Multilingual Doctoral School

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BILINGUAL WRITTEN WORD RECOGNITION OF LEARNERS OF ENGLISH IN A VOCATIONAL SECONDARY SCHOOL

PhD Thesis

by

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This dissertation, written under the direction of the candidate's dissertation committee and approved by the members of the committee, has been presented to and accepted by the Faculty of Modern Philology and Social Sciences in partial fulfillment of the requirements for the degree of Doctor of Philosophy. The content and research methodologies presented in this work represent the work of the candidate alone.

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Doktori értekezés

Kivonat

Lengyel Zsófia

Angolul tanuló szakközépiskolások kétnyelvű írott szófelismerése

A dolgozat tárgya első évfolyamos szakközépiskolás diákok szófelismerésének vizsgálata több szempont alapján. A disszertáció célja, hogy nyelvi és nem nyelvi vizsgálatokkal feltárja az idegennyelv tanulás során tapasztalható és azt befolyásoló faktorok egymásra hatását és jelentőségét, illetve, hogy fényt derítsen eme faktorok összefüggéseire. Ennek érdekében dunántúli középiskolások mintáján (N=60) nyelvi és nem nyelvi, standardizált valamint saját teszteket végeztem (szocio-ökonómia, info-kommunikációs eszközök használata, nyelvi attitűd, kettősnyelvűség, motiváció, nyelvérzék, kreativitás, verbális fluencia, EEG, anagramma felismerés, homográf használat, első szótag és szó kiegészítés).

Vizsgálatomban megnéztem, hogy a nyelvjárási sajátosságok, a szocioökonómiai háttér, az IKT eszközök használata, a nyelv iránti attitűd, a kettősnyelvűség, a motiváció, a nyelvérzék, a kreativitás és a verbális fluencia összefüggnek-e egy második nyelv elsajátításakor.

A kvalitatív és kvantitatív eredmények azt mutatják, hogy a hátrányos helyzetből érkező tanulók, bár tisztában vannak a nyelvtanulás jelentőségével, annak érdekében, hogy fejlődjenek, nem fejtenek ki erőfeszítéseket. Érzik a nyelvtudás szükségességét, de valódi nyelvérzék, motiváció és kreativitás hiányában nem igazán teljesítenek jól sem az iskolai eredményeik, sem pedig a nyelvi tesztek alapján. Kettősnyelvűségük nem meghatározó egy új nyelv tanulása során – pozitív hatást nem tudtam kimutatni. A kutatás eredményei közül jól hasznosíthatók a feltárt összefüggések, melyek – azon nyelvtanárok számára, akik fejleszteni szeretnék diákjaik idegennyelvi képességeit – indikátorként használhatók a mindennapi nyelvtanítási gyakorlatban.

PhD Dissertation

Abstract

Zsófia Lengyel

Bilingual written word recognition of learners of English in a vocational secondary school

This study focuses on a multifactoral analysis of Hungarian students' English written word recognition, with the help of linguistic, non-linguistic, standardized and own tests (anagram solution, homograph usage, first syllable and word completion, socioeconomic status, usage of infocommunication technology, language attitude, bidialectism, motivation, language aptitude, creativity, verbal fluency, EEG and an interview) on the sample of 15-year-old secondary school students (N=60). The aim of this research is to highlight the effects and significance of influential factors in foreign language learning.

The research aimed to find answers for the question whether SES, ICT usage, language attitude, bidialectal background, motivation, language aptitude, creativity and verbal fluency have significant correlations in the success of second language acquisition.

The results of qualitative and quantitative tests show that students from disadvantaged background are aware of the significance of language learning, though they do not make special efforts to achieve better results. They feel the need of language knowledge, but in default of motivation, creativity and aptitude they do not perform well neither in school nor in linguistic tests.

Teachers who want to develop their students' foreign language skills may learn from the research results and can utilize them well in language teaching practice.

This thesis is dedicated to my beloved father, Lengyel Sándor

Acknowledgement

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List of Abbreviations:

AMTB – attitude motivation test battery

AO – age of onset

CF – corrective feedback

EEG – electroencephalography

ERP – event-related potential

ICT – infocommunication technology

L1 – first language

L2 – second language

SEN – special educational needs

SES – socioeconomic status

SLA – second language acquisition

SPSS – statistical package for the social sciences

TTCT – Torrance test of creative thinking

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Chapter 1. Introduction

Concerning bilingualism, Grosjean (1997) claims that natural bilinguals are exposed to and use both of their languages on a daily basis, instructed bilinguals are believed to use English only in education, mostly in classrom settings. It is not the case in Hungary in the XXI. century. Many L2 learners use English for fun in their everyday life (playing computer-games, using social media, watching movies, listening to music, etc.) while for natural bilinguals the question of language dominance may be interesting to research, as language learners are considered to be L1 dominant. However, having two languages in one mind causes differences in their processing, and so cross-linguistic influences will change the quality of both production and perception (Navracsics 2007) in L2 as well as in L1. How does L2 learnt at school influence the written mental lexicon of the L2 learner? What is the role of the context in language acquisition? These questions generate considerable interest in second language acquisition (SLA) research. In bilingualism research there are numerous positive findings. Bialystok (2007) points at the preventive effect of bilingualism on dementia, as.bilinguals show symptoms 4 years later than monolinguals. The level of cognitive achievement of L2 learners is influenced by several factors: the educational level of parents, literacy, L2 proficiency and motivation (Bialystok 2004), just to mention but a few. Concerning results on the advantages of bilingualism Bialystok states that in childhood the effect of bilingualism is greater than earlier thought (Bialystok 2011). Grosjean (2016) says about the bilingual advantage that the selection of a language and inhibition of the other develops executive control[1]

The process of becoming bilingual can happen by conscious language learning or language acquisition. „Much research in second language acquisition (SLA) centres on the relationships among individual difference measures such as language attitudes, motivation, anxiety, self-confidence, language aptitude, learning strategies, field independence, and measures of achievement in the language. Numerous studies have supported the proposed influences of these individual difference variables on achievement, and a number of models have been developed to explain the relationships among subsets of these variables. However, there is a lack of research examining the relationships among all these variables simultaneously" (Gardner et al. 1997: 344).

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[1] https://www.psychologytoday.com/us/blog/life-bilingual/201601/the-bilingual-advantage-where-do-we-go-here

In the present study, I focus on a multifactoral analysis of Hungarian secondary vocational school students' English written word recognition. I used linguistic, non-linguistic, standardized and own tests to investigate whether linguistic creativity at the word level is in harmony with the school achievements of undermotivated students coming from underprivilidged circumstances. Primarily I would like to find the leading, non-linguistic factors, which must principally be developed in language teaching and learning, and within this in word recognition, in an average vocational school in Hungary, in order to achieve better results in foreign language learning. Secondly, I initiated this research to discover any possible correlations between linguistic and non-linguistic factors of L2 word recognition in a Transdanubian secondary school, where most of the students are from disadvantaged SES background. If I find answers to my questions and fulfill my aims, I hopefully will be able to highlight the aspects of foreign language teaching and learning, which are essential for non-elite students in achieving better results in languages, in an average vocational school. One, primary factor of the non-linguistic elements is creativity, which seems to be more and more crucial in language learning. There is a need for English teachers' effort and learners' parents to provide the possibility for the development of learners' creativity. (Meera & Remya, 2010). Pishghadam et al. (2011) emphasize that English teachers should help foreign language learners to increase their creativity, for this reason there should be many kinds of materials in the classroom.

In the following subchapter, I will focus on sociolinguistic aspects from different perspectives in order to define the participants' linguistic status in my study.

1.1 Sociolinguistic aspects of linguistic background

Language variation, as Quist (2008) discusses, is a vital concept in sociolinguistics. In every language we can find varieties. As it is explained in the 2008 article, language variety is biologically coded, there are no examples for two people, who use languages in the same way.

Language variation is accompanied by the stratification of society, communities, who use the language which includes societal dialects, styles, registers and linguistic repertoire. A language variable is a language unit which has more than one realization. There are variables on every layer of language. The occurence of these depend on language and societal factors. These variables can be based on form or vocabulary.

The given categorisation is not an obvious one so I find it important to highlight and clarify that language layers are the linguistic levels: phonetics, phonology, morphology, syntax, semantics and pragmatics, while variables in connection with the mentioned concepts are: sounds, phonemes, words, phrases, sentences, meaning and meaning in context.

In his 1959 article, Charles A. Ferguson defines diglossia as a language situation. It is a kind of bidialectism in a society in which one of the varieties of the language has a high and the other a low prestige, and these two are closely related. This kind of language background is characteristic of the participants in the present study. Making a difference between diglossia and bidialectism seems to be crucial. Though both of the concepts are based on the difference between low and high prestige of language varieties, there is a basic difference between them: diglossia is a surrounding based concept, as Ferguson defined (1959: 336): "Diglossia is a relatively stable language situation in which, in addition to the primary dialects of the language, there is a very divergent, highly codified superposed variety, the vehicle of a large and respected body of written literature, either of an earlier period or in another speech community, which is learned largely by formal education and is used for most written and formal spoken purposes but is not used by any sector of the community for ordinary conversation." On the contrary, bidialectism is usage based, which depends on the intention of the speaker, individually. „Only some of the younger speakers are bidialectal, the remaining speakers use virtually no dialect forms. We suggest these findings may signal dialect shift and predict a further move from local to standard in the coming generation. (Smith & Durham 2012:1)

Differentiation of diglossia and bidialectism appears in the present study. Students use a variety of dialect through formal education, where they learn new words and expressions and they have to avoid swearnig and nasty talk. On the other hand whether they are conscious about it or not, they are surrounded by a kind of dialect or dialects at home, which may not be totally/completely similar to the standard.

That is the reason why they are exposed to diglossia and bidialectism at the same time.

„The Hungarian language has dozens of dialects. It is, for the most part, mutually intelligible, and does not significantly differ from standard Hungarian. They mostly differ in pronunciation, although there are differences in vocabulary, they are generally small and do not interfere with intelligibility. In connection with growth of internal migration and urbanization during the XXth century, most of the characteristics of different dialects can only be observed in small towns and villages, and even there, mostly among the elderly, population in large cities and especially in the capital has been mixed for generations and dialectal differences was lost”.[2]

As in my research students use their vernacular language in their everyday life and elaborated code in their school life, I think it significant to introduce shortly the basic dialects in Hungary, since many of them exist in the country and in Transdanubia as well. As Kiss Jenő (2017) collects Hungarian dialectal regions Western-Transdanubian, Middle-Transdanubian, South-Transdanubian, South-Plain, Palóc, Tisza-Kőrös region, Northeast, Mezőségi, Székely and Moldvai dialects can be differentiated (Figure 1.).
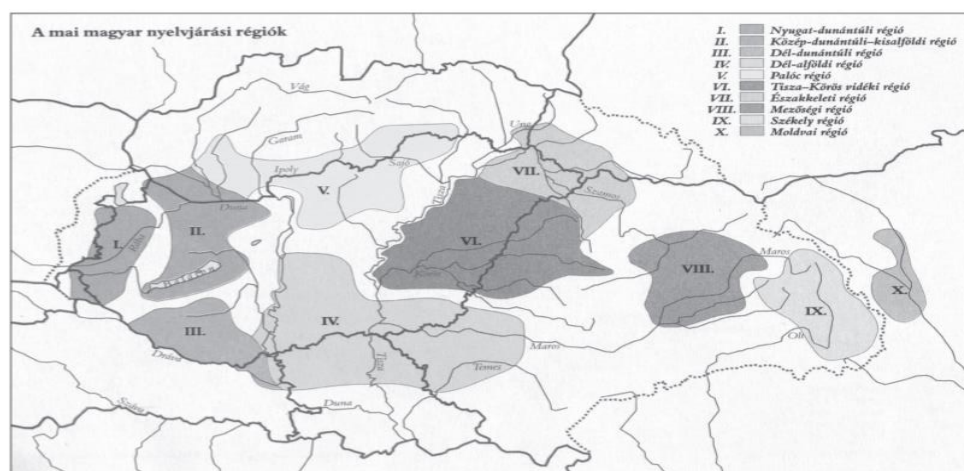
Figure 1. Hungarian dialectal regions in the XX. century[3]

Source: Kiss, J. (2001). Az alkalmazott dialektológia: a nyelvjárások és az anyanyelvoktatás.

In: J. Kiss (Ed.) *Magyar dialektológia.* Budapest: Osiris Kiadó. 145–156. 6. térkép

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[2] https://amp.en.google-info.cn/39427010/1/hungarian-dialects.html
[3] http://real.mtak.hu/75696/1/Tolcsvai_Magyarnyelv_199_Kiss.pdf

My research was conducted in Siófok, Hungary, where Central Transdanubian dialect is used. This can be divided into the Szigetköz, the Csallóköz and the Mátyusföld subdialect, which are in a way similar to the Western Transdanubian dialect in vocabulary and pronunciation. There are *ë–e~ä* sounds, but there are no diphthongs at the places of *ó, ő, é*. There are *o*-s after *á* sounds: háto, lábos. The tone of *á* is closed more. *Ú* and *í* sounds are usually short (Kiss 2017).

1.2 L2 acquisition and foreign language learning

First and for most of all I have to make a clear differentiation between second language acquisition and foreign language learning. Based on Krashen's distinction between acquisition and learning (1977) it is clear that there are two systems of second language performance, which are independent. As Wolfgang Klein writes about it in 1986 in his book titled Second Language Acquisition „The Acquisition-Learning Hypothesis of Krashen makes a distinction between acquiring and learning a second language. Acquisition is a natural language development process that occurs when the target language is used in meaningful interactions with native speakers, in a manner similar to first language acquisition—with no particular attention to form. Language learning, in contrast, refers to the formal and conscious study of language forms and functions as explicitly taught in foreign language classrooms" (Klein 1986:53.).

