SPECIFIC LANGUAGE IMPAIRMENT:
ADAPTATION OF A SCREENING TEST FOR LITHUANIAN

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INTRODUCTION

School children, especially in higher grades, are expected to use and understand language in a sophisticated manner as they listen, speak, read, and write throughout the school day and beyond. To perform these tasks successfully, adolescents must have a sufficient amount of relevant background knowledge and the ability to use and understand spoken and written language at an advanced level. Given these high expectations in schools today, it is not surprising to learn that when language impairments persist into adolescence, they frequently have a negative impact on academic performance, ultimately limiting an individual's vocational options (Nippold and Mansfield 2009). By 5 years of age, most children have acquired the ability to produce grammatically well-formed sentences containing all types of subordinate clauses including nominal, relative and adverbial (Diessel 2004). Despite these impressive attainments, the ability to express increasingly abstract ideas in longer sentences containing multiple and embedded subordinate clauses continues to develop throughout the school-age years, adolescence, and into adulthood (Berman 2004).

However, low literacy and educational achievement represent problems for many European countries, which further cause numerous social problems such as poor social adaptation and integration, behavioural problems, poor academic achievements and thus poor career possibilities (such problems are a significant burden on European education systems and are a reason of high annual societal costs). In other words, language impairments have a significant impact on children's success and well-being in all social and academic daily activities. To increase the success of impaired children, they should receive adequate help at the earliest possible stage from both professionals and non-professionals in teaching and home environments.

The area which exhibited much research in the past years is SLI (Specific Language Impairment). The term SLI refers to children who show difficulties in different aspects of language: lexical retrieval, phonology, morphology, syntax, pragmatics and

semantics (Leonard 1997; van der Lely 1996; van der Lely and Battell 2003). Children with specific language impairment exhibit clinically significant disruption of receptive and/or expressive language in the absence of identifiable causal factors such as hearing loss, mental retardation, brain injury or psychological disorder (Leonard 1997). There has been a long-standing interest in understanding the core deficits that relate to these language-learning difficulties and in determining which methods can be used to remediate the language impairments. Many children with SLI exhibit a disruption in overall rate of linguistic learning that hinders progress in language acquisition, particularly grammatical morphology, so that SLI is broadly modelled as a general weakness in the ability to acquire new linguistic forms (Leonard 1997; Leonard *et al.* 2004).

Sufficient data have been collected and described in the existing literature that points to those areas that are typically problematic for impaired children cross-linguistically and cross-culturally. Although children with SLI experience difficulties in a wide range of language areas, morphosyntax appears to be a particularly serious problem. This difficulty is most clearly seen in the use of tense and agreement morphemes by children with SLI. Relative to younger typically developing children with similar mean lengths of utterance (MLU) as well as typically developing same-age peers, children with SLI produce these morphemes with significantly lower percentages in obligatory contexts. In English, these especially problematic morphemes include copula and auxiliary forms of *be* (*is, are, am, was, were*), third person singular *-s*, past tense *-ed* and auxiliary forms of *do* (*do, does, did*) (Pawlovska *et al*. 2008).

A subgroup of disorders related to specific syntactic impairment and otherwise normal language function is termed 'Grammatical SLI' or 'Syntactic SLI' (Levy and Friedmann 2009; Friedmann and Novogrodsky 2004; van der Lely 1996; van der Lely and Christian 2000). Studies of this SLI subgroup revealed difficulty in understanding an array of semantically reversible structures. The comprehension of English passives was reported to be impaired (van der Lely 1996; van der Lely and Harris 1990). Relative clauses also form a considerable comprehension difficulty (Friedmann and Novogrodsky 2004; Stavrakaki 2001), as do referential object *Wh*-questions, topicalization sentences, and sentences with dative shift (Ebbels and van der Lely 2001; van der Lely and Harris 1990).

According to the results of the National Institute of Deafness and Other Communication Disorders (NIDCD), children with SLI constitute about 5% of preschoolers (Weiss 2001: 14). Other researchers have observed even higher rates of SLI prevalence ranging from 7.4% up to 12% of the population (for an overview, see Weiss 2001). The findings of NIDCD also demonstrate that there exists a gender bias for SLI; there are more males fitting the criteria of SLI than females at a 2:1 margin (Weiss 2001: 14). Such findings suggest that, because of its prevalence, SLI poses serious problems that can be solved only by adequate diagnosis and intervention. There have been

numerous studies examining language growth in children diagnosed with specific language impairment, and most of the studies indicate that symptoms of SLI can be improved with intervention (Camarata *et al.* 2009; Ebbels and van der Lely 2001).

The experience of most speech therapists in Lithuania shows that the education system of the country (as well as some other European countries) currently does not adequately serve the needs of children with language impairments. The resources that are available to clinicians are scarce and those that exist are often of poor quality and low efficacy. Therapists in both kindergartens and schools typically use their own unpublished materials that can be developed into a systematic, comprehensive, maximally universal and efficient resource package that would be equally easily available for professionals and non-professionals.

The diagnosis of speech impairments in Lithuania is carried out by using a non-standardized test (Gaulienė *et al.* 2000), which involves numerous tasks with pictures to check all the different areas of language competence: morphology, lexis, phonology, sound articulation, and narration. The tasks aim to evaluate the child's language production and perception. This diagnostic test is very exhaustive and detailed, but its applicability has certain practical drawbacks. Since it is too long to be performed in full, the procedure is commonly shortened, but such modifications are largely a personal speech therapist's decision. Therefore, the existing Lithuanian diagnostic test involves a high degree of personal judgment and requires a lot of professional experience and qualifications to interpret the results of the test. Consequently, such a test can be used only by highly experienced speech therapists, but cannot be employed by non-professionals (in contrast to the GAPS test, which will be discussed later).

The terminology that is used in the tradition of Lithuanian speech therapy also posits some problems since the terms that are used to refer to language impairment differ from the terminology used in most of the literature discussed above. The term SLI is not used in Lithuania; instead, language impairment is referred to by using the terms 'slight/ average/ severe language impairment'. The terms for different subtypes of LI suggest that there exists a continuum of linguistic disorders in terms of the severity of those disorders. Delineations of different subtypes of SLI were also suggested in some early studies of SLI in other countries as well (e.g. Rapin and Allen 1987; Rapin 1996; Conti-Ramsden *et al.* 1997); however, more recent investigations argue against subtyping since subgroup characteristics of SLI lack stability and are too dynamic to be clearly delineated.

