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**THE PROCESS OF MASTERING IMITATION AS A BASIC
COGNITIVE OPERATION AND AS A VERBAL TOOL**

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У статті представлено психолінгвістичне вивчення імітації як початкового етапу і базової функції пізнання й розвитку мовної здатності. Здійснено аналіз різних підходів і теорій мови. Розглянуто фази й рівні розвитку мовної здатності, мотиви розвитку мовлення й феномену імітацією в планах онтогенезу. В онтогенезі розглядається застосування імітації як пізнавальної функції і Мовленнєспобудови дитиною, а також наводяться приклади імітативної Мовленнєтворчості на різних рівнях оволодіння мовою.

У заключенні зроблено висновки щодо висунутої гіпотези. Імітація являється базовою пізнавальною функцією людини і відіграє важливу роль у формуванні дитячого мовлення імітація проявляється як в елементарному звуконаслідуванні, так і на більш складних рівнях

мовлення і є основою для складніших пізнавальних і мовленнєво-творчих операцій.

Ключові слова: імітація, мовленнєтворчість, мотивація, категоризація, звуконаслідування, словесні інструменти, психологічні інструменти.

В статті представлено психолінгвістичне вивчення імітації як початкового етапу та базової функції пізнання та розвитку мовної здатності. Здійснено аналіз різних підходів та теорій мови. Розглядаються фази та рівні розвитку мовної здатності, мотиви розвитку мови та феномен імітації з точки зору онтогенезу. В онтогенезі розглядається застосування імітації як пізнавальної функції та побудови мови дитиною, а також наводяться приклади імітаційного мовотворчості на різних рівнях володіння мовою.

В висновках зроблено висновки щодо обґрунтування висунутої гіпотези. Імітація є базовою пізнавальною функцією людини та грає велику роль у формуванні дитячої мови. Імітація проявляється як у елементарному звукоподражанні, так і на більш складних рівнях мови та є основою для більш складних пізнавальних та мовно-творчих операцій.

Ключевые слова: имитация, мовотворчество, мотивація, категоризація, звукоподражание, словесні інструменти, психологічні інструменти.

The goal of this research paper is the psycholinguistic study of imitation as the initial stage of human cognition and language acquisition in infants from the ontogenetic aspect of study. The article comprises an analysis of all significant theories of language origin, language acquisition and imitation. The discussion of imitation in its two representations is followed by a study of imitative language in the early verbal behavior of monolingual and bilingual infants. Linguistic data analysis leading to inferences supporting the proposed hypothesis is presented in the paper. Imitation is also proved to be an essential factor on all levels of linguistic categorization.

The conclusions drawn in the final part summarize the exploration of imitation in its twofold representation: as a basic cognitive operation with the world of objects and as a basis for semiotic abstraction of the sounds of the world into objects of linguistic signs.

Key words: imitation, language acquisition, motivation, categorization, sound imitation, verbal tools, and psychological tools.

Introduction

In the process of developing the research we have elaborated the hypothesis of primary, secondary and further degrees of modeling reality: historically – by the primeval man, ontogenetically – by an infant and socially – by an individual studying a second language. The first degree of verbal modeling of reality is imitation, the second – association, the third – metaphor, metonymy etc. Huge amount of researches has been dedicated to the last two phenomena mentioned above. As regards imitation, this has been until recently a neglected and troublesome topic. We assume that imitation in language may throw light on the mechanisms of verbal activity of human beings, on the problems concerning the emergence and the development of this activity and on the principles of verbal modeling of reality. Besides imitation may be related to other areas of human cognition and experimentation in imitation may enrich our knowledge about the nature and the principles of human thought.

The goal of this research paper is the psycholinguistic study of imitation as the initial stage of cognition, native language acquisition. The research hypothesis is that imitative processes lie in the basis of human cognition and it is as well the initial stage of language acquisition in infants from the ontogenetic aspect of study.

