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COGNITIVE APPROACHES TO FIRST AND SECOND LANGUAGE ACQUISITION

У статті аналізуються дуально-системний та сингулярно-системний підходи до вивчення першої та другої мови; переглядаються взаємовідношення між першою та другою мовою, що вивчаються; розглядаються методи дослідження вивчення другої мови.

Ключові слова: когнітивна лінгвістика, вивчення першої та другої мови, дуальна система, сингулярна система.

В статье анализируются дуально-системный и сингулярно-системный подходы к изучению первого и второго языка; пересматриваются взаимоотношения между изучением первого и второго языков; рассматриваются методы исследования изучения второго языка.

Ключевые слова: когнитивная лингвистика, изучение первого и второго языка, дуальная система, сингулярная система.

The dual-system and the single-system approaches to first and second language acquisition are analysed in the article; the relationship between first and second language learning is revisited; second language acquisition research techniques are observed.

Keywords: cognitive linguistic, first and second language acquisition, the dual-system, the single-system.

Introduction. Categorisation is an important cognitive skill which helps people process information about a range of stimuli in day to day life. As such, how people learn to categorise has been the focus of much interest. Research in this area falls into two broad groups: those who argue for a single underlying process (S. Channon, S. Kahan, D.A. Lagnado, B.R. Newell, R.M. Nosofsky, D.R. Shanks, M. Speekenbrink, S.R. Zaki et al.) and those who argue for multiple (typically two) processes (F.G. Ashby, M. Gluck, B.J. Knowlton, W.T. Maddox, J.A. Mangels, C. Myers, D. Shohamy, L.R. Squire, R.A. Poldrack, P.J. Reber et al.). The dual systems approach has dominated research in this area and often rests on the claim that it is the nature of the category structure itself which determines how people will learn a categorisation task (F.G. Ashby, W.T. Maddox).

A major assumption underlying a great deal of first language (L1) acquisition research has been that the acquisition of a language has a clear beginning and end state, and a somewhat linear path of development for each individual. Similarly, in much second language acquisition (SLA) research, a second language (L2) learner, no matter what his/her L1, is predicted to go through highly similar stages in acquiring the L2. Such a view of language learning or processing is often associated with an information processing (IP) model.

On the other hand, there have also been numerous linguistic and language acquisition studies that have not adhered to the linear view. They have shown that language, language acquisition, and language attrition are much more intricate, complex, and even unpredictable than a linear position would allow. Linguistic theories such as Cognitive Linguistics and Functional Linguistics, acquisition theories such as Emergentism, and processing theories such as the Competition Model recognize that there are many interdependent variables, not only within the language system, but also within the social environment and the psychological make-up of an individual. What these theories have in common is that they recognize the crucial role of interaction of a multitude of variables at different levels: in communication, in constructing meaning, in learning a language and among the languages in the multilingual mind.

Goals. The dual-system and the single-system approaches to first and second language acquisition are to be analysed in the article; the relationship between first and second language learning is to be revisited.

The relationship between how people learn their first language (L1) and how they learn their second language (L2) and subsequent languages has concerned second language acquisition (SLA) research ever since it became an independent discipline (V.J. Cook, S. Ervin-Tripp, L. Selinker, H. Stern et al.). The relationship between the two languages is crucial because it defines the very nature of second language acquisition: if L2 acquisition did not differ in some way from L1 acquisition, SLA research would be merely a sub-field of language acquisition research rather than a field of its own. It is a truism that the defining characteristic of L2 acquisition is the presence of a second language in the same mind as a first and that the characteristic of an L2 community is the use of additional languages to the first language. The unique problem for SLA research is to see how this pre-existing language affects the L2 user's mind and the L2 user's community.

The mainspring that drove SLA research in the 1960s was the independent grammars assumption as applied to children's language by people such as R. Brown [2] and D. McNeill [10]: children should not be treated as mini-adults but as children. The child's language constitutes an independent system of its own rather than being a defective version of the adult system. Children's utterances like more high were not deformed versions of adult sentences but reflected the unique pivot-open organisation of early child grammar; to make a two-word utterance, combine a pivot word like more with a content word like high, yielding more high, a request to be lifted up. Children's sentences are not poor attempts at adult sentences but proper sentences according to the child's own rules.

