

**HOW TO COMMUNICATE WITH
A SPEECH IMPAIRED PERSON?
A CASE STUDY OF A SUBJECT WITH
MOSAIC PATAU SYNDROME**

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Abstract. The current article is seeking an answer to the question how to communicate with a specific person with a partial loss of the ability to speak so that all participants of the communicative situation would understand each other. The subject of the study is a female who was born in 1990. Her speech impairment is caused by the mosaic form of Patau syndrome or trisomy of chromosome 13, and developmental verbal dyspraxia. Research material of the article consists of three communication situations recorded in a journal of participant observation; two situations involved a mother and a daughter (the subject of the study), who were joined by a third party in the third situation. The findings reveal that the subject uses in communication motional communication modalities and vocalizations, as well as combinations of these communicative means, manipulation with an object proved to be most effective. Collaboration of the communicators and consideration of shared knowledge play an important part. The subject guides her interlocutor to verbalize the meanings which she is unable to express orally herself. The findings of this study have practical implications for communication with other people with partial or total loss of the ability to speak.

Keywords: oral communication, speech impairment, trisomy 13, Patau syndrome, mosaicism, developmental verbal dyspraxia, multimodal communication, communication modalities

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1. Introduction

Any oral communication is an unsmooth system by its nature, characterized by various interferences, complications, misunderstandings and faltering. More problems arise when one conversation partner possesses very limited opportunities

for self-expression. People with impaired speech encounter difficulties in asserting themselves, because the lack of speech complicates communication significantly and decreases drastically the possibilities of making oneself understood. Problems accompanying speech disorders cause unevenness of communication and impede achievement of the goals or realization of the intentions that the involved parties had at the beginning of communication. The author of the current study considers it important to develop a suitable communication methodology for individuals with expressive speech impairment and for their communication partners. In order to accomplish this objective, it is first necessary to explore communication of this type.

The subject of the research is a female born in 1990. Her clinical picture involves the mosaic form of Patau syndrome, also known as trisomy 13, which has caused severe mental retardation and restrains the development of her speech. The accompanying diagnosis is dyspraxia – language impairment, which has mainly affected the production of speech, but not the ability to comprehend the talk addressed to her. She was diagnosed in 2006 at the Genetics Institute of the United Laboratories of Tartu University Hospital (Õunap 2006).

Research questions. The current article belongs to the field of qualitative research, and seeks an answer to the question how to communicate with a specific person with impaired speech so that all participants of the communicative situation would understand each other, in other words – how to reach a positive end result and to achieve the goal, which was the reason for starting the communication. In order to respond to this question, both successful and unsuccessful communication events are analysed. Three communicative situations are under observation (two between the mother and the daughter, and one with three participants). The first two occasions required several conversation rounds and corrections, before the message that the study subject wished to transfer was revealed. No misunderstandings occurred in the third communication event and two communicators comprehended each other quickly. In order to formulate the answer to the main question, it is necessary to determine the communication modalities which the study subject utilizes for expressing herself in these three situations, and to explore which communication modalities are more understandable to her interlocutor(s) and which cause confusion for some reason.

Domain and methods. This article belongs to the domain of clinical communication studies. Discourse analysis (DA) has been used for analysing the material. The means of linguistic anthropology have also been applied, particularly the SPEAKING model of Dell Hymes (Hymes 1972), which was developed for assessing how language is used in specific speech communities, and Michael Agar's (1994) MAR analysis. A suitable collective designation for close observation belonging to the frame of discourse analysis and methods of Hymes and Agar is qualitative microanalysis, which enables to focus on the details of communication. The study concentrates on communicative situations as events of oral discourse, discourse is dissected as language (or some other communication modality) in use, and the analysis explores the role of each specific modality on construction of meaning.

2. Medical background data of the subject.

Previous researches on the communication of people with the mosaic form of Patau syndrome and dyspraxia

Unsmooth co-functioning of the human brain and linguistic capability, and the occurrence of communicative problems is undoubtedly a topic of vital importance. Communication in the clinical context is of interest in medicine, psychology, special education, linguistic anthropology, sociolinguistics, pragmatics, semiotics and gesture studies, when only a few domains are to be mentioned. Due to development tendencies of modern science (interdisciplinarity, globalization and progressive utilization of novel technology), several methods and approaches that were previously at the disposal of only one branch of science, are now used trans-disciplinarily. Also, the disciplines themselves have become less clearly definable. Non-clinical and clinical directions in studies of communication and social interaction are approaching each other in the 21st century, and give a mutual contribution when it comes to methods and data (see e.g. Perkins 2007).

A person may have language impairment due to several medical reasons, such as various illnesses, psychic (developmental) disorders, genetic disabilities or damages to certain areas of the cerebral cortex (aphasias). It has been emphasized in clinical communication studies that communication involving a person with language disability represents completely dissimilar patterns and differs in principle from a situation where communicators do not have language impairment. The differences derive mainly from limited linguistic resources of the communicators, which cause various semantic, syntactical and phonologic problems (Ferguson 1994, Goodwin 1995, Laakso 1992, 2005, Sorjonen et al. 2004, Wilkinson 1995). Restraints or absence of speech determine the selection of alternative communication modalities (means of communication), the utilization of which depends in turn on the abilities that the individual has retained.

Professor Michela Balconi (2010:3) from the Catholic University of Milan remarks that there has recently been a growing interest of researches in the relations between linguistic and communicative processes and the underlying cortical structures supporting them. A comprehensive overview of these developments is presented in the collective volume “Neuropsychology of Communication” (2010) edited by her. The tradition of studying the relations between language impairments and communication has taken root also in the United States of America, for example at the University of California, which laid the cornerstone to such studies in the 1980s. Charles Goodwin, professor emeritus of applied linguistics, has guided research work at the University of California and arranged publication of international collective volumes. A fundamental compendium is “Conversation and Brain Damage” (2003) which was edited by C. Goodwin and published in Oxford. The topic is also actively studied in several Nordic countries; outstanding outcomes have been obtained for example at various Finnish universities. The Department of Speech Sciences of the University of Helsinki and its currently ongoing research projects *Speech, language, and communication after*

stroke (project manager professor Anu Klippi) and *Semantic impairment in Alzheimer's disease* (project manager docent Seija Pekkala) represent just one example (homepage: http://www.helsinki.fi/speechsciences/research/logopedics/communication_disorders.htm). The author of this article was unable to find any studies concerning the communication of people with Patau syndrome; the probable reason lies in the fact that the syndrome is very rare and is frequently accompanied by severe mental retardation. Longitudinal study of the communication of a person with Patau syndrome, who is knowingly the only one in Estonia, began at the University of Tartu in 2007, and the same person is the subject of the current article. The results of these studies have contributed to the publication of three articles: Jokinen et al. 2013, Rummo and Tenjes 2011, Tenjes et al. 2009. The articles have focused on the communicative situation in general, a manifestation of the concepts TIME and SPACE in communication involving the subject, selection of communication modalities of all participants and the cognitive abilities of the subject.

