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Reili Argus

ACQUISITION OF MORPHOLOGY IN ESTONIAN

Abstract

TLÜ KIRJASTUS

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Institute of Estonian Language and Culture, Tallinn University, Tallinn University, Tallinn, Estonia.

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CONTENTS

LIST OF PUBLICATIONS

I. **Imitatiivide kohast lapsekeeles: reduplikatsioonist, morfoloogiast ja sõnaliigilisest ambivalentsusest**. Margit Langemets (Koost.), Maria-Maren Sepper (Toim.). Eesti Rakenduslingvistika Ühingu aastaraamat 1 (2004), 19–34. Tallinn: Eesti Keele Sihtasutus, 2005

II. **Eesti keele käändesüsteemi omandamine: esimestest sõnadest miniparadigmadeni.** Mati Erelt, Maria-Maren Sepper (Toim.). Emakeele Seltsi aastaraamat 49, 2003, 23–48. Tallinn: Emakeele Selts, 2004

III. **The Early Development of Case and Number in Estonian.** Acquisition of Case and Number in Typological Perspective, Maria D. Voeikova, Ursula Stephany (Eds.). Mouton de Gruyter (in press)

IV. **Eesti keele verbi ajamorfoloogia ja aspektilisuse omandamisest.** Emakeele Seltsi aastaraamat 52, 2006, 7–32. Tallinn: Teaduste Akadeemia Kirjastus, 2007

V. **Kolmikute keeleline areng ja individuaalsed erinevused muutemorfoloogia omandamisel.** Keel ja Kirjandus, 3, 2007, 189–202

VI. **Acquisition of Estonian: typologically relevant features.** Sprachtypologie und Universalienforschung (in press)

INTRODUCTION

Objective of the study, research method

The acquisition of Estonian as the first language has been studied to a greater or lesser extent depending on the field. However, until now there has been no comprehensive study of the acquisition of inflectional morphology. The inflectional morphology of Estonian is complex; it is a rich and largely fragmented system where, in addition to regular inflectional patterns, a child has to acquire also a large number of irregular patterns. The study focuses on how Estonian children acquire such a complex system, the factors that facilitate acquisition, the factors that cause confusion, and the factors that affect most of all the acquisition process at some stage of language development.

The thesis is the first to deal with such aspects of the acquisition of Estonian as the first language on the basis of empirical research as the acquisition of imitatives, the acquisition of the categories of the case and number, the implication of lexical-semantic factors on the development of the tense morphology of the verb, individual differences in the acquisition of inflectional morphology in triplets, and the relation between the language-specific or typological factors and the development of the inflectional system. Apart from the principal grammatical categories, such as the categories of the case, number, and tense, the analysis of the acquisition of imitatives is important because it deals with the initial pre-morphological period of acquiring inflectional morphology; the individual differences in the acquisition of inflectional morphology in children who were born as triplets and the treatment of the acquisition of typological features enable us to understand the role of the general and the individual in the acquisition process. The thesis places greater emphasis on the acquisition of the noun; the inflectional morphology of the verb has been treated less thoroughly. The section devoted to the principal research findings of the thesis synthesizes the research results published as articles into a whole; however, it also adds some aspects that had escaped attention or had been treated to a lesser degree; if necessary, some research results, which cannot be found in the articles, were added.

The thesis looks for answers to the following specific questions: what is the role of phonological factors in the acquisition of inflectional morphology; how does acquisition depend on such purely morphological factors as a productive inflectional pattern; to what extent does a child pay attention to the typologically salient features of the inflectional system; what is the role of semantic factors in the acquisition of inflectional morphology. The articles do not deal directly with pragmatic factors or factors originating in the language environment of the child, which affect acquisition. However, some attention was paid to them where such factors became apparent, and one can find a brief overview in the section describing the main results.

The approach is essentially constructivist (see e.g. the work of Bittner, Dressler, Kilani-Schoch, and Voeikova on the acquisition of morphology). Such a choice was influenced by the fact that one can easily describe the findings concerning the acquisition of Estonian inflectional morphology within the framework of the constructivist research method. Chapter 1 provides a detailed account of the constructivist approach of language acquisition and its advantages over other approaches. In addition to the main theoretical trend, the author followed some other usage-based approahes.

Data and method of analysis

The main data of the study consists of the recordings of spontaneous dialogues between children and their caretakers; the supporting material coming from the diary notes of the parents was used to a lesser degree. The largest proportion of the data comes from the sub-corpora of Andreas, Hendrik, and Anna of the Estonian child-language corpus (http://childes.psy.cmu.edu/data/Other/Estonian/), which is a part of the international child-language database CHILDES. Also, the author has used some data, which has not been added to the corpus of Estonian child language as yet, but which was also presented in accordance with the transcription and encoding rules of CHILDES. Table 1 provides an overview of all the language material that served as the basis for the thesis. The grey colour in the table shows the age when a child reached the proto-morphological stage[1], whereas the proto-morphological stage begins with the first occurrence of a mini-paradigm[2] (of a noun or a verb) in the speech of a child.

Table 1. Language data used for the thesis: children, age of recording, duration of recordings in minutes

Age	0;11	1;0	1;1	1;2	1;3	1;4	1;5	1;6	1;7	1;8	1;9	1;10	1;11	2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0	Total (minutes)
Andreas									45	45	45	45	90	360	90		45	45	45	60	60	60	60	60	60	60	1545
Hendrik										6	5	14	18	16	21	23	14	25	41								183
Anna												90	105	90	25												310
Mia	60	60	60	60	60	60	60	60																			480
Triplets: Annela																				40	86	88					214
Liisa																				40	86	88					214
Mihkel																				40	86	88					214

The articles made use of the data of different children of different ages and stages of language development. The most comprehensive material comes from the sub-corpus of Andreas (created by Maigi Vija); Kaja Kohler collected the language material of Anna while Reili Argus collected the speech of Hendrik, Mia, and the triplets. Maigi Vija published a number of articles on the basis of the sub-corpus of Andreas (Vija 2007; Vija 2004; Vihman, Vija 2007) and wrote a master's thesis (Vija 2005) and a bachelor's thesis (Vija 2000)[3]. The

[1] For definitions of the terms pre-period and proto-morphological period see Chapter 1.
[2] The concept of mini-paradigm is explained in Chapter 1.
[3] The bachelor's thesis by Maigi Vija also discusses the suffix *–lii*, which is with dealt in Chapter 2.

language material of Mia served as a basis for the diploma thesis by Heinika Esko (Esko 2005). The automatic analysis of the language data was carried out by means of the program CLAN[4].

When analysing the language material, mean length of utterance served as the criterion for determining the language development of a child. The acquisition of morphological inflections was evaluated by means of the acquisition criteria worked out by Pizzuto and Cazelli (1994: 156), which were used also by Virginia Gathercole et al. and Marilyn Vihman and Maigi Vija. One can assume productive use of inflection if the same form occurs from more than one lexeme and if the child's speech reveals also other forms of at least one such lexeme (see also Vihman, Vija 2006 or Gathercole et al. 1999). However, one has to add that the acquisition of a form does not mean that the child has acquired the entire category (e.g. the category of case) or not necessarily a sub-categroy (e.g. the illative). Rather, one can speak of productive formation by means of some allomorph. For example, a child may reveal productive formation of the short illative forms earlier than that of the long forms of the same case or the other way round.

Structure of the study

The study consists of an introductory part, the articles, a section on the principal findings, and a general summary. The first subchapter of the introductory part "Some important concepts" provides an overview of the concepts and terms that are related to the theme and used in the articles. The chapter "Research and description methods of the acquisition of morphology" describes and compares the most important theoretical models and approaches of the acquisition of morphology; the chapter "About research on the acquisition of Estonian" provides an overview of the history and the present state of studying Estonian child language; the overview is supplemented by a reference list of the publications dealing specifically with the acquisition of Estonian. There is an introductory overview of the principal research findings concerning the acquisition of Estonian inflectional morphology.

Six articles dealing with the acquisition of Estonian inflectional morphology are ordered thematically and not chronologically. The first article "About the place of imitatives in child language: reduplication, morphology, and ambivalence in parts of speech" focuses on the earliest stage of linguistic development and discusses such characteristic phenomena of the pre-morphological stage as reduplication and the use of onomatopoeic words and imitatives. The article concludes that onomatopoeic words constitute a lexical layer that facilitates the acquisition of morphology. At the beginning of acquisition one can find linguistic units that lack morphological information; however, together with the acquisition of morphological inflections the onomatopoeic words are gradually replaced by morphologically more complex units. In addition, the author found that the parent who is talking to the child varies the shape of the onomatopoeic words, sometimes using as many as four different variants of a lexeme, which proves that child-directed speech is not necessarily a simplified but rather an adapted language variety.

Two articles – "Acquisition of the Estonian case system: from the first words to mini-paradigms" and "The Early Development of Case and Number in Estonian" – focus on the acquisition of inflectional morphology of Estonian nouns. The articles differ first and foremost with regard to the potential readers; one part of the English-language articles is

[4] An overview of the problems related to transcription principles and encoding can be found in Argus, in press.

devoted to the description of the Estonian case system, and there is more emphasis on the acquisition of typologically relevant features, morphosyntactic roles, spatial relations, and the category of number. Both articles deal with the acquisition of the inflectional morphology of the noun starting with the first rote-memorized case forms at age 1;7 until the productive use of the more frequent case forms in adult speech and the first plural forms at age 2;8.

The article "Acquisition of tense morphology and aspectual character of the Estonian verb" deals with the morphological (regular-irregular inflectional patterns) and lexical-semantic (situation type) factors that have an impact on the acquisition of the past. The author reaches the conclusion that similarly to other languages, in Estonian, too, one acquires at first the opposition of the perfective and the imperfective or the aspectuality, and the category of tense is acquired only after that. The article concludes that the occurrence of early imperfective forms only in perfective event types is caused by such pragmatic-cognitive factors as the child-centered speech situation where the immediate result of the action is more important than the past and insufficient cognitive development for the perception of the past.

The article "Linguistic development of triplets and individual differences in the acquisition of inflectional morphology" focuses on the acquisition of inflectional morphology by two sisters and a brother in the same language environment. The article provides a hitherto missing overview in Estonian about studies on the language acquisition by multiple children. The principal finding of the analysis of the acquisition of the inflectional morphology of the noun and the verb is the conclusion that children growing in the same linguistic environment may acquire inflectional morphology somewhat differently. The development may occur at different speeds in different parts of the morphological system (verbs versus nouns). The analysed material also revealed that such pragmatic factors as the somewhat different linguistic environment consisting of three same-aged children and the parents has some impact on the acquisition of the inflectional system. Namely, triplets acquire the plural personal verb forms earlier than singletons.

The English-language article "Acquisition of Estonian: typologically relevant features" summarizes the specific features in the acquisition process arising due to the nature of the morphological system, which had been discussed in the previous articles. Additionally, the article discusses such a typologically characteristic feature of Estonian as the acquisition of the case alternation of the object. A comparison of agglutinative and fusional inflectional formation showed that although agglutinative formation is simpler, a child may acquire frequent fusional forms earlier, whereas when acquiring more complicated and frequent fusional patterns the child tends to rely on some definite lexical pattern or construction. The article concludes that in all the studied structures a child begins the acquisition of Estonian inflectional morphology from the typologically characteristic, unmarked, and central parts – in gradation from quantitative alternation, in the lexical aspect from the situation type of achievement, in case alternation of the object from the partial object.

The concluding section, which is devoted to the main findings, presents the principal features of linguistic development and discusses the impact of the phonological, morphological, syntactic-semantic, and pragmatic factors on the acquisition of Estonian inflectional morphology during two essentially different stages of acquisition.

1. CONCERNING THE RESEARCH AND DESCRIPTION METHODS OF THE ACQUISITION OF INFLECTIONAL MORPHOLOGY

Although the method of data collection and the theoretical framework of child-language studies have changed over time, the posed problems have remained largely the same. Researchers have been interested in how and when a child acquires grammar, how the acquisition of the morphological system is related to the acquisition of the other the language levels, for example, vocabulary or syntax, which factors lead and influence the acquisition of morphology, and whether language acquisition is governed by a single general cognitive mechanism or a number of acquisition mechanisms. In the latter case it is assumed that these mechanisms coincide with the traditional levels of the language system, or, in other words, the acquisition of each language level (e.g. morphology) is governed by a definite acquisition mechanism. At the same time some authors, for example, Marchman, Bates (1994), have claimed that on one level the acquisition may also be governed by several mechanisms, or, more importantly, that the levels are interrelated and that the acquisition of a structure or element on one level may depend on the acquisition of elements of another level.

Broadly speaking, one can divide the approaches of language acquisition into **formal** ones, which proceed from the adult language system in the description of the acquisition process, for example, studies stemming from Chomsky's generative grammar, and more or less **usage-based** or functional approaches, which are by nature more child-centred. The latter approaches do not assume that the language elements should fit in with an adult structure, but the structures are set up on the basis of their frequency of occurrence and by means of concrete linguistic experience. According to this criterion, the studies on the acquisition of morphology can be very broadly divided into two main trends. Among the theoretical models or approaches of morphology acquisition discussed below only Slobin's operating principles and two-level acquisition model represent the formal approach; the other studies are clearly usage-based.

Dan Slobin's operating principles

Dan Slobin's essentially psycholinguistic approach of language acquisition does not concern only the acquisition of inflectional morphology. However, as Slobin's frequently quoted operating principles were also used in the articles of this thesis, it is expedient to provide a brief overview of the general basis of this approach and the main operating principles that are related to the theme of the thesis.