Regarding the language background, secondary vocational school students in Hungary, in general, are in a multiple situation as they compulsorily learn their mother tongue (Hungarian) and a foreign language (i.e.:English) simultaneously in educational settings, according to the national curriculum. They have diverse linguistic backgrounds with their own dialects and a common aim, to pass the school-leaving exam in a foreign language. The aim of L2 teaching is to provide a language knowledge for everyday purposes. In Hungary the National Core Curriculum (NAT) and the Framework Curriculum define the final aim in the knowledge of languages. As Petneki highlights (2009) students learn languages with different results, depending on which languages they learn at school. Theoretically there is a free choice of a limited number of foreign languages, and the choice is based on the availibility of language teachers. The two main languages taught in Hungary are: English and German. „According to one research study, language learning is influenced by the following factors: What part of the country pupils are studying in, the size of their community, their mother's (parents') level of education, the students' degree of capability, their achievement based on test exercises"[4]

In the present study secondary vocational school students come from Siófok, Transdanubia, Hungary. They all come from monolinguals and they are all instructed learners of English as L2 (for further details on their SES background see chapter 3.1.1).

As my dissertation aims at the analysis of bilingual written word recogntion in the next subchapter I will reveal details about the acquisition of written L2.

1.2.1   The acquisition of written L2

When learning a second language it is important to learn the writing system as well. Since my research data relates to English as an L2 in Hungary, I will refer only to English when discussing L2 questions.

[4] Petneki Katalin 2009 június 17. https://ofi.oh.gov.hu/teaching-and-learning-090617/teaching-foreign.

Both English and Hungarian use the Latin alphabets. Bassetti (2006) argues that a writing system represents language in discrete units, which are represented by graphemes. Learners' knowledge of their L1 writing system has an effect on how they use it in their L2. If a learner meets a new language it is important to learn the writing system, for which metalinguistic awareness is essential. L2 users and native users of this system, are different in reading, writing and thinking about it. [5]

Elliot cites[6] Cook & Bassetti (2005), who say second language writing systems have increasingly become the focus of growing body of research drawing on the fields of psychology, education, linguistics and second language acquisition among others. The term writing system is used to refer to the ways in which written symbols represent language in a systematic way. Further, a writing system can be discussed both in terms of its script and its orthography. Cook and Bassetti define script as the physical implementation of a writing system (ie. the written symbols) and orthography as the rule for using a script in a particular language. Koda (2005) finds that writing systems can be two folded: orthographic type (the minimal language unit represented in a script) and orthographic depth (the degree of regularity in symbol sound correspondences). If it is highly regular, the orthography is shallow, if not, it is deep.

In the recognition process of a writing system, more precisely word recognition and processing, several factors have inevitable roles. There is an assumption that the visual representation of a word influences processing (integrated lexicon), both potential word choices are activated (nonselective access) and because bilinguals' language proficiency is lower in L2 than in L1, the activation of L2 lexical representations will be delayed. Word recognition is an indispensable step in language comprehension. Understanding the meaning of a written word is a multiple task. After seeing a word a contact is made between the word and its representation. When a bilingual encounters a written word the activation of information can happen in two different ways. If the activation of information happens in both of a bilingual's linguistic subsystems in the bilingual memory, it is called language-nonselective lexical access.

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[5] https://www.llas.ac.uk/resources/gpg/2662.html
[6] http://www.ncolctl.org/files/second-Language.pdf

If the activation of information happens exclusively in the appropriate subsystem, which contains the representation of the input-word, it is language-selective lexical access (see chapter 3.1.1). For a detailed review on this topic see De Groot (2011).

The debate about the onset of written L2 acquisition is a critical issue in Hungary. Language teachers are concerned whether it is good or not for bilinguals or second language learners to start the acquisition of the written forms of their languages at the same time. Many teachers believe that children are not capable of learning two writing systems at a time, and that they will be confused and delayed in their learning processes. The general view is that children first should learn how to read and write in their L1, and so learning a second language should only be started some years later to avoid interferences and delays. However, literature so far has found that two similar writing systems may slow down, but they also may accelerate the acquisition process of two written languages (Bialystok 2004), while two different systems have no effect on each other.

Writing as a process, based on the above mentioned elements, is a complex procedure. As Zhang (2008) cites Ma and Wen (1999) the L2 writing ability of writers at different L2 proficiency levels could be significantly predicted by L1 writing ability. L2 writing was indirectly affected by L1 writing ability, which in turn, directly affected L2 oral expression ability, L2 vocabulary comprehension and L2 discourse comprehension ability. He continues with Khaled's thoughts (2007) writing include several competencies such as cognitive, sociocultural elements besides variety of linguistics. Hence, it is a complicated skill for L2 learners.

Klimova (2014) says that first and second language writing acquisition are different as far as the level of proficiency and writing skills are concerned. It is highlighted that teachers can help the procedure of L2 writing acquisition by focusing on students' needs and by using different methods such as consciousness raising, translation method and giving feedback.

„For more than a decade now, a great deal of research has been done on the topic of written corrective feedback (CF) in SLA and second language (L2) writing. Nonetheless, what those research efforts really have shown as well as the possible implications for practice remain in dispute.

Although L2 writing and SLA researchers often examine similar phenomena in similar ways, they do not necessarily ask the same questions. SLA-focused researchers investigate whether written CF facilitates the acquisition of particular linguistic features. In contrast, L2 writing researchers generally emphasize the question of whether written CF helps student writers improve the overall effectiveness of their texts" (Ferris 2010:181).

In the present dissertation writing systems are highly substantial as with three exceptions (LLAMA language aptitude test, verbal fluency test and interview) all the adopted tests were written. Writing systems include language units and different symbols. Learning a new language means new linguistic units, new symbols, new punctuation and new rules.

I believe that successful written word recognition is one of the fundamental steps in language learning in the next subchapter I will deal with some other components of successful language learning.

1.2.2 Criteria of successful language acquisition and language learning

Many attempts have been made in order to find the basic criteria of second language acquisition, which is a twofolded procedure as it can be successful or unsuccesful. Van Avermaet (2006) highlights that inspite of the fact that diglossia and linguistic background were not taken into consideration in research, they can affect successful language acquisition. Results of OECD-PISA show that education is not always successful. Children, who do not have many opportunities for successful language acquisition, have difficulties in education to catch up.

Therefore the educational gap becomes bigger, and that is the reason why relationship between socioeconomic status and school success must be attended to. Language acquisition can be blocked/set back by specific factors such as disadvantageous social, financial, emotional background, poor exposure to a language etc. These factors will inevitably have effects on education and school achievement. Bátyi (2011) says language background, environment, school and the family's language affect knowledge of languages and the structure of the mental lexicon. [7]

Foreign language learning as a process is not always successful as there are specific factors, which can set back the procedure. These factors are widespread containing exterior (SES, learning circumstances, etc.) and interior (motivation, aptitude, special educational needs, etc.) ones. To start with and exterior example Pfenninger (2017) argues that students in various school contexts/school climate have different educational attainment. She concludes her study as the broader social environment of learning is more influential than the cognitive state (Pfenninger 2017). Ma & Ma & Bradely (2008:99) state on shool context research: „School effects research represents a macro level empirical investigation that focuses on the effectiveness of educational policy and practice in promoting positive educational outcomes for students. Schools are differentially effective in capitalizing on educational policy and practice because they have different school context and climate". To continue with an interior factor SEN could be taken into account. Special educational needs (SEN) means difficulties in learning. These difficulties can be based on cognition and/or learning needs, communication and interaction difficulties, social-emotional-behavioral difficulties, sensory impairments and medical conditions. Types of SEN are categorized by Delaney (2016) as follows: (i) cognition and learning based, as in Down's Syndrome, where students have general learning difficulties; (ii) communication and interaction based, such as in autism spectrum condition, Asperger's syndrome, or students with speech and language production and reception difficulties; (iii) social, emotional and behavioral difficulties for instance attention deficit hyperactivity disorder; sensory impairments including hearing, visual, physical impairments; (iv) medical condition based including asthma, diabetes, epilepsy.

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[7] http://karpataljaiadatbank.net/images/pdf/batyi%20szilvia.pdf

Integrating exterior and interior affective factors of foreign language learning Polonyi & Mérő (2007:109) group the criteria of successful language learning in three categories (Table 1.): (i) external factors, which can have positive or negative effects, on (ii) motivational and cognitive factors, (iii) personal attributes and intelligence.

		outer factors		
		good communicative and writing competence		
linguistic talent	memory		endurance	motivation
	good phonetical and imitative ability		interest	
	communicative ability		positive attitude	
	analytical and combining ability		volition	
		knowledge of another language		
		musical talent		
	bravery	intelligence	openness	

Table 1. Factors of successful language learning according to Polonyi & Mérő

Source: Polonyi, T. É. & Mérő, D. (2007). A sikeres nyelvtanulás tényezői.

Alkalmazott Pszichológia 2, 109.

This model is a summary of some necessary components of successful language learning although not an exhaustive one. Not every layer of language was taken into account. Phonetics (sounds), was included but none of the others such as phonology (phonemes), morphology (words), syntax (phrases and sentences), semantics (literal meaning), pragmatics (meaning in context). Regarding linguistic talent, written language was in a way neglected, letter patterns and syllables are not presented in the list. In my view these concepts are equally important in the success of language learning.

As I think openness intelligence and bravery should not be among outer factors while volition and interest are in the center of the figure in motivation. I miss the detailed list in terms of outer factors too.

The question of: *What factors affect the success of language learning?* is constant in school circumstances. The reason behind being unsuccessful in learning languages was examined in Subcarpathia (Bátyi 2014a) According to this study non adequate coursebooks, methods and teachers are the main reasons. Bátyi finds that according to families, educational setting should include motivation and teaching of foreign languages. Navracsics & Sáry (2017) argue that a higher level of phonological awareness can be achieved by school instruction with conscious learning, where a special attention to phonology is paid. „Students' integrativity and attitudes form their language learning motivation, which is determining in the success of learning. Gardner regards motivation important in formal and informal learning, while aptitude, which is independent from motivation significant in formal and subsidiary in informal language learning. Those who have good aptitude and motivation reach better knowledge and show more positive attitude than others" (Sominé, 2011:68).

„Students' approach and attitude can affect the success of language learning (Csizér & Dörnyei, 2002; Csizér et al., 2004). Tánczos and Máth (2005) conclude, that every third student learns language because of a constraint, and at the same time they maintain, that without inner motivation it is impossible to be a successful language learner. „Teachers and parents have important role in motivating students, which seems to be fixed by the age of 14" (Novák & Fónai 2020:20). As Novák and Fónai summarise, successful language learning depends on the educational level of parents, the students' opinion about importance of language knowledge, but independent of the number of language lessons per week. Most of secondary school students watch films in a foreign language, more than half of them read in a foreign language and nearly half of them communicate with foreign people in foreign languages. Gardner (1975) connects language aptitude and success in second language learning. Successful foreign language learning as Flores (2015) defines is affected by anxiety, inner motivation and attitudes. Mobile apps, which support language learning, positively affect attitudes, decrease anxiety and increase motivation.

Mystkowska Wiertalak and Pawlak (2017) claim that motivation is a key concept in the success of learning additional languages.

1.2.3 Metalinguistic awareness in second language acquisition

Metalinguistic awareness in the present thesis is crucial since the participants in the linguistic tests had to recognize specific languages, and in these languages specific words. It was a kind of playing with a language in makig anagrams, recognizing homographs, and creating words from previously given letter strings and first syllables.

Göncz (2003) draws a clear distinction between the main concepts in terms of metalinguistic awareness. In his definition, metalinguistic awareness makes it possible to use a language in order to understand messages and this helps the linguistic system, structure to be the object of thinking. There are four types of awareness depending on the level in focus. The types are (i) phonemic awareness: the ability to segment the spoken words into sounds, (ii) word awareness: the ability to segment the sentence into words, (iii) syntactic awareness: the ability to listen to the grammatical structure of a sentence, (iv) pragmatic awareness: awareness of the connection between the linguistic system and the communication setting.

In her analysis, Ulrike Jessner (2006) makes a distinction between three significant concepts in language acquisition: (i) language awareness is a point of commonality between languages. (ii) linguistic awareness is a key factor of multilingual proficiency – in my study these first two concepts are relevant – (iii) cross-linguistic awareness means making use of two supporter languages, during the production of a third related language. Devoting her research predominantly to investigate metalinguistic and multilingual awareness (2006, 2008), in 2008 Jessner defines metalinguistic awareness as the ability to focus attention on language as an object in itself, to think about language, to play with language. „Metalinguistic awareness is the ability to focus on linguistic form and to switch focus between form and meaning. Individuals who can categorize words into parts of speech, can switch focus between form, function and meaning" (Jessner 2008: 277).

Metalinguistic awareness in Ehrensberger-Dow & Perrin's (2009) interpretation is the ability to reflect upon and manipulate languages, a sensitivity to what is implied rather than stated, and an analytical attitude towards language.

In recent years there has been a considerable interest in explaining metalinguistic awareness. Duncan et al. (2009) claim that in order to achieve it, the speaker has to focus on the structure of language. Ramirez et al. (2013) argue that metalinguistc awareness is an ability to distance the speaker from the content of speech so as to juggle the language's structure (Altman et al. 2018).

Atar (2018) quoting Bialystok (2001) suggests that metalinguistic awareness means to know and reflect upon a language. This kind of awareness includes striking out that languages have structures. About L2 users it was pointed out that they and monolinguals have different knowledge of L1, plus cognitive changes caused by language acquisition increases their metalinguistic awareness.

For people speaking or using more than one language metalinguistic awareness is assumed to be better than for monolingual speakers since they need to analyse at least two languages at a time. There is a considerable amount of literature on the investigation of written and spoken bilingual processing with its positive and negative aspects. The next subchapter discusses theories and models of word processing.

1.3   Bilingual written word processing

In the next section, I will highlight some of the most important milestones in bilingualism and visual word recognition, as both of them are crucial concepts in language learning and in it word processing.

Word recognition as a concept has received much attention in the past decades, as it is a fundamental constituent in language processing. In a narrow sense, word recognition is the moment of a match between a printed word and its orthographic word-form in the mental lexicon.

After this match, all information becomes available for processing. The second stage is lexical access in this procedure. In a broader interpretation, word recognition refers to a whole procedure from perception to all the knowledge stored with its lexical representation (De Groot 2011).