As mentioned before, partial speech loss of the subject of this study is caused by the mosaic trisomy of chromosome 13 or mosaic form of Patau syndrome and concurrent developmental verbal dyspraxia. According to professor Õunap (conversation on 7th July 2011), there are no other people with Patau syndrome living in Estonia, because this anomaly has been prenatally well-diagnosed since the 1990s, i.e. there are only a few false diagnoses and hence the decision is made in favour of abortion. The syndrome is rare throughout the world, since miscarriages, still-born children or deaths at a very early age are frequent because of severe malformations. Patau syndrome is most rare of various trisomies, according to Goldstein and Nielsen (1988) this trisomy occurs in about 1 in 12 000 to 1 in 29 000 newborns. The genetic origin of trisomy 13 was discovered in 1960 by Klaus Patau and his research group who analysed the clinical data of a female patient born in 1959 (Patau et al. 1960). Complete, partial, or mosaic forms of the disease can occur (Aypar et al. 2011). The mosaic form is very rare; it occurs in only 5% of all trisomy 13 cases (Magenis et al. 1968). Mosaic cases have a less expressed clinical picture, and malformations and anomalies are not so severe as in cases of full trisomy.

Studies concerning Patau syndrome and its mosaic form have mainly been medical or belong to the field of special education; trisomy 13 has often been analysed in combination with other diseases or developmental disorders. Hereby three of these studies are briefly discussed as they contain data regarding mental and linguistic development and communicative capacity of people with this syndrome. Research methods have been quantitative, the developmental level of study subjects has been assessed on the basis of the developmental quotient (DQ), defined as developmental age divided by chronological age (see e.g. Baty et al. 1994, Tang et al. 2013). However, it has been stated that the use of DQs is controversial and developmental specialists should regard it to be a rough estimate of functions (Baty et al. 1994). The studies have revealed that the development of patients with Patau syndrome is fastest during the first two or three years, and then

it decelerates or halts. The study of Baty et al. demonstrated that children with trisomy 18 and trisomy 13 had learned by the age of three to walk at least with a walker or moved by crawling, understood words and phrases, used a few words and/or phrases, followed simple commands, interacted with others and played independently. The article does not contain a more exhaustive analysis of their communication. One study subject of Tang et al. (2013) was a 3-year-old girl with the mosaic form of Patau syndrome combined with monosomy X. Evaluation of her development asserted that her language and mental development were delayed after 30 months (her language was the worst of the evaluated factors) and her DQ had dropped with growth (Tang et al 2013:4). The results of Griffith et al. (2009) confirm as well that speech delay and mental retardation are common in trisomy 13 mosaicism.

The communication of the study subject of this article is severely disturbed also by developmental verbal dyspraxia, which is a neurological sensorimotor speech disorder. *Dysphasia* and *alalia* have been used in Estonia as synonyms of the term *dyspraxia*, though in English medical literature *dysphasia* and *alalia* refer to speech development disorder caused specifically by organic damage of the language centre of the cerebral cortex.

Depending on the level of severity, differentiation is made between the terms *dyspraxia* (milder form) and *apraxia*, which refers to intensively inhibited or missing speech capacity. The concept *apraxia* is more general and is frequently used without drawing a distinction between different severity levels of the disorder. These terms may also occur in literature as synonyms. In psycholinguistics *apraxia* is defined as a disorder which does not allow the brain to program or execute the movements necessary for speech articulation (Field 2004:18). By the definition available on the website of the National Institute on Deafness and Other Communication Disorders (NIDCD) located in the United States of America, *apraxia of speech*, also known as *verbal apraxia* or *dyspraxia*, is a speech disorder in which a person encounters difficulties in speaking, he or she is not able to express himself or herself correctly and appropriately (NIDCD 2012). The disorder is not related to weakness or paralysis of the speech muscles, and the severity of apraxia of speech may vary from mild form to complete absence of speech capacity. *Dyspraxia* can be either acquired or congenital (i.e. developmental) (NIDCD 2012). In case of the subject of the current research, the disorder is congenital and the development of speech has encumbered the subject since birth.

Brookes (2007) also claims that *dyspraxia* is a neurological disorder (and not cognitive or induced by muscular malfunction). The signals originating from the motor centre of the brain do not reach muscles, and as a result the patient experiences difficulties in movement planning, the existing idea or a planned purpose remains unachieved or obstacles are encountered upon execution. Three processes are disrupted in the brain: 1) ideation; 2) motor planning; 3) execution (Brookes 2007:5–6). Brookes also describes three types of dyspraxia: oral, verbal and motor forms. The subject of the current study suffers from *developmental*

verbal dyspraxia as only the execution of speech movement is disturbed. According to Brookes (2007:61), in the case of *verbal dyspraxia* the speech muscles are not damaged, the patients use the same muscles in coughing, chewing and swallowing, but they are unable to utilize them for creating a desired sound.

According to previous medical studies, *verbal dyspraxia* is most commonly associated with one specific gene FOXP2 and the disorder occurs with deletion of this gene. The same conclusion was reached when two Estonian families were studied in respect of the deletion of gene FOXP2 and concomitant verbal dyspraxia (see Žilina et al. 2012:254–256).

In addition to speech movements, *dyspraxia* may also affect the ability of moving other muscles (motor dyspraxia). For example, Dewey et al. (1988) studied *apraxia* in relation to the ability of executing hand movements. One group was formed of children with *apraxia*; members of the control group were not diagnosed with this disorder. The results revealed that subjects with *verbal apraxia* obtained worse results when they had to imitate movements or when they were asked to perform movements upon command, but such difference did not occur in the utilization of various tools. Manifestation or non-manifestation of *dyspraxia* upon composition of hand gestures, use of tools and work equipment, and pantomime (mimicking) has been studied by medics as well as linguists and special education teachers. The example presented in this paragraph is only one of the many, and the objective was to draw attention to the fact that the manifestation of *dyspraxia* may be considerably more profound than in the given case.

Morgan and Vogel (2009) have emphasized that a diagnosis of *verbal dyspraxia* or *apraxia* has so far mainly been based on three key features: 1) abnormalities and errors without any specific pattern on formation of consonants as well as vowels in syllables and words reoccurring in speech; 2) lengthened and impaired coarticulatory transitions between sounds and syllables; and 3) inappropriate prosody.

