
ПСИХОЛОГИЯ РАЗВИТИЯ

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ФОРМИРОВАНИЕ ПСИХИКИ КАК РАЗВИТИЕ САМООБУЧАЮЩЕЙСЯ СИСТЕМЫ

ORGANIZATION OF MIND AS SELF-LEARNING SYSTEM DEVELOPMENT

Аннотация. В данной статье предлагается модель развития психики человека, разработанную на основе анализа большого количества существующих теорий и призвана обеспечить систематизацию существенной части эмпирических знаний в области психологии. В статье рассматривается психология развития человека с кратким описанием последовательности формирования человеческой психики как самообучающейся системы. Сделана попытка совместить в единую систему многие факты о работе мозга, из разных областей психологии. Помимо признанных научных моделей, рассматриваются также более спорные теории, включая MBTI и DISK, которые, однако, в силу их распространенности могут предложить значительные эмпирические данные. Исследование основано на предположении, что два полушария мозга формируются разными путями, хотя и в существенной зависимости друг от друга, в силу того, что должна сохраняться универсальность мышления. Модель формирования охватывает восемь возможных этапов, хорошо согласующихся с существующими периодизациями, и представленных для каждого полушария мозга. Способы обработки информации в полушариях могут остановиться в формировании на любом из этих восьми этапов, релевантном окружающей среде. В статье приведены все возможные случаи становления способов анализа на определенных этапах адаптации. Развитие левого полушария предполагается менее последовательным, чем правого полушария, в связи с тем, что деятельность левого полушария более зависит от опыта правого. Многие исследования показывают, что успех онтогенетического развития коррелирует с особенностями мышления. Это исследование рассматривает внешние причины для фиксации на различных этапах формирования направлений мышления. Эта фиксация имеет следствием различные типы обработки информации. Есть два вида внешних причин для прохождения этапа: проявляющиеся в качестве стимула и в качестве помехи. Эффект от внешнего воздействия зависит от стадии формирования способов мышления. В дополнение такой метод исследования человеческой психики в перспективе может объяснить вероятные когнитивные причины аутизма и шизофрении.

Ключевые слова: развитие ребенка, стадии развития, работа полушарий мозга, типология, MBTI, аутизм, шизофрения, DISC, формирование психики, темперамент.

Abstract. This article proposes a model of the human mind, developed on the basis of an analysis of a large number of existing theories and aims to provide a systematization of substantial part of empirical knowledge in the field of psychology. The article deals with the human developmental psychology, with a brief description of the sequence of formation of the human mind as a self-learning system. An attempt was made to combine many facts about the functioning of the brain into a single system. These facts were taken from different areas of psychology. In addition to recognized scientific models some controversial theories were also considered, which, however, can offer considerable empirical data because of their prevalence, included MBTI and DISK. The study is based on the assumption that the two brain hemispheres are formed in different ways, although substantially dependent on each other, due to the fact that universality of thought should be kept. Model covers eight possible stages for each brain hemisphere, in good agreement with the existing periodizations. Information processing ways of the hemispheres can stay in formation at any of the eight stages which are relevant to the environment. This article lists all the possible cases of stop of the methods of analysis formation at certain stages of adaptation. The development of the left hemisphere is supposed less consistent than the right hemisphere's, due to the fact that the activity of the left hemisphere depends on the experience of the the right one. Many studies show that the success of ontogenetic development is correlated with

the features of thinking. This study examines the external reasons for the various stages of formation of thinking ways. This has the effect of fixing various types of information processing. There are two types of external reasons for passing a stage: incentives and obstacles. The effect of external influence depends on the stage of formation ways of thinking. In addition, this method of the human mind studying in the future can explain the possible cognitive causes of autism and schizophrenia.

Key words: child development, developmental stages, cerebral hemisphere's operation, typology, MBTI, autism, schizophrenia, DISC, organization of mind, temperament.

Introduction

Different typologies of people's minds are an important instrument for modern practitioner psychologists and other specialists who work with people. Most of them are based on the experience of a few authors and have long subjective wording with empirical information, therefore using them has influenced authors' opinions and errors. This is why they often disagree with one another. But their number and empirical practice are sufficiently large so as to be systematized. In addition, modern developmental psychology and child psychology are well investigated despite there being several ways to identify developmental stages. Also, the approach grounded in considering a human as a non-linear self-organizing system is well developed [1; 2]. The means of generalizing these areas of psychology are proposed in this article.