Lengyel (1997) states that the importance of word recognition is based on different factors. It is a part of understnding a language, basis of semantic and grammatical understanding and a significant factor in writing and reading procedures. He also highlights that lexical decision test is among the best known techniques in examining written word recognition. In this test type the participant has to decide about a letter string whether it is a word or not. The correctness of the answer and the reaction time give data about the mental lexicon's procedures. He argues that there are specific factors which affect word recognition: frequency, wordlike effect, context, quality of the stimulus, word superiority, structure of cognitive knowledge, regularity, consistency, word length and rhythm.

Scientific research in the 20th century on bilingualism was based on that separate lexicons store words of different languages. Weinreich (1953) makes a distinction between three types of organization of languages: (i) coordinate, where the two languages are separated, (ii) compound, where languages share semantic representations, (iii) subordinate, L2 words have access to the semantic system after translation. Grainger (1993), (Grainger & Dijkstra 1992) introduces two models: the bilingual activation verification model, in which orthographic information activates lexical representation, bilingual interactive activation model, where letter representations, are activated by sensory input (Brysbaert et al. 1999).

Preliminary research on language activation has proposed that the activation of the bilingual memory can happen in two ways, in a language non-selective way with coactivation of information or in a language selective way with activation of information in the appropriate system. When investigating the bilingual lexical access, the activation or retrieval process of the mental lexicon is in the focus of attention. It is interpreted, as all aspects of word processing, including mental activities from perception to lexical knowledge. In the classical approach, language selective access is activation of information in one language system.

When a bilingual person faces a word, a decision has to be made on the language what is followed by the activation of the target language in the language-selected lexicon.

Language-non-selective access is a coactivation of words in both language systems. Encountering a word is followed by parallel activation in linguistic systems. That is the reason why bilinguals are slower in language specific tasks, as they do not deactivate the other language (De Groot 2011).

„Orthographic awareness develops at quite an early phase of language learning, which helps with decisions about the languages. However, if the phonological features do not separate words at the orthographic level, i.e. letter strings may suit the phonotactic rules of both languages, semantics could be the next help in deciding which language node to activate" (Navracsics et al 2014:126). (These finding will be crucial in section 1.3.1 in connection with SOPHIA model).

Keating (2017) argues that grammatical processing in L1 and L2 are different. To confirm this statement he mentioned Clashen and Felser's shallow structure hypothesis: L2 learners do not compute abstract representations in sentence comprehension, as they use lexical, semantic and pragmatic information.

1.3.1   Models of language processing

Trace model (Figure 2.) is the first model of speech perception, which was developed, by James McClelland and Jeffrey Elman in 1986. It is based on a dynamic processing structure made up of a network of units and a kind of interactive activation. The activated units convey information from one layer to another until a word becomes recognized. In this procedure, the brain processes speech sounds as they were heard. Bilingual people have two language networks (Grosjean 1997), which allow a bilingual person to speak only one language, and as they are interconnected, they also interact and influence one another, which can result in cross-linguistic influences, implicit interferences, and this makes bilinguals be able to switch between codes.
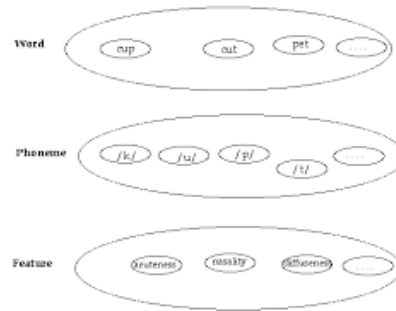
Figure 2. Trace model of speech perception by Mc Clelland &Elman

Source: https://en.wikiversity.org/wiki/Psycholinguistics/Models_of_Speech_Perception

Léwy and Grosjean invented the BIMOLA (Bilingual Model of Lexical Access) model (Figure 3.) in 1998 for bilingual auditive word recognition. This localist model is based on recognition of spoken words and on the assumption that a bilingual person stores lexical data in the same system. BIMOLA model contains three levels of nodes: features, phonemes and words. In this conception the feature level is the same to both languages, but the level for phonemes and words are different for the languages as organised in subsets. „Connections (mainly excitatory) are unidirectional between features and phonemes and bidirectional between phonemes and words" (Grosjean 1997: 183). Firstly features activate phonemes and then phonemes activate words.

„Descending connections bearing information about the listener's base language and language mode, and information from the higher linguistic levels (semantic, syntactic), serve to activate words which in turn can activate phonemes. Language activation (reflected by the overall activation of one language system over the other) takes place through these descending connections but also through within language connections at the phoneme and word levels. Finally, at the phoneme level, between phoneme connections within a language can allow for phonotactic activation" (Grosjean 1997: 183). At the level of words, word frequency is signed by the units' size. During processing there are activating and inhibitory procedures. BIMOLA accounts for language specific activation. In this model representations are fixed.
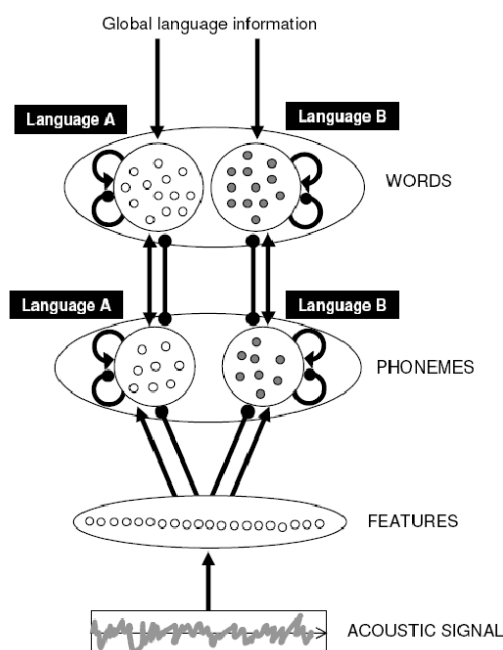
Figure 3. BIMOLA model for bilingual auduitve word recognition by Léwy & Grosjean

Source: https://www.researchgate.net/figure/The-Bilingual-Model-of-Lexical-Access-BIMOLA-as-proposed-in-Thomas-and-Van-Heuven_fig7_259641224

Dijkstra and van Heuven in 1998 created BIA (Bilingual Interactive Activation) model (Figure 4.), another connectionist, computational, localist model, focusing on visual word recognition, which is an extended version of McClelland & Rumelhart's (1981) interactive activation (IA) model. BIA emphasizing the orthographic representation of words and it is a language non-selective model on four levels: letter features, letters, ortographic forms of words, and as a new feature, language node. The features and letters are in an organic system, while words are in separate subsystems. Language nodes' layer contains two nodes, one for each language. After activation and inhibition, the lexical candidate, which matches the presented word, will be the most active. With the activation of the word, the language node is activated and the other language node is deactivated. Because of the interconnectedness of nodes within the word level, the word nodes mutually inhibit each other's activation (De Groot 2011).

A visual word is presented, it activates the feature nodes, which activate or inhibit the letter nodes, then letter nodes activate or inhibit word nodes. This activation is transmitted to the language node.

More details on this topic can be found in the book of De Groot (2011).
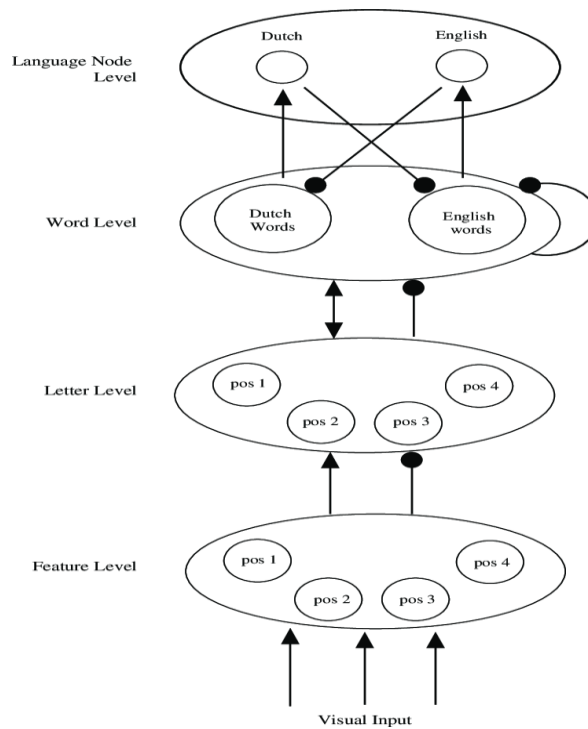
Figure 4. BIA model on visual word recognition by Dijkstra and van Heuven

The Semantic, Orthographic, and Phonological Interactive Activation/SOPHIA model (Figure 5.), integrates phonology and orthography. In 2001, Van Heuven and Dijkstra introduced this bilingual model, which connects levels of auditory and written word recognition. During the procedure of written word recognition, there is phonological activation. "Sublexical orthography and sublexical phonology are in constant interaction. Sublexical attributes activate the appropriate word and inhibit the other word" (Somogyi 2017: 84).

This model is incomparable as this is the first model, which takes semantics into consideration and this model includes a more detailed representation of orthography than BIA did, as a level of orthographic clusters and level of orthographic syllables appeared too.

SOPHIA model support that during the processing of written words phonological activation happens, during reading written words, auditory form of words also activates. Nodes can inhibit or activate representations.
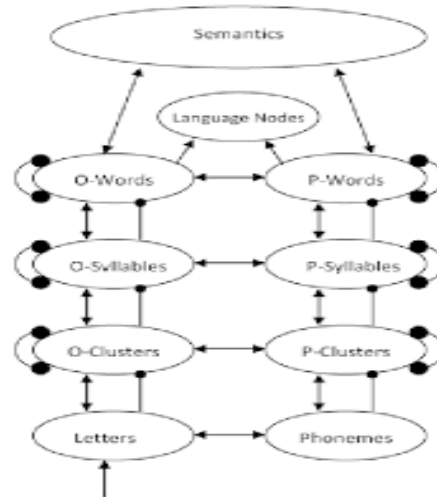
Figure 5. SOPHIA model by van Heuven & Dijkstra

Source: https://www.researchgate.net/figure/The-Semantic-Orthographic-Phonological-Interactive-Activation-model-SOPHIA-adapted_fig6_259641224

BIA+ (Bilingual Interactive Activation +) model (Figure 6.) from Dijkstra and Van Heuven (2002) focuses on how the languages are manipulated. "This model includes a control system to SOPHIA's word identification system. This control or task decision system is sensitive to extra-linguistic influences, whereas word identification system is only affected by linguistic sources of information" (De Groot 2011:180). The input activates sublexical ortography, which later activates lexical ortography and sublexical phonology and so on. Lemhöfer & Dijkstra (2004) point out that BIA+ model is based on that a visual-input causes parallel activation in the languages. According to this model interlingual homographs have separate representations for each language. The representations are monitored by the task decision system. Different tasks result in different response patterns as responding can happen at different time.

20

Task/Decision System

Word Identification System

Semantics

Language nodes

Lexical Orthography

Lexical Phonology

Sublexical Orthography

Sublexical Phonology

Input
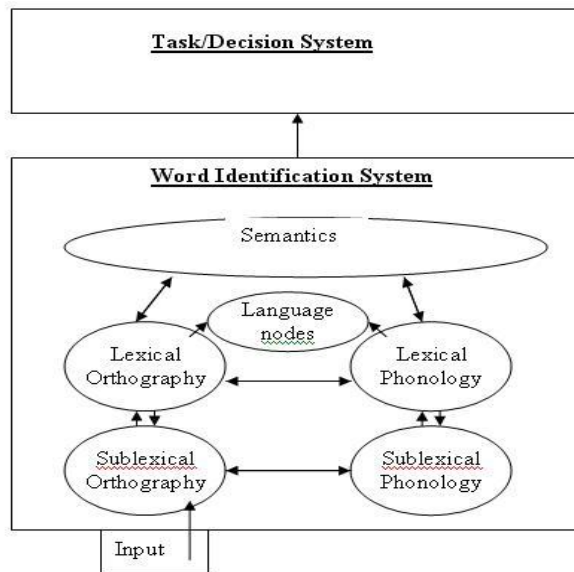
Figure 6. BIA+ model by Dijkstra & van Heuven

Source: https://en.wikipedia.org/wiki/Bilingual_lexical_access

„Proficiency in target and non target languages as well as cross linguistic overlap determine the extent of bilinguals' parallel language activation"[8] (Blumenfeld & Marian 2005: 286).

Kaushanskaya & Marian (2007) draw our attention to information processing, which is a substantial factor of the preceeding models. They underline that recognition is sensitive to lexical information while production is sensitive to phonological information. They come to the conclusion that bilinguals who produce words in one language can exercise a certain degree in language selection in production, while in recognition this procedure is less controlled.

To build upon Lemhöfer et al.'s (2008) construction of word frequency effect (L2 speakers need more time than L1 speakers to process low-frequency words) Brysbaert et al. (2017) suggest that word frequency effect is stronger in processing L2 than in processing L1. As lexical entrenchment hypothesis (Diependaele et al. 2013) defines this difference is caused by distinctions in exposure to the target language less exposure,

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[8] https://escholarship.org/content/qt9049m68c/qt9049m68c.pdf

measured with a vocabulary test result in steeper frequency curve for a language. They claimed that characteristics of L2 words are more significant than interference between L1 and L2 in understanding L2 word processing.

Not only linguistic components have effects on language processing, but there are also many non-linguistic factors, which affect word processing. The following subchapter deals with these non-linguistic factors.

1.4   Influencing factors of general language skills

I strongly believe that language teachers should keep in mind that in our era students and circumstances of teaching are permanently changing.

As I investigated 60 participants from the 15-year-old generation, I would like to highlight some thoughts of Tari (2015), who explains that the generation of 15-year-old students is prone to constant changes. The digital era caused significant changes in their average skills. The content of human attention reduced from 12 seconds to 8 seconds in our digital world. Among children in the 21st century there is a fallback at cognitive abilities. The ability to elaborate ideas, reflective thinking and creativity have reduced.

