the process of hearing, talking, reading and analyzing some texts.*

All MUK are coded as to some level of emotional scale. In the thinking process descreying notions are realized or are not realized. Those which are not realized do not have clear contours and only the directional thought at the thinking actions allow to frame these notions into clear contours. Such kind of directional thought is the characteristic of the process of thinking activity.

The thinking activity is the realizing of the thinking actions with the notions.

The result of researches allows us to come to the conclusion that not prepared standard gauges or schemes are entering into the man’s consciousness (for instance, the specific house or tree) but only the units of knowledge have steady connections with each other. These steady connections depend on each other logically, that’s why they allow to form the thinking representations – notions. Remember the case when it was impossible to visualize the notion – “round square”.

If it is necessary to visualize the specific house or tree the person uses the directional thought, that is to say he actuates some MUK in his basic collection of knowledge units. These mnemo-units of knowledge are integrated one into another forming the specific notion. Our observations has its explanation in Pavlov’s doctrine about the consciousness like “light spot”. He has been connecting the consciousness (in our term “thinking process) with the focus of excitation of light spot, the field of risen excitability, which can move on the cortex. Pavlov’s theory was developed further by Crick, who created “the searchlight theory of consciousness” (According to Danilova N.N., 1998).

He spoke about the existence of a special apparatus in the consciousness producing “the beam of searchlight”. The phenomena of a beam can be explained by the specific form of attention and gamma-oscillations in the electrical activity of brains.

Crick underlined the dependence of the consciousness upon the mechanism of some forms of operative memory – the fact which is related to our hypothesis about the structural organization of the consciousness in the form of MUK.

Crick assumed that “neural processes which are passing under the beam of searchlight determine the content of our consciousness. The neural processes, which are not under the beam of searchlight form the subconsciousness. Shortly speaking, thinking processes being recognized and thinking processes not being recognized are passing at the same time. The term “subconsciousness” is used to determine neural events, which are not realized.

According to the theory of light spot all MUK are equal in the passive state because in actuated state the weak MUK can be strong and the strong MUK can be weak in the passive state. It depends on the directional thought and on the characteristics of the materials perceived. That’s why we can say that in passive state there are equal MUK, which are integrated in the actuated process, “building” the necessary notions for the process of comprehension. In favor of this hypothesis there exists the fact that it is impossible to stop the process of thinking though it is possible to fix the thought. Every time running into the necessity to perceive something the person deals with the forming of notions and categorization. He estimates and refers the perceived materials to the special class and at the same time he carries out the correlation of the material perceived with that he has already had in his basic collection of MUK. If there were not separate MUK in the basic collection but the whole perceived ensembles, the person would not have the necessity to categorize, to recognize and to correlate the perceived material with the knowledge, which he has already had.

Since the notions which are not recognized can not have clear contours and only the recognition of the thinking process conducts to the forming of such notions which have clear contours, we can conclude that at every case requiring necessity of recognizing, the operation of additional adjustment of perceiving information and the actuated units of knowledge are executed. In other words, while the person is perceiving the information he is adjusting all the basic collection of the knowledge units in his thinking process. And the re-formation of the basic collection of knowledge units occurs.

The actuation of one MUK, which is in any field of structural knowledge leads to the actuation and integration of units, which have close tokens. The integration of such kind of MUK leads to forming of the thinking notions. This process is **the thinking algorithm**.

The chain actuation of MUK testifies the existence of permanent connections between mnemo-units of knowledge. Confirmation of this hypothesis can be found in the psychologist’s researches, in particular, in the field of discovery of so-called “gnostic units”. The conception of gnostic units belongs to U. Konorskiy, who supposed that excitation are not cell ensembles but separate neurons, which are responding to the separate perception, corresponding to recognition of the familiar face at the first look, familiar things, familiar voice with the first word, familiar smell, familiar gesture etc. The research of neuronal activity of cortex of higher animals confirmed his conception of gnostic neurons (According to Danilova, 1998:10).

In accordance with our hypothesis about the simultaneous coding of information through eye-sight, hearing, smelling and touching, which are fixed in the form of MUK in all moduses, the group of people was suggested to describe some notions. By the describing of these notions were supposed to reveal the structural organization of a man’s consciousness.