In the Lithuanian classification of LI, the indications of different degrees of impairment overlap to a certain extent with the indications of SLI. Table 1 presents the symptoms of slight, average and severe language impairment as distinguished by Gaulienė *et al.* (2000); these symptoms are compared to those of SLI (mainly for English but also other languages).

Table 1. Terminology in Lithuanian (Gaulienė *et al.* 2000) compared to the description of SLI (Weiss 2001, Reed 2005)

	LI Symptoms distinguished in Lithuania	SLI symptoms
Severe LI	– absence of narration skills – highly limited vocabulary (use of child-specific vocabulary only) – highly reduced morphology, no grammatical links between words	– deficits in language comprehension and production – slower acquisition of first words and new words – a more limited repertoire of verbs – slower acquisition of word combinations – restricted complexity of syntactic structure – problems with tense and agreement morphemes (esp. problematic morphemes are different forms of be, 3rd person singular -s, past tense -ed and auxiliary forms of do) – delays in learning the sound system – deficits in pragmatic development (e.g. limited ability to enter into ongoing conversations)
Average LI	– lack of narration skills, but there is an ability to answer questions with individual words or phrases – ability to name some objects and actions in pictures – numerous ungrammaticalities (ability to use only some simple grammatical forms, e.g. singular vs. plural nouns) – numerous morphosyntactic errors – problems in structuring sounds and syllables if the word is longer than 2 syllables – limited sentence production (usu. sentences consist of subject and verb only) – lisping – deficits in hearing reception	
Slight LI	– some basics of narration (can produce a story but it is not very elaborate) – numerous ungrammaticalities – problems with difficult sounds and sound clusters – articulation problems – deficits in hearing perception – sometimes articulation and hearing reception are more advanced than grammatical and lexical skills; therefore, testing may reveal no phonological problems.	

As can be seen in Table 1, the Lithuanian list of the possible indications of LI contains largely the same aspects as the list of SLI symptoms, but those indications are rather abstract; besides, the continuum of these indications is not delineated in any objective way, which decreases the effectiveness of diagnosis. One major difference between the Lithuanian degrees of LI and the definition of SLI is that the latter excludes hearing deficits, lisping, stuttering and other significant phonological disorders. In short, SLI is marked by language problems being manifested in some or all language areas; in this respect the definition of SLI is close to the Lithuanian definition of linguistic impairments, only that the SLI definition usually does not distinguish subtypes and excludes certain phonological disorders.

As was mentioned above, both effective intervention materials as well as diagnostic tests are very scarce in Lithuania. For that reason, in the present study our primary aims were to adapt the diagnostic test GAPS (van der Lely *et al*. 2007) and to carry out its pilot testing. Adaptation of such a test is of special importance in Lithuania,

where speech therapists have no uniform testing materials that could be applied to assess whether the child has appropriate linguistic knowledge at the pre-school age.

The GAPS test is a screening test quick and easy to use produced for assessing the grammatical abilities and key pre-reading skills of children between the ages of 3;6 to 6;6. It is a repetition test where the child has to repeat sentences and non-words uttered by the tester to the character named Bik (see Appendix 1 for the picture of the character). Bik is an alien and can understand only children but not adults; therefore, the child has to repeat the adult's utterances to him.

GAPS was developed and introduced in the UK by Professor Heather van der Lely and her colleagues. Her primary aim was to produce a test that could be used by professionals and non-professionals to test all children in the UK prior to or when they enter school to ensure that any child with language weaknesses or impairment is identified. GAPS tests two main areas of linguistic competence:

(1) Morphology: The most difficult grammatical areas are tested, e.g. in English questions, tense formation, and passive are tested: *The dog **is licked** by the cat.*

(2) Phonology: to test phonology, invented words, or **non-words**, with difficult consonant clusters are used, e.g. *tobilf, dremp, padrepper* in English. Such challenging consonant clusters are highly language specific.

What is important is that phonology problems are not just a feature of SLI or some articulation disorders, but may also be an early indicator of dyslexia. As van der Lely observes, 'some children with language impairment or dyslexia may not be able to structure sound combinations to correctly make words. This can cause problems with spelling and reading words. This difficulty is a key feature of dyslexia and can often be found in children with language impairment' (http://www.dldcn.com/phonology.html).

1. DATA AND PARTICIPANTS

This study is a part of the project *Crosslinguistic Language Diagnosis (CLAD)* (European Commission LLP/ K 1), which aims to experimentally test morphosyntactic and morphonological abilities and semantic-pragmatic abilities in typically developing children and children with SLI or Dyslexia. The project aims to test these aspects cross-linguistically by using traditional behaviour and new electrophysiological techniques. It mostly focuses on two key areas of linguistic performance: morphosyntax/ morphonology and pragmatics/semantics. In both areas the goal is to identify clinical markers for SLI.

For the present study 90 Lithuanian children, aged 5;0-7;3, 41 girls and 49 boys

were tested in 3 kindergartens in Kaunas, Lithuania (see Table 2). All the families of the tested children are mainly middle-class, with secondary or higher education. One kindergarten is a regular kindergarten for typically developing (TD) children; all the 75 children attending it were tested there (except those who have non-verbal deficits). In the other two kindergartens, which specialize in helping children with special needs (including language disorders), 15 children were selected for this investigation; 13 of them were diagnosed as LI children by speech therapists.

Table 2. Age of test participants

Age range	Number of children
7;0-7;7	11
6;11-6;7	31
6;6-6;0	13
5;11-5;6	15
5;5-5;0	20
Total:	90

The regular kindergarten for TD children was taken as a sample population; by using the data collected in this kindergarten, the results were standardized and used for interpreting the data from the specialised kindergartens. Most of the language impaired children in the specialized kindergartens are diagnosed as having (slight/ average / severe) phonological or general language impairment. As was mentioned above, the term 'SLI' is not applied in Lithuanian speech pathology. Those children that have these diagnoses but have no other disorders are expected to have what is called SLI.