Dudley & Osváth (2016) point out that teachers should show sensitivity towards the students' attitudes and motivation and it will have a positive effect on the classroom dynamic. This will result in creating strong and positive learning morale. Teachers should avoid negativism and focus on positive behavior. To have a positive effect on the students' attitudes they have to focus on their emotions and expectations about the learning situation. Regarding success it is important to listen to social skills, values and life skills.

In the next subchapters, I will highlight subsequent and more recent literature on factors, which can affect 21st century students and their language learning procedures. For those aspects of language learning which are not totally language or linguistic based as an umbrella term I use non-linguistic factors, which includes: socioeconomic status,

language attitude, usage of ICT devices, language aptitude, motivation, creativity and bidialectism. In the following sections I will study them one by one.

1.4.1   Socioeconomic status

Focusing on socioeconomic status (SES) must be a vital part of investigating cognitive achievement of language learners. According to Molnár (2007), the educational level of parents is a good indicator of the family's socioeconomic status and as it can be seen in her research results more than a half of primary school students in Békés, Csongrád and Jász-Nagykun-Szolnok counties are from families where the educational level of parents is maximum secondary vocational school (Molnár 2007: 278).

Dealing with socially disadvantaged learners essentially means being able to deal with diversity and heterogeneity in mainstream classrooms. When we see (language) learning as a process of social construction, diversity and heterogeneity is an advantage rather than a disadvantage. Putting socially disadvantaged children in "pullout classes" and providing separate curricula and tests reverts to a purely psychological approach to (language) learning: the individual child who has a language deficit and who will be better off if we treat him separately in a homogeneous group of children with the same "problem". We then neglect the social aspect and want them to adapt to norms and values set by representatives of a specific social background (Van Avermaet 2006).

Fejes & Józsa (2005) investigate disadvantaged situation from many perspectives. In a pedagogical view this means unfavorable situations concerning cultural, social and economic circumstances. If a child's position is more difficult than in average cases it can be named as disadvantaged and this disadvantage affects personality, learning and quality of life. Having good financial background can be disadvantaged too if there is a language drawback, disfunctional family socialisation and stereotype. Language drawback in sociolinguistics is a kind of financial drawback as in language development language skills have decisive role. The development of learning motifs is affected by emotional drawback. If this misses, it causes a fallback in motif's development.

„Socioeconomic status (SES) encompasses not just income but also educational attainment, financial security, and subjective perceptions of social status and social class. Socioeconomic status can encompass quality of life attributes as well as the opportunities and privileges afforded to people within society."[9]

Socioeconomic status has various approaches in terms of word recognition and language skills. Korat (2005) claimes that low SES children have poorer contextual and non-contextual knowledge than high SES children. Word recognition can be predicted by non-contextual components and not by contextual knowledge such as SES or age.

„Children who grow up in a socially disadvantaged context often lack the language skills required to function in society in the way that society expects them to" (Van Avermaet 2006:7). This statement aptly introduces the significance of socioeconomic status (SES). As our research is based on test results measuring linguistic and non-linguistic skills of students from a non-elite secondary school, the research also has to reflect the importance of socioeconomic status.

In their investigation into SES Hackman & Farah (2009) show that SES in addition to social factors such as power, prestige and hierarchical social status includes economical factors. Multiple family, psychosocial and neighborhood experiences and characteristics are those factors that influence development negatively. They emphasized that the most common indicators of SES are occupation, income and education. They studied language ability as a factor in connection with SES and they concluded „… language ability differs sharply as a function of SES. For example in one classic study the average vocabulary size of 3-year-old children from professional families was more than twice as large as for those of welfare. SES gradients have been observed in vocabulary, phonological awareness and syntax at many different stages of development" (Hackman & Farah 2009:66).

As a striking feature of the 2012 PISA test a strong connection was found between family background and school achievement in Hungary.

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[9] https://www.apa.org/pi/ses/resources/publications/education

More recent evidence from Pace et al (2017) reveals that SES is a kind of access to financial, educational and social resources, and their social positioning, prestige and privileges.

„SES exerts its influence on verbal ability beginning with the individual child's characteristics, progressing to the quantity and quality of parent-child interactions and ending with the availibility of materials for language learning in the home and informal learning opportunities outside the home" (Pace et al 2017:287). The best predictor of school readiness and school success at Pace et al. (2017) is language ability. Those kids who are from poor SES have worse results in language comprehension and production when entering school.

Giacomo et al. (2018) conclude that linguistic, social and cognitive stimulation is fewer for disadvantaged children than children from higher SES circumstances.

Irrespective of low socioeconomic status, children's language attitude can be absolutely positive or vice versa. The following subchapter deals with attitude on languages.

1.4.2   Language attitude

„Language attitudes are evaluative reactions to different language varieties. They reflect, at least in part, two sequential cognitive processes: social categorization and stereotyping. First, listeners use linguistic cues (e.g., accent) to infer speakers' social group membership(s). Second, based on that categorization, they attribute to speakers stereotypic traits associated with those inferred group membership(s)."[10]

In the literature, there are several definitions of the term „attitude". Dweik & Qawar (2015) find evidence that positive attitudes towards L1 originate from pride and culture.

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[10]https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-437.

„Given, as Appel & Muysken (1987: 16) correctly observe, the fact that languages are not only objective, socially neutral instruments for conveying meaning, but are linked-up with the identities of social or ethnic groups has consequences for the social evaluation of, and the attitudes towards languages" (Ihemere 2006:194).

As Gudykunst and Schmidt (1987: 157) say, "language and ethnic identity are related reciprocally, i.e. language usage influences the formation of ethnic identity, but ethnic identity also influences language attitudes and language usage" (Liu & Zhao 2011: 963).

Bátyi (2014a) cites Allport's definition of attitude, which can be interpreted as an influence on individual and a kind of mental readiness. Changing attitude has contradictory results in the short and long run.

Tódor & Dégi (2016) explain: „Positive attitude towards the language and its speakers can lead to increased motivation, which then results in better learning achievement and a positive attitude towards learning the language" (Tódor & Dégi 2016: 123). In their interpretation attitude is a set of variables which predict learner efficiency and achievement. They found that students' positive attitude towards languages helps cross linguistic associations and multilingual thinking.

As it can be found in Miller (2017), linguistic attitudes are the attitudes that speakers have towards their languages or language varieties. Feelings about a language reflect many things such as ease or difficulty of learning, social status, elegance, etc. Language attitudes can show feelings about a language. In investigating how attitudes change toward the minority language with age, he concluded that a shift occurs in language preference before a shift in language dominance.

„Positive attitudes towards a language often lead to higher motivation to learn and higher proficiency in the language" (Liu & Zhao 2011: 963).

1.4.3   Infocommunication Technology

„Information and communications technology (ICT) refers to all the technology used to handle telecommunications, broadcast media, intelligent building management systems,

audiovisual processing and transmission systems, and network-based control and monitoring functions."[11]

„Using ICT gives the learners real-life contact with, and exposure to the cultures of the peoples and countries where the new language is spoken and enables children to access and research information worldwide" (Ghasemi & Hashemi 2011:3099). ICT in the next few years will inevitably be an issue in teaching practice, as digital era has come because of COVID-19. The next decade is likely to witness a considerable rise in digital platforms of teaching.

Students use ICT devices as a source in learning context so not only students but teachers and parents also have to be able to apply ICT. As ICT is a constantly renewal field of science language learning can be facilitated by it. Its diversified quality makes it possible to use it for the practice of written and oral language. Language proficiency and academic skills can be developed with the help of it. Multimedia and Internet offer various new forms of education. In present days when digital teaching is required, a total reshaping is needed from students and teachers too in educational settings in teaching platforms, methodologies and everyday practises.

Ghaznavi et al. (2011) state that teachers using ICT should be multi-skilled people. ICT seems to be effective in increasing educational motivation, enhancing question-making skill, and enforcing research spirit. Talebian et al. (2014) claim that the application of ICT aims learning without constraints of time and place, which meet the needs of students. Its effectiveness depends on its usage as it does not work for everyone or everywhere the same way.

Aworanti (2016) suggests that ICT is a good tool to expand access to education, moreover it raises the quality of education with the help of an active process based on real life. Furthermore ICT highlights learning, teaching, certification and also assessment.

As Deaconu et al. (2018) describe, ICT includes many techniques and tools in order to communicate and to manage the information which are essential in learning and teaching. In altering key competences of students, teachers should avoid traditional methods and implement new ones in their teaching practice.

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[11] http://europeyou.eu/es/what-is-information-and-communication-technology/

There has been a huge number of scientific studies on the need and effectiveness of ICT usage in foreign language teaching and second language acquisition. „It was found that Digital Learning Games can be used as effective L2 learning tools that motivate players to learn and interact. Digital Game Based Language Learning can be a fun, engaging, and challenging way to learn, and provides differentiation and learner autonomy. From the included studies, 70% of the reported outcomes were entirely positive. This is evidence of the positive outcomes of DGBLL on primary through high school-age children" (Acquah & Katz 2020:12).

„In conclusion, it can be established that the use of Gamification in L2 learning contributes positively to the learning experience based on the information presented. At the same time learning interventions need to be taken with precaution. Gamification helps the L2 learner in plenty of personality factors. In addition the learner moves forward from an introverted mode of shyness and more motivated based on positive feedback and the game elements used. Gamifying the L2 classroom enhances the learning of writing, reading, and speaking and motivates collaboration and interaction. Through Gamification the educator is able to create meaningful experiences that will move away from just a game thinking mentality to a techno-constructivist mentality. To achieve success with Gamification in L2 learning the objectives and goals need to be aligned and have formal assessment criteria" (Flores 2015:19).

„ICT helps a student, who becomes more and more autonomous, define what learning strategies can be applied by learning different content from both printed and online sources, which are placed on institutional (University) and non-institutional (free online) platforms. Thus, a student is free to choose what, where and when to learn, expanding their foreign language learning experience to outside the classroom. A range of online resources for both teachers and learners are offered to be used in mastering four foreign language skills: reading, listening, writing and speaking, together with the proposed activities" (Kupchyk & Litvinchuk 2021:12).

„To conclude, the use of information and computer technologies opens up new opportunities for teaching English as it allows us to effectively organize the independent work of the student and thereby contributes to the formation of a free, active, independent, autonomous and competitive personality which is the main task of the modern educational places"(Ruzikulovna: 2020:1062).

Deaconu et al (2018) say ICT usage in most European countries' education emphasize teachers'skills, improve students' achievment. „These are those effects of using ICT which should not be forgotten by 21st century teachers.

ICT and lanuage learning: „ICT offers a powerful way of enabling children to be fully engaged in their own language learning process. Tasks done at home, at school or on a trip abroad can be uploaded to a learning platform, enabling teachers, parents and children to make comments and celebrate achievement. There is an increasing range of effective software to support primary languages teaching and learning" (Ghasemi & Hashemi 2011:3099).

As ICT is a constantly renewal field of science language learning can be facilitated by it. Its diversified quality makes it possible to use it for the practice of written and oral language. Language proficiency and academic skills can be developed with the help of it. Multimedia and Internet offer various new forms of education. In present days when digital teaching is required, a total reshaping is needed from students and teachers too in educational settings in teaching platforms, methodologies and everyday practises.

1.4.4   Language aptitude

In the literature there are various definitions of language aptitude. „Language aptitude refers to the potential that a person has for learning languages."[12]

Being a further significant factor of language learning, in general, average aptitude has many explanations in the literature. Sternberg (1984) introduces 17 types of aptitude and states that every society can decide on what is aptitude. Ágoston (1985) says that talented is a person, who is able to give an achievement above the average level. Harsányi (1994) argues that aptitude is an innate activity which creates an achievement highly above the average on a field of human activity.

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[12] https://www.teachingenglish.org.uk/article/language-aptitude

In Czeizel's (1997) 4x2+1 model (Table 2.), exceptional achievement is based on the coexistence of four factors. He suggests that aptitude is in grain but it has external terms.

family		school
	specific mental aptitude	
general intelligence aptitude		creative aptitude
	motivational aptitude	
contemporary group	fate factor	society

Table 2. Czeizel's 4X2+1 talent model

Source: Czeizel, E. (1997). *Sors és Tehetség*. Budapest: Minerva Kiadó.

From Czeizel's model family, school, contemporary group and society could be grouped as one and named as SES. Fate factor is irrelevant for my present study in a way that everyone has a fate so it is independent of the individual's gender, age, knowledge, aptitude, and environment.

One aim of the dissertation is to find ways and recognize correlations with the help of which students can be more successful in foreign language learning. In order to improve, we have to be aware of the factors important for becoming a successful/talented learner. Both of the previously mentioned models of Polonyi & Mérő and Czeizel investigate most of the necessary factors in becoming successful language learners.

Herdina & Jessner (2002) underline that aptitude as a concept means that a motivated individual, having the opportunity, is capable of learning.

To be precise we must confine general aptitude and language aptitude. Language aptitude as a notion is significant in the present study insomuch as I would like to find any possible relation between this (among other general skills) and linguistic skills.

Definitions of language aptitude are extremely varied in the literature. In 1973 Carroll defines aptitude as the ability of phonetic coding, grammatical sensitivity, inductive language learning ability and the ability of learning foreign language material. So it was clear in the past that this factor is a multiple field. Some years later he focused on the individual.(Carroll 1973)

Szirmai (2003) conducted a research on the connection between Maths and language aptitude among 10th grade students and she concludes that no relation was found between language aptitude and Maths, and on the other hand in language aptitude girls are better than boys. This result calls our attention to the incorrect present practice, in which preliminary examination to language classes in secondary school is partly based on Maths results.

Jessner (2006) compares language aptitude and metalinguistic abilities and concludes that in a way these are similar. „The more language systems that are involved in the acquisition process, the more difficult it is to decide whether language aptitude or metalinguistic awareness influence the language acquisition progress" (Jessner, 2006:68).

As Pléh & Lukács maintain (2014) 50s and 60s were the golden ages of language aptitude because two aptitude tests (Modern Language Aptitude Test (MLAT; Carroll-Sapon 1959) and Pimsleur Language Aptitude Battery (PLAB; Pimsleur 1966[13]) were made at that time.

