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The process of language acquisition has always fascinated people. Although many observations of this process were not scientific in their character, they presented a desire people felt to discover the rules that govern it. Tiedemann (1787) was one of the first who approached the problem in a scientific form. Modern scientific study of language development began when Preyer (1882) published a descriptive work that presented his son's language development. Then important works by Sully (1895), Grégoire (1937), Velten (1943) and others appeared. In the past mainly the order in which sounds appeared in child language development and vocabulary were taken into consideration. The aim of the research was to explain language acquisition on different levels. The scholars also tried to answer the question of how learning develops, especially, how much grammar is innate and how much of it is learnt (Chomsky and Halle 1968). Then in the eighties and early nineties of the last century non-linear phonology and prosodic phonology became the dominant phonological theories. This gave an impetus to phonological acquisition research, mainly in terms of the acquisition of segmental phonology (McDonough and Myers 1991, Fikkert 1994, Levelt 1994). Phonological research has also been dominated by the Optimality Theory (OT) (Prince and Smolensky 1993, McCarthy and Prince 1993, 1994). This theory claims that no division is made between segmental and prosodic phonology. Acquisition of segmental phonology developed in two ways: first – the acquisition of segmental inventories and second – the acquisition of segmental rules or processes. The segmental inventory theory dealt with a universal order in which segments (features) are acquired (Jakobson 1941/1968, Rice and Avery 1995).

For many years research on perception and production developed almost independently and usually speech production received more attention (Jusczyk 1997).

This situation has been changing (e.g. Broe and Pierrehumbert 2000, Hume and Johnson 2001). This tendency of the growing role of phonology in perception has two sources. The

first is connected with markedness in perception and production (Hayes, Kirchner, and Steriade 2004, Davis, McNeilage, and Matyear 2002) whereas the second is connected with phonological representations.

As it was mentioned studies in child language traditionally focused on production. The results indicated that children do not speak in the same way as adults do. Moreover, children's way of speech often differs from adults in a systematic way and children's language aim is to develop towards the target adult language. It is easy to notice that during the development children start producing simple and unmarked phonological patterns which change into more marked. Markedness is connected with typology. It means that what is typical of languages of the world is unmarked and acquired early. From this point of view typology relates to acquisition in the same way as phylogeny to ontogeny in Jakobson's theory (1941/1968). However, markedness constraints are seen in different way.

Some researchers believe in innate and universal constraints. Others indicate that markedness constraints are grounded in perception and articulation. For others markedness constraints are generalizations over a lexicon (Beckman and Edwards 2000, Pierrehumbert 2003, Fikkert and Levelt 2004). From an other point of view representations are acquired as part of the grammar and as a result representations cannot be presupposed (Fikkert and Levelt 2004).

According to Fikkert (2007) "(…) to acquire language's phonology children need to acquire (a) the segmental inventory of that language, (b) phonological processes, (c) restrictions on phonotactics, word prosodic structure and larger prosodic units that define the adult grammar. In addition, children need to build a lexicon in which phonological representations of words are stored" (Fikkert 2007, 541).

According to Jakobson children acquire phonology by building up a system of contrasts. The contrasts that are common are acquired first. From this point of view acquisition can be described as the unfolding of a pre-existing feature hierarchy. However, this position was criticized because children reveal more variation than those that can be expected from a universal feature hierarchy (Kiparsky and Menn 1977, Macken & Ferguson 1983). Kiparsky and Menn (1977) indicate that children break up consonant clusters in different ways and, in addition, children acquiring different languages reveal different systems of contrasts. What is more, there are also differences among children that acquire the same language. There are two ways of approaching of a system of contrast by children. The first concentrates on contrasts and processes that exist in child language. The second focuses on the acquisition of contrasts that are important in adult phonological processes. These contrasts are acquired early (Dresher 2004a, b, Fikkert and Freitas 2004). Dresher (2004a) introduced Continuous Dichotomy Hypothesis. In this hypothesis all sounds are variants of a single phoneme that appears at the beginning stage of acquisition. The process of dichotomy develops until all distinctive sounds are differentiated. In the process of differentiation Dresher suggests that phonological processes are crucial and only contrastive features are phonologically active. From this point of view child language is different from adult language in the way that children's phonological system is immature and does not respect all contrasts of adult language. However, it is important that it is not fundamentally different.