In the present study, the main selection criteria for identifying SLI children are as follows:

1) no attention deficit (ADHD)
2) no autism
3) no emotional / behavioural problem that would interfere with language learning
4) hearing thresholds fall within normal limits
5) at least one grammar test failed
6) fall within normal limits on the non-verbal IQ test (Raven's test in this study)
7) use a standardized language test where available
8) children with 2 SD in one test or 1.5 SD in 2 or more tests are included
9) avoid bilingual children; native language has to be the home language

The criteria above show that for identifying SLI children, it was important to ascertain that children under investigation have no non-linguistic disorders (such as attention deficit or autism). Therefore, we checked the diagnoses of all the tested children with their speech therapists. To make sure that the language deficits of linguistically

impaired children are not a result of bilingualism, we focused on monolingual children. In order to determine which children fall into the risk group, some statistical measures were applied when interpreting the number of correct answers.

2. RESULTS

As has been mentioned, the GAPS test consists of two parts that aim to evaluate children's competence in two broad areas (phonology and morphology). When adapting the test, the English sentences and non-words were translated and adapted by taking into account the results obtained from our longitudinal data (see Woijcik 2000; Savickienė 2003), which were used for identifying possibly problematic morphological and phonological aspects. The invented words that were developed for the test are not actual words of the Lithuanian language but contain typical consonant clusters that appear in real Lithuanian words and can cause difficulties to children.

The results of the present study will be discussed below by focusing on the two subtests individually. First, the results of the morphology section will be analysed and interpreted in order to distinguish the items that pose most problems to children and to the adequacy of the test itself; then the test of non-word repetition will be discussed to see which consonant clusters are most problematic to TD and LI children. In the discussion of the results of both test parts, we will try to answer the question whether the adapted GAPS test can be treated as an adequate diagnostic tool for diagnosing SLI children and which test items can be used as indicators of SLI in Lithuanian. Since the adaptability of some items in Lithuanian is highly questionable, such problematic instances of the test will be highlighted and discussed separately with regard to each individual area. Finally, we will try to determine which children can be identified as SLI children on the basis of the results of the present study.

2.1. RESULTS OF TESTING MORPHOLOGY

The morphology part of the GAPS test includes 11 sentences (excluding fillers) that children have to repeat one by one; all the test sentences in English and Lithuanian are provided in Table 3. The table also provides the number of correct answers for each sentence counted in two different ways, which will be explained in greater detail below. The sentences contain some morphosyntactic aspects that are expected to pose problems to LI children; those aspects are highlighted in bold in Table 3. In English the grammatical items that are tested include phrasal embedding, passives, verb endings for the present tense (*-s* for the third person singular) and past tense (*-ed* for regular verbs), question formation (question words, word order and auxiliaries), reflexive pronouns and the objective case of the pronoun. The items that are tested

in the adapted Lithuanian GAPS version include passives, phrasal embedding, case agreement, case endings, verb endings for the past tense, question words, reflexive form of the verb, the dative case (indirect object of the noun), the accusative (direct object) case of the pronoun, and modal verbs.

Though English and Lithuanian are structurally rather different (the former being an analytic language, and the latter being a synthetic one), some of the aspects tested in the English test version could be easily transferred into the Lithuanian version and successfully used as important indicators of LI. These include phrasal embedding (example 1) and passives (examples 2 and 3):

(1) Šit**a** katė **su varpeliu** yra linksm**a**.

That-pronom:sg:fem:nom *cat*-n:sg:fem:nom *with bell*-n:sg:masc:nom *is happy*-adj:sg:fem:nom

(The cat with the bell is happy.)

(2) Pienas **yra traukiamas** šuns.

Milk-n:sg:mac:nom *is pulled*-v:partic:pres:sg:masc:nom *dog*-n:sg:masc:gen

(The milk is pulled by the dog.)

(3) Šuo **yra laižomas** **katės**

Dog-n:sg.masc:nom *is licked*-v:partic:pres:sg:masc:nom *cat*-n:sg:fem:gen

(The dog is licked by the cat.)

These sentences are among the most problematic test items for children, as can be observed in Table 2 (slightly less than 70 % of correct answers for phrasal embedding, and around 70% of correct answers for passives).

Children who generally performed badly in the test made errors in the sentences with passives by reproducing senseless or grammatically unacceptable sentences (marked here and elsewhere with an asterisk *), as in example (4):

(4) **Šuo* (n:sg:masc:nom) *laižoma* (v:partc:sg:fem:nom) *katė* (n:sg:fem:nom).

Correct sentence: Šuo (n:sg:masc:nom) yra laižomas (v:partic:sg:masc:nom) katės (n:sg:fem:gen)

(The dog is licked by the cat.)

In example (4), the child omits the auxiliary verb *be* and uses incorrect case endings of the past participle and the noun that refers to the agent of the passive verb.

Sentences with phrasal embedding were often repeated inaccurately by producing senseless utterances or simplified sentence structures:

(5) Šita katė yra linksma.

Correct sentence: Šita katė **su varpeliu** yra linksma.

(The cat with a bell is happy.)

In example (5) the child simplifies the sentence structure by deleting the difficult item and thus making the subject phrase less complex.

Several morphological aspects tested in English seem to be important in Lithuanian, but their relevance in Lithuanian is less definite. One of them is the use of two objects, direct and indirect, after a ditransitive verb, as in example (6). Two objects in English, where no endings are used to indicate the type of the object, may pose more problems than in Lithuanian since in Lithuanian the possible ambiguity between the objects is solved by case endings:

(6) Šuo duoda kat**ei** pien**o**.

Dog-n:sg:masc:nom *gives*-v:pres:sg:3 *cat*-n:sg:fem:dat *milk*-n:sg:masc:gen

(The dog gives **the cat the milk**.)

In this sentence the order of the two objects can be easily switched, and the relationship between them is disambiguated by the endings (dative for the indirect object *katei* and partitive genitive for the direct object *pieno*).

The Lithuanian question words for *Who?, What?* and *Which?* are acquired early, and their use may be expected to cause no exceptional problems. Therefore, the degree of complexity of such questions is increased by adding certain verbs expressing modality, which is the next issue that will be further discussed with regard to the most problematic test items.

It was most complicated to adapt those sentences that include grammatical aspects which are of high relevance and importance in English, but are of highly questionable or no relevance in Lithuanian. In some sentences, when translated into Lithuanian, grammatically difficult items are no longer contained. This is especially the case in those sentences which in English contain some difficult verb forms, including tense and question formation, and the use of auxiliaries, as in examples (7)-(11):

(7) **Ką** katė **nori** gerti?

What-acc *cat*-n:sg:fem:nom *wants*-v:pres:sg:3 *to drink*-v:inf

(**What will** the cat drink?)

(8) Kur**į** šunį katė **bandė** stumti?