Singleton (2017) suggests that language aptitude is an individual trait, an innate advantage that learners have in language learning, so the focus is on the individual in the procedure.

Rogers et al (2017) conclude in their study that in spite of the fact that bilinguals have a cognitive advantage no significant difference appeared between mono- and bilinguals.

Granena (2013) finds that LLAMA_B, E and F measure explicit aspects of language-learning aptitude, and concludes that instructed L2 learners perform best, because vocab learning and grammar represent the basis of L2 classroom instruction (Rogers et al 2017).

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[13] https://lltf.net/aptitude-tests/language-aptitude-tests/pimsleur-language-aptitude-battery/

As Li's results reveal (1) aptitude is independent of other cognitive and affective factors: it is distinct from motivation, had a negative correlation with anxiety, and overlapped with, but is distinguishable from, intelligence; (2) executive working memory was more strongly associated with aptitude and aptitude components than phonological short-term memory; (3) aptitude measured using full-length tests was a strong predictor of general L2 proficiency, but it had low predictive validity for vocabulary learning and L2 writing; and (4) different aptitude components demonstrated differential predictive validity for different aspects of learning (Li 2016: 801).

„Certain components of language aptitude are prone to change with intensive exposure to second/third languages"(Kormos 2013:31).

Language aptitude in itself is not enough for successful language learning. There are further non-linguistic factors which can shape our achievement such as motivation and creativity.

1.4.5   Motivation

Motivation is a frequently examined field in scientific research. Pléh & Lukács (2014) affirm that research in motivation wants to find answer to what is the reason behind human behaviour. As language learning process is extremely complex the reasons cannot be listed entirely. The basic elements are: student's evaluation system, self esteem, self image, future image, family and friend's support, beliefs about foreign language and its speakers, attitudes, experiences about learning and language learning, environmental condition, teacher's personality in a classroom, group norms, curriculum etc.

„The motivation of children to learn L2 is closely tied to their attitudes towards L2 speakers. Where there is a strong desire to identify with members of L2 group, children will be highly motivated to learn the L2" (Cummins 1979:243).

A systematic study on motivation was carried out by Gardner (1985), who refers to motivation as a desire and attempt to reach the language learning aim which is in connection with the positive attitude towards the language learning.

Crookes and Schmidt (1991) define motivation as an orientation towards learning a second language. Oxford and Shearin (1994) explain motivation as a desire to reach aim and energy to work in order to reach it. „Gardner and Lambert (1972) differentiate integrative and instrumental motivation. Integrative is characteristic of those students, who would like to communicate in a specific language, and want to be similar to the memebers of language community, as they consider them in a positive way. On the other hand, instrumental motivation emphasizes the advantages of a new language and its practical benefit. Instrumental motifs are behind practical aims of language learning" (Bacsa 2014:64). Bacsa (2014) makes a distinction between intrinsic and extrinsic motivation. In case of inner motivated behavior the source of happiness is the learning of an activity, where the person acts for an award. On the contrary, outer motivated behavior is directed by outer award or constraint.

In Hungary, Dörnyei Zoltán carried out many researches in the field of motivation. In an article in The Modern Language Journal, Gardner wrote to him (which was published in Dörnyei's article in 1994) „For those teachers who want to stimulate their students' motivation it is significant to know where does motivation starts from. How would a teacher be able to support the roots of motivation without knowing where these roots are" (Dörnyei, 1994: 515).

From 1992 there were three big, national investigations on the effects of students' motivational factors in choosing languages and energy in language learning, under the direction of Dörnyei.

In 1993 language learning attitudes were investigated related to Russian, English, German, Italian and French languages, with the participation of nearly 5000 people. Based on a classroom survey by Clement and his colleagues on Hungarian samples, in 1994 Dörnyei created this 3 component model (Table 3.), which defines a basic structure in language learning motivation.

level of linguistics	instrumental and integrative motivational subsystem
level of students	need for achievement self-confidence
level of learning situation	course-teacher-group specific components

Table 3. Dörnyei's language learning motivation model

Source: Dörnyei, Z. (1998) Motivation in second and foreign language learning.

Language Teaching. 31 125.

On the level of language there are aspects of foreign languages which define language choice, while on the level of students personality traits have important roles, ultimately on the level of learning situation there are the curriculum, the method and the teacher. All these components are present in my study. The role of these will be investigated independently.

Csizér's (2012) theory is based on the assumption that only ideal second language self affects motivated learning behavior.

Piniel and Csizér (2013) emphasize students ability to integrate into second language community, they focus on the idea that motivation is effected by students' actual and possible language self and the connection of these. Last but not least, they underline that motivation is a dynamically changing aspect, which affects the learning process.

Barnucz and Fónai (2020) investigate the ICT usage in foreign language teaching. With their results the assumption that ICT usage affects motivation towards foreign language learning positively has been justified.

Masgoret et al (2003) find higher correlations between achievement and motivation than between achievement and integrativeness, attitudes toward the learning situation, integrative orientation, or instrumental orientation.

Fejes & Józsa (2005, 2007) point at the weak connection between students' motivation and the educational level of parents. If a mother has a university degree it has positive effect on the learning of her children. They authors found that interaction and knowledge are important in motivation. Motivation has an effect on grades, and grades formulate students' motif.

Hungary ranks among the last countries according to the latest Eurobarometer survey about the number of languages spoken in an EU country. Why do secondary school students not succeed in learning languages in general in Hungary? As compared to other subjects, students learn foreign languages in a great number but they are not good at language knowledge. It is hard for them to learn foreign languages and after some failures their motivation disappears. In the primary school foreign languages are popular but seeing their changing results in languages (see Chapter 3. Results), in the secondary vocational school something happens and this break hinders the language development. Presumably language learning motivation disappears. The educational system allow children to change foreign languages entering secondary school. For those, who learnt German previously it is possible to learn English in secondary school. Most of language teachers start a secondary school curriculum with a long period of revision for safety reasons and regarding those students who changed languages. It is really hard to differentiate because the language groups in secondary schools are heterogeneous. Students come to the secondary school from different primary schools and with diverse language knowledge. Creating small language groups is a kind of problem in some schools considering the need and facility of creating groups. Those who support the idea of language groups based on levels of language knowledge say it is easier to deal with students who are nearly at the same level in language knowledge, because you can teach them at a time which is in line with their better language skills. Those who are against creating groups say that requirements are the same for good and weak students so it is not worth creating specific groups.

In my study the above mentioned attributes are represented. The students are not motivated and they learn their L2 in mixed groups. Considering all these facts, I was interested in other characteristics of students' motivation.

Language learners are supported by many factors in their language development (such as music or games) they get bored with learning processes where they need attention, concentration and discipline. They lose their enthusiasm. School environment is not supportive because this is the period of long revision of previously learnt material. Without adequate guidance from parents and/or teachers students are not able to recognize at what time they have to rejoin the new material. There is no challenge and no new task because they know the presented material.

This situation generates many questions in methodology, which must be solved by schools and the educational system. Being aware that motivation provides aims and directions for students (Alizadeh 2016), I found it important to investigate students' motivation in language learning build upon knowing the results we can improve the present state. Regarding the present study, it seems to be focus on that nowadays the aim of a secondary school student is to successfully pass the school leaving language exam in an average secondary school, so the motivation is mainly instrumental in foreign language learning. The curriculum says that 12th grade students should have B1 language knowledge, and the further aim is to improve this knowledge at least to achieve the level of the school leaving exam. [14]

1.4.6 Creativity

In the last few years, much information on creativity has become available. However, as the literature suggests we have to differentiate between creativity and linguistic creativity as follows.

Szerencsi (2010) says creativity promotes students' motivation, problem solving and higher order thinking skill.

„Linguistic creativity is not simply a property of exceptional people but an exceptional property of all people" (Carter 2004: 13)

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[14] https://kerettanterv.oh.gov.hu/06_melleklet_912_szki/index_szakkozep.html

Hofweber & Graham (2017) focus on exposure to L2 and its effects on linguistic creativity. Linguistic creativity as a concept is the ability to generate linguistic combinations in a narrow sense, while in a broad sense it is a creative use of language. In a wide sense exposure to L2 literature can support linguistic creativity. With the help of poetry, speakers can communicate emotional state and express opinions. In linguistic creativity vocabulary is significant as learning it through reading seems to be more effective when language learners feel being involved.

Sántha-Malomsoki (2016) finds no correlation between the results of creativity and linguistic creativity though she concludes that regular exposure to a second language can result in a positive effect on linguistic creativity.

Students in the present study were asked to use their word creating creativity in written linguistic tests, where they had to formulate words in a language from given anagrams, write sentences in one language in which they recognized the homographs, create words from first syllables in English or in Hungarian language and last but not least complete letters to meaningful words in one language. Metalinguistic awareness being a vital part of creativity is important in doing these linguistic tests.

Creativity includes fluency as a common subfactor appearing twice in this thesis, first in Torrance Test of Creative Thinking and later in verbal fluency test.

1.4.7   Bidialectism

A regional or social variety of a language distinguished by pronunciation, grammar or vocabulary, especially a variety of speech differing from the standard literary language or speech pattern of the culture in which it exists."[15]

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[15] https://www.thefreedictionary.com/Bidialectism

Social, economical and technological processes have caused serious changes in using the mother tongue in the last decades. In the globalisation era the factor of regionalism is becoming de-emphasized. This will lead us to a change in mother tongue's variables. Foreign languages, mainly the English language became the elementary part of students' life in the 21st century, with the usage of online games, music, serials and social media. Youngsters can meet with various versions of mother tongue and foreign language besides standards, using these platforms.

"Monolinguals who routinely use a dialect variety of their native language show evidence for language control processes that are compatible with an architecture of the lexicon in which competing lexical representations are tagged for variety" (Kirk et al. 2018: 164).

Mészáros-Kas (2008) claims that exposure to environmental stimulus and gaining experience in the speaking community can result in children who are competent language users. This finding is crucial, because it is in line with studies, which evidence the positive effects of exposure to a foreign language and disregard the importance of critical period, and the earlier start, the better language knowledge view.

Albert & Obler (1978) argue that the more similar two languages are the more effort is needed to avoid interference. Ross & Melinger (2016) conclude that having the versions of language which appear in different language systems in the brain, can mean a bigger cognitive advantage. Whether the shift between two language versions is similar to code switching is not absolutely clear yet, but most of the scientific literature supports this view. (Antoniou–Katsos 2017, Antoniou et al. 2014). Vangsnes et al. (2017) conclude that Nynorsk 8th grade students, who became bidialectal with the addition of Bokmål were above the national average in tests on reading comprehension and foreign language skills.

However, as Leivada emphasizes (2017) these advantages can only predominate with adequate linguistic awareness and self-recognition and with the regular use of two language versions.

The significance of developing Hungarian students' language awareness is inevitable, this however happens in smallest number of cases (Parapatics 2019), so the dialectal background leads only to mother tongue insecurity. (Parapatics & Lengyel 2021).

The following sections will concentrate on the linguistic aspects of word recognition.

1.5   Testing word recognition with EEG

In the past 20 years the number of electroencephalography experiments has grown. With this method one get the most precise temporal picture of word recognition.

EEG (electroencephalography) is a non-invasive method to measure the electrical activity of the brain. Spontaneous and task-related activations of cortical neurons result in small current flows in the cortex perpendicular to the cortical surface. These activated neurons act as miniature current generators, also known as electrical sources. When a sufficiently large population of nearby neurons is activated simultaneously, the generated current fluctuations cause detectable changes in the electrical field of the brain. The scalp potential distribution, generated by the electrical field, can be measured by a suitable EEG measurement device and a set of scalp electrodes, and stored in computers as digital data for later processing and analysis.

The main advantage of EEG over other brain imaging methods (e.g. fMRI, PET) is its superior temporal resolution. No other imaging method can provide this level of accuracy in time, thus it comes as no surprise that EEG is a central tool in cognitive science.

The drawback of EEG, however, is its poor spatial resolution. The head is made up of tissues each having different conductivity properties. When the generated current flows from the cortex to the scalp, it must pass through the skull which has a relatively low conductivity. Consequently, the current spreads out within the bone of the skull instead of passing straight through to the scalp.
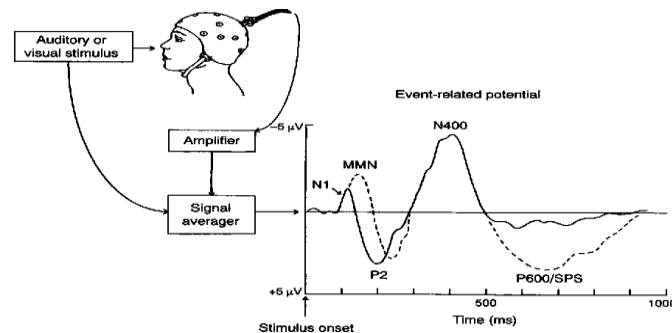
Figure 7. ERP[16] components

Sourece: http://faculty.washington.edu/losterho/erp_tutorial.htm

Event-related potential (ERP) is a small voltage change in EEG (Figure 7.). These changes are measured on the scalp with electrodes. The event/stimulus induce the voltage change and gives rise to other ERPs/components which can be positive or negative in polarity. Name of the components depend on their polarity and latency (N400) or topography and polarity (LAN). The most important constituents in ERP are the followings: N200 indexes the inhibition of the response, MMN reflects auditory deviance, N400 visual presentation of a word, goes waveform with peak latency of about 400ms, P2 second peak occurs in the ERP, P600 syntactically incorrect or non preferred continuations of a sentence. In the past N400 and P600 were accepted as official rates, but nowadays it is proved that recognition can happen at 100ms[17].

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[16] http://faculty.washington.edu/losterho/erp_tutorial.htm

[17] http://faculty.washington.edu/losterho/erp_tutorial.htm

As it is quick, has a direct sign of brain activity, collects a continuous stream of data, its obtained responses are multidimensional and in the procedure no interfering secondary task is needed ERP is great form of investigating brain activity.