Slobin presents procedures for constructing language or general cognitive operating principles, the function of which is to perceive, analyse, and use linguistic units. The set of such operating principles constitutes ***language making capacity***, which according to the author exists in its initial form already before contact with the input language and by means of which the child constructs its initial grammar (Slobin 1985: 1160). Universal grammar or the so-called proto-grammar, which is suitable for any language, develops gradually on the basis of the linguistic input into the grammar of a specific language. Slobin claims that the child's proto-grammar includes such acquired grammatical elements, the distribution of which in the child's language is very different from the input language (Slobin 1985: 1161). According to Slobin, the purpose of analysing early grammatical development is to define, on the one hand, semantic space, which makes it possible to define concepts and meanings, and on the other formal space, where allomorphs and construction types are related to one another and are placed into word forms. Both in semantic space and formal space the units can be ordered in accordance with the availability hierarchy. The operating principles function both in semantic space and formal space and between them, and that is how a child constructs its language (Slobin 1985: 1163).

From the perspective of acquiring inflectional morphology, the most important operating principles include: 1) ***storage*** and its sub-principle ***frequency*** (when memorizing linguistic units pay attention to the frequency of the units); 2) the sub-principles of ***attention*** as represented by ***end, beginning,*** and ***stress of the unit*** (pay attention to the first, last, and stressed syllables of linguistic units), 3) ***co-occurrence*** (pay attention to with which elements a linguistic unit occurs), 4) the sub-principles of ***mapping*** including ***dictionary*** (pay attention to the sound sequences that have an easily determined meaning and memorize the mapping in the lexicon in accordance with the concepts that already exist in your semantic space) (Slobin 1985: 1168), ***extension*** (once you have discovered a linguistic means with which you can express semantic content, try to apply it to all the members of the same word class), and ***analytic form*** (if you discover that more complex semantic content can be expressed both by a synthetic and analytic construction, use the latter as more transparent) (Slobin 1985: 1166–1229).

Slobin's universal operating principles were established on the basis of data from a large number of typologically different languages. The principles can explain the acquisition of the grammatical system from general cognitive premises. However, the author of the thesis claims that they are but are not sufficiently cohesive to explain all the acquisition schemata that can occur during the acquisition of inflectional morphology. Some principles may happen to be in conflict with each other in the acquisition process. For example, one might ask which principle (frequency or analytic form) the child will prefer if the same semantic content can be expressed both by a synthetic and a less frequent analytic construction. Although such characteristics of linguistic units underlying Slobin's principles as frequency and transparency have proved to be important also on the basis of the findings of this thesis, the findings about the acquisition of Estonian inflectional morphology differ from Slobin's findings first and foremost in the degree of universality in the proto-grammar of the child. The allomorphs and forms in the proto-grammar of the children have a largely similar distribution also in the input language.

Dual-mechanism model

The study by Gary F. Marcus et al., which is based on the data on the acquisition of English verb morphology and focuses on the overgeneralizations during acquisition, presents a dual-mechanism model of the acquisition of morphology. In English children often use the regular marker of the past tense to form irregular past forms (e.g. *cut : *cuted*). The proponents of this approach offer a simple explanation – the acquisition of morphology is guided by two fundamentally different mechanisms. The irregular verbs are stored in the child's lexicon; a child acquires them through associative links, but regular verbs follow the rules of inflectional formation and are formed each time separately. If a child finds an irregular verb in its lexicon, it will immediately block the rule for inflectional formation. At the same time the search channels of the child's memory are at first weak, and the child cannot always find the irregular verb in the lexicon quickly enough. For this reason, the rule-formation mechanism is triggered earlier, which results in an overgeneralized form, for example **comed* (Marcus et al. 1992: 1).

In Estonian regular and irregular inflectional formation cannot be separated as clearly as in English. Estonian has words with varying degrees of regularity; many inflectional types have a small number of members, and there are rules with a narrow application area where it is difficult to draw a line between an exception and a rule. Therefore, one might assume that a child simply memorizes all the irregular forms; however, it is unlikely considering the number of such forms in Estonian. English has relatively few irregular words (~150 verbs and 50 nouns) in comparison with Estonian.

Connectionist model

According to the connectionist model, the acquisition of morphology should be discussed in terms of the acquisition of lexicon. Virginia A. Marchman and Elizabeth Bates, creators of the connectionist model having a cognitive background, claim that both lexical and morphosyntactic development are based on a single acquisition model (Marchman, Bates 1994: 342). The connectionist model has been used to explain the acquisition of both nouns and verbs. Also, it has been used to explain why in the case of nouns the stage of overgeneralizations appears somewhat earlier than in the case of verbs. The authors claim that at the stage of acquiring morphology the total number of nouns in the child's lexicon is simply higher than the total number of verbs. Besides, English has a smaller number of irregular nouns than irregular verbs (Plunkett, Juola 1999: 465). However, the critical mass effect plays an important role in the appearance of overgeneralizations in both parts of speech. It appears that only after the vocabulary of the child has reached a certain size it begins to make assumptions about the rules of inflectional formation concerning the existing words followed by the appearance of overgeneralizations (Marchman, Bates 1994: 339). Marchman and Bates have also checked the hypothesis of the critical mass effect in an experimental situation, where children had to acquire various numbers or words. The findings showed that when children acquired words at a slower rate, that is, in manageable doses, no overgeneralizations were revealed. On the other hand, when the children were taught more verbs at a time, there were also more overgeneralizations, whereas the number of errors did not depend on whether the inflectional formation of a word was practised more or less (Marchman, Bates 1994: 342).

In the case of the connectionist model one assumes that the lexeme in the child's mental lexicon already has the phonological shape, and, in addition, the lexeme is provided with some syntactic and semantic information, which describes how to us it (Plunkett, Juola 1999: 466). The child gradually collects occurrences of the lexeme and compares them with the forms generated by the so-called hypothesis generator or those forms of the lexeme that should be, in principle, possible. Where the hypothetic form and the form actually heard do not coincide, the child has to adjust its hypotheses. The model assumes that the child is able to perceive the stem of a word of which part of the word remains the same in all the forms. Thus, acquisition can begin only after the child's mental lexicon includes a sufficient number of lexical units in order to put forward one's own hypotheses (Marchman, Bates 1994: 343).

Marchman and Bates have also emphasized that although there is a close link between vocabulary size and morphosyntactic development, this link is not linear. For example, while the child's vocabulary still includes a small number of verbs (consisting of both irregular and regular verbs and in many cases only verb stems without any inflectional morphemes), its speech reveals few overgeneralizations. By contrast, once the child's vocabulary of verbs exceeds 50 lexemes, the stems without suffixes quickly disappear, and the number of regular verbs with the correct past marker shows an increase. However, the number of overgeneralizations increases abruptly starting from 60–70 verb lexemes (Marchman, Bates 1994: 339–360). Thus, the acquisition of lexical units triggers the organization of the units in a way that enables the child to establish general formation patterns on the basis of the existing forms and to apply them productively thereafter.

The study by Marchman and Bates focused on the appearance of formal oppositions. One might claim that the weakness of this approach is that they ignored the development of full paradigms and morphosemantic factors, for example, how the formation of a form is governed by the use of the form in a semantic role.

Network model

The previously discussed connectionist model is similar to the network model worked out by Joan Bybee (see e.g. Bybee 1995) first and foremost in that it does not draw a strict line between regular and irregular inflection as the dual-mechanism model of acquisition. However, the main difference between the connectionist model and the network model lies in the fact that the former regards the frequency of textual words as mapping between the base form and the other forms while in the case of the network model one assumes that the more frequent a word form is, the weaker is the link between the concrete form and the base form. Thus, irregular words are not subjected to regular inflection because their mapping with the base form is more developed but because they are lexically stronger. Bybee claims that the words that appear in the lexicon have a different lexical strength and that it is mostly caused by the frequency of textual words or occurrences. It is easy, so to speak, to approach lexically strong words; they can be autonomous, not be subjected to changes, and they may be semantically independent. Only the forms of highly frequent lexemes are reveal suppletion. When showing links between frequency and irregular inflectional formation, Bybee claims that in English, for example, some irregular words, which for various reasons are not highly frequent anymore, tend to follow regular inflectional formation (Bybee 1995: 428).

Bybee explains the essence of the network model as follows – words entering the lexicon are linked with other words with similar phonological and semantic characteristics. The link can be stronger or weaker depending on the number shared features. For example, a weaker semantic link is characteristic of forms with stem alternation. Bybee claims, in fact, that stem alternation is more frequent in those forms that are reveal a weaker semantic interrelation, for example, where the tense form or aspect are different (e.g. *break* : *broke*), but not in those forms that reveal a difference only in person or number (e.g. *break* : *breaks*). Also, the frequency of a lexeme affects the strength of the bond; it is easier to acquire less frequent words through their links with other, already acquired, words; highly frequent words are acquired autonomously. Words that have similar semantic and phonological shapes start to be inflected similarly also morphologically and give rise to generalizations that can be described as schemas (Bybee 1995: 428). According to Bybee, there are two kinds of schemas: source-oriented schemas (generalization between two forms, that is, the base form and the inflected form *wait : waited*) and target-oriented schemas (generalization on the basis on a certain amount of inflected forms, e.g. *strung, stung, flung*, etc.). Such a set may include more or fewer central members; for example, the word *strung* shares more phonological common features with other words in the same group while the word *dug* has less. According to Bybee, acquisition does not begin with some unmarked base form, but the generalization is made on the basis of all the used forms (Bybee 1995: 430). In sum, the main idea of the model lies in the fact that the morphological characteristics of a word, the paradigms, and morphological patterns that can be described as rules are acquired on the basis of the arising associations between the lexical representations. Inflectional patterns arise if some link type is sufficiently represented. Bybee thinks that the frequency of forms, which triggers the establishment of a productive inflection pattern, is of utmost importance. According to Bybee, the alternative hypothesis that the structure of a word, and not its phonological-semantic similarity to other words, conditions the formation of a form was not confirmed (Bybee 1995: 428).

Bybee elaborated her model so that it could be applied to the data of many languages and to the acquisition of complex morphological systems. When considering the application of this model to the acquisition of the Estonian morphological system, it seems at first that the model could be suitable for a language where the inflectional system is not highly regular at all and the morphophonological structure of word does not fully condition its inflectional pattern. For example, Estonian has many words that share the same or very similar phonological shape but

inflect differently because of historical sound changes (e.g. *palk* : *palga* ‘salary’, *palk* : *palgi* ‘log’ or *nurk* : *nurga* ‘corner’, *purk* : *purgi* ‘jar’, *lagi: lae* ‘ceiling’, *nagi : nagi* ‘rack’). Proceeding from the fact that the source-oriented schema does not work in the case of the inflectional formation of such words, the child should use a target-oriented schema. However, as the input language need not have a sufficient number of word forms with similar phonological shapes in order to make generalizations, it could well be that a child uses the source-oriented schema and forms a wrong form. However, the findings of this study show that in the inflectional formation of Estonian the base form is still of utmost importance; the child, in fact, begins acquisition with the unmarked base form, which is also the most frequent form in the input language (in the case of nouns the nominative case and in the case of verbs the unmarked imperative or negative form, which is not considered as base form in the traditional grammar of Estonian). In case it is impossible to form other forms on the basis of the base form, one often resorts to a lexical pattern or construction in which the form is acquired as a unanalysed chunk. If the child used the target-oriented schema, it is likely that the child’s speech would not reveal overgeneralizations. The findings of the thesis show that the latter appear when building forms by following the regular formation of a previously acquired stem (mostly a base form).

Construction-based approach

Many usage-based approaches of language acquisition do not focus on a single lexeme or form, but they rather focus on the function of a form and on the construction where a form occurs. Michael Tomasello, who applied the construction-based acquisition model, does not assume the child to begin the acquisition of grammar from the establishment of adult-like categories or to make efforts to fill gaps in some adult-like structure. Rather, he believes that a child establishes and builds the grammatical categories step by step. While the categories are established, the child’s language reveals some non-adult-like forms, which arise because it generalizes an inflectional pattern also to such words that do not follow this pattern. Tomasello proceeds from a psycholinguistic view, according to which the acquisition of grammar takes place in a situation of joint attention, where the child perceives and performs communicative functions and where acquisition occurs by means of imitation, or where the child uses a linguistic symbol in the same way as an adult does it in child-directed speech performing the same communicative function (Tomasello 2003: 21–23). The proponents of the usage-based approach claim that speakers form constructions of varying degrees of complexity and use them at different degrees of abstraction. They do not offer rules similar to the ones used in mathematics that would be valid for the entire linguistic material; rather, they focus on how speakers actually use natural language and create conventional structures on the basis of language use (Tomasello 2003: 108, 2006: 259, Wilson 2003: 83).

