Relationship between General and Special Abilities on the Example of Linguistic Abilities

Lubov Cheremoshkina

Professor of Psychology, Moscow State Pedagogical University
1 M. Pirogovskayas st.. 119991, Moscow, Russia
Email: lvch2007 [at] ya.ru

ABSTRACT — ***The article deals with the structure of linguistic abilities as a system of tools for mastering and using a foreign language. It is shown that the structure of linguistic, as one type of special abilities, is due to the level of perceptual, mnemonic and mental general cognitive abilities' development and productivity. The principles of the linguistic abilities' formation, as a tool basis for speech in another language, do allow us to approach the study of influence of the educational content and, more broadly, of the information environment, on the qualitative - quantitative uniqueness of mental processes (abilities) that do determine, do create and do change the human's world picture.***

Keywords — intelligence, abilities – linguistic, general, special, mnemonic, cogitative, perceptual, articulator apparatus

1. INTRODUCTION

Abilities do represent by itself the tool-base of success in acquiring knowledge in developing and forming skills. The indisputability of this truth led to the development of didactic principles, it is visibly and invisibly present in the substantiation of both old and new methods of discipline teaching. It can't be otherwise because the methodical resources are aimed at creating a functional, stable, plastic and developing "building" from mental actions, operations, and knowledge, which is called intelligence. The performance indicators of this design, constructed by the joint efforts of teachers and students, are due to the reliability of the foundation with abilities' role. The more noticeable are the ability, the higher is the speed of knowledge acquisition and its' quality. This pattern is universal and does not need additional proofs. However, the processes of the opposite nature are not so obvious. Indeed, what effect do present already formed up representations, acquired information, elements of the child's inner world, i.e. the content of his mind and his abilities as instruments of knowledge of himself and of his world around.

What happens to the abilities that are the basic tool of the individuality, under the influence of specific methods of teaching specific disciplines? For example, how the immersion of a preschooler in the world of abstractions does influence his cognitive abilities, or too early studying a foreign language. Is it possible to assume that having mastered a nonnative language before and better than a native one will henceforth and forever look at the world through the prism of another language? Looking by strange eyes on our own life it might be perhaps another person, deprived of basic deep bases of national consciousness due to the too early assimilation of the non-native language. The answer to this question requires the efforts of different sciences: philosophy, cultural anthropology, culturology, linguistics and psycholinguistics. Noting this interdisciplinary problem, which goes far beyond the scope of this article, it is necessary to emphasize the following statement. In any case, whichever aspect of analysis is chosen (pedagogical, historical, semiotic or otherwise), there is necessary conceptual analysis of the possible trajectories of general abilities' change under the influence of special training.

Common abilities are generic properties of most normally developed people, which determine their suitability for different occupations, acting as a prerequisite for special abilities. Common abilities include cognitive, communicative, sensorimotor and spiritual abilities. Special abilities are formed up on the basis of general abilities in the conditions of training or of corresponding environmental influence. The study of regularities in the formation of special abilities depends, first of all, on the parameters of the desired result, in other words, on the clarity of ideas about special abilities' structure. The structure of abilities can provide a key to the explanation of their origin, then to an understanding of progressive and regressive changes in human's cognitive sphere, to work out diagnostic procedures and training systems.

The purpose of this article is to describe a possible algorithm for studying the structure of special abilities on the example of linguistic abilities. This duration allows us to approach the understanding of special abilities' origin, as well as the patterns of their formation and development.

2. LINGUISTIC ABILITIES

Linguistic abilities are mental tools for mastering the language, manifested in the effectiveness of understanding, speaking, reading and writing in a foreign language. Linguistic abilities are qualitative - quantitative peculiarity of cognitive processes, different degrees of stereotyping of which is manifested in speed, accuracy and reliability of listening, speaking, reading and writing developmental skills.