ERP gives information about temporal traits of mental processes. Next to these positive attributes its limitations are the followings: it is sensitive to muscle tension and eye movement, many trials are needed, pattern of activation is not very informative, constructing stimuli is really time consuming. ERP has imprecise results on where exactly the processing happens. To put it more simply it has high temporal and low spatial resolution.

This method is used in cognitive neuroscience, let us take the case of characterising language, memory, visual perception etc. Language comprehension gives rise some ERP components such as N400 which is elicited by content words, LAN which appears between 300-500 msec after stimulus, P600 marker of stages of syntactic analysis (De Groot 2011).

1.6   Testing linguistic skills

In the 21st century, exposure to a second language, especially to English, next to school instruction, is at disposal with the wide access to information technology devices such as mobile phones, computers, laptops, tablets, etc. Written foreign language enters children's life in a way and at a time when they are not aware of it, and this contributes to the development of their metalinguistic, cognitive, and phonological awareness. They start to use games and programs on these devices naturally and this procedure is not learning but acquisition, as they are surrounded by ICT constantly.

This feature is a huge treasure for language teachers, who should draw profit from this phenomena to become more successful and have better results in second language teaching. In addition to the use of ICT devices there are many other written form possibilities to arouse students' interest in foreign languages. A good way in this procedure can be playing with the language.

With the help of games, we can develop students' vocabulary, creativity and motivation on English lessons. Previous findings in this field of research are only indirectly related to mine that is why the following subchapters give a short account on the background literature of concepts and types of tests that I used in my research in the linguistic investigation: anagrams, homographs, first syllables and word completion.

1.6.1 Anagrams

An anagram is a kind of word that is made by arranging the letters of another word in a different order, for example an anagram of 'Elvis' is 'lives'. Anagrams have a significant role in speech science, specifically in investigating aphasia.

The Northwestern Anagram Test (NAT) is a specific type of anagram solving, which has scientific significance in measuring sentence production in primary progressive aphasia. Mayer (1983) finds that the influencing factors of anagram solution for 5 letter long anagrams are word frequency and frequency of specific letter combinations (*train, enjoy*). Cases with less movement of letters are easier to recognise, whereas wordlike anagrams are more difficult to change. If someone has experiences in problem solving it is easier to recognize anagrams if the words are in one semantic field.

Sarris & Panagiotakopoulos (2013) reach the conclusion that tasks based on anagram solution are mainly used to assess word recognition processes. Anagram solution ability is in connection with reading. The time of solving an anagram is affected by the syllabic structure of target words. Regarding teaching-learning context anagram solving tasks can led to how readers extract information from a text, besides this these tasks can illustrate how different orthographic features affect word recognition.

1.6.2 Homographs

There is a special role of lexemes in examining two languages' activation in word recognition tests. Interlexical homographs are words from two languages that have the same orthography but that are different in meaning.

What happens if the orthography and morphology of words are not language specific? I am eager to see what other factors influence this process in case of L2 learners of English.

Dijkstra et al. (1998) point out that interlexical homographs are not represented in two separate word nodes but share one and the same word form node between the two languages. During visual word recognition phonological memory nodes are activated as well. Nodes at one particular level can activate and inhibit representations at adjacent levels.

Navracsics & Sáry (2013) in their study on the bilingual written word recognition carried out among Hungarian dominant English L2 users argue that the processing of words sometimes can happen with just orthographical awareness and without phonological and semantical representation, which obviously does not lead to the total comprehension of the word.

Cognates are words with similar meanings and spelklings, while homographs are words with same spelling and different meaning. The recognition of cognates and interlingual homographs as Zhu & Pik Ki Mok (2020) highlight can be explained by several theories of the bilingual lexicon. „Psycholinguistic models prefer stage-by-stage lexical selection process. Bilingual models are different from monolingual ones in a way that they must formulate the lexical representations based on two languages. Our study found evidence for parallel activation of L3 and L2 lexicons during visual word recognition in a group of Asian trilinguals who were acquiring an L3 in adulthood. Despite the trilinguals being less proficient in their L3 than in their L2, there was still an observable cognate facilitation effect from the L3 to L2. Therefore, the mechanism of processing L2 lexical items should remain malleable over the lifespan, and it is possible for a recently acquired language, even with limited proficiency, to influence the processing of a proficient L2 acquired in childhood" (Zhu & Mok 2020:26).

1.6.3   First syllables

Being able to define what first syllable is, spelling and syllabify ability seems to be crucial. The ability to spell is a significant indicator of phonological awareness. Bhide et al. (2014) say that it is unacknowledged that development in the vocabulary of written language leads to more precise lexical representation. They propose that the improvement of spelling ability is a more important factor.

Müller et al. (2017) test how training at the text level affect the efficiency of written word recognition and transfer effects on reading comprehension. They suggest on the basis of Perfetti's findings (1985) that the efficiency of word recognition is an essential aspect of fluent reading and a prerequisite of good reading comprehension.

1.6.4   Word completion

In order to solve word completion tasks, participants of a study have to recognize words and than make lexical decision in my test.

De Groot (1983) argues that post lexical processing is required by lexical decisions. The extra time is assessed from naming and lexical decision times. The additional post lexical processing time can be influenced by contextual information. The processing time is shorter when context and target words are associatively related than in case of neutral context.

Norman et al. (2016) maintain that visual word recognition is driven by orthographic analysis and letter strings are analysed in terms of their constituent morphemes. Visual word processing of Indo-European languages is sensitive to the linear orthographic structure of the word and for the order of the letters in a word readers are not so much sensitive. In 2016 they found that visual word processsing is sensitive to orthography and readers reduce base forms. Hence readers are not very sensitive in what order are the letters included in words.

„It is apparent that information extracted from a word embedded in a letter-string is more accessible when in initial than final position, hence, generating greater interference in the lexical decision task. Furthermore, the interference from an initially embedded word is greater when it ends in a coda than when it ends in a vowel" (Taft et al. 2017:24).

The ability to complete a word from segments is a multiple procedure as the process of perception and production is connected by a language choice. This serie will be vital in the parts of this thesis where linguistic tests are introduced.

1.6.5   Verbal fluency

„Verbal fluency is the ability to form and express words according to required criteria. A normal level of verbal fluency is necessary for optimal communication. Disorders of cognitive functions including executive functions for example verbal fluency are often present in subjects with schizophrenia"[18] (Wysokiński et al. 2010: 438).

Verbal fluency is a kind of tool for clinical investigation and an adequate use of assessing subjects' linguistic abilities, subsequently with the help of verbal fluency we can get a picture about patients' specific brain functions. Results are needed twice: to get a picture of average abilities and about language skills too.

More recent evidence (Shao et al. 2014) shows that verbal fluency is tested by a short test consists of two tasks: category/semantic and letter/phonetic fluency. Neuropsychological assessment and clinical practice often include verbal fluency tasks such as in diagnosing attention-deficit/hyperactivity disorder, Alzheimer's or Parkinson's disease. In non-clinical research with the help of verbal fluency, verbal ability, lexical knowledge, lexical retrieval ability and executive control can be measured. During the retrieval of words, the activation of mental lexicon and executive control procedures simultaneously happen. Therefore poor performance in verbal fluency tasks indicate deficit in verbal ability or executive control. The tasks are based on letter and category fluency and they differ only in a subtle way.

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[18] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3282524/

In the category task participants can make use of existing links between related concepts. Healthy participants' results in neuroimaging studies show different brain circuits in the two tasks.

Tánczos (2014:53) says verbal fluency tasks are widespread in clinical practice and research[19] and she finds (2012) that 6 year old children performed letter fluency task very poorly, less than 5 words in a minute. Between the age of 6-11 verbal fluency increases. At the age of 12 it is at adult level.

Alkhrisheh & de Bot (2019) referring to the results of Mathuranath et al. from 2003, state that the level of education influences letter fluency, the level of education and age affect category fluency, age influences more category than letter fluency. Their own research concluded that gender has no effect on verbal fluency, while maturity has.

„Phonemic and semantic verbal fluency, as measured by an individual's ability to generate words beginning with a specific letter (e.g., FAS and CFL) and semantic category (e.g., animals), have played a prominent role in neuropsychological research.

Verbal fluency has been demonstrated to be sensitive to lesions in the frontal lobe, temporal lobe, and caudate nucleus" (Tombaugh et al. 1999:167).

As fluency was investigated in another test type (Torrance Test of Creative Thinking - repeated circles) I will try to compare verbal and written fluency results of my participants. TTCT is a tool for testing written type of fluency while verbal fluency test is applicable for testing orally.

Having considered all the above mentioned factors in foreign language teaching and learning, in the next subchapter I will conceive the hypotheses of the present thesis.

1.7   Research goals and hypotheses

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[19] http://doktori.bibl.u-szeged.hu/2197/1/Disszertacio_Tanczos.pdf

The aim of my work is to broaden the current knowledge of influencing factors and its correlations of foreign language learning. My research questions and hypotheses are:

RQ#1: Is there any kind of connection between linguistic and non-linguistic aspects of bilingual word recognition?

RQ#2: Do L2 achievement in school and linguistic test results correlate?

RQ#3: What kind of coherence is there between the linguistic and non-linguistic types of fluency as an influencing factor of foreign language learning?

Hypothesis No. 1.

There is a significant correlation between specific non-linguistic factors of foreign language learning and L2 achievement in school.

Hypothesis No. 2.

Creativity contributes to L2 word recognition.

Hypothesis No. 3.

Students with better L2 school achievments are better in written L2 word recognition tests.

Chapter 2. Methods

2.1 Participants

60 participants (55 boys) took place in this research. The reason behind the great number of boys is the profile of the school, which educates trades mainly for men. Students (average age: 15 years) attend the same, non-elite secondary school in a middle sized town, in the Transdanubian region, Hungary. They are from a similar situation as in Molnár's study (2007), which means low socioeconomic status. Concerning family background, 28 students come from single parent families, for 1 student the grandparents are the caretakers, in another case 1 student is left behind alone at home, because the parents work abroad. Most of them are unmotivated, have no plans for the future and come to school out of obligation. Exceptions are rare. At home they do not have examples for the need of language knowledge or high qualification.

Primed on their marks in English at school, their achievement in foreign language is average, the mean is 3.03 at the end of the first term in secondary school (see individual results in Appendix 1.). Fifteen students are in the good (4/5) and 45 are in the weak (2/3) category. This categorisation will be important in later sections. (see chapter 3.2) This term's result in English is in line with the school's average in English which is 3.1. The students have 4 English lessons a week, with the same teacher. Their compulsory students' book is Traveller. Their overall motivation during English lessons is average, based on the facts that Engish is a compulsory subject in the graduation and the attitude of secondary school students (mainly boys) towards learning is not so positive (see results of attitude and motivation tests in Chapter 3.). In case of the current volutary tests, students were highly motivated as it was a kind of playful activity with English, so they were curious.

As students are in the 9th grade and as the study focuses on the secondary school students' generation I found the previous years results not significant. The participants came from different classes so they learn different subjects, that is why their average school performance cannot be compared at the end of the term.

Based on the evidence from past students and the profile of the vocational school, about 10% of the 12th grade students continue their studies at universities. In this regard ELTE and Pannon University are the most popular.

The composition of the participants is varied: 8 students are left, 52 are right handed. Five of them have corrected eyesight, three are claimed ADHD, two have asthma and one has diabetes. In a way, these 11 students need special education. The school tries to support the integration of these students and provides specialists to help them.

For all the participants, Hungarian is L1, while English is L2. 51 of them started learning English after age 9. Each of the participants have a different language history (see chapter 3.1.2; 3.1.7) but the settings of instructed language learning are the same for them. All of the students come from monolingual families. Some of the parents speak and use foreign languages on a beginner level, but they define themselves as monolinguals.

2.2   Material

Form		Tool	Measure	Examples
Background questionnaires and tests				
Self made	written	SES (socioeconomic status)	SES of the students based on their and their parents' status	Have you got an own Tv at home?
		language attitude	L1, L2, preference on languages, language use	Which language do you prefer (English or Hungarian)?
		ICT (infocommunication technology)	usage habits of mobiles and apps, computers	How much time do you use your mobile phone a day?

		bidialectism	usage and meaning of dialectal words	töpörtő Do you use this word? What does it mean?
	oral	interview on language attitude	role of languages, feelings about language learning, use, knowledge	
Form		Tool	Measure	Examples
Standardized	written	AMTB (attitude motivation test battery, Robert C. Gardner 1985)	attitude towards learning foreign languages, learning English, English speaking people instrumental and integrative motivation, parental support in language learning	I wish I could speak many foreign languages perfectly. I strongly disagree I moderately disagree I slightly disagree I strongly agree I moderately agree I slightly agree.
		TTCT (Torrance test of Creative Thinking, Ellis Paul Torrance 1966)	fluency, flexibility, relative flexibility in thinking	Complete the following circles with drawings!
	digital	LLAMA (language aptitude test, Paul Meara 2005)	ability to learn new words in a short time	
Linguistic tests				

Standardized	oral	semantic and letter verbal fluency	listing animals; words beginning with F A S letters in a minute	dog, cat, mouse… fence, four, fire….
Self made	digital	language decision EEG test (N=28)	words and pseudowords in Hungarian and English	comb ~~topor~~
	written	anagram	creating meningful content words in English or in Hungarian from anagrams	iam …………………..
		homograph	creating sentences in English or in Hungarian with homographs	eleven …………………..
		first syllable	creating meningful content words in English or in Hungarian from first syllables	an……………..
		word completion	creating meaningful content words in English or in Hungarian from blanked words	d_v_ ………………....
L2 school achievement				2-3, 4-5

Table 4. Introductory table of applied instruments in present study

Source: Own elaboration

2.2.1 Questionnaires and tests on general language skills

A series of questionnaires and tests were applied, some of which were linguistic and some were non-linguistic (for detailed results see chapter 3.). The non-linguistic ones investigated the participants' socioeconomic status, language attitude completed with an interview, info-communication technology usage and language aptitude. The questions of these questionnaires were made up by me, based on the study's interest. AMTB's English version and TTCT as the standardized tests on motivation and creativity were used too, as a questionnaire based on the state of bidialectism by Andrea Parapatics.