This description of the organization of people's minds deals with eight possible base focuses of operation of both cerebral hemispheres. Cerebral hemispheres operate differently: the right collects information [3; 4] and finds analogies with the current situation; the left compares information and creates logic. Both functions must occur simultaneously and thus there are two hemispheres [5; 6]. This specialization causes the right hemisphere to be more responsible for the present and past, whereas the left is more responsible for the future. This trend is well demonstrated by the correspondence of the perception of the right side of an image to the left hemisphere, and vice versa [7]. It means that the right hemisphere's direction of data analysis affects the nature of people's actions in a current situation, and the left's conclusions from information processing influence general life goals. Therefore, people do not have a "dominant" hemisphere [8].

Survey

After birth, infants begin to discover their environment. They do not have enough data for complex analysis and therefore the left hemisphere develops later than the right. Newborns can feel uncomfortable, so as a result, they can feel fear. For security, they first try to introduce reliability and predictability to the surrounding area [9].

Babies try to learn new objects immediately, and like to keep their immediate surroundings under control, but in most cases, they focus on this activity only for the first several months. In addition, the work of the cerebral hemispheres proceeds in order. After the right, which works with separate objects, the left systemizes data, likes or fears not individual objects, but their features. If this occurs successfully, the baby feels assurance in the given area and proceeds further. When the right hemisphere finishes its activity, the left begins to systematize the data from the right.

Once confidence in the surrounding space is acquired, the next step in child development, as a self-learning and self-regulating system [10], is studying methods of object manipulation [11; 12]. This learning is necessary for maintaining greater safety in an environment of objects with multiple different properties. As previously, if this operation is successful, the next begins. When the right hemisphere is complete, the left begins based on the experience of the right. In this process the left hemisphere deals with features and not with individual objects.

The next stage of development is the attainment of maximum freedom [9; 13], as children encounter many restrictions in interactions with surrounding objects. These activities seem close enough to occur simultaneously, but their purposes are not equal, and therefore for quick data analysis in accordance with these goals, work should occur separately in an order. Further, when a new goal appears, the urgency of the previous has already passed. So, a child tries to attain more freedom, beginning at about three years of age, and the right hemisphere's activity is grounded in copying all of the operations which a child sees, especially if some implementation meets resistance. When it finds success, the left hemisphere begins to deal with the symptoms of possible limiting factors. According to the moral development theory, about this time the next stage of moral development takes place: from heteronomous morality to a more pragmatic morality based on reciprocity and exchange [14].

The fourth step in evolution regarding means of interaction with the external world is finding the most free and effective role [15] from experience, copying external features and manifestations of this type [16]. The right cerebral hemisphere starts this phase from

about seven years of age. When the left hemisphere begins this activity, it finds the aggregate features of the various successful roles instead of the exact copy of the private image.

The above steps do not always proceed successfully. In case of trouble, the right hemisphere will remain at its current stage, or in the case of lack of experience, the left hemisphere will remain at the previous stage. Such events will be considered further on. At the fourth stage, it can be assumed that a person has acquired all the skills required to operate in the physical world. Further evolution of methods of analysis takes place in terms not of success, but of failing. In such a case, the brain must change its instruments.

The next step will be described in order of each cerebral hemisphere, rather than in accordance with actual organization. The fifth stage is fulfillment of wishes and expectations of those around to create positive emotions. It is the first social activity dealing with the physical world. The right hemisphere's mechanism is fulfilling all wishes [9; 17], while the left's is friendly communication to create positive opinions. Moral development theory says at this point the stage of mutual interpersonal relationships and conformity begins [14]. Development of thinking type is not normally finished in the fourth or an earlier stage, but only for one hemisphere. If neither hemisphere proceeds further, it causes autism, and an individual will not be well socialized [18]. For face processing, autistic people use brain regions that are different from those used by most others [19]. Common face processing brain region is the fusiform face area which also is involved in the recognition of objects known at expert level [20]. Therefore autistic people don't need to be expert in people's faces.

In the sixth step the real work for other people is being replaced on creating favorable impressions [21]. The right cerebral hemisphere collects and plays the most profitable ways of expression, and the left selects the most kindly accepted occupation in society.

If managing people's emotions is not successful, the child's brain finds another basis for communication. The seventh stage is using well-known rules while interacting [21]. This activity requires compliance with the rules. The rules are independent of unpredictable human manifestations. The right hemisphere simply uses given rules, but the left first looks for the most suitable ideology. At the same time as the seventh stage of right hemisphere organization, the moral development stage of social systems begins.

The eighth phase is the last "social stage". It involves creating one's own new rules for oneself and his circle of friends. The right cerebral hemisphere seeks to convince others of the truth of its views. The left ce-

rebral hemisphere aims to encourage others as a role model.