3. Material

The study material of the article derives from a corpus which has been collected by utilizing two methods: videotaping natural communication situations involving the subject (the corpus contains 10 hours and 14 minutes of video materials), and participant observation constituting the basis of journal notes (25 pages of text). The study involved an analysis of three situations that were recorded in the journal of participant observation. The written form of the material sets certain limitations to the analysis in comparison with the analysis of video data, because complete reconstruction of the event is no longer possible. Some modalities (paralinguistic vocal means, precise facial expressions, glancing, etc.) are therefore bound to be left aside. As such data was of particular interest proceeding from the research question, they were still used despite the limitations.

The notes were recorded in two stages: the occurred communicative event was first fixed with as much detail as possible, and the text was then elaborated in written form on the basis of communication modalities and conversation rounds of the communicators. Analysis of the material began in parallel to the second stage of its recording – first selections concerning the importance of modalities (i.e. how much the use of each specific modality facilitated the clarification of the meaning) were made in this research stage.

4. Methods and concepts

4.1. Communication as collaboration. Discourse analysis

Discourse analysis (DA) has been applied to study the source material as the most extensive method. Discourse analysis considers language to be the creator, mediator and carrier of meanings (e.g. MacCabe 1979, Macdonell 1986, Schiffrin 2007). Brown and Yule (1983:26) summarize that the discourse analyst works with recorded materials that are part of a dynamic process in which a speaker or a writer uses language in a specific context as an instrument of communication to express meanings and to achieve his or her goals. The analyst strives to find regularly occurring phenomena which the communicators utilize for expressing their intentions and meanings (Brown and Yule 1983:26). Teun van Dijk (1997:13) defines discourse as communication with action and interaction in society; his later definition (van Dijk 2005:17) views discourse as an event (communication act) which the social agents (the speaker and the listener, the writer and the reader) attend at a specific time, in a specific place and under specific conditions. Specific situation determines the narrower meaning of an utterance/conversation round and the broader meaning of the communicative event as a whole. The meanings evolve and alter, because a communicative situation is dynamic, i.e. it develops and changes constantly. Clinical discourse analysts are mainly interested in the mechanisms which underlie discourse creation and transmission of information (Müller et al. 2008:4).

The construction of meanings, their transmission and reception are important functions of a communication act – meanings are construed in a communicative situation as a result of collaboration between conversation participants. People with partial or total loss of the ability to speak depend on their interlocutors to a very large extent. Goodwin discusses in the introductory chapter of the collective volume “Conversation and Brain Damage” that when communication involves a speech impaired participant, finding the necessary word does not concern only one communication partner, but requires systematic collaboration between the interlocutors. In ideal cases the latter translate into verbal language that part of information which the speech impaired person expresses nonverbally. In such communication finding the necessary word does not concern only one communication partner, but requires systematic collaboration between the dialogue participants. The proportion and patterns of utilization of various

communication modalities are also very different. In ordinary communication the utterance and the accompanying gesture are produced by one and the same person – the person, who is currently speaking (the communicator). When one of the participants is speech impaired, his or her movements are supplied with meaning through the speech of the dialogue partners. Roles are exchanged in such conversation – the listener contributes to the communication the part which is usually provided by the speaker (Goodwin 2003: 5).

Anu Klippi (2003:117–143) has described the collective construction of meaning, by analysing conversations of a group of four communicators with aphasia. Preserved linguistic abilities may vary to a great extent in case of aphasia – one patient of the group (Jaakko) writes, but is unable to read aloud or articulate what he has written so that it would be comprehensible to others, therefore another group member (Maija) does it for him.

4.2. Multimodality of communication. Functions of multimodal communication

Oral discourse is a multimodal communication process. This article treats communication modalities as modes of transmission of messages and explores their relations with pragmatic functions occurring in a conversation. Multimodality has been defined in literature in a broader (e.g. Kress 2004, 2013) and a narrower (e.g. Allwood 2003) sense. Kress (2004) has a semiotic viewpoint on multimodality. In his opinion modalities include all kinds of means utilized in communication, for example a CD-ROM, movies (including animated cartoons), various pictures and images (including comic strips), colour, music, human voice, gestures and movement. A narrower approach excludes everything else except for the human body – ways of communicating are associated with human sensorimotor pathways (visual, auditory, gustatory, tactile and olfactory channel) – and relies on the fact that perception is possible only via sensory organs and that humans produce information proceeding from their body. Allwood (2003:138–139) has presented an extremely detailed list of nonverbal gestural means, and asserts at the same time that such a list can never be complete or exhaustive, because communication is a complex phenomenon that is rich in nuances. His list is based on an analysis of video-recorded and transcribed data, and contains head movements, facial gestures, gaze, smiles, laughter with respective subcategories, body posture, and movements of arms and hands.

In conversations, utterances usually predominate and bodily gestures convey supplementary information; the gestures are strengthened by prosody. The messages produced in a communicative situation in the different modalities can either support each other or give contradictory information (Allwood 2003:134). In the viewpoint of Alan Cienki not only communication, but language itself is a multimodal phenomenon, though he argues that language is only variably multimodal. Cienki (2010:37) describes the following model of language:

The model of language proposed is one structured as a center-periphery category, with a prototype-center being the spoken words and grammar that are the traditional object of study within linguistics, and various positions outside

the center being held by other behaviours that are potentially highlighted in usage events (such as intonation, gestures of various sorts, object manipulation, and others).

In the framework of this study, inversely the bodily gestures are dominating and also some special modalities (touch or manipulation of objects) are applied which usually do not play such a significant role in other types of oral discourse.

As the material of the study belongs to the field which explores communication in a clinical context, determination of communication functions is based on the taxonomy of Paul W. Cascella (Cascella 2005:159, 163). The classification of his expressive communication forms (Cascella 2005:158, 162) is also taken into consideration, though current article defines them as expressive communication modalities. Both classifications are presented in an article documenting a study conducted at Southern Connecticut State University, describing the communication of 14 adults with intellectual disabilities. The classifications contain altogether 28 indicators. Cascella lists the following pragmatic functions of the communicator: expressing the emotional state, making a choice when one was presented, requesting desired objects, conveying protest, starting communication in order to obtain attention, greeting or bidding farewell, proposing an activity, asking for help, informing of the completion of an activity or a task, exchanging information about other people, making corrections when suspecting of being misunderstood. Cascella's classification of expressive communication forms includes body orientation, facial expressions, words and other vocalizations (sound utterances), eye gaze, head movements (nodding, shaking the head), etc. It is worthwhile to note that Cascella does not utilize any classical taxonomy of gestures, but proposes his own classification which enables to characterize the communication of people with speech impairment in a better way. Therewith according to his classification, pointing is not a gesture, but is denoted with more generic term *indicative activity*, while gestures include handing-over gesture, pushing-toward gesture, reaching gesture, etc.