The theoretical bases: the topic includes disciplinary and interdisciplinary approaches (linguistic, psychological, physiological, neurobiological etc.) to verbal cognition and imitation. The breadth of the *holistic approach* can be justified by the belief that in order to gain insight into phenomena as complex as imitation and LA are, one must study profoundly all the factors that determine the occurrence of LA – the motives that cause imitation and LA, the mechanisms of LA and imitation that are put into work with the help of outer and inner stimuli. The article comprises an analysis of all significant theories of language origin, language acquisition and imitation. During our research we have turned to the theories developed by Piage (Piage, 1983), Meltzoff A.N. and Moore (Meltzoff & Moore, 1999), Kohler E., Keysers C., Umilta M.A., Gallese V. and Rizzolatti G. (Kohler et al., 2002), Lakoff G. (Lakoff et al., 1987), Fadiga L. (Fadiga et al., 2002), Roberts L. (Roberts, 1966), Brown D.H. (Brown, 1994) etc.

Linguistic data analysis leading to inferences supporting the proposed hypothesis is presented in the paper. Imitation is studied in the early verbal behavior of monolingual and bilingual infants.

One of the specific features of this research is the cognitive perspective where language is viewed as verbal means of modeling reality. The second important feature is the exploration of imitation in its twofold representation: as a basic cognitive operation with the world of objects and as a basis for semiotic abstraction of the sounds of the world into objects of linguistic signs. The motives of language origin and the stages of language acquisition are also focused on in respect with the emergence of imitation as a form of motor reflection and activity.

According to the classical theories of cognitive development infants do not discriminate themselves from others. According to Piage (Piage, 1983), children start imitating the mimics of the grownups only by the end of the first year¹. He considers this phenomenon to be very important for the development of the mental abilities of the child. But the results of the recent analytical research of behavior demonstrate that infants successfully imitate the facial movements of the grownups as early as 42 minutes after birth (Meltzoff & Moore, 1999). The results of experiments conducted by neuropsychologists and neurologists in recent years give all the reasons to assume that the structural foundations for imitation are innate. The objects of these researches are those cognitive processes and those parts of the brain, which are responsible for imitation, perception and imagination (Meltzoff & Moore, 1999)². As a result, it is demonstrated that all the three abilities are based on the same mechanisms. Neurophysiological studies prove that while performing the action and observing someone else perform the action, the same parts of the brain activate. One major insight derived from the analytic researches of imitation is that the neural bases for movement and the neural bases for the perception are very close, sometimes even identical. The basic discovery is the existence of neurons which have dual visuomotor purpose – responding both to the perception of an action and to the planning and execution of the action. The essence of the experiment conducted by Lakoff was to demonstrate how these mirror neurons worked while hearing sounds and understanding actions. It became apparent

¹ *Пиаже Ж.*, Схемы действия и усвоение языка. Семиотика. М., 1983, с. 133-136.

² Meltzoff A. N. & Moore, M. K. A new foundation for cognitive development in infancy: The birth of the representational infant. In E. K. Scholnick, K. Nelson, S. Gelman, & P. H. Miller (Eds.), *Conceptual development: Piaget's legacy* Mahwah, NJ: Erlbaum Press, 1999, pp. 53-78.

that many object-related actions could be recognized by their sound³. «Multifunctional neurons in the premotor cortex discharge when the animal performs a specific action, when it hears the sound associated with the action and also when it observes the action» (Kohler et al., 2002)⁴.

During the first 3 months of its life an infant cries out sounds, which are conditioned with its physical needs. These sounds are included in its biological sound system. This system and its sounds are typical to all human babies independent of their nationality, sex, genetically inherited features etc. In this period these sounds are conditioned by discomfort (hunger, thirst etc.). In this initial unconscious phase of evolution in communicative cognitive activity babies can identify not all the sounds. The results of the experiment conducted by Fadiga and his colleges prove evidence that listening to speech sounds specifically activates the motor neurons of the muscles responsible for producing those certain sounds⁵. That is why the sound complexes, which don't have their tactile-kinesthetic equivalents in the baby's sound system, it can't hear clearly and can't utter correctly (Vinarskaya, 1987)⁶. Besides it seems reasonable enough to assume that infants imitate the sounds, the actions of the grownups, as the same neurons responsible for performing the same actions or the same sounds are activated. The vocal reactions of human babies in this phase do not have lexical, semantic or phonetic components. But they utter these sounds to react to different outer or inner impulses.