All moduses have at least 2 emotional levels: pleasant and unpleasant. That is to say, all the receiving information can be divided into 2 emotional levels. In this division we relied on V.I. Shakhovskiy's researches of emotions.

The division into moduses was carried out depending on the primariness of the registration of the receiving information.

The group of people described the notions according to the following parameters:

What kind of sense after fumbling could be	What color could be	What kind of smelling could be	What kind of taste could be	What kind of look, appearance, form could be	What kind of sound could be	What kind of functioning what kind of destination
--	---------------------	--------------------------------	-----------------------------	--	-----------------------------	---

There was suggested to describe the following abstract notions: "*happiness, freedom, future, affliction, misfortune, war*". We supposed that such notions like "*happiness, freedom, future*" can have steady connections in moduses as to the tokens of connecting. As well as the notions "*affliction, misfortune, war*" have common steady connections as to the tokens.

The results of researches (there were inquiries) are following:

happiness

after fumbling "soft, warm, fluffy, airy, pleasant" – 100 %.

color "pink" – 35 %, "blue and dark blue" – 65 %.

smelling "sweet, pleasant" – 100 %.

taste "sweet, pleasant, the taste of fruits, chocolate" – 100%.

form "oval, huge ball, something big and round" – 100%.

sounding "quietly, melodiously" – 65 %, "loudly, gladly" – 35 %.

destination "inspires, brings joy, gives hope, pleasant" – 100 %.

freedom

after fumbling "light, cool, soft, pleasant" – 100 %.

color "white, transparent" – 75 %, "blue" – 25 %.

smelling "freshness smell, flowers, pleasant" – 100 %.

taste "sweet" – 100 %.

form "circle, cloud, oval" – 100 %.

sounding "quietly, soft, tender" – 65 %, "loudly, gladly, proudly" – 35 % .

destination "brings joy, relief" – 100 %

future

after fumbling "soft and warm" – 75 %, "solid" – 25 %.

color "blue" – 65 %, "shining, silver" – 30 %, "white" – 5 %.

smelling "the smell of the sea, lemon, winter freshness, fir freshness, mint freshness" – 100 %.

taste "sweet, strawberries, pleasant" – 85 %, "tasteless" – 15 %.

form "circle, oval, cloud" – 100 %.

sounding "melodiously, loudly and pleasant" – 80 %, "quietly" – 20 %.

destination "inspires interests, conducts to somewhere, makes to live" – 100 %.

It is not difficult to notice that the coincidence happened as to the string of qualitative tokens. The notion "happiness" is warm and the notion "freedom" is cool. As to the pleasantness the both notions are coincided. All of three notions have the blue, white color, and the notion "happiness" - pink. Hence, the notions "freedom" and "future" are closer to each other as to their qualitative tokens than the notion "happiness". As to the

smelling sense the notions “freedom” and “future” are closer to each other again than the notion “happiness” because the notions “freedom” and “future” have relative MUK here in the form of equal tokens.

It is necessary to stress that the physiological abilities of a man allow him to differ only four main tastes: sweet, sour, salt, bitter. The tip of a man’s tongue is sensible to sweet taste and the side part of the tongue is sensible to salt and sour tastes and the back part of the tongue – to bitter taste.

As to the form all of three notions are coincided – 100 %. They are ball, oval, circle. The destinations of three notions are close too.

The next notions were suggested to the group of people and all of these notions have unpleasant emotional color. The results of researches (there were inquiries as well) are following:

misfortune

after fumbling “solid” – 75 %, “slippery, sticky” – 25 % .

color “black” – 100 %.

smelling “something suffocating, unpleasant” – 100 % .

taste “bitter” – 100 %.

form “something with edges, thorns, with rough verges” – 100 %.

sounding “sad, melancholy, crying” – 85 %, “loudly, shrill” – 15 %.

destination “brings grief, pain” – 100 %.

affliction

after fumbling “cold, thorny, sharp” – 100 % .

color “black” – 85 %, “gray, dark” – 15 % .

smelling “dampness, rain, tears” – 100 % .