In the opinion of the author of the current article, it is possible to distinguish the following modalities in a communicative situation:

- speech and uttering sounds
- paralinguistic means (e.g. characteristics of the voice; intonation; emphasis)
- gaze (existence or absence of eye contact)
- smile
- laughter
- head movements
- facial expressions
- movements of hands and arms
- body posture
- proxemics (location of the interlocutors in the communication space and their position towards each other, including the distance between them)
- communicative touch

- manipulation of objects
- clothing, hairstyle and other appearance-related details
- silence

Undoubtedly, the given list is not conclusive, because a communicative act is continuously influenced by its situation, context and various other factors. One can however roughly generalize that the addresser employs motoric modalities and the addressee the sensory ones. The message is conveyed by one modality (i.e. speech or hand movement) and received by another one (i.e. hearing or vision). Isabella Poggi (2001:1–2) has distinguished two senses of modality as well – motoric (or productive) modality adverts to the body organs that produce the signals, and sensory (or receptive) modality refers to the sensory (receptive) organs of the addressee.

4.3. Linguistic anthropology.

SPEAKING model of Dell Hymes, Michael Agar's MAR and the concept of rich point

Talking is a social activity. The fact that situations affect the meaning of words was first noticed in linguistic anthropology through the works of Polish-born British anthropologist Bronislaw Malinowski (1884–1942). Malinowski claimed that translating is not successful when words of one language are simply replaced with the words of another language; analysis of a language always includes analysing other aspects of a culture (Tenjes et al. 2009:270). Language acquires a significant part of its meanings from the culture where it is used, and particularly from specific communication situations. In order to understand words, one must first comprehend their context or cultural and communicative situation in which they occur. The circumstances in which words are used indicate whether the situation represents asking or commanding, transmission of a message or boasting (Ottenheimer 2006:92).

In the 1960s, American linguistic anthropologist Dell Hymes developed an effective fieldwork methodology, called the ethnography of speaking (also called the ethnography of communication). According to this method, it is of primary importance to ask how actual language is used in everyday situations in different cultures (Ottenheimer 2006:93).

Anthropology has provided us also with the term *community of practice*, which denotes groups of people who interact regularly. The group members establish via communication their own unique ways of joint activities and conventions of language use (Lave and Wenger 1991). Such communities also include families; hence the communication of the mother and the daughter presented in this article can be regarded as interaction of one community of practice. The SPEAKING model of Hymes (Hymes 1972) draws attention to eight aspects of a communicative context, the first letters of which constitute the acronym designating his method: setting/scene (time and place of a speech act, and the psychological setting or the cultural definition of a scene), participants (speaker and audience / discourse roles and social roles), ends (purposes, goals, and outcomes), act

sequence order of the event / what acts (actions) are included and how they are arranged sequentially), key (the mood of the speech event), instrumentalities (speaking, writing, using sign language, etc.), norms (what is suitable to say, what is improper to say, to do, etc.) and genres (lecture, conversation in a family circle, gossip, proverbs, etc.). Consideration of these aspects gives a good overview of the communicative situation and reveals the meaning with which various linguistic means (or nonverbal means) were used. The division of setting/scene includes among other things the expectations of the communicators in respect to progress of the situation, for example the time when an interlocutor speaks or is silent, or when it is proper to intervene and to ask questions. Expectations also constitute a part of other seven divisions, because participants have their own vision of each component of a communicative situation.

From the standpoint of the source material of this article, the division of ends is of most interest. This division represents the causes of starting the communication and the goals which the participants want to achieve, i.e. ends as the outcomes of the situation. Ottenheimer (2006) gives interesting examples when discussing the division of ends. The first one concerns bargaining at a market in Mexico: in some cases the shopper might start bargaining for the purpose of getting the most suitable price, but in several cases bargaining is seen as a way of establishing a pleasant social contact between the shopper and the seller, and determining an actual price is then a secondary consideration (page 99). The setting of the second example (page 109) concerns a pre-exam lecture at a university. The professor hopes that he has managed to impart all planned materials by the end of the lecture and the students will be more knowledgeable. The ends that the students aspire are to ascertain what the professor will ask at the exam and not to deal with the rest of the subject.

Another division of the SPEAKING model that is useful for achieving the purposes of this study and analysing the material, is instrumentalities which refers to channels mediating the communication (speaking, writing, using sign language, signalling with flags, etc.) and language varieties (official language, dialects, etc.) (Ottenheimer 2006).

Michael Agar's concept of *rich point* and respective three-stage analysis MAR are also suitable tools for analysing problematic communication situations. The acronym MAR derives from the first letters of the words mistake, awareness and repair. *Rich point* represents the moment when a problem arises in communication; it is not possible to proceed successfully with the communication without solving the issue. Mistake signifies recognition of the *rich point* – one of the communicators notices that something has gone wrong and communication starts fizzling or moving in the wrong direction. Awareness represents acknowledging the causes of the error, and identifying where and how the expectations of the interlocutors differed. Repair denotes that communicators construe new expectations for themselves; something (of any of the eight divisions) will be altered or replaced. The utilized correction method might be for example changing the speed of talking, switching the tone, etc. (Agar 1994).

5. Presentation of the material, analysis and results

Communication situation 1: presentation of the material

The dialogue took place on 27th September 2009, when the campaigns of municipal elections were being run. Communication involved the subject (signified with the letter G from the word girl) and her mother (signified with the letter M from the word mother). The situation was tightly related to the events which occurred a day before and circumstances that the subject remembered and referred to during the dialogue. The following section first presents the antecedent and then the communication situation under analysis. Conversation took place in Estonian, this article delivers it as a translation into English. The utterances are conveyed in the exact form as they occurred in the conversation; they have not [11] been replaced with any English equivalents for the sake of clarity.

The precedent. The subject attended a birthday party with her mother on 26th September 2009. There they gave the girl's brother his polling card, which had arrived in their mailbox.

Communication situation

1. G drew with her both index fingers a figure in the air which represented a square object, and vocalized: "Böö".
2. M looked inquisitively at G and asked what she wished to say.
3. G formed the sign THERE, by waving to the distance with the right hand, vocalized simultaneously *i-a-i-a* and looked at her mother.
4. M asked if G wanted to say something about the visit to the speech therapist, and added that she did not understand what G was trying to express.
5. G used a gesture which imitated stamping a paper. The left hand with an open palm represented the paper and the right fist hit against the left palm. G looked at her mother.
6. M asked again what she was talking about.
7. G asked M to come to the wall calendar, started pointing with her finger one by one to all Saturdays and Sundays of October, and vocalized at each date: "Öhö?"
G reached 18th October in the calendar and M understood that the conversation concerned elections.
8. M asked: "Would you like to go to the elections?"
9. G nodded and smiled.