These unconscious automatic reactions to the outer and inner stimuli are transformed into conscious intentional actions simultaneously with the formation of the objective consciousness. As a result of the development of the cognition from one side and the interaction with the outer world from the other side, the child establishes associations between his verbal/non verbal behavior and his own physical and emotional states. By this time babies begin

³ Lakoff G. *Women, Fire, and Dangerous Things: What categories reveal about the mind.* University of Chicago Press, 1987, p. 614.

⁴ Kohler E., Keysers C., Umiltà M. A., Gallese V. and Rizzolatti G. Hearing sound understanding actions: action representation in Mirror Neurons. *Science* 297 846-8 2002.

⁵ Fadiga L., Craighero G., Buccini G. and Rizzolatti G. Speech listening specifically modulates the excitability of tongue muscles: a TMS study. *European Journal of Neuroscience* Vol. 15 2002 pp. 399-402.

⁶ Винарская. Е.Н. Раннее развитие ребенка и проблемы дефектологии: Периодика раннего развития. Эмоциональные предпосылки освоения языка М.: Просвещение, 1987, стр. 165.

to identify all the sounds that are included in the sound system of their mother tongue. In other words they achieve socially, nationally conditioned structuralization of the biological vocal abilities unique for all human babies.

The analyses of the imitative behavior of the infants demonstrate that they are very sensitive towards their own movements and the movements produced by others. It is very probable that infants identify people under different circumstances with the help of imitation. As Fatiga states, «the observation/execution matching system (mirror neurons) is thought to be the physiological expression of the brain mechanism making possible understanding of actions of others». The agent and the observer share the same motor action repertoire, the same articulatory motor repertoire. This means that the source of nervous excitation – speech, action, physical or emotional sensation – becomes associated with the person who performs the action, causes physical or emotional sensations. When this process is well established, the child starts to find parallels between his verbal/non verbal behavior and physical/emotional states from one side and the behavior of other people and the responses he gets from parents as a result of his actions and vocalizations.

E.g. Little Anri from the day he was born, hears his mother pronounce «a,a,a,a,a» every time he is taken to bed to sleep. By the age of 2 months old, the child starts imitating his mother using the same tone and rhythm. But the child does not react if other members of the family produce the same sound. This means that Anri has formed association between his mother and this exact vocalization, in other words the child uses imitation for identifying the people. By 6 months the boy imitates his mother only when he wants to sleep. This means that with the help of imitation the child differentiates not only people but circumstances as well. By 8 months Anri «pronounces» this vocalization every time he wants to sleep despite the fact his mother is there or not. In other words this vocalization gained a communicative value, it became a verbal tool.

Lamar Roberts states, «It is necessary for the auditory, kinesthetic and visual systems to be intact to learn to speak normally⁷. The infant hears the sounds of the environment and he learns to babble. When he babbles, three things happen almost simultaneously: he hears the sound of his own voice, he receives kinesthetic sensations

⁷ Roberts L., *Central Brain Mechanisms in Speech*, University of Florida, 1966, p. 121.

of the movements made in producing the sounds and he sees the reactions to his sounds on the face of his mother or others. All three of these perceptions are necessary to learn to speak normally». We'd add the fourth system – the infant compares his vocalizations with the sounds pronounced by its mother's and tries to imitate her identically. The similarities between parent and infant vocalizations could have an important function in first language acquisition. During the babbling stage the infant learns to associate different kinds of sounds with the sounds made by him, to establish associations between the movements made by the articulatory organs that produce these sounds. The infant repeats the same movements over and over like he touches and moves the toys unless he finds the best toy, which is comfortable to hold in hands or to put into mouth. After establishing this feedback mechanism, the infant gains control over its speech organs and learns new sound, modifies the sounds included in his biological vocal system.