Modern approaches to the analysis of linguistic abilities are conditionally divided into two large groups with a psycholinguistic and psychological bias. The psycholinguistic direction is represented, in particular, in Noem Homsky works and his followers (Homskij, 1972; Slobin, Grin, 1976). N. Homsky proposed the language describing theory, which he represents as a whole system organized according to uniform rules. In his opinion analysis and synthesis of any proposals are possible with the help of unified rules. The author calls his model "generative", because he considers the transformation operation in its basis, which makes it possible to create any grammatical constructions on the basis of the original material, to fill in their vocabulary and grammatically formulate, but does not explain how the subject masters the language by its "rule" and "language ability" (Homskij, 1972; Slobin, Grin, 1976). The value of N. Homsky research consists most likely not so much in general discussions about the language and specific list of mental processes involved in the language assimilation, but rather in identifying the problem of correct speaking regulatory mechanisms in existence. It is the designation of the problem, because the specificity of language abilities in regulation, which is presented in this concept and is extremely difficult to describe in psychological categories. In the psychological interpretation of linguistic abilities' problem both methodologists and psychologists do gravitate. In this regard, the undoubted interest is noted for B. V. Belyaev (1959) work, in which the system of different levels of mental processes, necessary for the "active-creative" use of a foreign language, is described. The multicomponent scheme of linguistic abilities according to B. V. Belyaev (1959) contains a description of its constituent elements, which are formed up as a result of speech practice and thanks to which a person speaks the language effectively. Specific components of the linguistic abilities' structure according to B. V. Belyaev (1959) do need in depth psychological analysis, otherwise the concept remains inoperative.

Studies of the linguistic abilities' structure, mentioned above, are interested firstly by the statement of problems, rather than by necessary concreti-zation of the structure of the ability to foreign language mastering. This is due to a superficial interpretation of the abilities' concept and to a presence of some reductionism in the understanding of cognition processes. The further presentation will describe an attempt to consider the linguistic abilities' structure, taking into account the problems noted above. Understanding the abilities as psychological tools (sources, instruments) realized by stereotyped mental processes that have a qualitative - quantitative originality which determine the realization effectiveness of both individual functions and activities in general (Ceremoshkina, 2010), one can try to determine the linguistic abilities' structure and to consider their functioning and developing through the prism of the proper psychological regularities. Linguistic abilities are manifested in the effectiveness of understanding foreign speech, speaking, reading and writing in a foreign language. They can be defined as the processes of perception of another language speech, of analysis of linguistic phenomena, of memorizing, preserving and reproducing them. They are differentiated by qualitative - quantitative originality, manifested in the success of understanding and engendering the unfamiliar language speech.

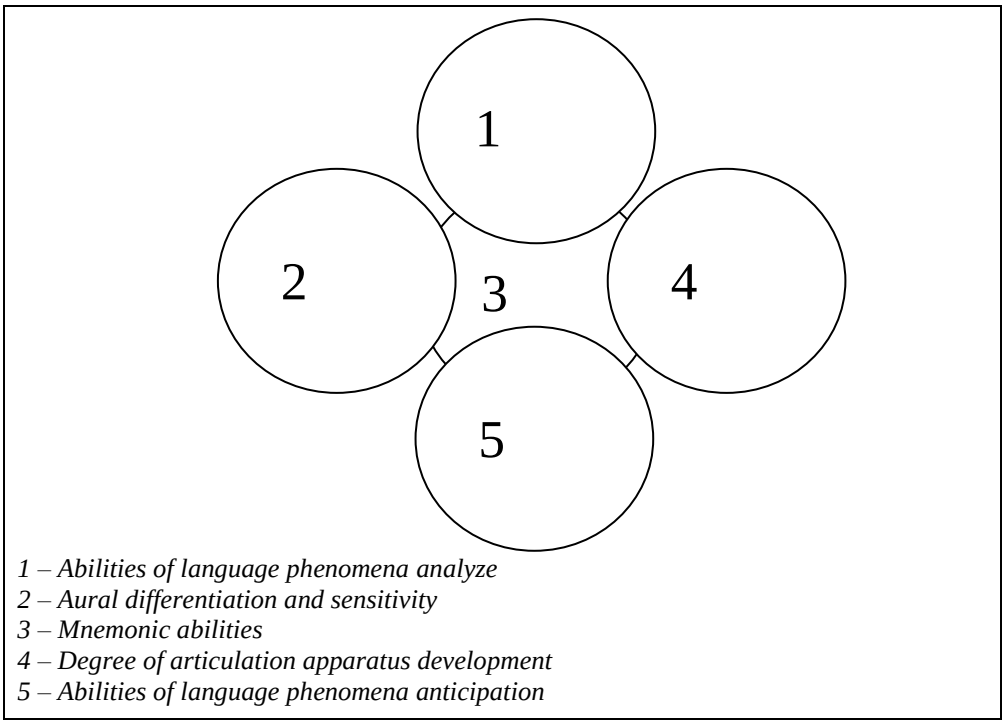
Considering the process of foreign language speech generating as an activity we can determine its components, and, consequently, the indicators of its effectiveness. The activity of speaking in a foreign language in general form consists on correct pronunciation, on knowledge of words and on knowledge of grammar. Consequently, linguistic abilities will be manifested in: - fast, accurate, robust, reliable development of phonetic skills; - fast, accurate, strong, reliable development of lexical skills; - fast, accurate, strong, reliable development of grammatical skills. Thus, it can be said that linguistic abilities are objectified in success and in qualitative uniqueness of phonetic-lexical-grammatical skills. Let's consider what abilities are necessary for each of these skills.