Communication situation 1: analysis and results

Communication was initiated by the study subject who started the dialogue with the intention of planning a joint activity with her mother and setting the respective date (function no. 7 of Cascella's taxonomy: *proposing an activity*). The realization of the goal required nine communication rounds and the objective was

obtained by combining various communication modalities. When the complete and recorded episode is analysed as a whole and its result is known, it is possible to identify the meaning of each conversation round and communication modality.

The first stage of the SPEAKING model (setting/scene) investigates the location of the communicative situation and the overall psychological atmosphere of the setting (Hymes 1972). The conversation took place at home. The atmosphere was peaceful; there were no parallel conversations with other family members or guests, because the mother and the daughter (the participants) were alone. The ends or the objectives of the conversation were different for the mother and the daughter; the mother did not understand the reason why the girl started the communication, and the mother's only goal was to clarify the intention of the daughter. The whole conversation reveals relatively low activity of the mother. The following section analyses the act sequence of the speech event in order to determine which communication modalities were used and how. It is also important to pay attention to what exactly gets said and when.

The subject uses in the first utterance a sign which might arbitrarily be called *something square*. This gesture of two hands has a very broad scope of meaning in the subject's lexicon and carries a generalized signification of all square or rectangular objects. Simultaneously with making the gesture, the girl vocalized her brother's nickname Böö, which she has construed of those sounds that she is able to articulate despite verbal dyspraxia. Discourse analysis uses the concept of shared (extra-linguistic) knowledge. In the context of this situation, the shared knowledge of the mother and the daughter includes the fact that a day before they had given the subject's brother his polling card, which was inside a rectangular envelope. In addition, the mother knew the meaning of the used nickname. Therefore, initial addressing of the subject contained already quite a lot of information. The girl was looking for alternative means for imparting her proposition, as she is not able to articulate the word *valimised* ('elections'). As the episode had a positive end result, it is possible to identify retrospectively the relations used in the attempt of transferring the meaning.

The rich point (the problem) occurred immediately in the first communication round, because the subject does not speak and cannot express herself clearly. The second stage of MAR – awareness – was present already in the second (i.e. the mother's first) speech round. As already mentioned, the mother was relatively passive during the whole episode: though her speech rounds 2, 4 and 6 express non-understanding, she makes her effort to solve the problem only in the fourth round when she suggests a solution by asking if the subject wishes to talk about speech therapy (the girl uses the vocalization *i-a-i-a* to imitate vocal exercises practiced at the speech therapist). However, it turns out that the assumption is wrong. The misunderstanding expressed by the mother directed the initiator of the conversation to 'paraphrase' her round by using nonverbal means. The episode reveals the subject's consistency in leading the conversation towards the target – the girl corrects her problematic round until she sees that the recipient of the message has understood her. According to MAR, the third stage (repair) occurred

even three times (conversation rounds 3, 5 and 7), but only the last correction proved to be fruitful.

The subject's vocalizations emerge in the first, third and seventh conversation round (the whole conversation includes five rounds of the subject and four rounds of the mother). In the third round the girl imitates the vocal exercises practiced at the speech therapist. The mother's next statement reveals her assumption that the subject wishes to transfer a message in relation to speech therapy: the diary notes confirm that the mother and the daughter attended speech therapy every Monday over several years. The girl starts 'talking' about speech therapy sessions, because the rehabilitation centre where the therapy took place and the polling division are located in the same neighbourhood, and they always used the same route to go to the speech therapist. Hence, the third utterance also reveals the subject's ability to create relations between events and objects of real life: it is clear that the subject knows which establishments are located in the same area, and that she has acknowledged these spatial relationships. In addition, the girl is able to apply this knowledge for making herself understandable.

The vocalization of the seventh utterance is *Öhö* – a self-created meaningful combination of syllables, which the subject always expresses with an interrogative intonation. The utterance depicts an interesting polysemic speech unit, which may represent any question, depending on the situation and the conversation topic. The speech unit is used in this dialogue with a repetitive movement: the girl taps on all weekend dates of October, until she reaches 18th October, which in 2009 was the voting day of municipal elections. The author of the article considered an alternative option of classifying this repetitive movement into the category of indicative gestures, but it is more likely that the subject touches an artefact. The communicator transferred the meaning with the latter modality, as this was most specific and visualized the election day for the recipient.

Before reaching the final solution, the girl tried to transfer the meaning with one gesture of two hands (round 5). The movement was an iconic gesture illustrating stamping a ballot paper – the left hand with an open palm represented the paper and the right fist depicted a stamp. The fact that the gesture mimicked stamping a ballot paper was yet revealed in the seventh round and after utilization of the artefact (the calendar). According to David McNeill (1992), there is a clear conformity between the formal characteristics (hand shape, movement, etc.) and the signified object (the referent) of iconic gestures, which is obvious also in the given example.

Communication situation 2: presentation of the material

The subject lives in a village accommodating young people with learning disabilities. She visits home every weekend and calls her mother in the evenings. The following phone conversation took place on a Monday (7th October 2013). The girl's intention was to remind her mother that a garbage truck would come on Wednesday to empty the dustbin, and therefore it was necessary to wheel the dustbin to the gate. The loudspeaker of the phone was used during the call.

1. G made a rattling sound, which is also known from Estonian baby-talk, and said: "Aupo".
TRANSLATION: G is telling something about a car.
2. M said that G is aware that their family does not have a car.
3. G repeated her first conversation round.
4. M asked what car she was talking about.
Activities taking place between conversation rounds: the girl gave her phone to the occupational therapist (OT) who also lives and works in the village. The girl then took a dustbin from the corner of the room and lifted it up.
5. The occupational therapist asked the subject why she was swinging that dirty dustbin.
The mother heard that they were talking about a dustbin and understood what the girl was trying to tell her.
6. The mother asked OT if G wanted to tell her that the dustbin had to be taken to the gate.
7. G nodded.
8. OT gave an affirmative reply to the question the mother asked at round 6.

Communication situation 2: analysis and results

The setting of the second situation differs from the first conversation in several aspects; therefore it is useful to include in the analysis another division of the SPEAKING model, i.e. instrumentalities (see 4.3.). A conversation mediated with a regular phone (as opposed to video phone or Skype) complicates significantly a communication where various nonverbal modalities are used, as such a communication is much easier when it takes place face to face. It is understandable because the receiver is unable to acquire information that is created with movements and requires the use of the visual channel. However, this episode reached a solution as well.