The concepts that are important for the proponents of the construction-based approach include *frequency*, *salience*[5], *lexical patterns*, and *construction*. They consider the construction and not lexeme, category, rule, or inflectional pattern to be a psychological and also a theoretical entity (Tomasello 2006: 258, Wilson 2003: 83). Construction grammarians claim that children acquire the inflectional system by means of certain constructions and lexical patterns (Wilson 2003: 75). For example, a lexical pattern of the verb *tulema* ‘come’ occurs in the following early utterances of a child *buss tuli* ‘the bus arrived’, *issi tuli* ‘dad arrived’, *emme tuli* ‘mum

[5] Salience has been defined as the property of a linguistic unit that determines how semantic content is distributed in an utterance or conversation; in other words, salience is a relative emphasis placed on a linguistic unit (Flowerdew 1992: 165). Usually salience is expressed by position; for example, the sentence-final position is more salient than the sentence-middle position (see e.g. Bassano et al. 2005: 72).

arrived', where a specific verb form is used with different subjects. Generally, Tomasello's verb island hypothesis claims that the acquisition of linguistic units takes place so that during a certain stage of development the child uses some verb only in a simple construction of some specific type and some other verb in more complex constructions of different types. At first a new use of each verb repeats the previously heard construction, and only thereafter the child slightly changes the existing construction (e.g. by changing the object) or adds some new elements. The proponents of the construction-base approach believe the children to create certain abstractions on the basis of the constructions by using such general cognitive, socio-cognitive, and learning skills as intention-reading and the ability to establish a grammatical pattern (Tomasello 2003: 144). These skills enable them both to detect the communicative functions of the interlocutor in the context and to establish the patterns among the utterances containing different grammatical morphemes. Tomasello claims that general cognitive, socio-cognitive, and learning skills are sufficient, and that there is no need for some other theoretical description method for the analysis of language acquisition (Tomasello 2003: 242).

While there is no doubt that the construction as a linguistic unit plays an important role in language acquisition, one has to admit that Tomasello's approach can be too general with regard to the acquisition of the complete morphological system. Construction grammarians have neglected those grammatical meanings that are expressed by the acquired forms, the hierarchy of forms, and paradigm formation. Moreover, according to Tomasello, the acquisition of grammar by the child on the basis of lexical patterns takes a very long time, even as long as up to the age of 4.5 years (Tomasello 1992). The author of the thesis thinks that Tomasello underestimates the children's ability to make generalizations on the basis of forms and to invent new forms creatively. Also, until now most construction-based approaches have relied on the acquisition of the morphology of English. However, the acquisition of Estonian as a language with a rich morphological system could occur differently.

Constructivist view of language acquisition[6]

The constructivist approach is based on Wolfgang Dressler's work in natural morphology and the view of language as a self-organizing process and the findings of neurophysiological research by Annemarie Karpf.

According to Karpf, the cognitive structures in adult brain have developed as a result of experience, that is, interaction between innate cognitive faculties and environmental factors. In her view, acquisition is operation with biological and environmental conditions. In order to classify linguistic units naturally and to establish systems of rules, it is important that when establishing neuronal links (which can be defined on the level of language as rules or generalizations), preference should be given to parallel, frequent, and regular (linguistic) data. According to Karpf, ontogenesis or linguistic development can be defined as the establishment of regular contacts between neuron sets belonging to different subsystems (Karpf 1991).

The constructivist approach takes the view that a child is not supposed to have innate universal grammar or linguistic models. The main emphasis of this approach is on the monitoring of the development of linguistic systems (models) and subsystems and their

[6] One should not confuse the constructivist approach with construction grammar. While the proponents of the constructivist approach usually do not use any term to describe their views, they often claim, for example, in the introductions to their publications that their approach is essentially constructivist (see e.g. Bittner, Dressler, Kilani-Schoch 2003: xviii).

variation (see e.g. Dressler, Karpf 1995: 3). It is assumed that the child itself constructs the grammatical modules (Dressler 2004: 9) by selecting suitable units from the surrounding linguistic environment or the input language, whereas different factors guide the choices of the child at different stages of acquisition (Bittner et al. 2003: xviii). Modularity of language as a cognitive system and the interaction between the modules are not regarded as innate, but they develop only in the course of maturation. At first the different modules or subsystems of language as a self-organizing system constitute a whole. They diverge only after the complexity of the entire system has reached some critical level (Karpf 1991: 341). Such properties as **regularity**, **transparency**, **markedness**, and **frequency** play a very important role in the development of the morphological system. Also, some constructivist principles are considered to be important. The latter include the selection of the inflectional pattern, which means that a child selects some forms from a certain context that are more frequent and salient, and self-organization, which means that a child not only imitates elements of the input language but also constructs the inflectional patterns. Once there are more linguistic data and they become more complex, the child is able to successfully divide the more extensive and general systems and patterns into smaller and more specific units (Bittner et al. 2003: 18).

Most constructivist studies divide the morphological development into three periods. During the first **pre-morphological period** the grammatical modules have not developed as yet, and the acquisition of mophology is governed by general cognitive principles. During this period the acquisition of morphology usually means the memorizing of word-forms as unanalysed chunks. The acquisition of the morphological system, however, begins only during the proto-morphological period. During the **proto-morphological period** children begin to establish analogical associations and even the first rules. This period reveals the largest number of overgeneralizations and individual differences in the course of acquisition (Dressler et al. 2002: 392). During this period the number of non-analysed units, which prevail during the initial acquisition period, show a gradual decrease. The beginning of the proto-morphological period has also been defined since the occurrence of the first mini-paradigms. The first **mini-paradigm** consists of at least three inflectional forms of the same lexeme that occur in the language data of the child during the one month period in a different context, which the child has used spontaneously, and the forms must be phonologically recognizable (Dressler et al. 2002: 396).

The proto-morphological period ends when the subsystems of inflectional morphology and also derivation start to develop, in other words: different modules of the linguistic system begin to interact (Dressler, Karpf 1995: 3). Researchers claim that the proto-morphological period ends and the period of **transition to modular** or **morphology proper** begins when the morphological system of the child has reached the adult level with regard to both quality and quantity (Dressler 1994: 91). However, the nature of the adult level remains to be specified and is far from clear at present. Will the child have acquired the adult-like morphological system when all the important (frequent) forms occur in all the important semantic roles? Does it mean that by that time all the main grammatical categories are acquired, or should the proportion of overgeneralizations be then lower than one per cent, or is there some other suitable criterion?

Conclusion

Several usage-based models of language acquisition explain the acquisition of regular and irregular inflection as two different processes. In the case of the dual-mechanism model and the network model one assumes that the irregular forms are memorized as unanalysed units. In the connectionist model, however, researchers believe that in order to form irregular forms,

a child establishes connections on the basis of a large number of phonologically similar forms. All three previously mentioned models treat the development of inflectional formation with regard to lexicon; the role of the other levels of the linguistic system and the cognitive factors remain insignificant. By contrast, in the construction-based approach the purely morphological and language-specific factors play a secondary role in the acquisition of inflection.

For most previously described approaches such concepts as the frequency, salience, and transparency of linguistic units are of greater or lesser importance. Slobin's approach, which is based on operating principles, emphasizes the frequency and stress of stressed linguistic units (sharing some common features with salience). Frequency is also the central concept of Bybee's network model, and the construction-based approaches of language acquisition mention frequency and salience of linguistic units as important factors.

However, the constructivist theory of the acquisition of morphology has a number of advantages over the other previously discussed models and approaches. First, the theoretical views of this approach came into being not only on the basis of Indo-European languages but also on the basis of highly different languages with poorer or richer morphology. Also, the morphological data cover inflectional, fusional, and agglutinative languages. At present one can find research findings for more than twenty languages. The second advantage of the constructivist approach over the other previously described models of the acquisition of morphology lies in the assumption that during the different development stages of the child language acquisition is governed by different acquisition mechanisms. Thus, this approach is able to essentially describe the acquisition of language during different stages of development. In addition, the works following this approach focus on the genesis of whole paradigms and on the development of morphological categories as a whole rather than on individual formal oppositions. The fourth advantage is the constructivist view of that language consists of mutually interacting modules, or, in other words, language structures do not operate independently. Each form is used together with other forms-words or mostly in some specific lexical environment, and each form is used to express some specific, to perform some specific communicative function in some specific situation. The author of this study holds the opinion that description of the development of morphological system without taking into account the above-mentioned factors would not reflect adequately the acquisition of inflectional morphology in Estonian.

2. PRINCIPAL FINDINGS AND FACTORS INFLUENCING THE ACQUISITION OF ESTONIAN INFLECTIONAL MORPHOLOGY

The principal findings of the thesis concerning the acquisition of Estonian inflectional morphology are presented according to the language levels. The input frequency of the linguistic elements play a very important role in the acquisition of Estonian; the findings support the constructivist idea that a child selects frequent units from the surrounding linguistic environment. Because the impact of the input frequency is noticeable at all the language levels, it will be analysed in all the following chapters.

2.1. PHONOLOGICAL, PROSODIC, AND MORPHOPHONOLOGICAL FACTORS

In the active morphology of Estonian the morphological inflection of words depends on their phonological shape; therefore the phonological factors have a remarkable influence on the acquisition of inflectional morphology. The description below focuses on those factors the impact of which is most explicitly manifested in the data on the acquisition of Estonian inflectional morphology. The author of the present thesis discusses the disyllabic stage in the language acquisition, its relation to reduplication, omission of the final sound of a closed non-initial syllable or its later acquisition. The acquisition of the stressed syllable is dealt with in the section on the acquisition of grade alternation (2.2.1). Reduplication and omission of the final consonant and the unstressed syllable belong to strategies of avoiding excessive complexity. The child uses such strategies to fit structures of adult speech into such form which is suitable for the child (Vihman 1997: 217). All the above-mentioned strategies were also employed by the studied children acquiring Estonian. The factors governing the acquisition of morphophonological structures are mostly the same as in other languages.

According to Ann Peters, the number of morphemes in any language is too large for a child to acquire them at once. For this reason, the child has to make a selection and to focus first and foremost on those morphemes that are frequent and salient. Among factors that facilitate acquisition Peters lists frequency, segmentability, position in relation to the stem, clear-cut function of the morpheme, and recognizable form or regularity in the occurrence of allomorphs (Peters 1997: 182). The factors facilitating the acquisition of morphemes that are listed in the constructivist approaches of language acquisition largely coincide with the ones listed by Peters; the most frequently mentioned factors include naturalness and salience of a linguistic phenomenon or structure and frequency in the input language. It is generally thought that phonetically natural morphophonological structures are acquired earlier and with a smaller number of errors (MacWhinney 1978; Zhang, Lai 2006: 109). MacWhinney defines the morphophonologically natural process as the process requiring the least effort (MacWhinney 1978: 18).

2.1.1. Short open syllables and reduplication

Open syllables are thought to be language universals on the ground that they can be pronounced more easily than closed syllables (Hint 1998: 46). Therefore, children should be able to acquire at first open short syllables as the most natural phonological structures. However, it has been claimed that the linguistic unit employed by the child need not be the syllable but the metric foot (Dziubalska-Kolaczyk 1999: 71)[7]. While it is true that the child

[7] According to Peters, children segment both syllables and metric feet in strings of speech; what is important is

proceeds from monosyllabic units, they are usually reduplicative. For example, the metric feet *la-la, ta-ta*, etc. are frequent also in the early language of Estonian children during the babbling stage when one cannot speak about morphological development in the traditional sense as yet. Most researchers agree that there is no distinct borderline between the babbling period and meaningful speech; parallel use of babbling and meaningful units keep occurring in the child's speech for several months[8]. Similarly, reduplication is intrinsic not only to babbling. Although the child begins to use reduplication very early when most of its speech still consists of babbling (Protassova 1997: 157), the child uses it also at the early or pre-morphological stage of morphological development (see Article 1).

Apart from the fact that reduplication is often due to its onomatopoeic nature iconic, whereby its general cognitive basis is highly transparent (Dressler 1994: 96), reduplication as a paragrammatical (or pre-grammatical)[9] device has been found to have several functions that facilitate language acquisition. First, reduplication makes it simpler for the child to segment strings of speech and to recognize syllable boundaries. Such routine expressions characteristic of child-directed speech as *ta-ta, oi-oi, ai-ai, kop-kop*, etc. help the child to determine the place where the same phonetic realization starts again (see Article 1). Second, reduplication helps to generate from a linguistic unit consisting of a single open syllable, which is not characteristic metric foot of Estonian at all, a disyllabic and, thus, a more natural metric foot.[10] Third, reduplication supports the child's understanding of the word as a whole consisting of several parts (or several syllables), and it, according to Maria Voeikova, helps in turn the child to perceive in the future the word form as a whole consisting of two units (the stem as the invariant part and the ending as a variant part that changes according to some rules). For example, Voeikova described how reduplicative syllable sequences of the child begin to develop into word forms – the first primary-stressed part of a disyllabic reduplicative syllable sequence remains unchanged, and the child develops the second part gradually and by using various strategies (e.g. omission of the end syllables, generation of another rhyming syllable by analogy, etc.) into an inflectional marker (Voeikova 1997: 40–42). Thus, reduplication can be regarded as practice in inflectional morphology and as a precursor of morphological rules (for Russian data see also Protassova 1997: 157 and for Finnish see Laalo 1997: 198–199).

It could be claimed that the reduplicative onomatopoeic expressions in the speech of Estonian children also serve the purpose of facilitating the acquisition of morphology. It is especially so in child-directed speech, where, as the child grows older, the onomatopoeic reduplicative words and expressions without morphology (e.g. *kop-kop* 'knock knock') are gradually replaced, when the child begins to acquire morphology, by units including more morphological (and derivational) elements (e.g. *kopu-ta-b* 'knock-DE-SG') (see Article 1).

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that they should be prosodically salient (Peters 1997: 155). Vihman, on the other hand, claims that the first segmentable unit could be the syllable rather than the word (Vihman 1997: 236). Concerning the discussion about the first linguistic units of the child see Vihman 1996: 215.

8 For the discussion of parallelism of babbling and speech see e.g. Savinainen-Makkonen 1998: 45.

9 Dressler claims that during the pre-morphological period the child has no grammar as part of the language system as yet; rather, the morphological operations that are manifested during this period are based on general cognitive faculties (Dressler 1994: 92).