Which-pronom:sg:masc:acc *dog*-n:sg:masc:acc *cat*-n:sg:fem:nom *tried*-v:past:sg:3 *to push*-v:inf

(**Which** dog **did** the cat push?)

(9) **Ką** katė **norėjo** prausti?

What-acc *cat*-n:sg:fem:nom *wanted*-v:past:sg:3 *to wash*-v:inf

(**Who did** the cat wash?)

(10) Katė nor**ėjo** pien**o**.

Cat-n:sg:fem:nom *wanted*-v:past:sg:3 *milk*-n:sg:masc:gen

(The cat want**ed** some milk.)

(11) K**atei patinka** pienas.

Cat-n:sg:fem:dat *likes*-v:pres *milk*-n:sg:masc:nom

(The cat like**s** milk.)

In Lithuanian neither of these aspects seems to be of high relevance since tense and especially question formation is not complicated. Therefore, in some of the sentences we included modals (*norėti – to want* and *bandyti – to try*) instead of the English auxiliaries (*will* and *do*). The sentences with modals (examples 7, 8 and 9) were difficult to repeat, especially the sentence in example (8), which contains not only a modal but also a complex question word (only around 50% of correct answers were scored; for more detailed information, see Table 3).

Sentences in examples (10) and (11), when adapted in Lithuanian, also lose their complexity since the present and past tense forms in Lithuanian tend not to pose any considerable acquisition problems. Here then the main tested items are not the verb forms but the noun cases: partitive genitive in example (10) and dative in example (11). However, the results of the sentence repetition task show that the performance of the tested children was high (100% or almost 100% of correct answers) when repeating sentences in (10) and (11); such high scores suggest that the grammatical items in these two sentences, i.e. case agreement, verb and noun endings, may be not relevant in the Lithuanian diagnostic test.

Table 3. Results of the sentence repetition task

No	Sentences LT/ EN	WO changes as incorrect	WO changes and deletion of optional items as correct	Difference
1.	Šit**a** katė **su varpeliu** yra linksm**a**. (T**he** cat **with the** bell **is** happy.)	**66 (69%)**	72 (76%)	6
2.	Katė nor**ėjo** pien**o**. (The cat want**ed** some milk.)	91 (98%)	91 (98%)	0
3.	Pienas **yra traukiamas** šuns. (The milk **is pulled by** the dog.)	**71 (75%)**	74 (78%)	3
4.	**Ką** katė **nori** gerti? (**What will** the cat drink?)	86 (93%)	90 (97%)	4
5.	Kur**į** šunį katė **bandė** stumti? (**Which** dog **did** the cat push?)	**50 (53%)**	**64 (67%)**	**14**
6.	Šuo duoda kat**ei** pien**o**. (The dog gives **the cat the milk**.)	84 (91%)	85 (92%)	1

7.	K**atei patinka** pienas. (This cat like**s** milk.)	91 (99%)	92 (100%)	1
8.	Katė prausia**si**. (The cat is washing **herself**.)	89 (96%)	89 (96%)	0
9.	Šuo **yra laižomas katės**. (The dog **is licked by** the cat.)	70 (74%)	76 (80%)	6
10.	Katė prausia **jį**. (The cat is washing **him**.)	83 (89%)	86 (93%)	3
11.	**Ką** katė **norėjo** prausti? (**Who did** the cat wash?)	84 (91%)	88 (95%)	4

In the present study, correct answers have been counted in two different ways (presented in Table 3) since in some instances it was difficult to decide which of them should be treated as correct and which ones as incorrect. Since the Lithuanian language system allows for a high flexibility of word order (WO), it was difficult to determine whether some children repeated the sentences with a slightly modified structure because they have language difficulties and cannot repeat the exact structure or they simply treat their sentence structure and the one in the test as absolutely interchangeable.

Relatively flexible word order is in the sentences with phrasal embedding, when the sentence contains two objects, and when the sentence contains a modal verb. For example, in the sentence with phrasal embedding, the prepositional phrase inside the noun phrase is relatively mobile, as in example (12):

(12) Šit**a** katė **su varpeliu** yra linksm**a**.

OR Šita **su varpeliu** katė yra linksma. / Šita katė yra **su varpeliu** linksma.

(The cat with the bell is happy.)

(13) Katė prausia jį.

OR Katė jį prausia.

(The cat is washing him.)

(14) Kurį šunį katė **bandė** stumti?

OR Kurį katė bandė/norėjo stumti šunį?/ Kurį šunį bandė stumti?

(Which dog the cat tried to push?)

(15) Ką katė **norėjo** prausti?

OR Ką norėjo katė prausti?

(Who the cat wanted to wash?)

In example (12) the embedded prepositional phrase does not necessarily have to follow the modified noun; in Lithuanian it can precede the noun or can be even

moved to the verb phrase. The alternative structures are less common in Lithuanian but still are possible. In example (13), the position of the direct object is mobile, and the only difference between these patterns lies in their rhetorical effect (the object receives a different degree of emphasis depending on its position). Similarly, in examples (14) and (15), the position of the modal verbs *bandė* 'tried' and *norėjo* 'wanted' is highly flexible; the difference between these alternative structures is mainly in the degree of emphasis on different sentence elements.

Just like in English, to construct the passive verb forms, Lithuanian uses the appropriate form of the verb *be* and the past participle. Passive structures are acquired by children rather late and naturally tend to pose problems, especially to LI children. Therefore, they are treated as an important indicator of SLI. However, in Lithuanian the form of the passive is more flexible than in English as the verb *be* is optional, especially in spoken Lithuanian.

(16) Pienas yra traukiamas uns.

OR Pienas traukiamas uns.

(The milk is pulled by the dog.)

Just like in the case of phrasal embedding, it was difficult to determine whether the omitted optional element should be treated as an error in children's responses.

Thus due to such an ambiguity in counting the results, we provide two ways of counting correct answers in order to show how much the data change depending on the approach we adopt with regard to the correctness of the answers. The column that presents the difference between the two ways of counting correct answers shows that this difference is most substantial in sentence (5), Table 3 (*Kur**į** šunį katė **bandė** stumti? (**Which** dog **did** the cat push?*)), where the difference of correct answers amounts to 14 responses (50 and 64). The difference is relatively less high in sentences (1) and (9) (see Table 3), where the difference is 6 correct answers. In all the other instances the difference is small or does not exist (e.g. sentences (2) and (8) in Table 3).

