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COGNITIVE MODELS OF GRAMMATICAL COMPETENCE OF STUDENTS

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Abstract. The article sees learner grammar competence through the lens of cognitive science viewing this construct as a mega unit of human kbowledge about grammatical organization of the sentence. Cognitive framework of describing grammar competence as percieved by humans includes exemplars, concepts, catgegories, prototypes, frames, scripts and schema as a whole, These components are considered in detail and a general model is built.
Keywords: grammar competence; cognitive model; exemplar; concept; category; prototype; frame; script; schema / schemata.

The basic contradiction of the cognitive model of grammatical competence of students

Basic contradiction of the cognitive model of grammatical competence ofstudents is the seeming incompatibility of the views of “cognitive” [1] and “mental” [2, 3] grammars. In fact, the contradiction between mentalism and cognitivism in understanding the nature of grammatical competence explains a single process of linguistic functioning – “from the brain” (mentalism) and “to the brain” (cognitivism).

Working definition of the cognitive model of grammatical competence of students

Before proceeding to the consideration of the problem, let us give an operational definition of the basic concept. Cognitive model of grammatical competence ofstudents is an abstract mapping of the verbal and grammatical means of the psycholinguistic mechanism of thought production in communicative and cognitive activity. We emphasize that, in accordance with the cognitive model, the transformation of thought is done through verbal realization and the same thought can undergo multiple transformations and interpretations through various grammatical structuring. Any thought can be expressed verbally in multiple ways.

Grammatical competence ofstudents in the light of scientific concepts

In the most general form, grammatical (linguistic) competence was defined by N. Chomsky [2], as theoretical and practical knowledge of a lim-

ited number of grammatical rules, which allow generating an unlimited number of correct sentences. It can be assumed that the grammatical competence in the context of learning a foreign language is a set of theoretical knowledge (rules) and language skills that are necessary and sufficient for students to construct correct sentences, to understand them, to monitor grammatical errors, to pass judgments about right and wrong linguistic forms, and to perform language testing tasks.

In the 80s, the American linguist R. Langacker put forward the idea of "space grammar" [1]. He claimed that the grammatical structures are closely related to lexical semantics and, together, constitute a single space of interrelated elements.

The idea of the interconnectedness of the elements of language knowledge gradually led to the development of scientific ideas, dubbed "connectionism" [4].

The essence of the idea of connectionism with respect to grammatical competence was the fact that the grammatical competence can be represented as a network of elements interacting in the intertwining connections. If we draw a parallel with the organization of the human brain, then there is an association with a network of neurons (brain cells).

Types of knowledge in the grammatical competence of students

All human knowledge is a set of learned or innate "stencils", filtering the information and letting through only what is recognized and understood from the outside. Grammatical knowledge can be compared to a set of internalized "speech stencils" organizing both productive and receptive speech.

Grammar is usually described in literature as "declarative" and "procedural". In learning the grammar of a foreign language preference in most teaching cultures is usually given to procedural knowledge, that is, practical grammar skills that students demonstrate in speech activity. However, the principle of consciousness in teaching means that for students to master the grammar of another language means also to acquire declarative knowledge that students demonstrate describing grammatical phenomena with the help of rules.

Rules are an important element of grammatical knowledge, although the path to this knowledge may be different: deductive (from rules to examples) or inductive (from examples to the rule). At the same time, knowledge of rules is not enough for grammatical competence and working on rules is always accompanied by intensive development of students' grammatical skills. Further on, rules and skills are not enough to consider the grammatical competence of students fully formed either. An important component of grammatical competence is intuition.

Grammatical intuition is discussed in language pedagogy, as a basis for a grammar decision making, which is not derived from explicit

knowledge of learners and their judgments about the rightness or wrongness of his or someone else's grammaticality.

While grammatical knowledge depends on the rules of grammar, grammar skills depend on the intensity of training exercises, and the grammatical intuition depends on the breadth and scope of the communicative experience of the students. Watching the students, you will notice that the best results are obtained when a communicative experience of students is supported by targeted training and language patterns are explained with the help of rules.

Grammatical programming of sentences

The most common and persistent grammatical rules for constructing sentences in each language were called by N. Chomsky "grammar principles". For example, the proposal "John goes to the pub" corresponds to the principle of constructing sentences with the 3d person singular according to the rules of English grammar. To make the picture of grammar principles more complicated, the grammar of any language is characterized by "switches". A grammatical switch is usually an exception to the rule in forming a relationship between words in a sentence, which is not always consistent with the principles of a particular language. A grammatical switch is very typical for young children with native English, as in the sentence "Dad goed to work". This phenomenon is called "overgeneralization", that is, the application of a common grammatical rule to all cases in the language.

As a result of principles and switches merging together certain "acceptable norms" surface up in the language that N. Chomsky called "language parameters" [3]. Language users have the right to deviate from grammar principles and to perform switches within certain socially acceptable parameters.

Native speakers do not always comply with the "principles of language". In their speech there are numerous deviations from formal rules and language "liberties" in such cases characterize authentic speech. Note that the parameters of grammatical correctness in oral communication are generally broader and wider than in writing, where strict and narrow linguistic principles prevail. The wider the students employ authentic grammar, the more advanced they are in their grammatical competence and the more their grammar parameters approach the standards of authenticity.