10 The two-syllable metric foot is highly characteristic of child-directed speech; for example, the data of Karl Pajusalu on South Estonian show that usually the words in child-directed speech are monosyllabic or disyllabic; the most frequent structure (C)VCV accounts for more than a fifth of all the word forms that occurred in child-directed speech (Pajusalu 2001: 83).

2.1.2. Preference of trochaic speech, disyllabicity as a constraint

The previous discussion shows that reduplication is closely related to the child's wish to adapt the produced linguistic units for the two-syllable metric foot. According to Katarzyna Dziubalska-Kolaczyk, reduplicative syllable strings act as precursors of disyllabic (not necessarily reduplicative) metric feet and further on as precursors of disyllabic trochees. The trochee, which is often the preferred metric foot (for Polish see Dziubalska-Kolaczyk 1999: 78–80 and for English see Peters 1997: 154), is also an important phonological shape for the acquisition of Estonian. For example, Vihman claims that before the age of two years the majority of the child's words reveal trochaic rhythm (Vihman 1997: 16). Trochaic rhythm or the alternation of stressed and unstressed syllables is generally believed to be a highly natural way of speaking (Hint 1998: 146). Thus one might claim that the Estonian child begins the acquisition of morphotactics from the most natural structures.

Disyllable linguistic units dominate in the speech of Estonian children during the pre-morphological period of acquisition while only 1–1.2 per cent of the textual words in the speech of the studied children were longer than two syllables. In addition to disyllabicity as a preference, it can be regaded as a constraint in Estonian because during the pre-morphological period the child shortens longer word forms into two-syllable forms. The speech of Andreas, a studied Estonian child, revealed shortened forms of the words *sitikas* > *siti* 'beetle' and *traktor* > *takku/takka* 'tractor' at age 1;7. While this age revealed a single example where the child generated a two-syllable word from a three-syllable foreign word so that he omitted the middle syllable, e.g. *banaanid* > *panni* 'bananas', then at age 1;8 the unstressed syllable disappears from the foreign words, e.g. *reklaami* > *kaammi* 'advertisement'. In native words, too, the child gives up the unstressed or the final syllable, e.g. *rebane* > *epa* 'fox', *masinat* > *masi* 'machine', *porgandid* > *pooga* 'carrots'. Nor does the child use during this period any case endings, which would make a word longer than two syllables; in the case of trisyllabic word forms the child simply omits the case ending and uses only the genitive stem. For example, the speech of Andreas at age 1;8 revealed the endless forms *musta-* 'black' and *poti-* 'potty'.

Although in the previous examples the child had not pronounced the morphological marker, this phenomenon has usually been treated as a phonological rather than a morphological constraint. Omission of the unstressed syllable is common at the early stage of language acquisition, and it has often been discussed in the literature on child language (see e.g. Vihman 1997: 234; Carter, Gerken 2004: 562)[11]. Researchers have explained the disappearance of the unstressed syllable by different perceptual salience of the syllables, that is, by the unstressed position in an utterance or a word form, but also by preferring the previously mentioned preference of the trochaic metric foot (see e.g. Wijnen, Krikhaar, Os 1994: 59). However, children do not omit the unstressed syllable because they do not notice or perceive it[12], but for some reason they are not able to pronounce it as yet. Therefore, many authors consider it to be a constraint of speech rhythm (Carter, Gerken 2004; Wijnen, Krikhaar, Os 1994: 59). Moreover, it has been found that in those word forms of the child where the first syllable is unstressed and it seems at first that the syllable is absent, a more accurate measurement of the place of the missing syllable still revealed some trace (Carter, Gerken 2004: 584).

[11] However, disyllabicity cannot be regarded as one hundred per cent universal; for example, there are data where a child can also lengthen two-syllable words into three-syllable words by means of reduplication (see Vihman 1997: 234).

[12] Peters claims that children can produce only a small proportion of those grammatical elements that they can actually distinguish and the meaning of which they know (Peters 1997: 177).

On the other hand, the preference of two-syllable word shapes largely depends on the phonotactic patterns of the frequent[13] words in the input language. The children select the most frequent rhythmical patterns in the input language; for example, metric feet beginning with a weak syllable are rare in Dutch; they are rare also in the child's speech and are acquired later (see Pajusalu 2001; Wijnen et al. 1994: 79). In Finnish, too, researchers have observed a period when the child's speech reveals only two-syllable words ending in a vowel (Laalo 1994: 430). Similarly to Finnish, the speech of Estonian children reveals occasional examples where monosyllabic words are lengthened into disyllabic words, for example, in the speech of Andreas *pai* > *paia* 'stroke' and in the speech of Hendrik *luti* in place of the nominative form *lutt* 'dummy', where one might suspect child-directed speech forms. In addition, one can reveal an effort to prefer two-syllable words also in the acquisition of compound words. For example, at age 1;9 Andreas shortens the four-syllable word *jõuluvana* 'Santa Claus' into a two-syllable word resulting in *jõvvu*. While the speech of Andreas reveals at the beginning of the acquisition of compounds such compounds that consist of both two disyllabic stems and one monosyllabic and one disyllabic stem, then words consisting of two disyllabic stems prevail in the speech of Hendrik, e.g. *lalli-autu* 'rally car' at age 1;11 and *tati-nina* 'snot' at age 2;0. The majority of the early compounds of both children are tetrasyllabic, however. There is also some Finnish data about preferring compounds consisting of two disyllabic stems to trisyllabic words where disyllabicity has been described as a phenomenon that is manifested in the acquisition of both simple and compound words (Laalo 2000). The effort to form a compound with a disyllabic modifying component from a compound with a monosyllabic modifying component can be observed in the Estonian data in the speech of both Hendrik and Andreas, e.g. *kaka-nunn**u*** (instead of *kaka-junn*) 'a piece of poo' 1;10, *pann**i**-kooki* (instead of *pann-kooki)* 'pancake' in the speech of Hendrik at age 1;11, *pann**i**-kooki* 'pancake' and *suu**a**-pilli* (instead of *suu-pilli*) 'harmonica' in the speech of Andreas at age 1;9.

The period of disyllabicity in children ends right before the beginning of the proto-morphological period, in Andreas at age 1;10.03 and in Hendrik at age 2;5. Then the speech of the child do not reveal anymore the shortening of longer words into disyllabic words, and the proportion of longer than disyllabic words has reached 9.5 per cent of all words. This indicator coincides with the frequency of longer than disyllabic word forms in the input language; namely, the input language also includes about 10 per cent of words consisting of three and more syllables (see Article 3).

As for the omission of syllables, there is some data that a child who is acquiring Estonian may shorten even 89 per cent of longer words while a child who is acquiring some other language, for example, for example, Czech or English, shortens only 26 per cent (Vihman 1980: 307). Also, the previously presented data show important individual differences. In one child, Hendrik, the period of disyllabicity lasts much longer than in the other child, Andreas, although in both children it disappears at the beginning of the proto-morphological period. Thus, disyllabicity depends more on the degree of linguistic development and less on biological age. Further research is needed to determine the causes and extent of individual differences.

[13] Adaptation of monosyllabic words into disyllabic words (mostly into trochaic metric feet) occurs also in Estonian child-directed speech, e.g. nominative forms *vend* > *venna* 'brother', *lutt* > *lutu* 'dummy', *mamm* > *mammu* 'berry'. Also, English-speaking parents generate disyllabic trochees from monosyllabic metric feet by means of diminutive derivatives, e.g. *dog* > *doggie* (Peters 1997: 154).

2.1.3. Later acquisition of the closed non-initial syllable

Closed syllables are more difficult for the child to pronounce, and generally they are not regarded as universal either (Hint 1998: 47). One might assume that for this reason children acquire the words containing closed syllables later. The findings about the Estonian language suggest that closed non-initial syllables are acquired later than the closed first (or stressed) syllables. The language data of the studied children provides some examples where the child adapts a word with a closed non-initial syllable so that it takes a shape enabling the trochaic structure: *viiul* > *villu/illu* 'violin', *saarmas* > *saamma* 'otter', *ämber* > *ämpu* 'bucket' (Andreas 1;7–1;8), *põrr* (in child-directed speech) > *põrra* 'whirr' (Hendrik 1;7).

Absence of the final consonant in the closed non-initial syllable is generally characteristic of the pre-morphological period. During this period the child's speech does not reveal any word forms with the closed non-initial syllable (see Article 3). When monitoring the acquisition of inflectional morphology, it can be noticed that during the pre-morphological period the child does not use such allomorphs, the attachment of which to the stem would make the non-initial syllable a closed syllable. For example, Andreas had at age 1;7 the comitative ending *–ga* in the word form *bussi-ga* 'by bus', but at age 1;8 he did not have the inessive ending *–s*, and he used the forms *tunni-* and *aia-* instead of *tunni-s* 'in an hour' and *aia-s* 'in the garden'. Similarly, the child did not pronounce the partitive ending *-t* in *kipsi-* 'biscuit' and the plural nominative ending *-d*, e.g. *mammu-* 'berries'. The speech of the other studied child Hendrik did not reveal any inessive endings (at age 1;8 *vanni-* 'in the bath' and at age 2;1 *lasteaia-* 'in the kindergarten') or partitive *t*-final forms either; Hendrik did not use *d*-marked nominative plural forms until age 2;4. At the same time the speech of both children reveals monosyllabic word forms ending in consonants – Andreas revealed some inessive forms, for example, *käe-s* 'in one's hand' at age 1;7, and Hendrik used some *t*-final partitive forms, for example *vett* 'water' at age 2;1. The occurrence of such forms in the speech of children indicates that while the children are familiar with the corresponding case endings, but they are able to pronounce the case ending only in those words where the word form remains monosyllabic (see Article 3). At the same time Andreas used the first trisyllabic case forms, which were comitative forms ending in an open syllable, for example, *bussi-ga* 'by bus' at age 1;7.

Avoidance of word-final consonants has been observed both in Estonian and in other languages. It is generally thought to be characteristic of child language that during the transition from babbling to meaningful speech the pronunciation of consonants depends very much on the position of the consonant – the word-initial consonant is never omitted; rather, it is the word-final consonant (Vihman 1980). In the close genetically related language Finnish, too, it has been observed that the first fifty words of the Finnish child do not contain any words with a word-final consonant (Savinainen-Makkonen 1998: 76). The avoidance of the closed non-initial syllable could possibly explained by the frequency of the input language. Because children acquire frequent structures earlier, and Estonian has many disyllabic words with an open final syllable (especially in child-directed speech, see Pajusalu 2001), one would expect later acquisition of the closed syllable.

2.1.4. Conclusion

In addition to the iconicity and naturalness of the structures, the prosodic salience of the morphological structure plays an important role in the acquisition of the Estonian morphophonological structure during the pre-morphological period and at the beginning of the proto-morphological period. Usually the child does not pronounce the unstressed (often the third) syllable and the final sound of the unstressed syllable, which is often a case or

personal ending. The acquisition of morphological structures and inflectional markers is influenced by the frequent phonological structures[14] in the input language. The trochaic metric foot, which is frequent in the input, is prevalent at first. All the inflectional markers the attachment of which would result in a different structure appear later in the speech of the child. The findings are to some extent in conflict with Dan Slobin's operating principle of attention, according to which the child pays attention to end of the word (Slobin 1973: 191). It seems that prosodic salience or stress is more important than the position of a linguistic unit.

2.2. IMPACT OF THE PECULIARITY OF THE ESTONIAN MORPHOLOGICAL SYSTEM ON THE ACQUISITION OF INFLECTIONAL MORPHOLOGY

In addition to such characteristic features of the Estonian inflectional system as gradation and stem alternation, the thesis also focuses on morphological factors as the order of acquisition of words that inflect according to the productive and non-productive inflectional class, the preference of some inflectional class, shifts in inflectional classes, the role of form homonymy in the acquisition of words belonging to some inflectional class, and the overgeneralization of the more regular and transparent inflectional marker.

According to Steven Gillis and Dorit Ravid, when children acquire typologically different languages, they pay more attention to those aspects of the language that carry the most important and salient information. For example, the Dutch children acquire a morphologically poor language, and therefore they pay more attention to word order and the lexical content of words. On the other hand, the children who acquire Hebrew, which is a language with rich morphology, pay more attention to the internal structure of the word (Gillis, Ravid 2003: 50). The early acquisition of the specific features of the inflectional system of a language indicates that early grammar of the child is not universal but reveals the features that are salient for the acquired language. It has been found that a morphologically rich language stimulates the child to acquire inflectional morphology already at an early age. The paradigmatic richness of a language is evaluated on the basis of the average size of the paradigms in the input language. The relevant indicator is calculated by dividing the word forms in the analysed language material by the number of lexemes in the same material. It has been found that the average paradigm size in agglutinating languages increases most rapidly in comparison with the average paradigm in inflectional languages (see Laaha et al. 2007). The findings of this study are in line with the general typological essence of the Estonian morphological system. Estonian inflectional morphology is acquired later than in purely agglutinative languages and earlier than in inflectional languages (see Article 6).

The data of this study show that neither the abundance of forms in the paradigm nor the fragmented system of inflectional classes seems to make the acquisition of the morphological system more difficult. However, what is important is that the child does not acquire the entire inflectional morphological system at once, but it begins with the core and acquires first and foremost the most frequent and important forms. Nor did the studied children acquire all the inflectional types at a time. Preferred inflectional types were revealed first and foremost in the acquisition of the inflectional morphology of the noun – at first morphological formation developed only in definite and highly frequent inflectional types in the input language (see Articles 2, 3, and 6). In the case of nouns the productivity of the inflectional class played an

[14] According to Zhang and Lai, the impact of naturalness on acquisition is far from clear. In other words, naturalness is related to accessibility or the frequency of a structure in the input language, which means that also an unnatural pattern is acquired early if it is more accessible or more frequent in the input speech (Zhang, Lai 2006: 71–72).

important role while in the case of verbs the acquisition was governed by some definite verb lexeme with its pattern of morphological formation. The overgeneralization of the morphological formation of an inflectional class can be regarded as a compensatory strategy that is used to acquire a complex morphological system. The studied children used it first and foremost for avoiding the homonymous genitive and partitive forms in some types.