Since GAPS is a repetition test, it can be assumed that the changes in word order deletion of optional items should perhaps be treated as errors. However, as will be shown later, the difference in counting can influence the selection criteria to a large extent and thus can change the diagnosis.

3.2. RESULTS OF TESTING PHONOLOGY

The phonology part of the GAPS test involves non-word repetition and consists of 8 invented words with difficult consonant clusters; the clusters that were used in the test were obtained from our longitudinal data (Kamandulytė 2006). All the items used for testing are presented in Table 4; the underlined letter indicates the stress position

in the non-word, and the letters in bold are the tested clusters. The non-words used in the Lithuanian GAPS have supposed endings, which are not present in the English non-words. Due to the flectional system of Lithuanian, endings could not be avoided, but the ones that were added to the invented roots are not used in the base forms of real Lithuanian words.

The consonant clusters that were included in the non-words are of different degrees of complexity; the non-words themselves also differ in their difficulty. As Table 4 demonstrates, there are 5 words with one binomial cluster, 2 words with two binomial clusters, and 1 word with a 3-nomial cluster. Two non-words are disyllabic (each of them contains two binomial clusters), and 6 of them are 3-syllabic (one of them is with a 3-nomial cluster; others contain binomial clusters).

Table 4. Item analysis of the non-word repetition test

		Number of syllables	Size of the cluster	Correct answers	%
1.	dr**e**mpo	2	binomial (x2)	69	73
2.	kl**e**sta	2	binomial (x2)	77	81
3.	tob**i**sko	3	binomial	77	81
4.	disi**p**ka	3	binomial	65	68
5.	bad**e**mko	3	binomial	49	52
6.	pok**u**sto	3	binomial	79	83
7.	pand**e**tu	3	binomial	70	74
8.	dip**a**skli	3	3-nomial	56	59

Table 4 also shows that in the invented words consonant clusters appear in different positions: some clusters are initial, while others are medial. As can be seen in Table 4, there are two non-words with initial clusters; initial consonant combinations are more salient because of the prominence that they receive. Initial clusters, especially *kl-*, are among the easiest clusters in our data. In contrast, medial clusters, which are less salient, are the most difficult ones. Among medial clusters there are two most difficult sound combinations, *-skl-* and *-mk-*.

As Table 4 demonstrates, some non-words appeared to be especially problematic both for LI children and even TD children. These include:

(17) Bademko: *repeated as* badenko; dedempu, bedenko

(18) Dipaskli: *repeated as* dibaskli (mainly by TD children), didali, dibas, bidaskli, dapaski (mainly by LI children)

Bademko is the most complicated non-word; only 52% of the tested children produced correct answers. *Dipaskli* is the next most difficult non-word; only 59% of the children repeated it accurately. These non-words contain difficult clusters of two or three consonants *-mk-* and *-skl-*, which are not highly common in Lithuanian.

Therefore, it can be assumed that the rarity of usage of these consonant clusters makes the two testing items too difficult.

The performance of LI children shows that these children have difficulties repeating other non-words as well. The variants produced by them in the non-word repetition task are listed below:

(19) Drempo:	dempo, damko
(20) Tobisko:	todisko, tovisko,
(21) Klesta:	klekta, kesta
(22) Disipka:	dopisko, ditipka, sidipka
(23) Pokusto:	pokuto, topusko, pokusko, kopusto
(24) Pandetu:	bandetu

Examples of children's errors in (13)-(18) demonstrate that there are three main tendencies of how non-words are reproduced, and they are as follows:

(a) omission, as in *dempo* (instead of *d**r**empo*), *kesta* (instead of *k**l**esta*), *pokuto* (instead of *pokus**t**o*);

(b) substitution, as in *to**d**isko* or *to**v**isko* (instead of to**b**isko), *kle**k**ta* (instead of *kles**t**a*), di**t**ipka (instead of *di**s**ipka*), *pokus**k**o* (instead of *pokus**t**o*);

(c) sound movement (changes in the order of sounds or syllables), as in *dopisko* (instead of *tobisko*), *sidipka* (instead of *disipka*), *topusko* or *kopusto* (instead of *pokusto*).

Such modifications made to non-words suggest the children's difficulty in differentiating confusing sounds and especially in sequencing sounds in words to produce non-monosyllabic units. As has already been mentioned, the child's lack of ability to structure sound combinations to make words can later cause problems with spelling and reading words, and thus can be an early sign of dyslexia. Though the choice of some non-words is still arguable and requires further investigation, in general the initial testing results strongly suggest that the non-word repetition test can be used in Lithuanian to identify children with language impairments.

3.3. IDENTIFICATION OF SLI CHILDREN

The results presented in Appendix 2 demonstrate that 1 child in the regular kindergarten for TD children meets the criteria for SLI; in the case of this child, the SD is higher than ±2 in both subtests. 6 children fall into the risk group as their scores are significantly low in one of the subtests. In their case, additional testing is necessary to determine the diagnosis.

To evaluate the scores of the children from specialised kindergartens, the standard

number of correct answers produced by children in the regular kindergarten was taken into account. Table 5 provides the ranges of correct answers that do not fall beyond ±2 SD; the numbers are provided for each age group separately. Table 5 presents two ways of counting correct answers in the sentence repetition part (see columns for Sentences 1 and Sentences 2) in order to show how much the selection criteria change depending on the approach we adopt with regard to the correctness of the answers (as discussed in relation to the sentence repetition test).

Table 5. Standard ranges of correct answers in different age groups of children in the regular kindergarten

Age	Number of correct answers Sentences 1	Number of correct answers Sentences 2	Number of correct answers Non-words
7;1-7;3	8-11	8-11	6-8
6;7-6;11	9-11	10-11	5-8
6;0-6;6	10-11	10-11	5-8
5;7-5;11	4?-11 (4 is at risk; -1.91 SD)	7-11	2-8
5;0-5;6	6?-11 (6 is at risk; -1.98 SD)	8-11	1-8 (1 is at risk; -1.83SD)

Here the results in the second column (Sentences 1) are the standard number of correct answers counted by treating all changes in the word order as errors even if such a word order is generally acceptable in Lithuanian. The third column (Sentences 2) provides the standard number of correct responses if we treat the word order errors more flexibly, i.e. grammatically acceptable changes in the word order are considered not as mistakes but as correctly repeated sentences.