The success of the formation of phonetic skills depends on: 1) features of auditory differential sensitivity (phonemic hearing) of the subject; 2) degree of articulatory apparatus' development and plasticity; 3) mnemonic abilities of the subject. Mnemonic abilities form up on the basis of auditory memory types: short-term, working, long-term, involuntary, immediate and mediated, as well as visual memory and other memory types, individually necessary for memorizing the phonetic structure of the language.

The success of lexical skills depends on:1) human's mnemonic abilities; 2) language phenomena analysis abilities; 3) abilities to anticipate the result (by language feeling and language intuition as one-functional multilevel abilities).

The success of grammatical skills' development depends on: 1) abilities to analyze the language phenomena; 2) abilities to anticipate the results; 3) mnemonic abilities. Thus general form of linguistic abilities' structure can be represented as follows, see Figure 1.

Figure 1. General form of linguistic abilities' structure



The structure of linguistic abilities in this form looks enough schematic. Indeed, only a list of structural components of linguistic abilities is indicated. In order to get closer to understanding the mechanisms of functioning of this structure, it is necessary to consider it through the prism of the general structure of intellectual processes.

3. INTELLIGENCE AND ABILITIES AS OPEN SYSTEMS «NESTED» TO EACH OTHER

Intelligence is a multi-level phenomenaon presented by itself the system of cognitive abilities and organized in selected level, with information "appropriated" by subject. Intelligence is the unity (system) of the individuality cognitive abilities' and its individually-unique information field, with the functioning sense and development of which is the establishment of cause-effect relationships, understanding and preserving information, forecasting and creation of a novelty. This duration allows us to characterize the intelligence structurally, efficiently, ontologically and procedurally. Formation and development of linguistic abilities as a process of system-genesis "nested" to each other open systems (intelligence and linguistic abilities). So, the system-forming cell of the intelligence is the ability whose structure can be represented as a system of different-level mechanisms. The functional mechanism of the ability is a genotypic-ally conditioned formation that has a naturally specified degree of expression, manifested in the realization of a specific function: in the formation of sensory images, in the imprinting of information, in instant understanding, in the "suddenly" seen solution, etc. The system of functional mechanisms of cognitive abilities forms the first fundamental level of intelligence (natural, nonverbal intelligence), the effectiveness of which in the greatest extent is due to innate properties of higher nervous activity of man and consists of two main indicators: - degree of expression of each cognitive ability; - degree of tightness of the connections between them.

It is obvious that in the "pure" form it is difficult to isolate the functioning of this level. We can speak only about some prevalence or a tendency to dominate in some cases of intelligence's natural base. First, in the situation of a simulant image formation of the surrounding reality, in other words, without scrutiny, listening, measuring, and comparing tones, halftones, shades and other perceptual actions. In the description of the stages of the sensory image formation, these are first and second stages: the detection of the object and discrimination with the selection of individual features in the object. So that is until the perceptual actions are activated. Secondly, in those cases when human capture either remembers directly and involuntarily. Moreover, in those cases when thinking "up to words" takes place, the thinking whose procedural characteristics are hidden from the human's consciousness: guesswork, sudden insight, instant understanding, in other words insight. Further, this is involuntary unintentional operating with secondary images: turning, turning, transforming old images and the emergence of new ones in the absence of conscious regulation of the process. It is also unconscious concentration of mental activity on something. Exactly at this level there is a necessity for looking at the sources of intuition, including linguistic which is called by specialists as the language sensitivity.