The Estonian language has agglutinative, fusional, and analytic morphological formation. It is claimed that the more transparent agglutinative method of morphological formation is easier to acquire. Although fusional forms appeared early in the language use of the studied children, their acquisition during the proto-morphological period caused more problems than the acquisition of agglutinating forms (see Article 6). The research results about the preference of analytic and synthetic means of expression showed that the children revealed some individual differences despite the fact that agglutinating, fusional, analytic formation are used almost equally where equal means of expression are present in the input language. Some children preferred the analytic locative construction for the expression of the locative relation (*auto pääl* 'on the car', Hendrik aged 1;11). On the other hand, the speech of Andreas, the other child, did not reveal such a preference. Thus, Slobin's operating principle about the preference for an analytic form need not be valid for all the children.

2.2.1. Acquisition of gradation and end and stem alternations

At first sight it seems that gradation, which is typical of Finnic languages, could complicate the acquisition of the Estonian inflectional system because in addition to attaching the markers and endings the child has to put in some extra effort by selecting the stem in the correct grade for each form. However, the results of two articles (Articles 3 and 6) indicate that the productive patterns of grade alternation (morphological formation of monosyllabic nouns with weakening stems) are acquired very early in Estonian. The first quantity oppositions in the speech of the studied children appeared already during the pre-morphological period when the case endings and other inflectional markers had not been acquired as yet. Even occasional overgeneralizations in the material did not concern quantity alternation but only the verbs with quality-alternation. In addition to the frequency of the input language, the early acquisition of quantity alternation is supported by the functional role of segmental length oppositions in distinguishing the grammatical meaning – the greater is this role in some language, the earlier are the segmental lengths acquired (see Article 6). In Estonian a word form in a weak or strong grade distinguishes important grammatical meanings for the child, for example, the possessor and the object or the object and the location. In fact, these semantic roles are important in the case of early acquired case forms.

Errors of stem alternation occur in the speech of children at the beginning of the acquisition of active morphological formation, during the transition from the pre-morphological period to the proto-morphological period, and at the beginning of the proto-morphological period at age 1;9–2;6. The erroneous forms suggest that the morphological formation of words of quantity 2 ending in a consonant is the most difficult for the child. Usually there are errors in the morphological formation of *el*- and *er*-words. At age 2;1 the speech of Andreas reveals such forms as **numbert*, **numberit* (instead of correct form *numbrit*) 'number'; **kahvelga*, **kahveliga* (instead of correct form *kahvliga)* 'with a fork', and **kolstest* (instead of correct form *korstnast)* 'from the chimney'. Phonological complexity is important in all the previous examples; by using these forms the child, namely, avoided the consonant cluster consisting of three consonants. Errors in the formation of word forms ending in other consonants are

common, too. For example, at age 2;1 Andreas revealed the genitive form *küünla* instead of the nominative *küünal* ‘candle’, and at age 2;4–2;5 the child had difficulty with the morphological formation of the *s*-ending forms of the words *kärbes* ‘fly’ and *võõras* ‘stranger’: **kärbese* , **võõraseid* , *kapsat* 'cabbage'.

The child experienced also some insecurity with regard to the suffix alternation *ne*-suffixed words. At age 1;10 Andreas revealed the disyllabic *reba-* in the nominative function instead of the trisyllabic stem *rebane* ‘fox’ but **rebali* instead of the genitive case form. The child must have realized that something should change in the genitive of this word, but what it was exactly was not clear as yet. However, a month later at age 1;11 Andreas used the genitive form **rebase* in the nominative function where the form *rebane* would be correct. Thus, the child had registered also the genitive stem, but he did not know how to use it as yet and generalized it into other forms. Similar insecurity was revealed also in longer words, e.g. **lindistamise* 'tape-recording'.

Although in the case of gradation the studied children acquired quantity alternation early (see Articles 2 and 6), there is also an example where quality change in combination with the ending change V > *me* presents some difficulty for the child. By age 2;0 the child has acquired the nominative plural form *juhtmed* ‘cables’; the child builds also the forms **juhtme* 'cable' and **juhtmet* 'cable, part' by analogy with this form. A month later the form *juhte* 'of the cable' was registered, and it can be assumed that the child has noticed that in some other forms of this word the *m*-sound disappears, but it remains unclear at this stage in which specific form.

Estonian has fewer patterns with end-alternations of verbs than those of nominals. It could well be that for this reason the acquisition of the end-alternation patterns of verbs does not pose any problems to the children. The only erroneous form **kiskudud* (instead of *kistud*) 'torn' occurs in the data of Andreas at age 2;6. As it is a highly unproductive end-alternation pattern for only three verbs, then one would even expect a difficulty in morphological formation here. At the same time it is surprising that the morphological formation of verbs does not reveal any errors, and the child acquires even such stem alternations as *sööme* : *süüa* ‘eat’, *lööb* : *lüüa* ‘hit’, *ei pea* ‘does not have to’ : *pidime* ‘we had to’ early and without any errors (the examples come from Andreas at age 2;0).

Because end alternation in Estonian is not as systematic as grade alternation, and there are many unpredictable end changes, the morphological formation of end-alternating poses the largest number of difficulties in the acquisition of Estonian inflectional morphology. In addition to the relative irregularity of end alternation, the formation technique is important, too. When building end-alternational forms, the child does not have to attach any sound-morphemes, but it has to change the order of final sounds (for example, in the case of nouns the child had difficulty with the change in consonant-final words). The material of this study shows that this technique is most difficult to acquire.

2.2.2. Preferences for inflectional types, the role of diminutive derivation

Most studies dealing with different acquisition of regularly and irregularly inflected words are based on English or some other Indo-European language, which have a small number of irregularly inflected words (see e.g. Plunkett, Juola 1999, or Wilson 2003). In the case of

Estonian that is characterized by fragmented system of inflectional classes and a morphological system with a large number of irregularly inflected words one could rather speak of dividing words into productive (open) and unproductive (closed) inflectional types (see Erelt et al. 1993: 139, 143).

It is generally thought that the productive inflectional patterns are acquired earlier than the unproductive patterns (Dressler 2004: 7; Dressler et al. 2007: 94; Laaha et al. 2007: 30). It is true that the speech of a child acquiring Estonian reveals at first some occasional rote-memorized forms of words belonging to unproductive class (see Articles 2, 3, 4, and 5). However, at the beginning of the development of active acquisition of morphology or at the beginning of the appearance of the first mini-paradigms the preference for the productive inflectional type can clearly noticed. All the first mini-paradigms of nouns in the studied children were at first formed from words belonging to a specific inflectional type (monosyllabic gradational words with weakening stems, model word *sepp* 'blacksmith'), e.g. *poeg* 'son', *lill* 'flower', *klots* 'block' (see Article 2).

The next important inflectional type for the child is also an open type that comprises disyllabic word without gradation (model word *auto* 'car'). This type represents such everyday words of the child as the diminutive derivatives *kiisu* 'kitty', *Atsu*, as well as *emme* 'mum' and *issi* 'dad', which are frequent in child-directed speech. Diminutive derivation is regarded along with reduplication the second important extra-grammatical device. Its use during the early acquisition period does not serve the purpose of vocabulary enrichment, which is otherwise so characteristic of this kind of derivation (Dressler 1994: 101), but it clearly simplifies the acquisition of the morphological system. Namely, diminutive derivation shifts the otherwise gradational words into another non-gradational class. It has been found that as a result of this kind of derivation usually the words belonging to an unproductive type are moved to a productive inflectional class (Dressler 2004: 7). However, the Estonian data suggest that a class shift may also occur between two productive classes. It seems that grammatical homonymy is an important facilitator of acquisition; namely, the derivatives are moved to an inflectional type where the nominative and genitive forms are homonymous. At the beginning of the proto-morphological period the words with the homonymous nominative and genitive predominate among the first form oppositions of the child (see Articles 2 and 3). The economy of grammatical homonymy has been observed also in the acquisition of other languages. Researchers have also noted that homonymous forms that can be used as different case forms facilitate especially the acquisition of large paradigms (see Dressler 2004: 9; Kilani-Schoch, Dressler 2000: 102, 107).

As for preferences for inflectional classes, one could conclude that when proceeding to the proto-morphological period, the child seems to have as if two prototypical inflectional types of the noun – one for monosyllabic gradational words and the other for disyllabic non-gradational words. It seems that one is dealing here not only with a clearly morphological preference. Namely, in the case of words belonging to these inflectional types one should take also into account that the two previously mentioned inflectional classes are the most frequent inflectional classes of the noun in the input. For example, speech that is directed at a two-year-old child reveals that about 30 per cent of all the nouns belong to the former inflectional class and 21 per cent to the latter inflectional class. In terms of the number occurrences the frequency of the words belonging to these inflectional classes is even higher.
However, verbs do not reveal such a clear correlation between verbs with productive-unproductive inflectional morphology and their frequency in the input. During the pre-morphological period the child's speech reveals the highest number of verb lexemes belonging to an open inflectional class. At the same time there is a high frequency of verbs belonging to some closed inflectional classes (see Articles 4 and 5). The proportion of verbs

with productive and unproductive morphology changes considerably during the proto-morphological period. In addition to core verbs with unproductive morphology (for the concept see Tragel 2003), the child's speech reveals more and more verb lexemes with productive morphology (70 per cent of all verb lexemes). At the same time the proportion of the occurrences of verbs with productive morphology remains almost the same. In other words, verbs with productive morphology are added to the child's repertoire of verbs, but the child uses these verbs less frequently. Generally speaking, the more frequent core verbs (*olema* 'be', *tegema* 'do, make', *panema* 'put', *tulema* 'come', *saama* 'become', *vaatama* 'look, and *minema* 'go') predominate the language use. The child acquires the inflectional paradigms of these verbs earlier than the verb paradigms with productive morphology without preferring any specific inflectional class. The influence of the input can be clearly noticed also in the case of verbs. Similarly to the input, the speech of the child includes a higher percentage of verb lexemes with productive morphology (66 per cent). However, in terms of the number of occurrences verbs with unproductive morphology prevail (70 per cent).

On the background of the previous discussion the role of productivity may be somewhat different in nouns and verbs. It is clear, however, that the frequency of the language element in the input affects the acquisition of active morphology during the proto-morphological period much more than productivity. In other words, the frequent words and, thus, inflectional classes in the input are acquired earlier irrespective of whether they are productive or unproductive classes.

Frequency is related to the segmentability of linguistic units. Peters claims that where it is difficult to segment a word form into morphemes, for example, word-initial stress turns the entire word form into a more easily segmentable unit, the child acquires such a form as a whole (Peters 1997: 179). Thus it can be assumed that many Estonian forms, such as the stem plural, the short illative, and the fusional simple past, may still have been acquired as unanalysed units at the beginning of the proto-morphological period.

2.2.3. Impact of morphotactic transparency of morpheme-forms – the sequence of the acquisition of forms and overgeneralizations

It has been claimed that the morphotactic transparency of morphemes or the situation where one morpheme has a single meaning and / or it marks a single grammatical function serves as a facilitator of the early acquisition of inflectional morphology (see e.g. Peters 1997: 182). Dressler argues that the role of morphotactic transparency is even more important than that of productivity. For example, he claims that the children who acquire fusional languages acquire at first productive inflectional patterns but then acquire also unproductive inflectional patterns but only if they are morphotactically more transparent (Dressler 2004: 7).

In Estonian morphemes are generally attached agglutinatively in forms of nominals, but in certain inflectional classes the markers can also be attached fusionally. The merger of the plural marker and the stem takes place in stem-plural forms, e.g. *jalu-l* 'on feet'; one can find a merger of the stem and the case marker in short illative forms, e.g. *pessa* 'into the nest' and a merger of number and the case marker in partitive plural forms, e.g. *pesa-sid* 'nests'. The children should acquire the agglutinative or transparent forms earlier than not so transparent fusional forms.
The speech of a child who is acquiring Estonian reveals at first stem-plural forms, e.g. *lill-i* 'flowers' (Andreas 1;8) and only then agglutinative forms, e.g. *kartule-i-d* 'potatoes' (aged 2;0). Also, the children's speech reveals at first some short illative forms, e.g. *lihvi* 'into the lift', *poodi* 'to the shop', *püksi* 'into trousers' (Andreas 1;6–1;7), *õue* 'outside' (Hendrik 1;6). The agglutinative *sse*-illative, e.g. *tasku-sse* 'into the pocket', occurs in the data of Andreas as

late as at age 2;0 (see Article 2). The partitive plural form with the fusional *–sid*, e.g. *maja-sid* 'houses', is acquired along with the agglutinative partitive plural forms (see Articles 2 and 6). Thus, it seems that the morphotactic transparency of morphemes does not play an important role in the acquisition of forms. Rather, the prevalence of short forms may indicate the influence of frequent forms in the input language and the short forms formed from them. Also, the preference for short forms could be explained to some extent by disyllabic stage in the language acquisition because at first the child acquires those forms that do not become longer than two syllables as a result of inflection, e.g. *lill-i* flower- PLPRTV), followed by those that become, for example, trisyllabic, e.g. *kartule-i-d* 'potatoe-PL-PRTV) (see 2.1.2).