When child phonology is taken into consideration, processes are always focused (Ingram 1974). One of the most well-known is consonant harmony. However, Kiparsky and Menn (1977) suggest that the acquisition process is more complex and is characterized by two types of rules: invented rules and rules that exist in adult phonology. Invented rules are important in order to simplify adult forms in the way the children are able to produce them. Generally, there are many rules typical of child phonology. However, it should be stressed that there are also specific rules typical of individual children (Fikkert 2007).

> As children become more competent language users, they can do without the simplification rules. As a result the invented, child-specific, rules gradually disappear. However, as children learn more words, and also more related alternations: the adult phonological rule system. This may lead children to restructure the underlying forms to more abstract representations (Fikkert 2007, 544)

Generally, during the phonological development two kinds of rules arise. The first are invented rules which disappear during the process of development and the second are adult phonological rules which appear and restrict phonological representations.

Segments are not acquired in isolation, they need a word to surface and the position in the word is important since some contrasts appear in onset earlier than in coda position. Moskowitz (1974) suggests that the first unit that is acquired in English is the syllable. Phonology without syllable is proposed by Dziubalska-Kołaczyk (2001). However, other researchers (e.g. Menn 1971, Ferguson and Farwell 1975) propose a larger unit, a word. This point of view in research is connected with word templates. "These word templates constrained word forms that children produced and formed the basis of children's phonological representations" (Fikkert 2007, 545).

When syllable structure is taken into consideration, it should be mentioned that special features are noticed: the acquisition starts with CV syllables, next the child reduces consonant clusters and deletes final consonants. Fikkert's analysis of syllable structure revealed that the developmental patterns showed relatively little variation among twelve children who were examined by her (Fikkert 1994). Levelt & van de Vijver (2004) based their research on many studies on Dutch, proposed that acquisition follows frequency of syllable types in the ambient language. Levelt et al. (1999/2000) examined stressed syllables produced by children and they found that the stressed syllables were mostly word-initial (stress pattern in Dutch). In French stressed syllables are final and in Portuguese stressed syllables appear in final or pre-final position (Fikkert et al. 2004).

When prosodic word forms are focused, it can be noticed that there are studies in different languages. At first they were seen as fixed templates. English, for example, is characterized by trochaic template. Children who acquire Germanic languages produce mainly words that are monosyllabic or disyllabic trochees in character. Children acquiring Romance languages produce few monosyllabic words both trochaic and iambic word patterns (Hochberg 1988a, b, Santos 2003). Cross-linguistic research into factors related to prosodic shape of first words is very important for understanding phonological acquisition (Fikkert 2007).

Phonological acquisition is explained in different ways. One of them is Optimality Theory (OT) which is different from rule-based theories presented, for example, by

Chomsky and Halle (1968) in Sound Patterns of English (SPE). In this theory output is formed by application of rules whereas in Optimality Theory it is taken from options by means of output constraints as well as constraints on input-output relations (Fikkert 2007). In OT there are no restrictions on inputs. Input forms are the same for children and adults, but children's output forms are different from adult output ones. Furthermore, it is suggested that child and adult phonology consist of the same elements. In OT grammar is made up of a set of innate constraints. There are two main groups of constraints: Markedness constraints and Faithfulness constraints which are often in conflict. Because inputs and constraints are the same for children and adults it means that output differences are connected with differences in the ranking of the constraints. Development depends on constraint re-ranking. As a result output forms that are more marked and more similar to the adult forms arise.

It is also important that constraints can emerge during the acquisition. Hayes (1999) and Hayes et al. (2004) indicate that constraints are created by factors that refer to articulatory and acoustic mechanisms. Consequently, phonological constraints are acoustic or articulation in character. The elements that are easy to produce or perceive are acquired first and those that are more difficult to produce or perceive are acquired later. Boersma, Escudero, and Hayes (2003) presented an acquisition model. The model starts with non-lexically distributional learning of phonological categories that are based on acoustic properties:

> Once phonological categories have emerged, faithfulness to phonological categories starts playing a role and interacts with articulatory constraints that are created when the child learns the gestures to produce the phonological categories. In other words, they assume a perception grammar that links the acoustic signal to phonological categories and ultimately to stored phonological representations, and the production grammar that mediates between stored phonological representations and output forms. In such a view markedness is driven by phonetics rather than phonology (Fikkert 2007, 551)