The linguistic ones consisted of word recognition with anagrams, lexical decision and sentence formation from homographs, word completions by given first syllables, completion of letter strings into meaningful words, verbal fluency including category and letter fluency too and an EEG test. In what follows, I describe the test materials in details.

All the first day tests were self made, all of them were in Hungarian (tasks and questions too) to avoid any misconception. Types of tasks were varied: multiple choice, sentence completion, short answers, word completion etc. (for the self made questionnaires/tests and sample pages of them see Appendix 2-13). On the first test day students filled in three non-linguistic questionnaires (SES, language attitude and ICT) and four written linguistic tests such as anagram, homograph, first syllable and word completion tests.

The second day consisted four standardized tests, LLAMA AMTB, TTCT, verbal fluency; a questionnaire on bidialectism and an interview.

Third day was different for different groups. 4-4 students attended the EEG test in Veszprém, at the university lab at a time.

In the following subchapters, I will introduce the quantitative and qualitative tests and questionnaires.

2.2.1.1 Socioeconomic status

I have developed a questionnaire on the socioeconomic status (see Appendix 2.) of the students to gain a picture about their everyday home life, family relations and financial background. It contained 23 questions. There were multiple choice questions as well as word completions among the tasks. With students coming from a socioeconomically disadvantegous background, I find this test highly important to see the chances, possibilities and also the reasons behind motivational factors of these students. The aim was to get a picture of their general living conditions. I was interested in their parents' educational level and current job; number of people in their household; whether the students have their own TV, mobile phone, room; whether they go to private classes, abroad, cinema, theatre; whether there is a person in their family who is permanently ill or works abroad.

2.2.1.2 Language attitude and interview

Another self-developed questionnaire is the language attitude test, which included 30 questions in Hungarian about their age, gender, handedness, L1 and L2, their parents' L1 and L2, age of L2 acquisition, their own preferences and feelings about languages, reasons of learning languages, advantages and disadvantages of bilingualism, their knowledge in L1 and L2 (see Appendix 3.) For most of the questions they had multiple options to choose from, but for the questions of advantages and disadvantages of bilingualism they had to give a short answer.

In order to get qualitative data as well, I prepared a list of 40 interview questions about linguistic attitudes and dialectal background (e.g.: Are you self-confident when using Hungarian?, Do you have further plans with English? etc.). Twenty-five questions related to English and 15 questions related to Hungarian language (see Appendix 9.). All the questions were asked in Hungarian and the answers were recorded. Four participants completed this interview who represented four types of marks in English: number 24 represented the category of mark 2, number 14 represented 3, number 13 represented 4 and number 7 illustrated the category of 5. The evaluation of the test meant quoting the participants answers to illustrate the background of their feelings and to make their answers clear from previous tests (see chapter 3.).

2.2.1.3 Infocommunication technology

I have made up a questionnaire on the usage of ICT devices (see Appendix 4.) in the students' everyday life in an attempt to see their writing habits manually and electronically, the age when they first accessed a mobile phone, the time spent using mobile phones, functions on mobile they use most often, the solidity of information on the net, their knowledge of abbreviations and emoticons, usage of specific functions focusing on games, music, photos and chat programs, advantages and disadvantages of facebook and the importance of the phone for them. The questionnaire comprises 40 Hungarian questions. I was interested in the background of mobile phone usage, as students are online whenever they can. My focus was not on all types of ICT devices in general, but mainly on the mobile phone as this is the device nearly every student has.

2.2.1.4 Language aptitude

 In obtaining data about the language aptitude of my participants I applied the free version of the official LLAMA language aptitude test[20], which is freely available to researchers on the net. This test is user-friendly, with downloadable individual tests. I chose this particular apparatus since it is a tool which is enjoyable to use and makes our research varied because of computer based fulfillment. I applied the LLAMA B subtest (see Appendix 5.), which contains a vocabulary learning task. Paul Meara created this version at the University of Wales, Swansea in 2005, for students of English Language and Linguistics. There are Swedish, Hungarian and French versions of the test. This test is based on picture stimuli (Figure 8.) and it measures your ability to learn new vocabulary in a short time. This version does not require L1 input, so this is suitable for any L1. The words, you have to learn are real words from Central American Language.

Students had to appear at the computer-lab in the school according to a previously made schedule. In the test procedure, after registration and selection of B subtest,

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[20] http://www.lognostics.co.uk/tools/llama/

test-takers were given twenty small pictures without obvious names, which means a kind of freedom in learning new things in this vocabulary learning task.

Figure 8. Figures in the LLAMA B subtest[21]

Source: https://www.euroslajournal.org/articles/10.22599/jesla.24/

These kind of figures are on the screen simultaneously. The task is to click on them one by one and that time their names are displayed. In twenty minutes the test-takers have to have a look at all the names and then after the learning phase a testing phase comes. The names of the objects are displayed on the screen and the test taker has to click on the appropriate figure. Each of the names worth 5 points, so the maximum score you can have for the correct answers is 100 points. The manual offers ratings at four scales: (i) very poor results, 0-20 (ii) average results, 25-45 (iii) good score 50-70 and (iv) excellent score, 75-100. On the average, most people are in the second category, with points between 25-45. In this computer-based test session participants of my research worked individually. This method was slower than written tests, but the evaluation is at hand right after the test-taking.

Since Rogers et al's version (2005), when the LLAMA manual was published based on the running and evaluation of subtests in LLAMA test, there has been considerable disagreement in some articles with regard to the validity of LLAMA language aptitude tests. As a result, Rogers et al. (2017) and Bokander & Bilund (2020) found that LLAMA B subtest is suitable for measuring language aptitude based on picture stimuli and regarding vocabulary learning skill.

„Over the past decade, the LLAMA language aptitude test battery has come to play an increasingly important role as an instrument in research on individual differences in language development. However, a potentially serious problem that has been pointed out by several scholars is that the LLAMA has not yet been carefully validated.

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[21] https://www.euroslajournal.org/articles/10.22599/jesla.24/

We addressed this issue by examining the internal validity of this test battery.

We collected LLAMA data from 350 participants and assessed these data using classical item analysis, Rasch analysis, and principal component analysis within a framework of best practices in educational and psychological test validation. The results show that only one out of the four subtests (LLAMA B) produced scores that fit a latent trait model with sufficient accuracy."[22] (Bokander & Bilund 2020:11).

„The results showed that the LLAMA tests are gender and language neutral. The younger learners (10–11s) performed significantly worse than the adults in the sound/symbol correspondence task (LLAMA_E). Formal education qualifications show a significant advantage in 3 of the LLAMA subcomponents (B, E, F) but not the implicit measure (LLAMA_D)"[23] (Rogers et al. 2017:179).

Students really liked this kind of test maybe as it was conducted with the help of ICT, on the computer.

2.2.1.5 Motivation

Motivation – as a non-linguistic influencing factor of word processing – was investigated by Attitude Motivation Test Battery (AMTB) (see Appendix 6.). The original version of AMTB was created by Robert C. Gardner in 1985, after 20 years of research in the topic of motivation. The original AMTB was developed for a situation where the L2 community was present in the environment (French Canadians) which is not a typical foreign language learning situation. Since then more developed versions have been published. I applied the 2004 version adapted to English language. The English language version was introduced by Gardner as specifically created to measure motivation of secondary school students who are learning English as a foreign language and it is freely accessible on the internet, moreover it proved to be a useful mean in measuring motivation (Bátyi, 2017 a,b).

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[22] https://onlinelibrary.wiley.com/doi/abs/10.1111/lang.12368
[23] https://www.jbe-platform.com/content/journals/10.1075/eurosla.16.07rog

In fulfilling this paper-based test specific statements are given and participants had to choose from answers, given on a Likert-scale. There are no good and bad answers; the participants make decisions based on their personal feelings. There are six options to choose from as an answer: strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree. (Figure 9.)

I applied an adapted version in Hungarian, which is to some extent based on the original one. I used a variation of Gardner's original test, including the following scales:

1. attitude towards foreign language learning (AFLL) (eg.: „If I visited a foreign country, I would like to speak the language.")

2. attitude towards English people (AEP) (eg.: „English people are really outgoing warm-hearted and creative.")

3. attitde towards learning English (ALE) (positively and negatively worded statements eg.: „English is a significant part of school programme." „Learning English is a waste of time.")

4. integrative orientation (INT.O.) (eg.: Learning English is important for me because it enables me to better understand and appreciate English art and literature.")

5. instrumental orientation (INST.O.) (eg.: „Learning English is important for me because it is useful in searching for a job.")

6. anxiety in English lesson (AEL) (eg.: „I always feel other students speak English better than me.")

7. parental support (PS) (eg. : „My parents support me to practice English as much as it is possible.")

Figure 9. Sample of a statement and possible answers in AMTB

Students only had to sign/circle their choice, so no written language was used to illustrate their language knowledge.

2.2.1.6 Creativity

During my research I adopted a figural test, based on repeated circles to get a picture of participants' creativity. For this reason Torrance Test of Creative Thinking -TTCT- (1966) is applicable. Tóth & Király (2006: 288) say this paper-pencil based test has acceptable validity and reliability that is why it is an expansively used creativity test.[24] Pásztor (2015:324) introduces the TTCT test as it has 3 parts. In the first participants give verbal answer for verbal stimulus, in the second they give verbal answer for non verbal stimulus, third participants fulfill non verbal tasks.[25] I applied the last version. The original test works with different components of creativity: (i) fluency (the ability of thinking easily), (ii) flexibility (unite more procedures towards an aim), (iii) originality (new ideas) etc.

In the figural test (see Appendix 7.), named repeated circles (Figure 10.), the participants' task is to create figures out of the given circles in 20 minutes. The drawings can be black and white or colorful, drawn by pencil, pen or tipped pen. Students can use more circles to create a figure or just only one. The circles can be drawn in a chosen order.
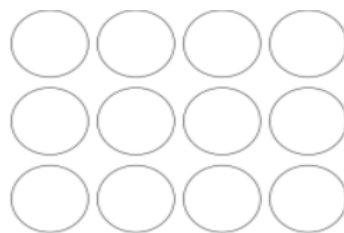
Figure 10. Repeated circles to complete in TTCT [26]

Source: https://whsgraphicdesign.wordpress.com/2015/09/09/creativity-test-2

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[24] http://www.magyarpedagogia.hu/document/Toth_MP1064.pdf
[25] http://www.edu.usfzeged.hu/kkcs/sites/default/files/legfrissebb/2015/Pasztor_2015_Kreativitas_online_merese.pdf
[26] https://whsgraphicdesign.wordpress.com/2015/09/09/creativity-test-2

The evaluation is based on two scoring systems of Barkóczi and Klein (1968) and Papp (2015)[27]. Repeated or same patterns are not accepted.

In my evaluation, I applied three different concepts of the 1968 version: (i) fluency (F): the total number of drawings/answers (ii) flexibility (X): the number of topics in which the participant drew/answered, (iii) relative flexibility (rX): quotient of flexibility and fluency. As a plus data I investigated (iv) complexity (C) as a concept from the 2015 version, which is the number of pictures where more than one circle was used to create a figure[28] .

Originality is not included in my research, as literature has many adaptations about that factor. Papp (2015) referred to this concept as the number of drawings, which were unique at a person. In Zétényi's Creativity tests' testbook (1989) $k=(1- (I+i)/2T)^{14}$ formula was used in order to get results in originality.

With the usage of Barkóczi-Klein's originality index a huge number of creativity tests was made. As a result, a scoring table was created. When evaluating a creativity test we can search for the answers and their k values. Adding these numbers we can obtain the originality score (Mező & Mező 2017).

2.2.1.7   Bidialectism

To determine wheher the dialectal background of participants is a crucial factor, I applied a paper based questionnaire (see Appendix 8.) made by Dr. Andrea Parapatics. Thanks for her help in creating and evaluating the test. The questionnaire investigated the linguistic background of the students, their regionalism, their parents' and grandparents' dialects, and their conscious use of dialectal words in everyday speech.

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[27] http://www.kandosuli.hu/sites/default/files/files/TEHAZONOSITAS.pdf
[28] http://www.kandosuli.hu/sites/default/files/files/TEHAZONOSITAS.pdf

The source of the questionnaire was *Magyar Nyelvjárások Atlasza* between 1949-64, because it contains specific linguistic attributes concerning the Transdanubian region in Hungary.

It was based on 99 dialect words, documented in the region. In selecting dialect words, the criteria were as follows: use words which have regional characteristics and use words which can be connected to the present day lifestyle. The test contains words which refer to animals, (e.g. *pucok* 'vakond'), plants (e.g. *bicske* 'csipkebogyó'), objects (e.g. *sámli*' kisszék') etc. The task was to indicate whether they themselves, their parents or grandparents use the given words. They also had to give the meanings of the listed words and if the words were familiar they had to give synonyms too. The meaning was important in order to check whether they really know the equivalent of what they use.

The other part of the test was based on family background. Participants had to give information on their date of birth, the place of their own and their parents childhood, they had to comment on how often do they meet their grandparents and if they had other remarks, memories concerning linguistic background, they could give it at the end of the test.[29]

I presupposed that depending of the family background students will have different results and there will be some who use much more dialectal words than their schoolmates. The results can warn us that ignoring the dialects during education is not only a deficiency but a serious irresponsibility (Kiss 2001: 151).

2.2.2 ERP measurements of bilingual written word recognition

Participants carried out a computer based language decision test, where they had to make decisions about 60 English, 60 Hungarian words, and 60 interlingual homographs (see Appendix 14).

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[29] Parapatics, A. & Lengyel, Zs. (2021). A regionális nyelvi háttér és a második nyelv elsajátításával kapcsolatos motivációk vizsgálata: Egy kísérlet tanulságaiból. *Anyanyel-pedagógia* (in press)

EEG was recorded with a BioSemi apparatus on 128 channels. The electrode layout and labels are the following:

The raw signal was cleaned of artefacts, downsampled to 256 Hz, and baselined to the -200ms to 0ms period. Data processing and statistics were carried out in MATLAB with the EEGLAB toolbox. Conditions were always compared in pairs, using a one-way parametric ANOVA with FDR correction across all channels at 25 ms averaged time windows. Condition differences were plotted on topographic maps, and channelsof significant difference are denoted by stars. ERP waveforms are plotted with CIs for these electrode sites of interest. Thanks to András Benyhe for data processing and visualising the ERP results.