In the input stem-plural forms constitute 60–62 per cent of the partitive plural forms and the proportion of agglutinative forms reaches 33–35 per cent (Andreas); only 3–6 per cent of the forms are formed by means of the fusional formative *–sid*. On the background of this data it is even surprising that the *sid*-plural is acquired along with agglutinative formation. Apparently, the morphological formation of some important lexeme for the child, such as *auto* 'car' : *auto-sid*, *onu* 'uncle' : *onu-sid*, *tädi* 'aunt' : *tädi-sid*, may influence the acquisition of the *sid*-form. Another possible explanation is that the *sid*-morpheme, despite the fact that the plural and the partitive markers have merged in this morpheme, is still perceived by the children more clearly as a whole than the *i*-marker.

In verbs, considering the acquisition period under discussion, it is important to focus on the merger of the marker of the simple past and the stem in the simple past forms of some word types, e.g. *tulin* 'I came'. The simple past forms are formed fusionally only in a few but frequent words. As the early repertoire of words of the child revealed the fusional simple past form *tuli* 'came' along with the first agglutinative forms, e.g. *kukku-(s)* 'fell', one might assume that the frequency of a lexeme or form in the input language may play a more important role than the transparency of formation. In addition, one has to take into account that during the period when the above-mentioned forms appear in the speech of the child, acquisition still takes place as unanalysed chunks. Therefore, there is strong likelihood that it is not productive morphological formation or the perception of the fusional allomorph *-i* as a separate morpheme.

Thus, morphotactic transparency has no clear impact on the acquisition of inflectional forms. Rather, the order of acquisition seems to be conditioned by the frequency of the forms and lexemes in the input language and by such pragmatic factors as the importance of some lexeme and thus also its forms for the child.

While at the beginning of the proto-morphological period it appeared in the case of preferring certain inflectional classes that grammatical homonymy plays a facilitating role and that morphotactic transparency does not have such a role, then a closer analysis of the errors shows that once a transparent marker has been acquired the child, by contrast, tries to avoid grammatical homonymy and tries to form morphotactically transparent forms from also those words where their formation is not permitted.

Once a child has acquired the partitive marker *-t*, it generalizes the latter also to those types that do not have the partitive ending and where the grammatical case forms reveal homonymy. For example, at age 2;1–2;4 Andreas declines the quantity 1 words *muna* 'egg' and *saba* 'tail' after the example of the disyllabic quantity 2 words as **muna-t*, **saba-t* and the gradational word *kauss* 'bowl' also according to the same type as **kausi-t*. Overgeneralization of the more transparent marker occurs also in the illative forms, e.g. *tühja-sse* 'into the empty' instead of *tühja* (Andreas 2;4). In all these cases the inflectional class shift occurs between two productive classes, whereby the more transparent marker is generalized. Here one can draw some parallels with the previously mentioned use of

diminutive derivations. Such child-directed speech forms as *kiisu* 'kitty' and *kutsu* 'doggy', where the simplex *koer* 'dog' and *kass* 'cat' would have been without an ending in the partitive singular, have the more transparent marker *–t* through a shift in the inflectional class or diminutive derivation. Thus, one cannot claim that morphotactic transparency has no role whatsoever in the acquisition of Estonian inflectional morphology. Although the child's speech revealed few overgeneralizations, the latter indicated the preference for the transparent marker.

According to Slobin (1985: 1216), inflectional imperialism is complete or almost complete replacement of one morphological inflectional pattern by another pattern. It is an operating principle where a large and numerous inflectional class attracts words from less numerous inflectional classes. Thus, a child may use for some case an allomorph that is used only in one (large and productive) inflectional class and generalize the latter to words belonging to all the other classes and use, for example, some more clearly marked form instead of forms that have a zero morpheme in the standard language (see also Dressler 2004: 8). Although the overgeneralizations and diminutive derivations in the Estonian data indicate preference for the phonotactically more transparent marker, one cannot speak of inflectional imperialism or the operating principle of extension because of the small number of such cases (e.g. only 0.6 per cent of all the partitive plural forms in the material of Andreas.

2.2.4. Conclusion

The peculiarity of the inflectional morphology of the acquired language and the influence of the general processes that are characteristic of the acquisition of morphology are most explicit during the proto-morphological period of acquisition when the acquisition of active inflectional morphology begins and when memorization in the form of rote-memorized forms is not that important any more. The Estonian data show that gradation in Estonian is acquired early; however, the acquisition of the forms of words that are inflected according to the productive and unproductive inflections classes depends most of all on the frequency of the lexemes in the input. A child may acquire the inflection of words belonging to an unproductive class earlier than that the inflection of words belonging to the productive, but it happens only if these words are frequent in the input.

Apart from its frequency and salience of in the input, the transparency of a morphological element is not important as yet during the pre-morphological period. The agglutinative case ending *-sse* should be more transparent than the short illative, but nevertheless the Estonian children acquire earlier the short illative, which is more frequent in the input and is not longer than two syllables. The role of the transparency of the inflectional marker begins to increase during the proto-morphological period when the child prefers distinguishable case endings to zero morphemes. The most difficult area for a child acquiring Estonian is the inflectional formation of the end-alternation patterns of nouns ending in a consonant. In addition to the fact that end alternation is highly irregular, the general cognitive acquisition mechanism is important, too. The agglutinative technique of the addition of markers and endings to the stem is easier than the replacement of sounds and their alternation.

2.3. MORPHOSYNTACTIC FACTORS

Of the morphosyntactic factors affecting the acquisition of inflectional morphology, the present study deals with the connection between the mean length of utterance and the acquisition of forms, the development of inflectional morphology with regard to the parts of speech, and the role of constructions in the acquisition of more complex forms.

2.3.1. Mean length of utterances, the proportion of base forms, and the development of inflection

The mean length of an utterance (MLU) can be regarded as the most classic index of language development, which is used first and foremost for the analysis syntactic but also morphological development. When analysing morphological development, the important period is when the MLU value is more than 1, which means that the utterances of the child already contain more than one word. During the period when the child uses mostly one-word utterances, the nominative forms of nouns and the imperative forms of verbs predominate the child's speech. Once the mean length of utterances begins to increase, inflectional formation begins to develop, too. For example, during the pre-morphological period the speech of the studied child Andreas contained on average 1.2 words per utterance. In addition to nominative case forms, the child's speech then contains only occasional wholly adopted partitive, illative, and genitive forms. When utterance length exceeds at the end of the pre-morphological period 1.5, which means that over half of the child's utterances contain more than two words, the inflection of verb begins to develop. The first mini-paradigm of the verb was registered in the speech of Andreas at age 1;10 when the MLU value was 1.6.

The beginning of the proto-morphological period shows an abrupt increase in the mean length of utterances. While at age 1;11 the MLU value in the speech of Andreas was 1.8, then a month later at age 2;0 it was even as high as 3.6. Thus, once a sentence has already more than two nouns, the semantic role of these words has to be expressed by means of some case, and therefore one can see an abrupt increase in the newly acquired case forms in the speech of the child (see Articles 2 and 3). Active acquisition of inflection of nominals is proved by the proportion of base forms in all the case forms, which begins to decrease at age 1;8 and reaches in the course of a few months by age 1;9–2;0 the same level as in child-directed speech (about 50 per cent of all the forms of nominals, see Articles 2 and 3). However, in order to acquire morphological system of the language, the child's utterances need to be longer than on average 1.6 words. Thus, the length of an utterance depends directly on the development of inflection or the proportion of base forms in the speech of the child. Thus, important MLU values include in the case of verbs more than one word per utterance and in the case of nominals more than two words per utterance. It is when active acquisition of inflection begins.

2.3.2. Parts of speech and the development of inflectional morphology

Researchers have claimed that the speed of acquiring inflectional morphology differs depending on the part of speech and that in some languages the morphology of nominals develops faster than the morphology of the verb (Dressler at al. 2007: 67). A possible reason is that in the case of nouns the child has to acquire a smaller number of morphological categories than in the case of verbs. Another important factor is that verb morphology could

be acquired differently from noun morphology. It is easier to grasp nouns cognitively because of their correspondence to the signified object or greater referentiality (Choi 1997: 47, Bassano et al. 2005: 69). However, verbs, especially highly frequent verbs are semantically more complex, and they are more related to the syntactic structure of the language. Therefore, syntactic factors play a more important role in the acquisition of the verb than in the acquisition of the noun (Dressler et al. 2007: 68). Thus, verbs are more important from the point of view of grammar, and they enable more grammatical relations between the nouns (Bassano et al. 2005: 69). Michael Maratsos claims that in the case of nouns semantic coherence is of paramount importance; however, in the case of the verb the morphological information is important (tense, aspect, affirmation-negation, etc.) (Maratsos 1991). Even general richness of the morphological system could play a more important role in the acquisition of nouns than in the case of verbs. However, Dressler et al. claim that what really matters is how important is the morphology of words belonging to different parts of speech in the structure of the acquired language as a whole. In other words, child-directed speech determines the child pays at first more attention to the morphological structure of nouns or verbs (Dressler et al. 2007: 68).

As noted in the previous chapter, the Estonian inflectional morphology begins to develop slightly more quickly in verbs than in nouns. In three children out of five the first verb appears earlier than the first noun miniparadigm. The time difference between the beginning of the acquisition of the inflectional morphology of two parts of speech can be from one to two months. The speech of two out of the five studied children reveals the first noun and verb paradigms at the same time.

At first sight one might think also the transparency of forms could exert some influence on earlier acquisition of the inflectional morphology of the verb. Namely, in Estonian agglutinating technique plays a more important role in the inflectional morphology of the verb than in the noun (see e.g. Ehala, in press). Thus, children might find it easier to acquire agglutinating verb forms than noun forms that are more fusional. At the same time, the forms of the verb *olema* 'be' in the first mini-paradigms were suppletive, and they should be more difficult to acquire. However, in the case of the *olema*-verb one can clearly see the influence of the input frequency; child-directed speech contains about ten times more different forms of *olema* than forms of any other verb, see e.g. Argus 2006, whereas the occurrence of the *olema*-verb in compound tense forms does not contribute much to the frequency because compound tense forms are rare in child-directed speech[15].

Researchers have also argued that the different salience of nouns and verbs could be an important factor in the acquisition of the morphology of different parts of speech[16]. However, in the case of Estonian where the verb usually occupies a non-salient position in an utterance, which means that usually it is not at the end or the beginning of an utterance but somewhere in the middle, one might think that the input frequency could be an important factor. It is true that child-directed speech contains more nouns than verbs, but at the same time child-directed speech contains more repetitions of one and the same verb (form) (Argus 2006). The verbs and verb forms that occurred in the first mini-paradigms are also highly frequent in the input, for example, the verb *panema* 'put', which was one of the very first mini-paradigms in the speech of Andreas and which belongs to the most frequent core verbs.

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[15] For example, a dialogue of Andreas recorded at age 2;0 revealed eighty occurrences of the *olema*-verb in mother's speech among which there was only one case when the form occurred as part of a compound tense form.

[16] For example, in English nouns have a more salient position in the sentence than the verb, and English-speaking children acquire the inflectional morphology of the verb later. On the other hand, in Korean the verb is usually placed at the end of the sentence, and Korean children acquire at first more verbs than in English (Choi 1997: 49–53) .

2.3.3. Role of constructions or lexical patterns in the acquisition of more complex forms

Although the present study is not directly based on construction grammar, one should not underestimate the fact that words (forms) always occur in some combination that conditions their form or the role of construction in the acquisition of inflectional morphology. The importance of the construction becomes especially apparent in the acquisition of the first past tense forms of the verb and morphologically more complex forms.

The first simple past form of the verb in the speech of Andreas was from the verb *tulema* 'come' at age 1;8. The child always used this form in a similar situation and in a similar lexical pattern, where at first he simply replaced one element (subject) by another element (*auto tuli* 'the car arrived', *buss tuli* 'the bus arrived'). He then started to add also new elements to the end of the construction (*issi tuli kop-kop* 'dad came knock-knock'). The partitive plural and the total object are good examples of how lexical patterns support the acquisition of more complex forms. The quantifier-based lexical pattern plays an important role in the acquisition of the stem-plural partitive plural. For example, the first stem-plural partitive forms occurred in the speech of the triplets at first only in combination with the quantifier *palju* 'many' (*palju kotse* 'many blocks', *palju loomi* 'many animals') (see articles 5 and 6). Such a lexical pattern seems to facilitate the acquisition of the fusional partititive plural form; the forms that occurred in this kind of lexical environment did not cause any errors at all. Children are faced with a serious challenge when it comes to the acquisition of the correct case of the total object. The studied child Andreas acquires at age 2;0 the nominative total object with the help of such a lexical pattern where the verb *andma* 'give' stands in the imperative, and the verb occurs in combination with the delimiting adverb *siia* 'here': *anna siia raamat* 'lit. give here book', *anna siia kruvikeela* 'lit. give here screwdriver', *anna siia lamp* 'lit. give here lamp'.

The previous examples show how the acquisition of a more difficult form is at first strongly supported by some lexical pattern. It happens not only at the initial stage or during the pre-morphological period but also later at the beginning of the proto-morphological period.

2.3.4. Conclusion

The earlier development of inflectional morphology can be explained by the combined effect of several factors. First, inflectional markers of the verb are needed already in two-word utterances where the nominal can still be in the nominative, which means immediately after MLU is more than one. However, the active acquisition of different forms of the nominal begins only when the sentence contains more than two nominals or when MLU is more than three. The earlier acquisition of verb morphology could also be explained by the high frequency of some verb lexemes and forms in the input. While in the case of nominals child-directed speech contains a larger number of different lexemes, and many lexemes are represented by a single form and only some by more than one form, then in the case of verbs one and the same lexeme is repeated many times, and these lexemes are represented by many more different forms. Lexical patterns support the acquisition of the inflectional formation of both verbs and nouns.