Communication was again started by the study subject who called her mother to remind her that it was necessary to wheel the dustbin to the gate (this was her goal or ends of the communication). According to the taxonomy of Cascella, this episode refers to function no. 7 (*proposing an activity*), just like the previous example. The phone conversation may as well reflect function no. 11 (*giving orders to the staff*, or *giving orders to the family* when modified for compliance with the given situation). During the phone call, the subject raised various conversation topics for mutual discussion. It then recurred to the girl that the garbage truck would come on Wednesday of the week when the conversation was taking place. It is known from the diary notes that the subject reminds her family members of specific routine obligations which the rest of the family tends to forget. For example, she indicates to food products or other commodities that are needed at home when the family goes shopping. She also remembers casual obligations that are related to specific days, and tries to remind the family of these tasks even when she is away from home. The ends of this speech event for the

mother are similar to the previous situation – understanding what her daughter is trying to tell her. It is important to her to preserve the functionality of the communication and maintain a good relationship.

Three processes of memory can be differentiated: encoding, storage and retrieval of information (Tulving 1995:843). The manifestation of one operational memory process (retrieval) in the facts presented above confirms that the subject possesses memory as a functional cognitive ability.

In case of the organized municipal waste transport, the container must be taken to the gate by the right time as a garbage truck will come to collect it. The girl tries to speak about garbage collection in her first round, by mentioning the respective vehicle. She uses two modalities: the word *auto* ('car'), in which one specific plosive consonant (*t*) has been replaced with another (*p*) that is easier to articulate for her, and the utterance *prr* that marks the sound of a vehicle. This is a metonymic transmission in which the signifier of an activity is replaced with the means used for performing the activity. The lexicon of the subject's communication means (a list that has been compiled by the researcher and is organized by communication modalities) has revealed that the majority of the subject's means of expression are polysemic. Economical use of language is a vital coping mechanism for patients with dyspraxia, because their articulation ability is extremely limited. In the most severe cases they must manage with a few single syllables which signify almost everything that they wish to express. For example, Brookes (2007:62) describes a patient whose only articulation was the syllable *da*. Patients with dyspraxia have developed polysemy to an extreme extent, all lexical items of their speech are loaded with numerous interrelated meanings, and therefore with the logic of creating relations may differ from common reasoning.

At the same time, polysemy is a very common phenomenon also in the ordinary language. Ronald Langacker, one of the most famous representatives of cognitive linguistics, has stated (2008:37): "A lexical item used with any frequency is almost invariably polysemous: it has multiple, related meanings that have all been conventionalized to some degree". *Aupo* from the subject's lexicon represents one example of polysemy utilized by her, as the word enables to signify various activities in addition to several vehicles. In the given communication situation the word refers to the activity of collecting garbage.

The mother's reply (2) verifies that she is listening, but does not understand the message. It is clear from the second round that the rich point has been detected and acknowledged; the following rounds are used for solving the problem collectively. Non-understanding forces the communicator first to repeat her first round (3) and then to seek for alternative means (refer to activities taking place between conversation rounds). The subject uses the present occupational therapist as a mediator and translator, who verbalizes her nonverbal activity and transfers the message to the mother. When the girl passed the phone on to the occupational therapist, she was unable to express what kind of help she needed, and hence the 'translator' was actually not aware what she had to 'translate'. The mother understands the message, because she hears what the third party says to subject (5) – a

sentence which was intended to be a prohibition, transmitted the description of the girl's activity and led to mutual understanding. Manipulation with an object (lifting a dustbin) was this time the resolving modality that enabled to achieve the solution.

Communication situation 3: presentation of the material

The last situation represents an example of a communicative episode, which did not contain a rich point or any misunderstandings. The conversation took place on 12th October 2013, on the first floor of a department store, in front of a grocery store after coming out of it. The setting was therefore a public place, which might have involved several disturbing factors (e.g. background disturbance and noise).

1. G vocalized the sound *u* with a rising intonation and used a simultaneous hand gesture – the arm bent at the elbow moved up, the fingers were first in a fist and then opened while moving the hand.
2. The mother said that they would buy the flowers from the market.
3. G pointed with the hand to one front door of the shopping centre, and then to another.
4. M indicated towards one of the doors that the girl had pointed to.
5. G vocalized *aa*.

The mother and the daughter leave the department store and go to the market to buy flowers.

Communication situation 3: analysis and results

It can be assumed that the conversation was smooth and did not involve complications, because it took place in clearly defined routine circumstances – both communicators had an overview of the situation and the activity had specific sub-activities. The mother and the daughter were going to a birthday party; they had bought the cake from the shop, but did not yet have the flowers. In the first round the girl uses the interrogative word *kus* ('where'), which has shortened in her lexicon to one vowel *u*. In parallel to the vocalization, she imitates with her hand a blossoming flower. The meaning of this gesture is also known from the list of her communication modalities. Hence, the girl used the combination of a movement and a meaningful utterance. The mother did not encounter any problems in comprehending the meaning – she understood that the daughter was asking from where they were going to buy the flowers for the birthday. The mother's reply (2) indicates that the plan was to buy the flowers from the market. There are several markets close to this particular shopping centre – the open market, which is a bit closer, and the market hall, which is a bit further away, but was on their way – and therefore the girl wanted to specify which front door of the department store they would be using. She asked this question in the third round, by pointing first to one door of the shopping centre, and then to another. The communication modality of this round was an indicative gesture. This time the mother does not verbalize the meaning of what the girl expressed with the hand movement, because it is not necessary (she would use words for verifying that she understood the question of

her dialogue partner correctly). Instead, she uses the same modality for replying. The subject's vocalization *aa* in the fifth round allows to interpret the situation as an expression of comprehending (*ahhaa* ('aha') in the ordinary language), because the girl's reply is followed by the activity, which was agreed upon in the dialogue: they leave the shopping centre and go to buy flowers.

6. Discussion and conclusions

The research question of the article was to determine the communication modalities which are necessary for achieving the goals of a dialogue. The study allowed to detect the means which enable the subject with impaired speech to express herself and to make herself understood. The observed communication situations involved various hand movements (including indicative gestures), head movements (nodding), facial expressions, vocalizations and manipulation with objects (the wall calendar in the first episode and the dustbin in the second dialogue). In case of problematic conversations (examples 1 and 2), the positive end result was obtained by incorporating a necessary object into the conversation and by showing it to the communication partner(s). It is known from the subject's communication lexicon that the majority of her modalities are polysemic and their exact meaning is revealed in a specific communicative situation. In the observed cases, the conversation partner(s) did not know at the beginning of the dialogue on which topic the subject wanted to communicate, and therefore the meaning had to be transmitted with a more unambiguous mean. The third situation (going to a birthday party) consisted of several activities (buying a present from the shop, discussion that concerned buying the flowers, leaving the shopping centre in order to go to the market and the bus station), which were routine for the participants as they had performed these activities in the same sequence several times before. The mother had reasons for assuming that the daughter wished to communicate on a subject that somehow regarded their ongoing joint activity, and therefore it was easy for her to recognize the hand movement signifying a flower. The indicative gesture that followed was also unequivocal and clearly marked spatial relations.