The Semantic Web as a metaphor for grammatical competence ofstudents

Cognitive model of grammatical competence, may be understood more clearly with the help of the theory of "semantic web", which was first mentioned in 1969 [5].

Grammatical competence of students as "Semantic Web" can be represented in a set of "nodes", connected by a maze of "relations" (arches). Note that not all nodes in a semantic network can be filled with lexical and grammatical information. Many cells remain empty and "are waiting for their moment", when they are filled with the appropriate content. Empty cells (nodes) are called "slots" [5]. The process of developing grammatical competence ofstudents is a permanent process of "slot filling" and producing an increasingly complete semantic network.

Instances (exemplars), concepts, categories, prototypes, frames, scripts in the cognitive model of grammatical competence of students

Let's consider the following terms of cognitive psychology and linguistics as an "instance" (exemplar), "concept", "category", "prototype", "frame" and "script" as each of them suggests a useful idea and each can help in understanding the structure of the grammatical competence of students.

Grammatical instances (exemplars) - are specific examples of language used in natural communicative situations. Language instances stored in the memory of native or trained speakers are an integral part of their grammatical competence.

By grammatical concepts in linguistic competence of students we mean notions that can be used to describe the correct English sentence. Important concepts for learning English grammar are parts of speech (noun, verb, adjective, etc.), their function in the sentence (subject, predicate, minor sentence), the order of words in the English sentence (direct order and inversion), morphological features of grammatically correct statements and many others. We can say that the grammatical concepts for students are the metalanguage (the language of linguistic terms), with which we can describe, analyze and correct grammar instances of the learners. Without listing all the grammatical terms let's mention just one example of an "action to be taken at the moment of speech". This and other concepts grouped together with the relevant instances (exemplars) make up a category called "Present continuous".

Grammatical categories are used not just to name but to describe and to explain grammatical phenomena using appropriate concepts and instances (exemplars). Therefore, a category always consists of concepts, instances (exemplars) and rules that make up the "little theory" as part of the theoretical fabric of grammatical competence of students. For example, the most important grammatical category for students who study English language grammar is grammar tense. Without this knowledge, the formation of grammatical competence ofstudents in English is impossible. For comparison, Chinese grammar is not dependent on the category of tense as the morphological expression of time in Chinese is not necessary.

Grammatical prototypes

Grammatical prototypes are typical cases illustrating a particular grammatical category. For example, a prototypical illustration of the English infinitive is the Shakespearean line: "To be, or not to be...".

The knowledge of grammatical prototypes is valuable for students not just because they are typical instances (exemplars) of language, but rather for the reasons that prototypes combine the "typical" and the "borderline".

The same phrases may simultaneously belong to different grammatical category. The words "high" and "low" belong both to the class of adjectives and nouns to form a different paradigm of word forms. It is a discovery for some students to come across the sentence "The famous writer experienced highs and lows in his life". Language learners come to know that adjectives may function as nouns and even appear in the plural form. Another example is the word "like", functioning not only as the verb, but also as an adverb (Like father like son).

There are many examples where structures formally belonging to a certain grammatical tense, actually indicate a different time period. For example, in the sentence "That will be Mary" future is not expressed at all. Instead the speaker is making an assumption about the immediate present tense event on the basis of regular observations (Mary always comes home at this time of the day).

The features that differentiate grammar categories function as "grammatical frames" - the boundaries of grammatical phenomena making them recognizable. The knowledge of frames - the distinctive features of grammatical phenomena - is an important part of the grammatical competence of students.

Grammatical frames

A "frame" in cognitive science is a set of features identified to distinguish one phenomenon from another [6]. According to scientists, frames are a form of storing human knowledge in distinctly recognizable sets [7].

Grammatical frames are needed by students to recognize grammatical phenomena, to classify examples, to pass judgments about the rightness or wrongness of a grammatical form, to cope with testing tasks etc.

For example, the grammatical frame, which allows students to distinguish between the Present Perfect Tense and the Past Perfect Tense includes, among several other features "obvious result to the moment of speech" in the Present Perfect Tense and the reference to "the completion of one event by the beginning of another past events" in the Past Perfect Tense.

Grammatical frames, as well as other semantic tools of cognition contain blank "slots", which are gradually filled with new differentiating fea-

tures that allow students to more fully imagine the boundaries of grammatical phenomena, understand language mechanisms for constructing correct sentences and to form a structured view of the grammatical panorama of the language under study.

Grammatical scenarios

Back in the seventies of the 20th century, scientists have proposed a theory of "scenarios" (scripts) - sequences of events and actions that are stored in memory enhancing the ability to map some processes using language means (Schank, Abelson).

Based on this theory, it is believed that a script is the mechanism of chain links, including the "slots" in the chain, the requirements for the completion of slots and probable sequences, generating a more or less complete picture of some succession of events. It is possible to assume that grammatical scripts, which students need most of all are the sentence scenarios. Other important scripts are "cultural scenarios" (e.g. in what succession of actions a bank customer should open an account with the bank) that language learners also need to know in order to function successfully in other cultures [8].