taste “bitter-salt” – 100 % .

form “sharp, polygonal, unpleasant” – 90 %, “dark, unpleasant” – 10 % .

sounding “crash, crack, squeal, unpleasant” – 75%, “slowly, unpleasant” – 25 % .

destination “brings misfortune, pain, fear, makes to suffer” – 100 %.

war

after fumbling “solid, rigid, thorny, cold, unpleasant” – 100 % .

color “red, black-red” – 100 % .

smelling “the smell of blood or burning” – 100 % .

taste “bitter, salt” – 100 % .

form “squire” – 90 %, “rectangle” – 10 % .

sounding “loudly, crack” – 100 %.

destination “killing, destroying” – 100 %.

There is the absolute coincidence of the qualitative tokens of the notions. The taste of all notions are “bitter and salt”, the color – “black, gray, red-black”, the form – “sharp, squire”, sound – “unpleasant, squeal”.

It was interesting for us to see if there are similar tokens of the researching notions in the definitions of these words in the dictionary. In the dictionary by S.I. Ozhegov the following definitions are given: “the happiness – the feeling of freedom, the state of the higher satisfaction”, “the freedom – the absence of restrictions, limitations”, “the future – the time and events which are following after the presence”, “the misfortune – deep sorrow, grief”, “affliction – sorrowful event”, “the war – the struggle between the states or between the classes within the state” (Ozhegov, 2001).

We came to the conclusion that it’s necessary to reveal the sema composition of these notions. As to the logic, semas must be included in the notions while the process of notions perceiving is passing. Hence, in this kind of notion semas, which organizes it must be somehow fixed.

The linguistic dictionary explains “sema (Greek term) is the minimum unit of the word content”, “... sema is the operational unit of the component analysis while the researches of the word semantic field and word versions, as well as determining of similarities and differences are conducting” (LED, 1990: 437). And there is given the example of revealing of semas in the word “father”. Five semas are revealed which form the main meaning of the word “father”: ‘male sex’, ‘parent’, ‘close relationship’, ‘blood relationship’, ‘the first generation” (abid., 1990:437). In the dictionary by S.I. Ozhegov the definitions of the word “father” are as following: “1.The man with reference to his children. 2. The male with reference to his kids”(Ozhegov, 2001:470). With this explanation of the word we want to underline that in the dictionary the semas of the word are not revealed and the definitions are only given. Hence, to analyse the semas composition of the word we should make the inquiries to reveal the mnemo-units of knowledge of the person because the semas must be included in the person’s knowledge about the notion. We gave the group of people the same notions and ask them to explain their comprehension of these notions.

The explanations were the following:

“**Happiness** – love, health, children, harmony, gladness, the state of the soul, the phenomenon of the soul, calm, pacification, the absence of the problems, riches, bliss, well-being, fun, pleasure”.

The sema composition of this notion coincided with the analyzing moduses of the destination “brings the gladness, gives the hope, inspires”.

“**Freedom** – the feeling of flight, travel, unlimited space, absolute space, the absence of the dependence, the feeling of the lightness”.

The sema composition of the notion coincided with the analyzing moduses – the touching. There were underlined that the freedom can be “light”. The coincidence is in the destination – “to relief”.

“**Future** – children, grandchildren, something unknown, family, happiness in private life, good job, hope for the best, something far, the expecting of something, mystery, inevitability, plans, purposes, dreams”.

The sema composition of the notion coincided with the destination – “conducts to somewhere, makes to live, inspires interest”.

“**Affliction** – loneliness, tears, sadness, treachery, the state of the soul, loss.” The tokens according to the moduses of perceiving are close here – “pain, fear, suffering, tears, the taste of bitter-salt”.

“**Misfortune** – death, tears, poverty, sickness, loneliness, sadness, troubles, problems”. There are the following qualitative tokens in the concept which are close to the tokens according to the moduses “affliction” – “crying, suffocating smell, pain, depressed”.

“**War** – soldiers, weapon, blood, fear, death, destruction, starvation, explosions, suffering, pain, cold”.

The notion “war” coincided with the notion “war” according to the moduses – “the smell of blood, square form, destruction, killing”.