The indicated manifestations of the natural level of cognitive activity have much in common. They are sometimes difficult to manage. Domination of this level of intellectual activity is expressed by "short circuits", the result of which are bursts of ideas, humor, unexpected metaphors and associations. The manifestations of the qualitative nature of the natural intelligence in behavior and activity are very diverse: from the insight of the designer to the instant grasp of harmony, meaning, individuality or disharmony of the artistic image, the artist's painting, intuitive penetration into the meaning of a foreign language utterance. In the process of mastering a foreign language, the natural intelligence is manifested with the greatest clarity in the so-called communicative style of its development, when the presence or absence of precisely the sense of language determines the result. The development of cognitive abilities in ontogenesis is associated in their structure with the appearance of ways of transformation (processing) of information in order to weave it into the existing experience to understand, to remember, to store and to use. Strictly speaking, the development of separate cognitive ability is going in two directions: in deployment of a genetically engineered program (the maturing of functional mechanisms) and their capabilities increasing through the actions they acquire. In essence, this is nothing more than a specific mechanism of the processes of integration and differentiation of mental functions.

A developed ability is a formed structure. Therefore, it is easier to differentiate, but its development provides for a close relationship with other functions. For example, for successful storage, information can be ranked, grouped, classified, structured, systematized, etc. Thirteen types of operating mechanisms of mnemonic abilities were identified 30 years ago. Subsequent studies of mnemonic, perceptual, and musical abilities have shown that operational mechanisms are most likely poly-modal, multi-functional (Ceremoshkina, 1987, 1994, 1999 a, 1999 b, 2010). Second level of intellectual activity is due to the emergence of a system of information processing methods. The effectiveness of this level of intellectual activity will be different depended on how the subject "interweaves" information into his experience: in the form of concepts, images, associations, by concrete examples or others. Therefore, the second level of intelligence is a unity of operational mechanisms and of that representations' system, of which the subject owns. The result of the process of interaction between operational mechanisms (as means of organizing information) and information itself (semantic zones of the individual) is the formation of cognitive-personal structures that provide a concrete representation of the situation. These cognitive-personal formations are called differently in connection with the polyphonic nature of their properties in different types of activity: operational image (Oshanin, 1977), prototypes (Rosch, 1973, 1978), anticipating schemes (Najsser, 1981), cognitive maps and frames (Minskij, 1978), scenarios (Rosch, 1978) etc. These types of cognitive-personality formations can be called cognitive schemes or mental structures. The cognitive-personality structure or cognitive schema is a generalized and stereotyped form of storing past experience with respect to a strictly defined subject area (Hofman, 1986). Cognitive schemes have been seriously studied in foreign psychology. For example, in the psychology of information representation in memory, there were extensively studied the properties of the prototype as a cognitive structure that reproduces a typical example of this class of objects or an example of a certain category. It is shown that in many subjects the most typical example for the furniture category is the chair, and the least typical is the phone; for the category "fruit" - "orange" and, accordingly, "fruit puree"; for the category "transport" - "car" and, accordingly, "elevator" (Rosch, 1973, 1978, Hofman, 1986).

We can say that a prototype is a generalized visual representation in which a set of common and detailed characteristics of a typical object is presented and which serves as the basis for identifying any new impression or concept. What will be perceived and what the primary interpretation of the information will be, can also be determined by such a variety of cognitive schemes as frames (Minskij, 1978). The frame, by virtue of the characteristics of its organization, is a form of storing stereotyped knowledge about a certain class of situations: its "frame" characterizes stable, always existing relationships between the elements of the situation, and the "nodes" (or "slots") of this skeleton are the variation details of this situation (Minskij, 1978). One of the most difficult aspects of studies of cognitive entities of this kind is the question of the characteristics of their mental material. According to Najsser (1981), the cognitive schemes are generalized-visual formations, which arise as a result of visual, auditory and tactile-tactile impressions integration. Field of the correlation of mental forms and mental contents is in charge of Oshanin (1977) fundamental research. He, having formulated the concept of the operational image as a specialized reflection of the transformed object that is formed in the course of a concrete action performance and subordinated to the task of action, focused thereby on the fundamental questions of the cognition processes regulation, not only in the general psychological, but also in the differential-psychological sense. These and other approaches and directions of research pay attention to various properties of cognitive structures, the determination of their formation in ontogenesis, the relationship between verbal and nonverbal components, the degree of controllability, their role in the representation of information in memory and in the process of obtaining it.