Beckman and Edwards (2000) and Pierrehumbert (2003) indicated that constraints could also appear as generalizations over the lexicon. According to the researchers acquisition is connected with the frequencies in the lexicon. Zamuner (2003) and Zamuner et al. (2004) suggest that it is rather difficult to distinguish between frequency and universal markedness. The point is that both frequency and universal markedness work towards the same pattern. On the other hand, Fikkert and Levelt (2004) indicate that constraints are forms of generalizations over children's own lexicon. In addition: "The relation between the make-up of a child's lexicon and frequency in the target language is not 1:1, even though frequent items are more likely to appear in children's lexicon early" (Fikkert 2007, 551).

What is more, the acquisition of place of articulation was also taken into consideration. Fikkert and Levelt (2004) noticed that, at the beginning of the acquisition, words are created from consonants and vowels that have the same place of the articulation.

Recently Natural Phonology has become more and more popular. It has its origin in Stampe's dissertation (submitted to the University of Chicago in 1973 and then published in 1979). This theory deals with phonological processes as "a mental operation that applies in speech to substitute, for a class of sounds or sound sequences presenting a specific common difficulty to the speech capacity of the individual, an alternative class identical

but lacking the difficult property" (Stampe 1979, 1). It was developed by Stampe and Donegan (cf. Donegan and Stampe 1979). Phonological processes are forms of natural reactions of the humans, vocal tract and perceptual possibilities to difficulties that arise during the process of speech production and perception. Because they are typical of all humans they are universal in character. Natural Phonology concentrates on returning the ease of production and clarity of perception. Processes are phonetically motivated. During the speech development a child tends to inhibit some of the natural processes to get the point of a language-specific phonology. "As the child comes closer to an adult competence, processes will be suppressed or limited in response to the demands of the phonological system" (Clark, Yallop, and Fletcher 2009, 412). According to Stampe "Phonological acquisition is a matter of suppressing or constraining innate tendencies rather than of learning rules" (quoted after Clark, Yallop, and Fletcher 2009, 412). He also explains that the main difference between processes and rules is that processes are innate whereas rules are learned. Donegan and Stampe described their theory as natural because "(…) it seeks to explain why language is the way it is" (quoted after Clark, Yallop, and Fletcher 2009, 413).

One of the main ideas of Natural Phonology is connected with phonological processes. The processes are not rules since they develop as the child masters a language. They are a form of tendencies that reflect the nature of human articulatory as well as perceptual ability. As a result "(…) a child will prefer to articulate plosives as voiceless rather than voiced (because of the relative difficulty of maintaining voicing while the supraglottal tract is closed off) or will prefer the nasalize vowels next to nasal consonants (again for reasons of articulatory ease)" (Clark, Yallop, and Fletcher 2009, 412). What is more, phonological processes as Dziubalska-Kołaczyk (2001–2002) explains

> (…) are universal, since all humans exhibit the same potential to respond to the difficulties of speech. A child learns to inhibit some of those natural responses in order to arrive at a language-specific phonology. Natural Phonology explains by referring to the tension between two conflicting criteria (ease of production vs. clarity of perception). Processes perform substitutions in order to adapt the speaker's phonological intensions to his/her phonetic capacities as well as enable the listener to decode the intentions from the flow of speech (Dziubalska-Kołaczyk, 2001–2002, 11)

However, it should be mentioned that universal does not mean exactly the same for all language learners since the learners are active during the process of language acquisition (or L_2 language learning) and they are influenced by an ambient language. Consequently the term *universal* seems to be rather *a tendency*. Although innate processes are different from the rules that are learned the border between what is innate and what is learned is not always clear. One of the main tendencies that speaker-listener exhibits during the everyday speech is the principle of least effort (cf. R-principle and Q-principle).

Although acquisition of phonology has been studied for many decades there is no consensus about the main ideas of this process. It is an interdisciplinary issue and approaches to it differ considerably.

During the second half of the last century the interests in the acquisition of a second language system developed significantly. The research has shown that the process of L_2

acquisition is much more complex than contrastive analysis of the first and second language presented. Moreover, it was also noticed that there were many factors that influenced the level of phonological development of L_2. Furthermore, technological changes also have had an impact on the ways in which the research was done.

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