The study subject understands when she is given a signal of occurrence of a rich point. She comprehends when some of her means of expression are not understandable, and she is able to ask for translation and vocalization of intentions. She is capable of deciding whether she is being translated with sufficient accuracy. The subject's activity in repetitive corrections of a problematic round demonstrates her consistency in directing the conversation in a direction which would clarify the meaning.

The situations analysed under the scope of this article indicate that the subject is eager to assert herself by making her interlocutors (the mother in the first situation, the occupational therapist in the second) to express something that she is not able to formulate herself. At the end of the first example, the mother phrases with her question "Would you like to go to the elections?" the girl's wish that

inspired her to start the dialogue. The subject knows now that she has been understood, and signals it by nodding and smiling. The circumstances of the second example are somewhat different. In this episode the occupational therapist plays the role of a translator: the subject is unable to show her mother a dustbin during the phone call, and hence she directs the dialogue with her activity so that the therapist finally vocalizes the girl's message. The meaning was construed in collaboration here as well; the direct modality of the girl was manipulation with an object, while at the same time she managed to utilize her interlocutor's ability to transfer verbally those mutual thoughts which emerged during the conversation. The creation of meaning through joint activity is successful when the interlocutor of the subject is motivated to listen and is aware of the communication modalities of the girl. If necessary, the interlocutor may ask the subject to use a specific object, the utilization of which would enable her to transfer the desired meaning.

Ethical aspects and data protection

In accordance with clause 2.2 of the instructions of the Data Protection Inspectorate on processing personal data within the scope of scientific research, it is not obligatory to acquire an agreement for utilization of impersonal data, a permit from the Data Protection Inspectorate, nor registration of processing delicate personal data (www.aki.ee). However, the author of the article applied to the guardian of the subject (who is also the mother of the individual) for the written permit and received it in August 2007 before her research started.

Human research was necessary for exploring and describing communicative capacity of a person with the mosaic form of Patau syndrome. In the current study, participant observation was used as one of the most relevant methods of material collection in discourse studies. The author ensures anonymity of the subject and will not reveal or publish her name. Source materials will be kept in a way which restricts the access of third parties.

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References

- Agar, Michael (1994) *Language shock: understanding the culture of conversation*. New York: William Morrow.
- Allwood, Jens (2003) "Cooperation and flexibility in multimodal communication". In *Gestures: meaning and use*. (Proceedings), 133–141. Monica Rector, Isabella Poggi, and Nadine Trigo, eds. Porto: Universidade Fernando Pessoa.

- Aypar, Ebru, M., Selman Yildirim, Ahmet Sert, Ilhan Ciftci, and Dursun Odabas (2011) "A girl with metopic synostosis and trisomy 13 mosaicism: case report and review of the literature". *American Journal of Medical Genetics*, Part A 155, 638–641. Available at <wileyonlinelibrary.com>. Accessed on 07.07.2011.
- Balconi, Michela, ed. (2010) *Neuropsychology of communication*. Milan: Springer Verlag Italia.
- Balconi, Michela (2010) "Biological basis of linguistic and communicative systems: from neuro-linguistics to neuropragmatics". In *Neuropsychology of communication*, 3–27. Michela Balconi, ed. Milan: Springer Verlag Italia.
- Baty, B. J., L. B. Jorde, B. L. Blackburn, and J. C. Carey (1994) "Natural history of trisomy 18 and trisomy 13: II. Psychomotor development". *American Journal of Medical Genetics* 49, 2, 189–194.
- Brookes, Geoff (2007) *Dyspraxia*. London and New York: Continuum International Publishing.
- Brown, Gillian and George Yule (1983) *Discourse analysis*. Cambridge: Cambridge University Press.
- Cascella, W. Paul (2005) "Expressive Communication strengths of adults with severe to profound intellectual disabilities as reported by group home staff". *Communication Disorders Quarterly* 45, 1, 156–163.
- Cienki, Alan (2010) "Language as a variably multimodal phenomenon: keynote lecture abstract". In *Gesture: evolution, brain and linguistic structures*. 4th Conference of the International Society for Gestures Studies (ISGS), July 25–30, 2010. Abstracts, 37. Frankfurt/Oder: European University Viadrina.
- Dewey, Deborah, E. A. Roy, P. A. Square-Storer, and D. Hayden (1988) "Limb and oral praxic abilities of children with verbal sequencing deficits". *Developmental Medicine and Child Neurology* 30, 6, 743–751.
- van Dijk, Teun Adrianus (1997) "The study of discourse". In *Discourse as structure and process. Discourse studies: a multidisciplinary introduction*, 1–34. Teun A. van Dijk, ed. London: SAGE Publications.
- van Dijk, Teun Adrianus (2005) *Ideoloogia: multidistsiplinaarne käsitus*. [Ideology: multidisciplinary approach.] Tartu: Tartu Ülikooli Kirjastus.
- Ferguson, Alison (1994) "The influence of aphasia, familiarity and activity on conversational repair". *Aphasiology* 8, 143–157.
- Field, John (2004) *Psycholinguistics: the key concepts*. London and New York: Routledge.
- Goldstein, Henri and Kim Gjerum Nielsen (1988) "Rates and survival of individuals with trisomy 13 and 18". *Clinical Genetics* 34, 366–372.
- Goodwin, Charles (1995) "Co-constructing meaning in conversations with an aphasic man". *Research on Language and Social Interaction* 28, 3, 233–260.
- Goodwin, Charles, ed. (2003) *Conversation and brain damage*. Oxford: Oxford University Press.
- Goodwin, Charles (2003) "Introduction". In *Conversation and brain damage*, 3–20. Charles Goodwin, ed. Oxford: Oxford University Press.
- Griffith, Christopher B., Gail H. Vance, and David D. Weaver (2009) "Phenotypic variability in trisomy 13 mosaicism: two new patients and literature review". *American Journal of Medical Genetics*, Part A, 149A, 6, 1346–1358.
- Hymes, Dell H. (1972) "On communicative competence". In *Sociolinguistics: selected readings*, 269–293. J. B. Pride and J. Holmes, eds. Harmondsworth, UK: Penguin Books.
- Jokinen, Kristiina, Silvi Tenjes, and Ingrid Rummo (2013). "Embodied interaction and semiotic categorization: communicative gestures of a girl with Patau syndrome". In *The construal of spatial meaning: windows into conceptual space*, 74–97. Carita Paradis, Jean Hudson and Ulf Magnusson, eds. (Explorations in Language and Space, 7.) Oxford: Oxford University Press.
- Klippi, Anu (2003) "Collaborating in Aphasic Group Conversation. Striving for Mutual Understanding". In *Conversation and brain damage*, 117–143. Charles Goodwin, ed. Oxford: Oxford University Press.
- Kress, Gunther (2004) "Reading images: multimodality, representation and new media". In *IIID Conference*. Expert Forum for Knowledge Presentation: Preparing for the Future of