One of the options for the structural analysis of the verbal, conceptual, and managed intelligence is way of processing out the information as acquired tools of cognitive activity. With some degree of conventionality, it can be assumed that the types of mental structures under consideration are those that essentially intersect with the operational mechanisms of cognitive abilities. Indeed, both and others and the third are a system of mental formations that, provide the opportunity for information on events in conditions of cognitive contact with reality, to occur its transformation, management of information processing processes, and the ingenuity of intellectual reflection. In classical mental tests, mental structures or operating mechanisms in an expanded form are not demonstrated as a rule. However, this is the

problem of existing approaches to the diagnosis of intellectual features, and not the problem of lack of humanity's intellectual gift.

Operational mechanisms (cognitive schemes, mental structures) form the basis of individual cognitive experience. These structures are formed, accumulated, aligned, mutated in the subject's experience of the course of his interaction with the objective world, the world of other people, and the world of human culture as a whole (Ceremoshkina, 1995, 2002). In the most general form, one can say that mental structures are responsible for actualization of the subjective reflection space within which a specific image of a concrete situation (speech statement, object, event, task, other person, idea, etc.) is constructed. Operational mechanisms are original cognitive mechanisms in which the available intellectual resources of the subject are represented in a «collapsed» form and which can «unfold» in a collision with an external influence a specially organized mental space. The individual originality and efficiency of processing information in the process of deployment of mental space depend to a certain extent the properties of these cognitive-personality entities. Productivity of the second level of intellectual activity (verbal, conceptual, logical intelligence) will be determined by the following indicators: - variety of ways of processing information; - degree of possession of them, or in anyone way; - breadth and depth of the representational picture of the subject (the picture of the personality world), in other words, the volume and depth of knowledge; - nature of the organization of the semantic field of the personality (hierarchy, conjugation and compatibility of various cognitive-personality formations of the subject); - nature of the dominant level of information processing (conceptual, associative, figurative, visual or otherwise); - the «specific weight» of the participation of concepts in the representation process of new information by a person.

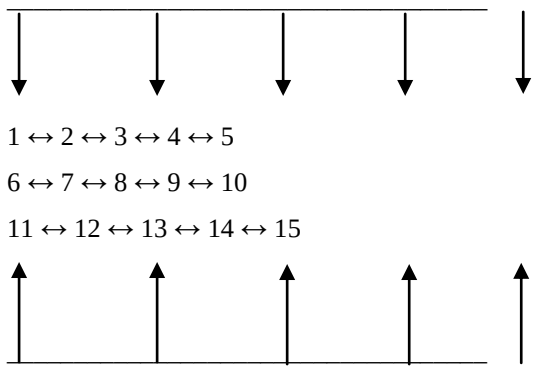
Third level of intelligence is the regulation of intellectual activity. Each of the known methods of information processing has its own structure, which can be described by a system of actions: goal-setting, orientation, decision-making, anticipation, planning, monitoring, evaluation and correction. This is the core of the regulation of intellectual activity (this is an internal intellectual regulation of intellectual activity). The unfolding of internal regulation is conditioned by the specific needs, motives, self-esteem, strong-willed qualities, emotional-sensory sphere and the character of the subject's beliefs. It is the system of different kinds of motivations of the individual to intellectual activity and actions of control, correction, planning, goal setting, orientation, anticipation and decision making that constitutes the third level of intelligence. If the developmental point of the second level of intelligence can be considered the emergence of generalizations (as a consequence of the development of thinking and speech), the principal moment for the development of the third regulatory level of intelligence is the development of cognitive abilities as systems of elementary abilities enriched by various methods of processing incoming information.