2.4. SEMANTIC FACTORS

2.4.1. Primary linear mapping of semantic roles and case forms

The primary morphosyntactic and semantic categories are distinguishable in a child that is acquiring Estonian already during the one-word period. Although during this period the child's speech does not usually contain utterances that are longer than one word as yet, the context makes it possible to claim that the child uses the first oblique forms to express some specific semantic role, which becomes clear either from the previous or the following turn. For example, the object role of the noun in the partitive may be concretized not in the same turn but in the next turn of the child containing a verb:
*CHI: pitti [: pilti] 'picture; part'.
*CHI: ettaa [: ei taha] 'does not want' (Andreas 1;7).

Thus, the child is able to express certain semantic roles by the case forms that were acquired as unanalysed chunks already before it begins to acquire the structure of the sentence.

During the two-word period (MLU 1.2–1.8) only the main semantic roles are expressed in the child's speech, for example, the nominative to express the agent and the neutral participant, the genitive for the possessor, and the partitive for the object. Location, instrument, and companion will appear somewhat later when MLU begins to approach two (see Table 2). The other semantic roles will be acquired still later, whereas in the case of the locative cases one can notice that the child acquires location, which performs the prototypical role of the locative cases, somewhat earlier than the roles of possessor and recipient. Table 2 presents the first occurrences of case forms in terms of semantic roles in the speech of Andreas[17].

The problem whether semantic categories are acquired earlier than the grammatical categories has for decades been central in the studies focusing on (morpho)syntactic development. Without entering into discussion about the primariness of syntactic or semantic categories (for discussion see Ingram 2001: 261–339), the Estonian data makes it still possible to assume that the child can perceive and express by means of the first inflectional forms such primary and principal semantic roles as neutral participant, object, and agent[18] already during the one-word period when it is impossible to monitor the syntactic development of the child's utterances. Bates and MacWhinney (1982: 199) also claim that at first the child perceives semantic categories for each of which there is only one form at first. The appearance of the first case forms of Estonian at first only in one semantic role (e.g. the genitive at first only in the role of possessor and much later in the role of object) provides a reason for agreement with this model of acquisition. The development of the semantic roles could be explained also by pragmatic preferences. For example, the allative in the role of recipient is much more important for the child than the adessive, which appears as possessor somewhat later.

[17] Article 3 also presents the semantic roles and case forms in the speech of Andreas, but it does not provide the data about the first occurrences. The first occurrences of the forms in some concrete semantic role are presented here because this chapter deals with the mapping of the initial first role and one form.
[18] The classification of semantic roles is based on " Estonian Grammar" (Erelt et al. 1993: 11–12).

Table 2. First occurrences of case forms as semantic roles (Andreas)

Age	MLU	Case	Semantic role	Examples
1;7	1.1	NOM	Neutral	**Atsu** (on) siin ‘Atsu is here’
		PART	Object	*CHI: **kommi** äitää [= aitäh] 'kommi tahan' ‘thanks, I want some
		COM	Instrument	**bussiga** (läks issi tööle) ‘dad went to work by bus’
1;8	1.2	NOM	Agent	**mina** iska 'I throw'
		COM	Companion	(koos) **emmega** emmega (tuleb tõsta) ‘one has to lift with mum’
		ILL	Location	**kotti** (viskan) ‘I throw into the bag’
		GEN	Possessor	**emme** käsi ‘mum’s hand’
1;11	1.8	INESS	Location	**riius** 'riiulis' tudu(b) ‘sleeping on the shelf’
		GEN	Object	emme sööb ära **tüki** ‘mum eats up a piece’
2;0	3.6	ALL	Recipient	anna siia purk **mulle** ‘give me the jar here’
			Location	tule sina ka **maale** ‘you come to the country, too’
		ELA	Location	Antsu (tahab) **lusikast** võtta (rohtu) ‘Antsu wants to take (some medicine) from the spoon’
		ADESS	Location	üks see (oli) eile **maal** ‘lit. one this (was) in the country yesterday’
		NOM	Object	pane **see** maha ‘put it down’
2;1	2.7	TRL	Condition	varsti läheb **pimemaks** 'soon it will get darker'
		ABL	Location	nuku isa tuli **töölt** ära ‘doll’s dad left work’
		ADESS	Possessor	teeb nööbid lahti **nukul** ‘undoes the doll’s buttons’
2;8		NOM	Condition	ma olen **haige** ‘I’m ill’

2.4.2. Acquisition of tense and aspect and lexico-semantic factors

The impact of semantic factors can be observed also in the acquisition of the inflection of the verb. The acquisition of the category of tense depends not on the membership of a productive or unproductive inflectional class or morphological factors but on the situation type where the child uses the past forms (see Article 4). At first the past tense forms of the child occur only in telic and punctual situation type of achievements. The use of the past tense forms extends to the other situation types only later during the proto-morphological period and is not so closely related to perfectivity any more. The past tense is acquired the latest in states or the static situation type. In the case of the situation type of states one has to take into account that adjectives expressing states appear much later in the lexicon of the child than nouns, verbs, and adverbs (Argus, Podneks 2007), which could in turn influence the development of the situation type of states. Similarly to the simple past, the acquisition of the perfect also begins from the perfective centre and only later extends to the not so prototypical imperfective situation type.

However, the early acquisition of the situation type of achievement and past tense verbs is not based on input frequencies because child-directed speech contains more past tense forms that belong to the situation type of actions. The cognitive development of the child seems to influence the order of acquisition more than the input frequency. Namely, one can assume that children at the age of one and a half and two years are at first able to express such situations that take place here and now. It can be also assumed that children are more oriented to the result than time.

The acquisition of aspect, which in Estonian is grammaticalized only to a certain extent, generally takes place similarly to the other hitherto studied languages (see Articles 4 and 6). As the case alternation of the object, which is an important means of expressing aspectuality in Estonian, is one of the most difficult areas for students of Estonian as a second language (see Pool 2007: 18; Teral 2007: 91), it is important to study how the child acquires it.

Andreas acquired the most frequent case of the object, the partitive and the partitive object, rather early at age 1;8 (see Article 6). However, the total object was much more difficult for the child to acquire, and problems arose already in the first utterances with the total object. At first the child kept using the partitive object in the constructions that require the total object. The first correct utterances with the total object (in the genitive) were registered in the child's speech 2–3 months later, and at first the acquisition of the total object is supported by the perfective particle *ära* 'away; up'. At the beginning of the proto-morphological period the child's speech revealed the first nominative objects, which were at first used only in one lexical pattern. A closer analysis of errors showed that typically the child overgeneralized the genitive object the cases where the partitive was expected (see Article 6). There were also many errors in the selection of the correct form of the case of the total object, where the child often made mistakes in constructions with imperative verbs. The selection of the case of the total object is difficult for a child acquiring Estonian as the native language. There were some errors even at the end of the observation period when the child was already three years old.

It seems that the input frequency does not play an important role in the acquisition of the case choice of the total object. The child hears large numbers of imperative verbs and constructions with the nominative object. Rather, the non-linear character of the connection between meaning and form could pose difficulty for the child (for the mapping of one meaning and one form see Bates, MacWhinney 1982: 199), which means that the object or one meaning can be expressed by three different case forms and apart from imperfectivity-perfectivity the choice of the form sometimes depends only on grammatical factors.

2.4.3. Conclusion

Semantic factors play an important role in the acquisition of inflection. The choice of the form of the nominal is largely guided by the need to express some semantic role or relation. At first the children acquire the forms of grammatical cases because they perform at first such semantic roles as neutral participant and object, whereas each case form corresponds at first to one role. During the pre-morphological period witnesses the beginning of the use of the case forms in prototypical roles, such as the nominative in the semantic role of neutral and agent and the locative cases in the role of location. The initial linear mapping between one role and one form is replaced at the beginning of the proto-morphological period be a more extensive use of case forms also in other roles.

An analysis of the acquisition of the tense forms of the verb shows that the use of the imperfect forms develops during the pre-morphological period from the prototypical situation type of the past also other types that are not so prototypical and is not so closely connected with perfectivity any more. The child began the acquisition of the choice of the object case as a grammatical means of expressing the aspect from the central or prototypical part of the category, that is, the partitive object. Absence of one-to-one mapping is a factor that makes the choice of the form more difficult, but lexical patterns are used as a facilitating strategy to form more complex forms.

2.5. PRAGMATIC FACTORS OR THE IMPACT OF THE LANGUAGE ENVIRONMENT OF THE CHILD ON THE ACQUISITION OF INFLECTIONAL MORPHOLOGY

The impact of the daily linguistic environment of the child and thus the impact of pragmatic factors on the acquisition of inflectional morphology is manifested in a number of aspects. Apart from other factors the pragmatic significance of forms affects the acquisition order of morphemes. Some forms are more significant for communicative functions than others, and the significant form is acquired earlier. The pragmatic factors are often intertwined with preferences based on the frequency and salience in the input language. The only differences concern those elements, lexemes or forms, which have a different significance or usefulness[19] for the child and the adult. Also, pragmatic salience plays an important role in the expression of the locative relations. Even diminutive derivation, which was described in 2.2.2, performs a clearly pragmatic role in addition to the morphological role.

2.5.1. Pragmatically important forms and lexemes

From the perspective of communicative function there are certain forms that are more important for the child than others. For example, it is more important for the child to express the present negative and not the past negative because the present negative enables the child to refuse to perform some undesirable action or to protest against something. The past negative is more common in a narrative situation, and at first the child has no need for it, at least during the pre-morphological period. The child needs to express who did what rather than who did not do what. The present negative form was among the very first verb forms that were acquired as unanalysed chunks. The speech of Andreas revealed the first present negative forms, e.g. *ei taha* 'don't want to', at age 1;7, but the first past negative forms (*tegelt ka ei olnud* 'actually wasn't', *ma ei saanudki* 'in fact I couldn't) as late as at age 2;3. The early appearance of the present negative forms could be regarded as characteristic of the acquisition of Estonian inflectional morphology. For example, Vija found that the speech of five out the six studied children revealed at first the negative form of the verb *tahtma* 'want' and then the affirmative form (Vija 2004: 124), whereas the verb *tahtma* is not at all frequent in the input. For example, a dialogue of Andreas recorded at age 2;0 revealed only a single occurrence of the verb *tahtma* in the speech of the mother.

Another pragmatically important form is the imperative, which enables the child to wish something and to manage events and actions. The studied children acquired the imperative at the same time with the negative forms already during the pre-morphological period. The children use the imperative unmarked stem as a multi-purpose form almost throughout the pre-morphological period, at the time when the person endings have not been acquired as yet.

Pragmatic significance is related to some other factors, especially to the input frequency. For example, the imperative and the negative forms are frequent also in the input. A dialogue of Andreas recorded at age 2;0 revealed in the speech of the mother altogether 98 imperative forms from 29 lexemes, 46 negative forms from 20 lexemes, and 275 other forms from 81 lexemes. Thus, imperatives constitute roughly a quarter of all verbs occurrences. Because these forms are unmarked, and they are usually not longer than disyllabic stems, it is the easiest form for the child to acquire.

[19] Elizabeth O'Dowd defines links between usefulness and salience as degrees of redundancy – if a linguistic can be omitted and it is still possible to understand the sentence, then this element is not salient (O'Dowd 1991: 6).

Even locative relations expressed by different case forms can be pragmatically salient to different degrees, and salience can be different for the child and the parent. For example, the lative locative case forms are more important and salient for the child than the separative forms. Usually it is more important for the child that the object / person goes somewhere than when it appears (from somewhere). Both the locative case endings and locative adverbs are acquired accordingly – at first lative forms (for a more detailed description see Articles 2, 3, and 5) and then separative forms. By comparison one could examine some data in the study by Vija; it appears that in the pair *sisse–välja* 'in–out' *sisse* is acquired earlier and that the occurrence of relational words (thus also significance) can be different in the speech of the mother and child. For example, the word *siia* 'to here' is more frequent in the speech of the child, but *siin* 'here' is more frequent in the speech of the parent (Vija 2004: 117–121).

Some lexemes are more important for the child than others, that is, the frequency of lexemes can be to some extent different in child-directed speech and the speech of the child. For example, there is some data to the effect that the verbs *olema* 'be' and *tahtma* 'want' are important in the early speech of Estonian children (Vija 2004: 124). While in this study the children acquired the frequent forms of the frequent lexemes in the input early, there was an interesting difference in the partitive plural. Namely, the speech of the studied children revealed partitive plural forms with the *sid*-formative concurrently with the agglutinative forms, whereas the partitive plural forms with the *sid*-formative are considerably less frequent than the agglutinative forms. A closer examination of the words that reveal the *sid*-forms shows that this marker usually occurs in lexemes that are highly important for the child, such as *auto* 'car', *tädi* 'aunt, a lady', and *onu* 'uncle, a man'. Thus, the pragmatic significance of lexemes or, to be precise, usefulness may influence the acquisition much more than the input frequency.

2.5.2. Development of deixis and the acquisition of inflectional morphology

As the development deixis is beyond the scope of the present study, the following section deals only with those deictic aspects that are directly related to the development of inflectional morphology. When examining the early speech of the studied children one can assume that the development of deixis in the child begins from the deictic zero point me–here–now (for concepts and definition see Pajusalu 1999) and develops in the direction from the egocentric to the exocentric.