- Knowledge Representation. Available online at <<http://www.knowledgerepresentation.org/BuildingTheFuture/Kress2/Kress2.html>>. Accessed at 19.07. 2011.
- Kress, Gunther (2013) *Multimodality: a social semiotic approach to contemporary communication*. USA and Canada: Routledge.
- Laakso, Minna (1992) "Interactional features of aphasia therapy conversation". In *Studies in Logopedics and Phonetics* 3, 69–90. R. Aulanko and M. Lehtihalmes, eds. Publications of the Department of Phonetics. University of Helsinki, Series B: Phonetics, Logopedics and Speech Communication 4.
- Laakso, Minna (2005) "Afaattisten henkilöiden vuorovaikutuksen keskusteluanalyttinen tutkimus". *Puhe ja kieli* 25, 2, 53–64.
- Langacker, Ronald (2008) *Cognitive grammar: a basic introduction*. Oxford: Oxford University Press.
- Lave, Jean and Etienne Wenger (1991) *Situated learning: legitimate peripheral participation*. Cambridge: Cambridge University Press.
- MacCabe, Colin (1979) "On discourse". *Economy and Society* 8, 4, 279–307.
- Macdonell, Diane (1986) *Theories of discourse: an introduction*. Oxford: Blackwell.
- Magenis, R. Ellen, Frederic Hecht, and Samuel Milham (1968) "Trisomy 13 (D1) syndrome: Studies on parental age, sex ratio, and survival". *The Journal of Pediatrics* 73, 2, 222–228.
- McNeill, David (1992) *Hand and mind: what gestures reveal about thought*. Chicago: University of Chicago Press.
- Morgan, Angela T. and Adam P. Vogel (2009) "A Cochrane review of treatment for childhood apraxia of speech". *European Journal of Physical and Rehabilitation Medicine* 45, 1, 103–110.
- Müller, Nicole, Jacqueline A. Guendouzi, and Brent Wilson (2008) "Discourse analysis and communication impairment". In *The handbook of clinical linguistics*, 3–31. Martin J. Ball, Michael R. Perkins, Nicole Müller, and Sara Howard, eds. Blackwell Publishing Ltd.
- Ottenheimer, Harriet Joseph (2006) *The anthropology of language: an introduction to linguistic anthropology*. Thomson Wadworth.
- Patau, Klaus, David W. Smith, Eeva Therman, Stanley L. Inhorn, and Hans P. Wagner (1960) "Multiple congenital anomaly caused by an extra autosome". *The Lancet* 1, 790–793.
- Perkins, Michael (2007) *Pragmatic impairment*. Cambridge, UK: Cambridge University Press.
- Poggi, Isabella (2001) "Towards the alphabet and the lexicon of gesture, gaze and touch". In *Intelligent virtual agents*. Third International Workshop, IV A. Madrid, Spain, September 10–11, 2001. Proceedings. Series: Lecture Notes in Computer Science. A. de Antonio, R. Aylett and D. Ballin, eds. Berlin, Heidelberg: Springer, Vol. 2190/2001.B. Available online at <www.semioticon.com/virtuals/multimodality/geybou41.pdf>. Accessed on 05.06. 2013.
- Rummo, Ingrid and Silvi Tenjes (2011) "Aja mõistestamine Patau sündroomiga subjekti suhtluses". [Category of time in the subject with the Patau syndrome.] *Estonian Papers in Applied Linguistics* 7, 231–247.
- Schegloff, Emanuel A., Gail Jefferson. and Harvey Sacks (1977) "The preference for self-correction in the organisation of repair in conversation". *Language* 52, 2, 361–382.
- Schiffirin, Deborah (2007) *Approaches to discourse*. Blackwell Publishing Ltd.
- Sorjonen, Marja-Leena, Marja-Liisa Helasvuo, and Minna Laakso (2004) "Searching for words: syntactic and sequential construction of word search in conversations of Finnish speakers with aphasia". *Research on Language and Social Interaction* 37, 1, 1–37.
- Tang, Hao-Wei, Su-Fen Liao, and Jyun-Sian Li (2013) "Development of patients with 47,XX, +13/45, X mosaics: case report and review of the literature". *European Journal of Pediatrics* 5, 1–5.
- Tenjes, Silvi, Ingrid Rummo and Kristiina Praakli (2009) "Kommunikatiivse situatsiooni dünaamiline dimensioon". [Dynamic dimension of a communicative situation.] *Estonian Papers in Applied Linguistics* 5, 267–285.
- Tulving, Endel (1995) "Organization of memory: quo vadis?". In *The cognitive neurosciences*, 839–847. M. S. Gazzaniga, ed. Cambridge, MA: MIT Press.

- Wilkinson, Ray (1995) "Aphasia: conversation analysis of a non-fluent aphasic person". In *Case studies in clinical linguistics*, 271–292. M. Perkins and S. Howard, eds. London: Whurr.
- Õunap, Katrin (2006) *Conclusion of the consultation of a geneticist from 28.12.2006*. Manuscript. Tartu.
- Žilina, O., T. Reimand, P. Zjablovskaja, K. Männik, M. Männamaa, A. Traat, H. Puusepp-Benazzouz, A. Kurg, and K. Õunap (2012) "Maternally and paternally inherited deletion of 7q31 involving the FOXP2 gene in two families". *American Journal of Medical Genetics, Part A*, 158A, 1, 254–256. Available online at <<http://www.ncbi.nlm.nih.gov/pubmed/22105961>>. Accessed on 01.05.2013.

Internet resources

- Homepage of the University of Helsinki. Available online at <http://www.helsinki.fi/speechsciences/research/logopedics/communication_disorders.htm>. Accessed on 21.12.2013.
- Homepage of National Institute of Deafness and Other Communication Disorders (NIDCD). Available online at <<http://www.nidcd.nih.gov>>. Accessed on 12.06.2012.
- Homepage of Estonian Data Protection Inspectorate. Available online at <<http://www.aki.ee>>. Accessed on 07.01.2013.