The above eight stages resemble the first eight stages of ego development: "presocial" (E1), "impulsive" (E2), "self-protective" (E3), "conformist" (E4), "self-aware" (E5), "conscientious" (E6), "individualistic" (E7), "autonomous" (E8) [22], which are also associated with defensiveness [23]. The last stage of ego development, "integrated" (E9), is the rarest and corresponds exactly to abstract wisdom and empathy.

As aforementioned, the hemispheres can finish changing their mechanisms for data analysis at any of the eight stages, and continue to develop particular mechanisms and algorithms which satisfy them. The right cerebral hemisphere can stay at one of the first four stages if safety is not yet achieved and if the necessary conditions are not present for beginning the next step. However, it can stay on the one of the further four stages if safety is achieved and there is no reason to change the analysis mechanism. The left hemisphere can pass the first four stages if it has enough data about the next stage for systematizing from the right hemisphere. Furthermore, it can move on to one of the last four steps if the next step is similar to the current and if the current is not successful enough. There should be a similarity or orientation. If both cerebral hemispheres reach the last four "social stages", it causes schizophrenia in different forms depending on the combination of the stages [24].

The fixing of any of the stages of organization means only general trends of data analysis (for past/present and future) [25; 26], it does not lead to any character, mental capacity, abilities, field of interest, moral or anything else. These properties depend on experience too, but this experience is modulated with general directions. Some actions can be exactly identical, but at the same time have different objectives according to the stage of organization. Knowledge of the main trends can be used as a well-founded explanation of general behavior in individuals, or for understanding their perception.

Analysis

In this section of the article the congruence between the stages of organization and some famous typologies will be described. Several theories of people typology will be mentioned, but for the purpose and volume of this article, their description is not required. The necessary information is limited to specific names of types from these models. Of course we have studied the full details and believe in our findings, and if anyone wants to read further, the bibliography gives all source links with specific pages.

The orientation of activities at each stage has two types: the changing of external objects in accordance with the needs (stages 1, 3, 6, 8) and the development of personal activity in accordance with external requirements (stages 2, 4, 5, 7). These orientations are similar to the means of adaptation: assimilation and accommodation, which are described by Piaget [12; 27]. The stages alternate except in the transition from the fourth to the fifth stage in which the focus moves from the physical world to the social sphere. Apart from the specializations of the brain hemispheres present / future, it is logically more efficient to use their number to divide activities into introverted / extraverted and physical / social. But an individual combination depends on success in passing the stages of organization. As in the above, the hemispheres can stop their organization to the next stage. In such a case, the other hemisphere cannot continue its change in the normal order. Thus, to avoid matching properties, its development can be faster than usual. The normal ages for the right hemisphere stages are: 0,5; 1; 3; 7; 10; 14; 16; 18 years. These ages are similar to the periods of structure changes in the brain [28].

The right hemisphere's operation in charge of the present is the most noticeable in communication, and so Jung's eight types represent them [29]. The left's operation responsible for the future introduces the meaning of life evident in basic human values. An example of such values listed apart from common ones such as security and hedonism is described in Schwartz's theory of basic individual values [30].

The names which will be used for the organizational stages are for usability only; for a more detailed understanding of these stages, developmental psychology should be studied, and foremost, the works of Vygotsky, Erikson, Lichko, Elkonin, and Piaget.

A useful way to sort the stages of organization is to split them into four pairs of introverted and extroverted closed steps. There are two such pairs in the physical sphere as in the social sphere. The first two stages, which can be shortly described by the word "order" [31] and "handling" respectively, are the pair which deals with objects. The third and fourth stages, which can be described with words "freedom" and "role" [32], are the pair which deals with regularities in the world of objects. The pair of the fifth ("opinion" [21]) and sixth ("expression") stages is the pair which deals with separate emotions. And the last pair of stages ("rules" and "influence") notices parties.

The above pairs can also be named "sensing", "intuition", "feeling" and "thinking" respectively, which names are used in the Myers-Briggs type indicator (MBTI) [33] based on the Jung theory. Therefore, the four "social" ones can be named "rational" as they

deal with unpredictable people and tends to look for patterns. The four "physical stages" can be named "irrational" as they tend less towards predictability. But the pairs "rational / irrational" and "introverted / extraverted" from the MBTI are applicable only to the right hemisphere's operation, as the most noticeable during communication and supervision. This typology's terms "sensing", "intuition", "feeling" and "thinking" correspond to the hemispheres' activity. In the "sociotics" cognate theory [34] the difference between the hemispheres' operation corresponds to the difference between "the leading function" and "the creative function"—the first function is similar to the right hemisphere's activity and the "creative function" is similar to the logic of the left hemisphere. These functions can also be equal to one of the eight variants. Therefore, the sixteen mind types of mind can be justified by people's development after birth and by features of each cerebral hemisphere.