One important outcome that is reflected in Table 5 is that the appropriateness of the sentences that can have grammatically correct alternatives (discussed in section 3.1) should be reconsidered. The standard number of correct answers is higher if the alternative structures are counted as correct; consequently, the selection criteria become more strict and fewer errors are allowed if the more flexible approach is adopted to the counting of errors. The differences between the two standards are unimportant for the age groups 7;1-7;3 and 6;0-6;6; in all the other age groups, there are slight or even considerable differences in the standard range of correct answers.

Another important implication of the results in Table 5 is that the scores of the non-word repetition test are very low, especially in the age group 5;0-5;6, where the child has to provide no correct responses to fall into the risk group. Such results may imply that this test part is too complicated and the appropriateness of some items should be reconsidered.

On the basis of the standards presented in Table 5, the results of the children in specialized kindergartens were evaluated. The data have revealed that 2 children meet

the criteria of SLI (both of them diagnosed as LI children by speech pathologists as well); 3 children partly meet the criteria since their scores are low only in the morphological part (all of them also diagnosed as LI children by speech pathologists). Finally, 5 children who were diagnosed as linguistically impaired by speech therapists did not match the SLI criteria used in the present study.

In total, in the present study 3 children out of 90 were identified as children with SLI, which constitutes 3.33% of all the tested children; 9 children have features of SLI but additional testing is necessary to determine the diagnosis. The numbers are lower than the tendencies observed in previous research, i.e. 5% of the population have SLI. However, it can be expected that additional testing would diagnose at least some of the 9 suspected as children with SLI. Thus, although the study has highlighted some problematic aspects of the GAPS test, the obtained results suggest that the test can be applied for SLI diagnosis in Lithuanian but some modifications are necessary.

CONCLUSIONS

Since the existing diagnostic test for evaluating children's linguistic competence has some important drawbacks, Lithuanian speech therapists still lack a standardized, quick screening test for diagnosing language impairment. In western tradition there is a large body of evidence regarding reliable indicators of language deficits in young children; however, in Lithuanian speech therapy such indicators have not been determined yet, and the very term 'SLI' is still not in use. The Grammar and Phonology Screening (GAPS) test is therefore an important development in speech therapy as it can offer a reliable assessment of young children's language abilities.

The present paper has raised some important issues related to the development of a screening test for specific language impairment for the Lithuanian language. The analysis is based on the initial results obtained after testing 5, 6 and 7-year-old children with and without language problems in three kindergartens in Kaunas.

This paper reports the results and observations of the pilot study and the initial steps of the adaptation of the test. The obtained results have highlighted some advantages and disadvantages of the Lithuanian GAPS version. The data have shown that some test items can be used as significant markers of specific language impairment in Lithuanian (e.g. passive and phrasal embedding in the morphology part and some consonant clusters in the phonology part).

The initial results of the study have also demonstrated that GAPS is effective in detecting a range of children in need of further in-depth assessment or monitoring for language difficulties. Approximately 3.33% of the tested population meet the criteria of SLI, 9 more children have features Grammatical-SLI. Such results largely

correspond to the tendencies observed in the existing literature on SLI research and diagnosis.

Since the analysis has revealed some limitations of the adapted GAPS test, the results should be re-evaluated on additional and much larger studies using additional testing procedures. The morphology part poses problems since it allows for a double interpretation of correct answers, which should be avoided in an effective screening test. Such sentences have to be reanalysed and modified to remove the ambiguity in the result interpretation. Some children's errors in the phonology part may have occurred due to the frequency effect of some consonant clusters included in the non-words as some of them are of very rare usage in Lithuanian. Therefore, some test items in the phonology subtest should be reconsidered and more default cases should be included.

Despite some drawbacks and limitations of the test which can be eliminated in later stages of the adaptation process, the adapted GAPS test can be used as a successful screening tool in kindergartens and schools. Being short and easy to use (it takes only 10 minutes), it can facilitate identification of language impairment or at-risk factors of reading impairment in the early educational years. Effective early diagnosis is of crucial importance when providing targeted intervention to children who have such problems as SLI or dyslexia. The Lithuanian GAPS test can afford a first step in a process of assessment and targeted intervention.

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Jūratė Ruzaitė, Ineta Dabašinskienė

SPECIFINIS KALBOS SUTRIKIMAS: VERTINIMO TESTO PRITAIKYMAS LIETUVIŲ KALBAI

Santrauka

Šiame straipsnyje aptariami vaikų kalbos sutrikimų diagnostikos tyrimo rezultatai, gauti atlikus eksperimentus trijuose skirtinguose darželiuose, iš kurių vienas yra skirtas tipinės raidos vaikams, o kiti du – vaikams, turintiems raidos sutrikimų. Šis tyrimas yra Europos Komisijos remiamo projekto „Universali kalbos sutrikimų diagnostika" (angl. *Crosslinguistic Language Diagnosis, CLAD;* LLP/ K 1) dalis; juo siekiama nustatyti pagrindinius specifinių kalbos sutrikimų (angl. *Specific*

Language Impairment – SLI) simptomus. Specifiniai kalbos sutrikimai (SLI) yra pirminiai kalbos sutrikimai, diagnozuojami tipinės raidos vaikams, neturintiems jokių klausos sutrikimų, smegenų pažeidimų ar intelekto sutrikimų. SLI pasižymi fonologijos sutrikimais (vaikas sunkiai atpažįsta ir taria kai kuriuos garsus ir tam tikras garsų samplaikas) arba gramatikos sutrikimais (vaikui sunku pasakyti / parašyti gramatiškai taisyklingą sakinį, sakiniuose gausu netinkamos žodžių tvarkos atvejų, žodžiai vartojami netinkama forma ir pan.), o kartais vaiko kalboje esama ir fonologijos, ir gramatikos klaidų. Šiems sutrikimams tirti ir diagnozuoti buvo adaptuotas GAPS (*Grammar and Phonology Screening*) testas (van der Lely *et al*. 2007). Testą sudaro dvi pagrindinės dalys, būtinos kalbos kompetencijai įvertinti: (1) morfosintaksinė dalis (apimanti tam tikrus gramatikos aspektus ir sakinio struktūrą) ir (2) fonologinė dalis (skirta priebalsių samplaikų tarimui tikrinti). Atliekant pirmąją testo dalį, tiriamasis vaikas turi pakartoti tyrėjo sakomus sakinius (sudarytus tam tikrų specifinių gramatikos konstrukcijų pagrindu); atliekant antrąją testo dalį, vaikas kartoja tyrėjo sakomus išgalvotus žodžius, kurie yra sukurti lietuvių kalbai būdingų priebalsių samplaikų pagrindu.