Taken into SLA research, the independent grammars assumption became known as the 'interlanguage' hypothesis: 'the existence of a separate linguistic system' [13, p. 211]. The learner's language system is not a defective version of the native speaker's but a developing system in its own right. This concept served to liberate SLA research from the dead hand of structural linguistics and Contrastive Analysis by starting from the learner rather than a preset apparatus. The main focus became the detailed analysis of learners' speech, in principle independently of the language of native speakers. You no longer had to compare the total syntax and phonology of the two languages before you tackled L2

learning as it were but could start in on what actual learners did and see what their syntax and phonology consisted using the learners' own speech or writing – in a sense a bottom-up data-led process rather than a top-down theory-based one.

Yet, despite paying lip-service to interlanguage, the vast majority of SLA research never quite accepted the interlanguage assumption that learners have to be studied in their own right. In L1 acquisition research people had indeed knuckled down to the task of looking at the child's own language development rather than looking for deviations from adult speech, as most introductions to L1 acquisition show to this day [1; 4]. L2 learners, however, were at every turn measured against the monolingual native speaker, both overtly as shown by remarks like 'Relative to native speaker's linguistic competence, learners' interlanguage is deficient by definition' [9, p. 5], and covertly through research techniques such as grammaticality judgements that implicitly use the native speaker as a touchstone.

One crucial question to be developed is whether the L2 user's knowledge of the second language is the same as that of an L1 monolingual native speaker of that language. The main question for many researchers has been whether the stages and processes through which L2 learners develop are the same as those for L1 children. SLA researchers were impressed by the overall idea of sequence: the discovery of a common acquisition sequence for L2 learners is surely one of the most exciting and significant outcomes of the last decade of second language research. Experiments indeed showed that L2 learners acquired things in a sequence resembling L1 acquisition. Like L1 children, L2 users first confused the difference between *John is easy to please* and *John is eager to please* and sorted it out comparatively late [5, p. 22] – plateau stages with transitions – despite having no clear way of deriving the structure from the speech that they encounter.

As a new area of research, SLA research undoubtedly borrowed most of its research techniques from first language acquisition and has continued to do so. The techniques most obviously borrowed from L1 acquisition research are those for studying actual sentences that L2 learners produce, which we can call natural data [5]. In SLA research the ESF project adopted a similar approach by recording large amounts of speech by immigrants to five countries and producing an account of the learners' common basic grammar and semantic stages through which they progressed.

SLA research was also fond of a technique for tackling natural data called Error Analysis (EA) [6]. This looked at the differences between the learners' speech and that of native speakers and then looked for explanations.

Another popular technique with natural data was scoring obligatory occurrences of particular syntactic forms. The continued use in SLA research from Dulay and Burt [7] to the Competition Model [11], however, defines obligatory as what a native speaker would say.

The second broad family of techniques borrowed from L1 research generated controlled data. One form this takes is getting learners to produce naturalistic speech. Elicited imitation was used for second language acquisition by V.J. Cook [5] for testing the comprehension of relative clauses, and by many others.

An important additional source of information for SLA research is introspection data [5]. L2 learners are asked about their emotions, motivations and strategies. Much of this data is unobtainable in L1 acquisition as the children's age makes such testing virtually impossible. One key technique in SLA research has been grammaticality judgements, the vital technique used in generative SLA research.

Linguists are concerned with how language as a system works. Yet, some of them are especially interested in linguistic processing, or in other words, they wish to know what it is that people actually do when they produce and understand speech. And yet others set out to study linguistic processing in different populations of speakers – young children acquiring their first language (L1), child and adult second language (L2) acquirers, or children and adults with language impairments. The last two categories of researchers differentiate between a linguistic construct and the actual mechanisms underlying speech production and perception, storage and retrieval of linguistic units, and conduct experiments to find out which theoretical constructs have a better fit to real speech processing observed in human speakers-hearers. In order to do so they utilize a variety of experimental techniques, which allow them to collect different types of speech data and perform analyses.