As the structure of operating mechanisms develops, the regulation of intellectual activity is improved, becoming to self-regulation. The development (formation) of the third level of intelligence is determined by the nature of the interaction of external and internal regulation, based on two factors: - reflection by the subject of his cognitive processes and the results of behavior in general; - development of the subject's own criteria, indicators, benchmarks of intellectual activity. The third level of intelligence is education, which both dynamites and stabilizes intellectual activity. It depends on force, on development and on the degree of conformity of external and internal regulation. The consequence of harmonization of external and internal regulation, apparently, is a certain deep orientation of the subject to a certain idea or object. Our studies of the regulation of memorization, reproduction and forgetting processes (Ceremoshkina, 2002), as well as the study of the regulation of cognitive activity in the mastery of a foreign language (Ceremoshkina, 1995, 2002) have shown that in the process of intellectual intentions forming up the motivational sphere of the personality and the actual state of intimate personal structures do play important role. The regulating level of intelligence is thus formed on the basis of and in the conditions of the «atmosphere» of the relationship between the cognitive faculties of the personality and that picture of representations that contains a variety of verbal and nonverbal semantic structures consisting of concepts, images, signs, emotions, words, gestures, etc. Perhaps, deep intellectual motives are one of the properties of those individual structures that were named above by cognitive-personal formations. Consequently, the structure of a dynamic, open, «unpredictable» system – of the intelligence developed and evolving with the continuous interaction of the individual with the surrounding world, can be described by the interaction and interdependence of three levels whose functioning is determined by innate and acquired mechanisms. The system of natural, verbal and regulating levels of intelligence determines the form of organization of individual mental experience in the form of available cognitive structures that generate intellectual space and are constructed within this space of individual, qualitatively and quantitatively diverse representations of what is happening.

The structure of intelligence, therefore, is a system of different levels of formation, in each of which there is one or another proportion of genetically predetermined and acquired as a result of the maturation of the brain and the training of the individual. In the process of mastering a foreign language, various levels of intelligence are participated. Each of the components of linguistic abilities can function unconsciously, involuntarily (with the support of the functional mechanisms of cognitive abilities), and controlled, arbitrary, consciously, when the second and third levels of intelligence are involved. The share of realized processes on development of phonetic skills can be less, than on development of lexical-grammatical skills. In the latter case, different levels of thinking must be involved. The study of

linguistic abilities and intelligence as «nested» to each other open systems allows us to specify the structure of linguistic abilities in the following way, presented in figure 2.

Figure 2. Linguistic abilities' structure



1 – Ability to analyze language phenomena as a system of multilevel mechanisms of abilities
2 – Mnemonic abilities as a system of multilevel mechanisms
3 – Hearing differential sensitivity as a system of multilevel mechanisms
4 – Plastic and controlled articulatory apparatus
5 – Abilities to anticipate linguistic phenomena as a system of multilevel mechanisms
6 – Mental operations
7 – Methods of processing the memorized material
8 – Perceptual actions of auditory differential sensitivity
9 – Actions to control the articulatory apparatus
10 – Operational mechanisms of abilities to anticipate linguistic phenomena
11 – Natural basis of cogitative abilities
12 – Natural basis of auditory mnemonic abilities
13 – Natural basis of auditory perceptual abilities (phonemic hearing)
14 – Natural possibilities of the articulatory apparatus
15 – Language intuition (natural basis of abilities to anticipate linguistic phenomena)

Analysis of the processes components of the linguistic abilities gives backgrounds for assuming the possibility and necessity of using different methods of teaching a foreign language both in the framework of communicative and linguistic approaches, as Belyaev (1959) noted. It should be mentioned that combinations of difference in human's general and linguistic abilities are possible depended on the level of intelligence development. In addition, the study of linguistic abilities' structure clearly revealed the problem of the specifics of the regulation of the learning of a foreign language and the generation of foreign speech, depending on the dominant level of intellectual activity of the subject. It's obvious that regulatory processes are uniform, but in any case, the main role is played by cognitive abilities. However, the qualitative uniqueness of cognitive abilities within linguistic ones is one side of the problem. Another, no less fundamental task, is the need to study the interrelations of arbitrary linguistic analysis and the conceptual, informational field of the subject of activity, in other words, meaningful fullness of the cognitive-personal structures of his intelligence.

4. CONCLUSION

The study of the problem of the relationship between general and special abilities and the structure of abilities for a particular type of activity necessarily requires a number of conditions. Firstly is conceptualized understanding of what capabilities are. Secondly is the idea of the classification of general abilities. Thirdly a psychological analysis of the relevant activities is necessary. Finally, a study of the relationship between general and special abilities is not possible without the analysis of general and special abilities as substructures of the intelligence.

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