Pinker believes that language acquisition can't be explained as a kind of imitation⁸. He supports this statement with the help of an experiment, which he conducted with a preschool girl, Sarah, whose parents had only high school education. This child can be seen obeying the English agreement rules.

E.g. Donna *teases* all the time and Donna has *false* teeth.

Besides she would utter verb forms, which she couldn't have possibly heard from her parents.

E.g. When she *be's* in the kindergarten...

(*be's* is used instead of *is*)

Pinker assumes that she must have created these forms herself, using an unconscious version of the English agreement rules. If the child had this unconscious version of the English agreement rules, he would also know the exceptions. Here works the principle of generalizes imitation⁹ or analogy. The child has formed a model-type according to which all the verbs in 3rd person singular in present tense must have -s or -es ending.

During the process of mastering the linguistic reality children acquires knowledge about the subjects of this reality. They categorize

⁸ Pinker S., *The Language Instinct*, Morrow, 1994, p. 525.

⁹ The term was introduced by Baer et al (Baer et al., 1967). Baer D. M, Peterson R. F., and Sherman J. A., The development of imitation by reinforcing behavioral similarity to a model. *Journal of Experimental Analysis of Behavior*, vol. 10, pp. 405-416.

this knowledge in accordance with the knowledge about the objective world. In other words children master the forms of the words based on the perception of reality. The orientation towards the sound form, which is ascribed to have a motivated meaning, results in formulating *generalized relations*: analogous phenomena must have analogous sound forms. This is not the analogy in the general sense of it, but the generalization and the active creative tendency of a child to express adequately perceived knowledge.

E.g. For 2 years old Sona every little object, animate or inanimate, is a «fly» (she means «little object»). During the experiment Sona was asked to give her mother all the «fly»-es she could find. She chose all the tiny toys. By the age of 3 she was able to choose all the «toy-insects». By the age 3,5 she corrected her grandmother who called the spider a «fly»: «Grana, tis spider, not fly».

E.g. For 2 years old Andre every food, except porridges, is [мыс] (meat) (here the child means «not porridge»). By the 3 he named meat [мяс] and other food, except porridge, [мыс].

Generalized relations, in their turn, serve as bases for the formation of the Model – Type, i.e. a kind of model of the sound form, which will be applied to all the phenomena of a given type. The Model – Type is the reason for word-creation, but it also signals the passage to the rules of the word – formation, which means the functional usage of the signs of the language.

E.g. A four years old child (Ann) learns Russian with her mother. She has a dog. Her father says «haf - haf» or «hafo» to refer to the dog. Her mother uses the word «гав-гав» in the same situation. While talking about me with her father she says «Hamest», in the presence of her mother she says «Gamest». And to my question why she calls me «Gamest» in the presence of her mother, she said: «Мама говорит гав-гав, папа говорит [haf-haf], значит по-армянски йты [Hamest], а по-русски – Гамест».

Ann has acquired the Model-Type according which the sound system of Russian does not have the sound [h] and instead of [h] Russians use the sound [g]. And she forms words according to this Model.

As it has been mentioned above, the object- related actions and objects could be recognized by their sound. This explains the fact why onomatopoeic words or sound imitations

form the basic vocabulary of the child during the initial stages of LA. Onomatopoeic words can appear in child language as imitations of the sounds of the surrounding world. Simultaneously with the first words children imitate the sounds made by animals and different objects. They use these imitative sounds to nominate certain animals and objects.

E.g. Little David uses the word [ko-ko] to name a hen, the sound made by the hen, eggs and egg-like candies, though he can pronounce the word *курица, яйцо, конфета*. Every time he is asked to repeat these words, he does it with pleasure. But he does not use these words himself for naming the above-mentioned objects.

E.g. 3 years old Andre names the chewing gum [tsa]. This is the sound which usually can be heard when he is chewing. This new «word» can be considered to have an imitative origin, in other words it can be considered to a kind of onomatopoeic word.