There are two main points of view with regard to morphological processing, which draw on two understandings of linguistic mechanisms in general. English past tense inflection has become the experimental ground for testing the predictions of the two conflicting points of view concerning morphological processing with most of the data, especially, generated in connectionist modeling, coming from English. Past-tense verbs in English are inflected in two different ways. The vast majority of verbs form their past tense by a general-purpose concatenative rule, 'add-ed to the stem,' which constitutes regular inflection: *walk-walked*, *play-played*. A relatively small group of irregular verbs is inflected by some unpredictable stem change with or without the addition of some kind of inflection. These irregular verbs can cluster into 'neighborhoods' with similar stem allomorphy, such as *sing-sang*, *ring-rang*, *spring-sprang*. These properties of English, namely a categorical distinction between regular and irregular past-tense inflection, make it possible to investigate the issue whether regular and irregular processing are performed by two distinct mechanisms or just one, and whether regular, but not irregular inflection makes use of symbolic rule computation.

According to the dual-system approach (H. Clahsen, J.J. Jaeger, G.F. Marcus, S. Pinker, S. Prasada, A. Prince, M.T. Ullman et al.), which is most consistently represented in Steven Pinker's Words and Rules Theory, linguistic processing is subserved by two main systems – the mental lexicon and a computational system [12]. Words in the mental lexicon are connected to each other based, e.g., on phonological or semantic similarity, and their storage and retrieval are performed in associative memory; symbolic rules are applied by computation. In the domain of inflectional morphology, irregular forms are stored in the mental lexicon while regular forms are computed on-line. There is no need to store regular inflected forms, as they will be assembled by the application of concatenative rules. However, no such rules can exist for the irregular forms, therefore they have to be memorized, and retrieved from the mental lexicon when needed. For example, English speakers do not need to store both the singular form of the noun

tree and its plural form trees, since the plural is generated by the application of a regular rule: add-s to the singular stem. The noun *child*, however, needs to be memorized together with its irregular plural *children*. One important implication arising from such a standpoint is the assumption that irregular forms processed in associative memory will show frequency effects. Generally speaking, the underlying assumption in research on frequency effects is that the words that are activated more often have stronger memory traces, and as a result, are retrieved from memory faster. Contrary to irregular inflection, regular inflection will not show any frequency effects, because symbolic rules are applied when the necessary criteria are met, regardless of the frequency of use. Since regularly inflected words are assembled on-line, they are not stored in undecomposed form (with inflections attached to the stems), and thus cannot show whole-word frequency effects. Thus, the dual-system approach makes clear predictions about the connection between input frequencies to the speaker (learner): frequency effects will be observable in irregular inflection, but not in regular inflection. One of such predicted effects includes shorter reaction times (RTs) in a lexical decision task (LDT) to high-frequency than to low-frequency irregular word-forms, but no such effect for regular ones. The same strong predictions involve the role of phonological similarity in regular and irregular inflection – only irregular word-forms will show effects of phonological similarity, e.g., in a nonce word generation task. Speakers will use the irregular inflectional pattern only for the nonce words, which are very similar to the existing irregularly inflected words, whereas they will use the regular inflectional pattern regardless of phonological similarity. Over time, the dual-system approach moved from its strong version, according to which no regular inflected words are stored in the lexicon in undecomposed form, to a weaker version expressed in the Words and Rules Theory [12]. The Words and Rules Theory admits that a certain number of high-frequency regular word-forms can be stored undecomposed, but that this fact does not affect the general processing model.