Tyrime dalyvavo 90 vaikų (41 mergaitė ir 49 berniukai), jų amžius buvo nuo 5;0 iki 7;3 metų. Dauguma tiriamųjų vaikų priklauso vidurinei socialinei klasei, jų tėvai yra įgiję vidurinį arba aukštąjį išsilavinimą. Tyrime dalyvavo 75 vaikai, lankantys tipinės raidos vaikams skirtus darželius, ir 15 vaikų, lankančių sutrikusios raidos vaikams skirtus darželius (13 iš jų diagnozuotas kalbos neišsivystymas naudojant įprastinį Lietuvos logopedų taikomą testą). Tyrime dalyvavę vaikai neturi jokių nekalbinių (klausos, intelekto ir kt.) sutrikimų.

Pirminiai tyrimo rezultatai parodė, kad 3,33 % testuotų vaikų atitinka SLI kriterijus, o dar 9 vaikams nustatytas vadinamasis gramatinis SLI (jam būdingas tik gramatikos sutrikimas, o fonologinės testo dalies rezultatai atitinka normą). Gauti rezultatai daugmaž atitinka kitoms šalims būdingą tendenciją, kad SLI sutrikimą turinys žmonės sudaro apie 5–7 % populiacijos. Įdomu tai, kad tyrimo metu keletui vaikų, kurių kalba atitinka normą taikant įprastinį lietuvišką diagnostinį testą, buvo nustatytas SLI.

Tyrimas taip pat parodė, kad kai kurie diagnostinio GAPS testo vertinimo kriterijai netinka lietuvių kalbai, todėl atliekant tolesnius tyrimus bus modifikuojami kai kurie pirmosios (morfosintaksinės) testo dalies sakiniai ir antrosios (fonologinės) testo dalies išgalvotieji žodžiai.

Vis dėlto, nepaisant kai kurių tyrimo metu išryškėjusių trūkumų, GAPS testas yra tinkama priemonė kalbos sutrikimų diagnostikai: jis yra trumpas, efektyvus, tinkamas ankstyvųjų kalbos sutrikimų diagnostikai ir lengvai atliekamas (juo naudotis gali ne tik profesionalai, pvz., logopedai, bet ir vaiko tėvai ar globėjai).

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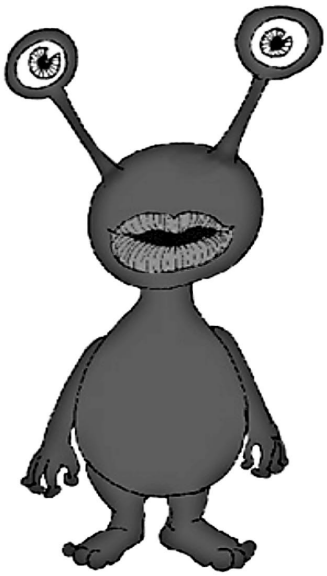
APPENDIX 1. BIK THE ALIEN



APPENDIX 2. TEST RESULTS IN THE KINDERGARTEN FOR TD CHILDREN

The table presents the number of correct answers in the two test sections and the SD score. The results are grouped into sets by the children's age.

		Age	Sentences 1	Sentences 2	Difference 1&2	Non-words	SD Sentences 1	SD Sentences 2	SD Non-words
VIK		7;3	**11**	**11**	0	**7**	0.71	0.71	0.27
VKA		7;2	**9**	**9**	0	**7**	-0.71	-0.71	0.27
MIG		7;2	**10**	**10**	0	**7**	0.00	0.00	0.27
GAB		7;2	**11**	**11**	0	**6**	0.71	0.71	-0.54
SKA		7;2	**11**	**11**	0	**7**	0.71	0.71	0.27
MA2	SLI?	7;1	**7**	**7**	0	**6**	-2.12	-2.12	-0.54
VI2		7;1	**9**	**9**	0	**8**	-0.71	-0.71	1.09

		Age	Sentences 1	Sentences 2	Difference 1&2	Non-words	SD Sentences 1	SD Sentences 2	SD Non-words
MAR	SLI?	7;1	**11**	**11**	0	**4**	0.71	0.71	-2.18
NED		7;1	**11**	**11**	0	**8**	0.71	0.71	1.09
Mean			**10**	**10**		**6.7**			
Standard Deviation			**1.41**	**1.41**		**1.22**			
EDG		6;11	**9**	**9**	0	**7**	-1.33	-2.05	0.37
ALI		6;11	**11**	**11**	0	**8**	0.93	0.74	1.08
GJB		6;11	**11**	**11**	0	**8**	0.93	0.74	1.08
JOK		6;11	**11**	**11**	0	**7**	0.93	0.74	0.37
LUK		6;11	**11**	**11**	0	**6**	0.93	0.74	-0.33
VLŪ		6;11	**11**	**11**	0	**7**	0.93	0.74	0.37
TIT	SLI?	**6;10**	**8**	**9**	1	**5**	-2.47	-2.05	-1.04
GIE		6;10	**10**	**11**	1	**8**	-0.20	0.74	1.08
AIR		6;10	**10**	**11**	1	**6**	-0.20	0.74	-0.33
DO2		6;10	**10**	**10**	0	**3**	-0.20	-0.66	-2.45
IGN		6;9	**11**	**11**	0	**8**	0.93	0.74	1.08
MIN		6;8	**10**	**11**	1	**8**	-0.20	0.74	1.08
GEI		6;8	**10**	**10**	0	**6**	-0.20	-0.66	-0.33
LAU		6;8	**10**	**10**	0	**5**	-0.20	-0.66	-1.04
MAG.		6;7	**9**	**10**	1	**5**	-1.33	-0.66	-1.04
ARM		6;7	**10**	**10**	0	**6**	-0.20	-0.66	-0.33
NED M.		6;7	**11**	**11**	0	**7**	0.93	0.74	0.37
Mean			10.2	10.5		6.5			
Standard deviation			0.88	0.72		1.42			
VLT		6;6	**10**	**10**	0	**6**	0.35	0.47	0.47
AU2		6;6	**10**	**10**	0	**6**	0.35	0.47	0.47
KOT .		6;6	**10**	**10**	0	**8**	0.35	0.47	-1.31
ROK		6;6	**11**	**11**	0	**7**	-0.65	-0.53	-0.42
GAB2		6;6	**11**	**11**	0	**6**	-0.65	-0.53	0.47
MART		6;5	**11**	**11**	0	**7**	-0.65	-0.53	-0.42
ARN		6;5	**11**	**11**	0	**6**	-0.65	-0.53	0.47
IGN2		6;5	**11**	**11**	0	**7**	-0.65	-0.53	-0.42
KOT A.		6;4	**11**	**11**	0	**8**	-0.65	-0.53	-1.31