The other convenient means of dividing the development process is into the pairs of stages which correspond to the four temperament types when the right cerebral hemisphere is at each stage respectively. Such sorting gives four types of personality [35]. The fourth and fifth stages alike match to a melancholic temperament as their purposes are easy to lose but achievable in the long run. The third and sixth stages correspond to a choleric temperament type since their goals are easy to lose too, but are quite quickly achievable. The other stages' purposes are difficult to lose, but the goals of the second and seventh stages are also difficult to reach, and the first and eighth stages' goals are easy to achieve. They correspond to phlegmatic and sanguine temperaments respectively.

There is another interesting way to receive four behavioral traits by sorting the development stages into pairs that is similar to the popular DISC theory [36]. This typology is based only on the right hemisphere's activity too. In this view, the extraverted "physical stages" (first and third) correspond to the "dominance" dimension of behavior. The extraverted "social stages" (sixth and eighth) are similar to the "influence" behavioral style. The "steadiness" style is close to the introverted "physical" second and fourth stages. And finally the introverted "social stages" (fifth and seventh) are in accordance with the "compliance" dimension.

Another theory of psychological types depending on the right hemisphere's operation is the Peter Honey and Alan Mumford learning styles model [37]. In accordance with this theory the pairs contain only the extraverted or introverted types as at the DISC or temperament theories but the pairs are new. The first and sixth stages ("order" and "expression") correspond

Table 1.

The typological models at the relevant stages of organization of the brain hemispheres

Stage of the right hemisphere	Stage of the left hemisphere	MBTI	Temperament	DISC	Honey & Mumford learning style	Learning modality
I "order"	5	ESFP	sanguine	dominance	activist	visual
	7	ESTP	sanguine	dominance	activist	visual
II "handling"	6	ISFP	phlegmatic	steadiness	reflector	kinesthetic
	8	ISTP	phlegmatic	steadiness	reflector	kinesthetic
III "freedom"	5	ENFP	choleric	dominance	theorists	auditory
	7	ENTP	choleric	dominance	theorists	auditory
IV "role"	6	INFP	melancholic	steadiness	pragmatist	visual
	8	INTP	melancholic	steadiness	pragmatist	visual
V "opinion"	1	ISFJ	melancholic	compliance	reflector	visual
	3	INFJ	melancholic	compliance	reflector	auditory
VI "expression"	2	ESFJ	choleric	influence	activist	kinesthetic
	4	ENFJ	choleric	influence	activist	visual
VII "rules"	1	ISTJ	phlegmatic	compliance	pragmatist	visual
	3	INTJ	phlegmatic	compliance	pragmatist	auditory
IIX "influence"	2	ESTJ	sanguine	influence	theorists	kinesthetic
	4	ENTJ	sanguine	influence	theorists	visual

to the "activist" style. They are the least affected by the properties of objects which they manipulate. The third stage, "freedom" and the eighth stage, "influence" can be combined into the pair "theorists", as their activity is associated with excuses in communication. The next learning style, "reflector" contains the second stage, "handling" and fifth stage, "opinion" as their activities change in accordance with an interacting object. And the pair of the fourth and seventh stages ("role" and "rules") is similar to the learning style, "pragmatist" as at these stages people compare all information with the general scheme given them.

The three above theories contain all the possible simple pairs of the extraverted or introverted stages of the right cerebral hemisphere. The next famous division of people does not depend on the stage of the separate hemispheres, but only upon the "physical stage" of any of them. As in the above, the stages which operate with the physical world can be fixed by only one of the cerebral hemispheres. This next model of people types is a theory of learning modalities: visual, auditory and kinesthetic [38]. The main instrument of both the first stage ("order") and the fourth stage ("role") is the visible features of the surrounding area or the selected role. So their modality is "visual". The second stage ("handling") deals with kinesthetic mechanisms. The

third stage ("freedom") begins when the child learns speech [39] and intonation by which the child defines his boundaries, so its modality is an auditory one.

Conclusion

In table 1 all the above typological models are collected in accordance with the relevant stages of organization of the cerebral hemispheres. The table contains all possible combinations of development stages of the different hemispheres in accordance with their operations divided into present / future, introverted / extraverted, physical / social.

The analysis of the relationship between ontogenetic development and psychological typologies shows that the study of the bases of the individual differences can help to understand and clarify the present empirical descriptions of people types, and allows us to find links between various typologies. This method of development description as an evolution of a self-learning system has good confirmability by typologies, and may provide the basis for a new approach in practical psychology, and child psychology in particular. Our experience shows that such change of empiric descriptions on a general intention caused by the ontogenetic development is more convenient and easy.

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