The single-system approach is built on the premises that there is no categorical distinction between two different processing mechanisms, the rule-based and the association-based ones (J.L. Bybee, R. Langacker, J. Leinbach, B. MacWhinney, V. Marchman, J.L. McClelland, K. Plunkett, D.E. Rumelhart et al.). All the words, uninflected, regularly and irregularly inflected, are stored in the mental lexicon and form associations based on phonological and semantic similarity. The frequency of these mappings between word-forms in the lexicon is crucial for their processing, e.g., for the speed of their retrieval. If a certain type of mapping, e.g., between the verb stem and the regularly inflected past-tense form, *repeat–repeated*, *discuss–discussed*, etc., is highly frequent in the network, such pattern of association gains in strength. This associative patterning has been modeled in numerous versions of connectionist networks, in which the weights of connections between the nodes representing word-forms are adjusted depending on the frequency of their activation. Obviously, the single-system approach predicts that both regular and irregular inflection will show frequency effects, since both regular and irregular word-forms are processed in the same associative network. It goes without saying, that phonological similarity lies at the core of single-system models, and its effects are predicted both for regular and irregular inflection. Associative patterning is a proposed alternative to symbolic rule computation, and the single-system approach seeks to show that our mind processes language without symbolic rules. Several research directions, most of them involved in connectionist modeling, espouse the single-system approach, including emergentism, a relatively recent direction, focusing on the emergence of language in an associative network in children acquiring their L1 as a product of input processing [8].

Since English does not possess a developed conjugational paradigm, and has only one large regular productive default class and one small irregular unproductive class in the past tense, in other words, it is impossible to divorce regularity, productivity, and high type frequency in it. Regularity in inflectional morphology refers to a pattern involving less changes to the shape of the morphemes involved. Regular inflectional processes can be described by a simple concatenative rule: add a certain ending to the stem. English past-tense and noun plural formation are examples of regular inflectional processes. Productivity refers to the fact that the pattern is used in new words, e.g., English uses the productive *-ed* pattern in *blog–blogged*. Type frequency refers to the frequency of occurrence of a linguistic pattern, or in other words, to the size of a certain class of words using this pattern. And finally, default is characterized by the most open schema, and it is used «when all else fails» [3, p. 440]. It is important to maintain this distinction in the data, because the dual- and single-system theories connect regularity to different linguistic parameters.

Summary. Thus, the dual-system approach claims that regularity and productivity are interconnected, and therefore, regular inflection has to be productive. Also, it does not explicitly differentiate between regular and default processing, often using the ‘regular’ and ‘default’ terms interchangeably. Contrary to that, the single-system approach draws a connection between productivity and high type frequency, and maintains that regularity, productivity, and default are all different parameters.

Bibliography:

1. Bloom, P. (2002), *How Children Learn the Meaning of Words* / P. Bloom. – Cambridge Ma. : MIT Press, 2002. – 314 p.
2. Brown, R. *A First Language: The Early Stages* / R. Brown. – London : Allen and Unwin, 1973. – 449 p.
3. Bybee, J. L. Regular morphology and the lexicon / J.L. Bybee // *Language and Cognitive Processes*, 10, 1995. – pp. 425-455
4. Clark, E. V. Language builds on cognitive development / E.V. Clark // *Trends in Cognitive Sciences* 8, 2004. – pp. 472-478.
5. Cook, V. J. The comparison of language development in native children and foreign adults / V.J. Cook // *International Review of Applied Linguistics*, XI, 1, 1973. – pp. 13-28.
6. Corder, S. P. Idiosyncratic dialects and Error Analysis / S. P. Corder, *International Review of Applied Linguistics*, 9, 2, 1971. – pp. 147-159.

7. Dulay, H. C. & Burt, M. K. On acquisition order / H. C. Dulay, M. K. Burt // Second language development: Trends and issues, 1980. – PP. 265-327.
8. Elman, J. Rethinking innateness: A connectionist perspective on development / J. Elman, E. Bates, M. Johnson. – Cambridge : MIT Press, 1996. – 447 p.
9. Kasper, G. Communication Strategies: Psycholinguistic and Sociolinguistic Perspectives / G. Kasper, E. Kellerman. – London : Longman, 1997. – 416 p.
10. McNeill, D. Some thoughts on first and second language acquisition / M. McNeill. – Mimeo, Harvard University, 1965. – 357 p.
11. Pienemann, M. Language Processing and Second-Language Development: Processability Theory / M. Pienemann. – Amsterdam : John Benjamins, 1998. – 366 p.
12. Pinker, S. Words and rules: The ingredients of language / S. Pinker. – New York, NY : Basic Books, 1999. – 384 p.
13. Selinker, L. Interlanguage / L. Selinker // International Review of Applied Linguistics, 3, 1972. – PP. 209-231.