		Age	Sentences 1	Sentences 2	Difference 1&2	Non-words	SD Sentences 1	SD Sentences 2	SD Non-words
MART M.		6;4	**11**	**11**	0	**6**	-0.65	-0.53	0.47
DOM	SLI?	6;3	**7**	**7**	0	**5**	3.37	3.45	1.36
VILIU		6;2	**10**	**11**	1	**7**	0.35	-0.53	-0.42
DEIV2		6;2	**10**	**10**	0	**4**	0.35	0.47	2.25
BEN		6;1	**10**	**11**	1	**8**	0.35	-0.53	-1.31
DOVY		6;1	**11**	**11**	0	**6**	-0.65	-0.53	0.47
IEV Z.		6;1	**11**	**11**	0	**6**	-0.65	-0.53	0.47
SIM		6;0	**10**	**10**	0	**8**	0.35	0.47	-1.31
Mean			10.4	10.5		6.5			
Standard Deviation			1.00	1.01		1.12			
VILT2		5;11	**7**	**9**	2	**6**	-0.57	-0.07	0.50
RUG		5;10	**9**	**9**	0	**3**	0.32	-0.07	-0.60
RUG2		5;10	**11**	**11**	0	**7**	1.22	1.39	0.87
DEIV		5;9	**5**	**7**	2	**1**	-1.46	-1.52	-1.33
NAG		5;9	**8**	**8**	0	**5**	-0.12	-0.79	0.13
SAID		5;9	**9**	**9**	0	**5**	0.32	-0.07	0.13
SAU MA	SLI?	5;8	**4**	**7**	3	**7**	-1.91	-1.52	0.87
UGN2		5;8	**8**	**9**	1	**0**	-0.12	-0.07	-1.70
ALA		5;8	**10**	**10**	0	**7**	0.77	0.66	0.87
ADO STR		5;7	**9**	**10**	1	**2**	0.32	0.66	-0.97
DOM S		5;7	**11**	**11**	0	**8**	1.22	1.39	1.23
Mean			**8.3**	**9.1**		**4.6**			
Standard Deviation			**2.24**	**1.38**		2.73			
PAM		5;6	**9**	**10**	1	**2**	-0.09	0.20	-1.44
MANT		5;6	**10**	**10**	0	**7**	0.54	0.20	0.50
KRI		5;6	**11**	**11**	0	**7**	1.17	1.01	0.50
KTRY		5;5	**8**	**10**	2	**8**	-0.72	0.20	0.89
ARV O.		5;5	**10**	**10**	0	**6**	0.54	0.20	0.11
MAR	**SLI**	**5;4**	**5**	**6**	1	**0**	-2.61	-3.08	-2.22
MED		5;4	**8**	**9**	1	**1**	-0.72	-0.62	-1.83
AUG		5;3	**9**	**9**	0	**8**	-0.09	-0.62	0.89
KASP	SLI?	5;2	**6**	**8**	2	**3**	-1.98	-1.44	-1.06

		Age	Sentences 1	Sentences 2	Difference 1&2	Non-words	SD Sentences 1	SD Sentences 2	SD Non-words
IZA		5;2	**9**	**11**	2	**7**	-0.09	1.01	0.50
RING		5;2	**10**	**10**	0	**7**	0.54	0.20	0.50
MARG		5;2	**11**	**11**	0	**8**	1.17	1.01	0.89
JUS		5;2	**11**	**11**	0	**7**	1.17	1.01	0.50
UGN		5;1	**9**	**10**	1	**4**	-0.09	0.20	-0.67
NOJ		5;1	**9**	**10**	1	**8**	-0.09	0.20	0.89
GUS		5;1	**9**	**9**	0	**7**	-0.09	-0.62	0.50
DOMI		5;1	**9**	**9**	0	**2**	-0.09	-0.62	-1.44
IEV		5;1	**11**	**11**	0	**7**	1.17	1.01	0.50
ALAN		5;0	**8**	**10**	2	**7**	-0.72	0.20	0.50
JUST		5;0	**9**	**9**	0	**6**	-0.09	-0.62	0.11
AURJ		5;0	**11**	**11**	0	**8**	1.17	1.01	0.89
Mean			**9.1**	**9.8**		**5.7**			
Standard Deviation			**1.59**	**1.22**		**2.57**			

APPENDIX 3. TEST RESULTS IN THE KINDERGARTENS FOR CHILDREN WITH SPECIAL NEEDS

The table presents the number of correct answers in the two test sections. The highlighted results indicate the possibility of SLI.

		Kindergarten	Age	Sentences 1	Sentences 2	Difference 1&2	Non-words
LUK G.	SLI?	G	6;11	**7**	**9**	2	**5**
TOM		G	6;11	**9**	**9**	0	**6**
KAJ	SLI?	G	6;10	**8**	**9**	1	**6**
GINT	**SLI**	G	6;9	**4**	**8**	4	**2**
PAT	SLI?	G	6;9	**6**	**7**	1	**5**

		Kindergarten	Age	Sentences 1	Sentences 2	Difference 1&2	Non-words
SIM		G	6;7	**11**	**11**	0	**7**
MYK		G	6;6	**11**	**11**	0	**6**
ENR		G	5;10	**5**	**5**	0	**5**
REM		G	5;7	**6**	**6**	0	**4**
AND		G	5;5	**11**	**11**	0	**2**
Mean				**7.8**	**8.6**		**4.8**
Standard deviation				**2.62**	**2.12**		**1.69**
TER			7;1	**11**	**11**	0	**8**
SAU			7;0	**11**	**11**	0	**6**
MART			6;10	**11**	**11**	0	**7**
KAR			6;8	**11**	**11**	0	**6**
EDV	**SLI**		6;3	**4**	**7**	3	**2**
Mean				**9.6**	**10.2**		**5.8**
Standard deviation				**3.13**	**1.79**		**2.28**