The names of the objects are tightly connected with the objects in child's cognition. The word (name) is considered to be the indivisible part of the object for a long time.

The results of our analytic research allow us to believe that imitation as a cognitive process is traced in language acquisition and socialization in young children. Here two types of imitation work: 1. surface structure imitation

2. deep structure imitation.

The first type is **surface structure imitation**, where a person repeats or mimics the surface strings, attending to the phonological code rather than the semantic code.

During the initial stages of language acquisition the child uses mainly the surface structure imitation, «since the baby may not possess the necessary semantic categories to assign 'meaning' to the utterances» (H. Douglas Brown, 1987)¹⁰.

During the late phases of language acquisition, when children's cognition is better categorized and they distinguish the semantic level from the phonological one and «perceives the importance of the semantic level of language, they attend primarily if not exclusively to that meaningful semantic level – the deep structure of language. They engage in **deep-structure imitation**» (H. Douglas Brown, 1987). He brings as preschool children repeat an example the tendency that

¹⁰ Brown D.H., Principles of Language Learning and Teaching. Englewood Cliffs, Prentice-Hall, 1994, p. 347.

sentences like «The ball that is rolling down the hill is red» and «The boy who is in the sand box is wearing a red shirt» as «The black ball is rolling down the hill» and «The red boy is in the sandbox» (H. Douglas Brown, 1987). Here it is important to understand what children are imitating.

E.g. A three years old child has created a word «рванность». She has imitated the word «рванный» and the suffix «ость» (surface structure imitation) and the model-type of word formation (deep structure imitation).

E.g. 2 years old David was asked to wash his hands after playing with a ball. The boy answers: «Мам, что мои руки мячные?»

The child has used the Model-Type *существительное + ные*, as every time his hands are «грязные», he is asked to wash his hands.

E.g. 3 years old bilingual Andre has created words using the model-type of negation in Russian, one Russian morphem and one Armenian word: «не» ([ne]) + «գնում» ([gnum] – to go) = [negnum] (не пойду) «не» ([ne]) + «սիրում» ([sirum] – tolike) = [nesirum] (не люблю).

The creation of the new words is an example of deep-structure imitation, in other words the child has imitated not the word but the «rules» of word formation in his native language.

Thus it seems reasonable enough to assume that the initial stage of acquiring the mother tongue is imitation of different degrees of complexity.

While speaking about imitation, we have to turn to reinforcement and repletion as well. All that parents have to do is to talk while caring for their infant and to provide direct contingencies for their infant's vocal behavior. Parents present vocal models in appropriate contexts and the infant's attempt to approximate the model is usually followed by praise and repletion of the correct model. By repetitions of the movements producing the speech sounds the infant produces closer approximations of the model, eventually imitating the parent successfully. Although reinforcement and repetitions are not the only factors responsible for ontogenetic language acquisition, they are unique and fundamental for the acquisition of other mental skills of different degrees of complexity and for the development of the infant's cognition.

The researches of the imitation spread light on the preverbal memory¹¹. During the experiment the 2-3 months old infants were shown several objects and the usage of the tem without being allowed to touch the objects. After some time, by the age of 6-15 months, the children demonstrated imitative actins as a result of preverbal memory¹².

Thus we can assume that imitation is essential for the formation and the development of the culture and the survival of the cultural practice, perpetuation of the acquired knowledge across generations.

The results of analytical research allow us to believe that *imitation as a cognitive process is traced in LA in younger children. Besides, onomatopoeic words can serve as part of basic vocabulary in initial stages of LA. During the process of learning the words of the natively language that contain sound imitation the child acquires the system of phonemic modeling of reality, in other word, it obtains the subconscious understanding of equivalents of natural sounds of the native language. Imitation is also proved to be an essential factor on all levels of linguistic categorization.*

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¹² Squire L. R., Knowlten B., Musen G., The structure and the organization of memory. *Annual Review of Psychology*, 1993, pp. 453-495.

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