The development of person deixis in Estonian has been studied by Vija (see e.g. Vija 2005, 2007). According to Vija, in the Estonian child person reference by means of the pronoun starts from the self-referring pronouns and is completed by age 2;0 (Vija 2005: 70–71). The acquisition of grammatical person deixis or the category of person of the verb is preceded by the use of the third person of the verb. The child uses the third person singular for referring to himself / herself. For example, the speech of Andreas at age 1;10 generally revealed this form when making comments about himself (*Antsu tahab* 'Antsu wants'), and there was only one instance when it was used to make a comment about another person (*päkapikk istub* 'the dwarf is sitting'). At age 1;11 Andreas uses a verb stem without a person ending to refer to his own action – when the mother asks *mis sa teed?* 'what are you doing', the child responds *istu-* 'I'm sitting'. One might assume that the late acquisition of the person ending could be explained by phonological factors (see 2.1.2 and 2.1.3). The child acquires the ending of the third person singular earlier than the other person endings. The majority of the third person forms had an ending by age 1;11, but the use of the other personal endings is very rare and insecure. The ending of the first person plural appears rather early in the speech of the child,

which once again points to the significance of the phonological factors in addition to the pragmatic factors. Namely, at first this ending is attached to the monosyllabic stem whereby a disyllabic structure with an open non-initial syllable is formed. The latter is much easier and more natural for the child than structures with closed non-initial syllables, such as the third-person forms.

By comparison with singletons the everyday speech situation makes an impact on the development of the speech of triplets with regard to the person endings. The speech of triplets also consisted of unmarked verb stems during the pre-morphological period, but the use of the third person form (including the unmarked form) to describe one's own action is extremely rare in their speech. At age 2;6 there is only one example of such a use in the speech of one child, Liisa, and one in the speech of other child, Annela. On the other hand, the speech of one of the same-aged triplet revealed some forms of the first person plural (*tee-me* 'do-1PL', *läh-me* 'go-1PL'). Thus, it can be assumed that for triplets the deictic center of grammatical person deixis is *meie* 'us' rather than *mina* 'me.

The study of Estonian children showed that in the case of local adverbs spatial deixis begins to develop from the adverbs of the deictic center. The adverbs *siia* 'to here', *siin* 'here', and *siit* 'from here' are acquired earlier than *sinna* 'to there', *seal* 'there', and *sealt* 'from there' (see Articles 2, 3, and 5). In Estonian the spatial-deictic local adverbs and locative case endings are generally acquired at the same time (see Articles 2 and 3). However, once again there is an interesting difference in the case of triplets; namely, unlike singletons they acquire local adverbs earlier than the locative case endings. The early acquisition of the local adverbs cannot be explained by frequency-based preference of the input language because the triplet-directed input contains more or less the same number of local adverbs and locative case endings. Rather, the early acquisition and frequent use of the local adverbs could be explained by the daily deictic space of the triplets. While being located more time as a group of three in the same physical space, the local adverbs enable them to refer to only those items that are familiar to all the members of this speech community or all the three children. The use of the local adverbs enables also some economy – when using local adverbs, one is not faced with inflection all the time. It is easier to use a ready-made form than to add the locative case endings to the correct stem of each different lexeme.

Temporal deixis is typically expressed in grammatical tenses and adverbs of time (Pajusalu 1999). The present study deals in greater detail with the acquisition of tense forms in connection with lexical-semantic factors in 2.4.2. One should mention, however, that the difference from the adult-like distribution of past tense forms that is revealed in the use of the first past tense forms, where in the child the imperfect forms occurred in perfective situation types and in the adult also in imperfective situation types, clearly shows the significance of the factors arising from the everyday speech situation in the development of inflection. As for the pre-morphological period, it can be claimed that the child has not acquired the tense as yet. The child uses the imperfect form precisely for the description of such a (perfective) action, which occurred right before the moment of speaking (e.g. a situation where some object fell on the floor, broke, etc.) and the result of which is still visible (the object is lying on the floor, is broken, etc.). Such an imperfective form resembles more an adverb than a verb. In the case of Andreas one can speak about the acquisition of the grammatical tense as late as at age 2;0 when the imperfective forms occur also in the imperfective situation type. Although it has been claimed that contemporary Estonian provides no evidence that spatiality is primary by comparison with other deictic distinctions (Pajusalu 1999), the speech of Andreas reveals that the range of relational words with a temporal meaning is much less numerous by age 2;0 than the range of spatial words (Vija 2005: 114). The present thesis claims that in the speech of Andreas the development of lexical temporal deixis began later

than the development of spatial deixis. It could well be that there is a cognitive reason for this – space is more concrete and easier to perceive than time. The speech of Andreas did not reveal any temporal words before the age of 1;10. His first temporal word *siis* 'then' (*siis tule-kop-kop* 'then come(s) knock-knock') expressed relative time. The use of the word *praegu* 'now', which belongs to the deictic center and was registered at age 1;11, was at first insecure. The child did use the temporal word that denotes the moment of speaking, but the verb form occurred in the same utterance in the past form: *praegu õue*(s) *valge oli* 'lit. now outside light was'. At age 2;0 the development of the temporal deixis of the child undergoes an abrupt change. In addition to the time word *praegu* 'now' and *täna* 'today' and *nüüd* 'now', which belong to the deictic centre (the latter two occurred at this age for the first time) there are temporal words that are located both in the past and the future from the deictic centre, for example, *eile* 'yesterday', *home* 'tomorrow', and *varsti* 'soon'.

Apart from the fact that the Estonian children begin to develop their deictic space at the same time from person deixis and spatial deixis, it can be also concluded that during the acquisition of general deixis and inflectional morphology the child acquires deixis at first by lexical and then by grammatical means.

2.5.3. Pragmatic role of diminutive derivation

By comparison with adult interaction, the child-centred speech situation is characterized by a more frequent use of diminutive derivations. Estonian has two diminutive suffixes: *ke(ne)-* and *–u*; the latter is typical of a child-centred speech situation. The primary function of using diminutives is to facilitate the acquisition of the morphological system (see 2.2.2). Unlike many derivational suffixes, diminutive derivation does not shift words to another part of speech but to a more transparent / easier inflectional class (see also Dressler 1994: 102). Apart from facilitating the acquisition of the morphological system, diminutive derivation plays an important pragmatic role; in other words the morphological device has a more general pragmatic significance. Comparisons of the acquisition of different languages have shown that during the early stage of language development diminutives are used without any reference to smallness (Dressler, Barbaresi 2002: 51). Diminutives occur first and foremost in a hypocoristic speech situation when one discusses a pleasant topic that is important for the child and with close people. Also, the data of the Estonian children proves that the notion of smallness, which is considered to be the main semantic function of diminutive derivation, is apart from the hypocoristic or intimate function not important in child and child-directed speech (to be precise in the case of *u*-derivatives). For example, the diminutive derivative *kutsu* 'doggie' refers not only to a small dog but to any dog, including a large dog, and the derivative *kätu* 'hand' denotes also the hand of an older person and not necessarily the hand of a child.

2.5.4. Conclusion

Pragmatic factors generally have the same-direction impact as the frequency in the input. Pragmatically important forms and lexemes are frequent in the input, and they are acquired early. At the same time the significance of some pragmatic factors increases during the acquisition of such parts of the morphological system where it is impossible to detect any direct impact of the input. The data collected shows that the clearest areas of this kind include the acquisition of the first past tense forms and the acquisition of spatial relations in triplets. In addition, one can see the impact of pragmatic usefulness in the acquisition of the

inflectional formation of some lexemes that belong to the child's early lexicon. The present thesis did not discuss the factor of usefulness in detail or even define it, nevertheless, it seems that its impact on the acquisition of inflectional morphology is noteworthy and deserves further study.

Comparison of the development of deixis and the acquisition of inflection shows that when proceeding from the deictic center, the child prefers lexical means of expressing deixis; the grammatical devices are acquired somewhat later.

CONCLUSIONS

The acquisition of Estonian inflectional morphology is a process that is, on the one hand, governed first and foremost by the input with its frequencies and preferences. On the other hand, one should also consider the role of typologically intrinsic features and the factors that arise from the peculiarity of the morphological system, as well as the role of the other levels of the system, such as phonology, morpho-syntax, semantics, and pragmatics. The present thesis focuses on the combined effect of the different factors in the acquisition of Estonian inflectional morphology.

The main part of the thesis consists of four articles dealing with the acquisition of Estonian inflectional morphology, which were published in 2004–2007, and two articles are in press. The introduction to the thesis provides an overview of the major models and approaches of studying the acquisition of morphology, an overview of the study of Estonian child language together with the bibliography, and an analysis of the main research findings of the articles according to the different levels of the language system.

The thesis is based on spoken dialogues between the child and the parent(s); the speech of both the child and the caretaker was analysed. The study focuses on how the complex morphological system of Estonian is acquired, which factors facilitate it, which factors could lead to confusion, and which factors play a major role during the different stages of acquisition. The study seeks answers to the following specific questions: what is the role of the phonological factors in the acquisition of inflectional morphology, such as preference for the natural disyllabic metric foot; how does the acquisition depend on the purely morphological factors, such as the productive inflectional pattern, etc.; to what extent does the child pay attention to such typologically significant features of the inflectional system as gradation, and what is the role of the semantic factors in the acquisition of inflectional morphology. The articles did not directly address the pragmatic factors that influence the acquisition or the factors related to the linguistic environment of the child. However, some attention was paid to them where such factors became apparent, and they were also described in the section on the main research findings.

There is a fundamental difference between the acquisition of inflectional morphology during the pre-morphological and the proto-morphological periods. Rote-memorization is the prevalent general acquisition strategy during the pre-morphological period; the inflectional markers are memorized as part of a word forms, and during this period the children's speech reveals very few overgeneralizations or errors. During the pre-morphological period the acquisition of morphology is mostly affected by the phonological factors. The children prefer natural structure, such as metric feet consisting of two open syllables and trochaic feet; they avoid elements that are not salient, such as unstressed third syllable and the final sounds of the closed non-initial syllable, and they often use unmarked stems (the genitive stem of nouns and the imperative stem of verbs) as multi-purpose forms.

The input exerts strong influence already during the pre-morphological period. The child acquires earlier those lexemes and forms that are frequent in the input. However, the pragmatic factors already influence the order of acquisition as well; the usefulness of some lexemes and forms dictates their earlier acquisition by the child. Gradation, which is an important typological feature of Estonian, begins to develop already during the pre-morphological period when a form in the strong or weak grade enables the child to perform pragmatically important communicative functions and to express semantically important meanings by using form oppositions to express different semantic roles.

The morpho-syntactic development is also closely related to the development of inflectional morphology. Once the child's utterances are on average longer than one and a half words, one

can witness active acquisition of the inflectional morphology of the verb. In the case of the inflectional morphology of the noun, the child's utterances have to contain more than two words, which means that in addition to one noun and one verb there has to be another noun. Only then there is a need to express the semantic roles of nouns by means of some case marker, and the beginning of active acquisition of the inflectional morphology of nouns can be observed. During the pre-morphological period there is linear mapping between meaning or the semantic role and the case form of the noun, and at first one meaning is connected with one form only.

An analysis of the development of deixis showed that the child begins the development of inflection from the deictic centre. At first, during the pre-morphological period, the child's speech contains some local adverbs as lexical devices for spatial reference. However, the child uses pre-categories for person reference and time reference, third-person forms and one's own name for self-reference. In the case of time deixis past tense forms are used in addition to present tense forms, in which case one cannot speak about the acquisition of the grammatical tense as yet. The imperfective forms that occur in strictly telic situation types indicate aspectuality rather the acquisition of tense.

At the beginning of the proto-morphological period the language use of the child reveals overgeneralizations, which show how and on what basis the child beginning to create his or her own grammar. During this period, the important phenomena include preferences arising from the morphological system of the language. Such phonological constraints as disyllabicity and the inability to pronounce the final sound of a closed non-initial syllable begin to disappear, and the preference for specific productive inflectional types and overgeneralization of more transparent markers becomes prominent. Diminutive derivation plays a significant pragmatic role in the context of child-directed speech. Apart from the hypocoristic function it facilitates the acquisition of inflectional morphology by shifting words into the inflectional type with a more transparent partitive ending.

In the parts of speech the development of active inflectional morphology begins at somewhat different time; in the case of verbs on average two months earlier than in nominals. Morpho-syntactic development plays an important role in it; the general length of the child's utterances conditions the time when there is a need for the inflected forms of the verb and the noun. Linear mapping between the semantic role and some case form disappears during the proto-morphological period. The child is then able to express one semantic role with different case forms, and the child uses one case form to express also different roles.

The most difficult areas of Estonian inflectional morphology include the acquisition of fusional partitive plural forms, the acquisition of the end alternations, and the choice of the case of the total object, where overgeneralizations and insecurity can be found even at the end of the observation period. At the same time some compensatory strategies are used to help the acquisition of the above-mentioned difficult forms. The child may acquire a complex case form as a unanalysed chunk because prosodic stress makes the entire form segmentable as a single unit, or as part of some lexical pattern, as the analysis of the acquisition of the partitive plural or the acquisition of the nominative total object demonstrated.

By way of conclusion it can be claimed that the acquisition of Estonian inflectional morphology depends on a large number of factors. The impact of some factors is manifested during the initial period of the acquisition; others have become apparent only after the child has already been able to acquire the main inflectional forms; the impact of some factors is of different strength during different periods. Because the impact of the input can be considered to be the most important throughout the entire acquisition process, one might claim that language acquisition is first and foremost a process that assumes interaction between the language modules and is based on the frequencies and preferences of the child-directed speech.

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