Grammatical schema

The term "schema" (plural "schemata") was first mentioned by Kant and applied in developmental psychology by Piaget. He called a schema - "the reality grasped by consciousness". Cognitive scientists interpret schemata as previously acquired knowledge that channels further cognition.

English scientist F. Bartlett investigated the effect of previously learned knowledge, - "schemata" - on the perception and assimilation of new knowledge. He found out that recollection of stories once heard significantly change under the influence of one's own life experience.

Schemas (schemata) in the grammatical competence of students manifest themselves in that previously learned grammatical knowledge of students including their native tongue, has an effect on the foreign language learned and also on the assimilation of new grammatical knowledge.

Grammatical schemas (schemata) get stabilized in the process of learning in accordance with the achieved language level. Because of the schemata acquired, the students formulate their sentences with varying degrees of adequacy and accuracy.

The acquired schemata add to the authenticity, richness and variety of grammatical patterns of students depending on their communicative experience, strength of grammatical skills, clarity of grammatical concepts, and adequacy of grammar frames.

Grammatical creativity

Grammatical competence of students would be incomplete without creative construction of sentences. Chomsky included grammatical creativity in his construct of linguistic (grammatical) competence [2], linking this "creative component" both to "competence" and "performance".

R. Langacker [1] also reasoned about creativity. In his seminal work on cognitive linguistics, the author claimed that linguistic (grammatical) creativity is possible in the form of non-traditional construction of phrases both in compliance with the rules of grammar, as well as violations of grammatical rules.

Grammatical manifestation of students' creativity can assume a variety of forms of expression of the same idea, for example, "I don't want you to go", "I don't like you to go", "I'd rather you didn't go", "You had better not go", "Please, don't go", etc.

Grammatical creativity can be observed in students' writing. One example is a fragment of an essay: "Our silence on the issue of animals' rights has become even more dead than ever". Grammatical basis for such a creative phrase was the two previously learned English phrases: "to feel more dead than alive" and "dead silence".

The so-called "ungrammaticalities" in students' writing are, in fact, a manifestation of their grammatical creativity. N. Chomsky never separated grammatical creativity from its appropriateness. With all the doubts about grammar creativity and the language inaccuracies that inevitably arise it is obvious that without creative communicative strategies the achievement of sufficient level of communicative competence is not possible [9-16].

Conclusion

Cognitive model of grammatical competence allows us to more clearly capture the nature of grammatical knowledge. The model shows what components are needed for the students' to know how an English sentence is grammatically organized. This makes cognitive model of grammatical competence of students a useful tool for students and teachers.

Literature

1. LANGACKER, R.W., 1986. An Introduction to Cognitive Grammar. *Cognitive Science*, 6, pp. 1-40.
2. CHOMSKY, N., 1965. *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press, 240 p.
3. CHOMSKY, N. and LASNIK, H., 1993. *Principles and Parameters Theory in Syntax.* An International Handbook of Contemporary Research, Berlin: de Gruyter, 190 p.

4. MCCLELLAND, J.L., and RUMELHART, D.E., 1986. Parallel Distributed Processing: Explorations in the Microstructure of Cognition. *Psychological and Biological Models*, 2. Cambridge, MA: MIT Press, pp. 160-198.
5. STERNBERG, R., 2009. *Cognitive Psychology.* Belmont: Wardsworth, 210 p.
6. FILLMORE, Ch., 1976. Frame semantics and the nature of language. *Annals of the New York Academy of Sciences: Conference on the Origin and Development of Language and Speech*, 280, pp. 20-32.
7. GURIN, R.V., 2005. *Frame representation of knowledge.* Popular Education. Research Institute of School Technologies, pp. 138-167.
8. WIERZBICKA, A., 2002. Russian cultural scripts and their reflection in language. *Russian language in a scientific light*, 2 (4), pp. 6-34.
9. MILLROOD, R.P., MATIENKO, A.V., and MAXIMOV, I.R., 2005. Foreign experience of language testing and evaluation of the quality of teaching foreign languages. *Foreign Languages in School*, 7, pp. 32-41.
10. EVANS, V., and GREEN, M., 2006. *Cognitive Linguistics. An Introduction.* N.J.: Lawrence Erlbaum Associates, 210 p.
11. FAUCONNIER, G., and SWEETSER, E., 1996. *Spaces, Worlds, and Grammar.* Chicago: University of Chicago Press, 182 p.
12. FODOR, J., 2010. *The Language of Thought Revisited. Oxford.* Oxford University Press, 180 p.
13. KUMAR, S., 2007. *Neural Networks. A Classroom Approach*. New Delhi: Tata McGraw-Hill, 190 p.
14. PINKER, S., and MEHLER, J., 1988. *Connections and Symbols*. Cambridge MA: MIT Press, 240 p.
15. SCHANK, R., and ABELSON, R., 1977. *Scripts, goals and understanding: an enquiry into human knowledge structures.* N.J.: Erlbaum, 256 p.
16. TURNBULL, W., 2003. *Language in Action. Psychological Models of Conversation*. East Sussex: Psychology Press, 290 p.