In the researches mnemo-units of knowledge appeared in the form of knowledge about “the happiness is pink and warm”, “the war is with the smell of blood and with thorny” and in the thinking process MUK were integrated one into another forming the thinking representations – notions. In the thinking process the actuation of MUK (and their integration) is “the light spot”, which moves nearly equally in all persons’ consciousness.

The results, which show 100 % of coincidence, prove that on the level of MUK submission of consciousness corresponds to the equal logic-thinking base.

It would be interesting to see the results of the experiments done with the representatives of other people, for instance, with Japanese, and compare obtained results with the results obtained in researches of west people. This research would allow to reveal the differences or coincidence in the equal logic-thinking base on the level of minimal units of knowledge.

References:

1. Danilova N.N. Psychophysiology. – M. Aspect Press, 1998. – 373 p.
2. Linguistic encyclopaedic dictionary. – M. Sov.encyclopaedia. 1990. – P.437.
3. Ozhegov S.I. The dictionary of definitions. – M. Azbukovnik, 2001 – P.470.
4. Rosin V.M. The studying and constructing of the consciousness in the humanity sciences // The questions of methodology. – M, Kastal. No. 1 – 2. – P.15 – 39.
5. Suliymenova E.D. The concept of meaningfulness in the modern linguistic. – Alma-Ata. Mecktep, 1989. – 160 p.
6. Shakhovskiy V. I. The categorization of emotions in the lexical-semantic system of the language. – Voronezh. SVU, 1987. – 190 p.

Структура наших знаний

Н.И. Колодина, М.Н. Макеева

Кафедра иностранных языков, ТГТУ

Ключевые слова и фразы: когнитивный процесс; модель мыслительного процесса; единицы знаний; представления; структура знаний; кодирование информации; модусы восприятия.

Аннотация: Статья посвящена исследованию структуры человеческого знания. Структура человеческого знания представляется как собрание единиц знания. Гипотеза об одновременном кодировании информации посредством зрения, слуха, обоняния и осязания в форме минимальных единиц подвергается экспериментальной проверке. Эти единицы выступают как минимальные единицы знаний, сочетание которых становится строительным материалом для создания когнитивных комбинаций, известных как понятия, возникающие в процессе понимания. В статье структура знаний представлена с учетом постоянных связей между единицами знаний и логически соответствующими им модусами восприятия (осязательным, геометрическим, графическим, обонятельным).

Struktur unserer Wissen

Zusammenfassung: Der Artikel ist der Untersuchung der Struktur der Menschenwissens gewidmet. Die Struktur des Menschenwissens wird als Sammlung der Wissenseinheiten dargestellt. Die Hypothese über das gleichzeitigen Informationskodieren durch die Sehkraft, das Gehör, den Geruch und das Tastgefühl in der Form von Minmaleinheiten wird experimentell untersucht. Diese Einheiten sind minimale Einheiten des Wissens, deren Kombination als Baustoff für die Schaffung der Kognitivkombinationen gilt. Die Letzte sind als im Prozeß des Verständnisses entstehende Begriffe ba-

kannt. Im Artikel ist die Wissensstruktur mit Rücksicht auf die ständigen Beziehungen zwischen den Wissenseinheiten und ihnen logisch entsprechenden Auffassungsmodusen (tastgefühllichen, geometrischen, graphischen, geruchlichen) dargestellt.

Structure de nos connaissance

Résumé: L'article est consacré à l'étude de la structure de la connaissance humaine. Celle-ci se présente comme un ensemble des unités de connaissance. L'hypothèse sur le codage simultané de l'information à l'aide de la vue, la ouïe, l'odorat et le toucher en forme des unités minimales est soumise à la vérification expérimentale. Ces unités se présentent comme de véritables unités minimales de connaissance dont la combinaison devient une matière de construction pour la créations des ensembles cognitifs qui sont connus comme notions surgissant au cours de la compréhension. Dans l'article la structure de connaissance est présentée compte tenu des liaisons permanentes entre les unités de connaissance et les modus de la perception qui leur correspondent logiquement (tangible, géométrique, graphique, olfactif).