Electroencephalography (EEG) is a non-invasive method to measure the electrical activity of the brain. Spontaneous and task-related activations of cortical neurons result in small current flows in the cortex perpendicular to the cortical surface. These activated neurons act as miniature current generators, also known as electrical sources. When a sufficiently large population of nearby neurons is activated simultaneously, the generated current fluctuations cause detectable changes in the electrical field of the brain. The scalp potential distribution, generated by the electrical field, can be measured by a suitable EEG measurement device and a set of scalp electrodes, and stored in a computer as digital data for later processing and analysis. The number and layout of the electrodes used in practice vary greatly, but 64 or 128-electrode systems arranged in the universal 10/10 or 10/5 layouts (Jurcak et al. 2007) are the most common in research laboratories.

The 128 electrodes were used to sign activity of specific brain areas during completing linguistic tasks. Students could take part in the experiment with the consent of their parents and school. On one test day 4 students could complete the EEG test, so there were 7 sessions altogether. This test period lasted for two months as we had tests every Friday for seven weeks and an evaluation session on the eighth week's Friday. The duration of the test was one and a half hours including preparation for the test for every single participant. Before the test students had a trial period to avoid any kind of movement including blinking at the time of carrying out the test.

Participants used a laptop with a custom-made MATLAB based program on it. During their test completion the activity of their brain and their responses were recorded.

In the lexical decision test participants had to decide whether words appearing on the computer's screen are words or not. In language decision test they had to choose the language of the word. Lexical decision and language decision tests were carried out at one time. In the task I applied the wordlist of Navracsics & Sáry (2013). 240 words (see Appendix 14.) appeared on the screen for 5 seconds. Out of the 240 words 60 were real Hungarian, 60 real English, 60 interlexical homograph and 60 pseudowords (30 according to Hungarian and 30 according to English phonotactic rules) (Navracsics & Sáry 2013).

I focused on the correct answers, and for homographs, on their language choice, whether they considered the homograph English and Hungarian. The program also measured the reaction times of their answers.

2.2.3 Test materials on linguistic skills

The linguistic tests contain specific test materials, which I have developed myself based on my previous readings on anagrams, interlexical homographs, first syllables and word completion (see Chapter 1.), with which I wanted to test the participants' creativity in word recognition and their phonological awareness.

2.2.3.1 Anagram test

For the anagram test, 45 words consisting of 3-6 letters were used from the participants' English coursebook (see Appendix 10.). By mixing the letters of the words, it is possible to create both English and Hungarian words from the letter strings. I checked the words for familiarity and word frequency in the English (COCA[30], i.e. Corpus of Contemporary American English) and Hungarian (HNC, i.e. Hungarian National Corpus[31]) corpora.

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[30] https://www.english-corpora.org/coca/
[31] http://corpus.nytud.hu/mnsz/index_eng.html

From the given letter strings both English and Hungarian meaningful content words were possible to create, but participants had to write only one word, which came first to their minds, irrespective of language (Table 5.). It is essential to emphasize that some of these words were Hungarian–English interlexical homographs (e.g. *tan,* i.e. two orthographically identical words that are pronounced differently and have different meanings and origins). All the possible word creations of the letter strings are in the first 60.000 most frequent words in both corpora. The sizes and the approaches of the two corpora made it very difficult to compare the frequencies in the two languages. For instance specific numbers indicate different status of words in different languages.

The task description was given in Hungarian to avoid misconceptions. The translation of the task is: *In what language can you make a word from these anagrams? Write the first word you recognize in the column of the appropriate language!* Participants had to indicate their answers by writing the meaningful word they could think of first in the appropriate column of the language.

Hungarian word	Anagram	English word
	1. amla	
	2. dda	
	3. ickk	
	4. enm	
	5. emes	

Table 5. Sample questions of the anagram test

Source: Own elaboration

In evaluating the test, I counted the number of answers in Hungarian and English too (Table 6., 7) If the participant wrote meaningful words in both columns, their answers were neglected, as the proper language was not selected. Answers with orthographical mistakes were also rejected.

Hungarian word	Anagram
alma	1. amla
add	2. dda
cikk	3. ickk
nem	4. enm
mese	5. emes

Table 6. Example answers in Hungarian in the anagram test

Source: Own elaboration

Anagram	English word
1. amla	*lama*
2. dda	*dad*
3. ickk	*kick*
4. enm	*men*
5. emes	*seem*

Table 7. Example answers in English in the anagram test

Source: Own elaboration

Where more options were possible to create in one language I examined the word frequency data, too.

2.2.3.2 Homograph test

I carried out a test with 25 Hungarian-English interlexical homographs (see Appendix 11.). The task was as follows *Put the words into meaningful sentences in English or Hungarian. Do not change the words.* (Table 8.)

Foglald teljes, értelmes mondatba a következő szavakat angol vagy magyar nyelven!

A megadott szót ne alakítsd át!

1.   mind
……………………………………………………………………………………
2.   most
……………………………………………………………………………………

Table 8. Sample of questions in the homograph test

Source: Own elaboration

All the homographs were checked for familiarity and frequency. The length of the sentence was not defined beforehand. The answer was not accepted if (i) the sentence was not meaningful, (ii) there was an orthographic mistake in it, or (iii) it contained mixed languages. I focused on the language dominance (whether Hungarian or English sentences were created more frequently), sentence modality (declarative, interrogative, etc.) and number of words in a sentence in order to become able to compare students' specific answers in English and Hungarian languages. (Table 9.)

mind
Hungarian: *Mind elmegyünk moziba.*
Mind megettük a reggelit.
English*:   I don't mind.*
Do you mind me opening the door?

Table 9. Example answers in both languages for a question in the homograph test

Source: Own elaboration

In case of homonyms, such as *fog* in Hungarian, I made a distinction between the meanings and the frequency of words as I was interested in the factual decision of students and their specfic, intended answers (*fog* as a written Hungarian word indicates three different meanings, the English equivalents can be (i) 'hold' 3rd Person Singular, (ii) the auxiliary for future tense and (iii) 'tooth').

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2.2.3.3 First syllable test

Participants had to create meaningful words with the given first syllables. (Table 10.) The task was to write the word in the table in the middle column if it was in Hungarian and in the right one if it was in English. The first syllables were listed in the left column of the table. The test contained 49 first syllables (see Appendix 12.).

first syllable	Hungarian	English
an-		
a-		
ba-		
cu-		
don-		

Table 10. Sample of questuons in the first syllable test

Source: Own elaboration

I checked the frequency of the parts of speech and the word frequency of the answers. In the cases of homonyms, the participants had to sign the part of speech, for example in Hungarian, first syllable *ne-* can be finished as *nemes* (which can be an adjective and a noun), where students wrote after the word 'noun' or 'adjective'. This became important in investigating the appearance of the parts of speech in total. I was also interested in the number of answers in different languages. Only grammatically correct answers were accepted (Table 11.,12.) Answers with mixed languages or orthographic mistakes were not accepted.

first syllable	Hungarian
i-	*idő, ijed*
li-	*lila, liget*
sta-	*stabil, statikus*

Table 11. Example answers in Hungarian in the first syllable test

Source: Own elaboration

first syllable	English
in-	*inside, internet*
prac-	*practice, practical*
sa-	*salary, salad*

Table 12. Example answers in English in the first syllable test

Source: Own elaboration

2.2.3.4 Word completion test

The participants had to recognize meaningful words in the given 50 letter strings in only one language and they had to write their first idea (answer) by completing the word (see Appendix 13.) in the appropriate column (Table 13.) The task was given in Hungarian, here translated in English: *Fill in the following letter strings in order to get meaningful English or Hungarian words. Write only one word in the appropriate column, which came first to your mind. Create words in one language. Do not use proper nouns. Be careful with orthography and legibility!*

Töltsd ki a következő betűsorokat, hogy értelmes magyar vagy angol szavakat kapj! Csak azt a szót írd be a megfelelő oszlopba, ami először eszedbe jut! Csak egy nyelven alkoss szót, azon a nyelven válaszolj, amin először eszedbe jut egy szó a megadott betűkkel. Tulajdonneveket ne írj, a helyesírásra és az írásképre ügyelj!

Hungarian word	Letter string	English word
	1. d_v_	
	2. f_st	
	3. h_g	
	4. eg_	
	5. k_t	

Table 13. Sample of word completion test questions

Source: Own elaboration

The assessment was based on (i) language dominance, (ii) parts of speech and (iii) frequency of words. Answers with spelling mistakes or given in both languages were not counted as the participants' word recognition was not correctly written down or the task was misunderstood.

2.2.3.5   Verbal fluency test

In the current research, I applied verbal fluency tests in order to measure the oral language skills of the participants.

As Tánczos (2012) argues, verbal fluency tests are measures of executive functions. They are prevalent in cognitive psychology as they serve useful information about strategies, executive function and lexico-semantic webs. The sufficient working of executive function means elemental processes in listening, thinking and problem solving. These procedures determine school performance, so their imperfect operation may lead to learning disorders, attention deficit hiperactivity disorders etc.

I applied the semantic and phonetic parts as well in the test taking period. All the participants fulfilled this test individually.

The number of animal names generated in 1 minute (semantic fluency) was obtained from all the individuals. Instructions required individuals to say the names of as many animals that they could think of in a 1-minute period (Tombaugh et al. 1999). The total number of words generated in 1 minute for the letters F, A, and S (phonemic fluency) was obtained, participants were instructed that proper nouns and multiple words using the same stem with a different suffix (e.g., friend, friends, friendly) were not acceptable.

The leader of the survey recorded the given answers. The number of answers were the indicators at the evaluation session. As a crucial factor in further investigation, I asked the participants about their L2 achievement in school (end of year result in English).

The advantages of this kind of test series are the anonymity and based on this factor the truthfulness of participants. The results of non-linguistic tests will provide a comprehensive characterization of students, for whom the LLAMA language aptitude test, ERP test and all the linguistic tests were unprecedented and unfamiliar types of using L2.

The main disadvantage of the investigation was that it lasted for more days, so it was tiring, not to speak of ERP test, which was completed in another city, 50km far from the school.

2.3   Procedures

The test series were accomplished in the second semester of academic year 2017/18. I conducted the tests, and as I am a teacher in the school, I was familiar to them. The EEG test was carried out in Veszprém, at the EEG laboratory of the University of Pannonia, where I accompanied them and introduced them to the staff. The standardized tests were created as referenced, and besides the self made tests I used Dr. Andrea Parapatics' bidialectism test,

Regarding the whole test taking period, the participants were given a series of non-linguistic and linguistic, qualitative and quantitative tests.

They were tested on school days with the consent of the director of the institution, parents and students themselves. The test period was totally stress-free. Prior to doing the whole test we did pretest with 15 participants. The evaluation session of this called the attention to the time frame of the survey. The experiment was then repeated under corrected conditions in which 60 students took place.

All the participants completed the questionnaires and tests on three test days. Students used codes, so they were anonymous during the whole test period. The experiment proceeded following the steps outlined below. First, as an introduction an informative meeting was organised, where respondents were informed about the aim of the research, the proceedings, the time frame, access of results. Students had to decide about their own attendance. If they decided to take part in the research a parental and school agreement statement were needed and the student had to authorise the publication of anonym results. During the test period the instructions were shared in Hungarian in order to avoid any misconception. It is important to note that in the questionnaires there were warm up, deductive and control questions in order to get appropriate answers. At the beginning of the research, I explained the basic terms to the students, so there were no problems with using specific concepts during the tests, such as bidialectism, second language etc.

On the first test day, in their own secondary school's auditorium, students had to fill in SES, language attitude and ICT questionnaires and anagram, homograph, first syllable and word completion tests without time limit. They could fill in the test in an order they wanted to. On the second school day, they fulfilled the LLAMA test on computer in a school lab, the AMTB, Torrance test and bidialectism questionnaire in written form in the auditorium. The interview and the verbal fluency test were carried out in spoken language personally in the English lab. The general conditions were the same as earlier. Regarding testing, on the second day the participants fulfilled the tests in the same order and they could have a rest between the individual computer-based LLAMA test and the other test types, which all were written and completed in one group.

Out of the total 60 participants, the ones whose parents did not give their consent, were excluded from the EEG experiment. Finally, 28 participants were tested with EEG, which was carried out in seven sessions on school days, due to the capacity of the EEG lab at the University of Pannonia.

Chapter 3. Data analyses and results

All the data were coded manually except ERP and LLAMA language aptitude tests, which were evaluated digitally and coded real time by the computer.

During the evaluation of results data management was performed by Microsoft Office, Word and Excel. Statistical analysis was carried out by IBM SPSS Statistics 22. The first set of analysis examined raw data and give an overall view of results. In the next step, different types of correlations are tested.

3.1 Results on influencing general skills

3.1.1 Socioeconomic status

In my study SES seems to be an important influencing factor on word recognition. I examined the factors, which were relevant in the literature too, to explore the participants' socioeconomic status and linguistic repertoire. The parents' educational level is an important factor, as Bialystok (2004) determined it. In my study, the mothers' and fathers' educational levels were similar: the majority had secondary school certificates. Most of the parents are factory workers. Focusing on the students, it was clear that most of them have their own rooms in their homes, some of them with their own TV sets. They own mobile phones, but on the contrary, only a few of them can afford to travel abroad or go on a holiday. Based on these, we can say that they come from lower middle-class families. This factor may be an answer to their poor results in specific tests.

Participants had to answer 23 questions about their living conditions. Based on the results of the socioeconomic test, the educational background of the families is homogeneus among the 60 participants. Seventy-one percent of the parents have secondary school certificate, 20% of mothers and 21% of fathers has a university degree. The others have primary school studies.

The majority of respondents (85%) live in their micro family with their parents and 56% with their siblings. They have their own rooms (89%), tv sets (89%) and mobile phones (98%). They mostly live in flats (80%).

Only 16% go to private classes and 75% have already been abroad. The results of the 60 respondents on these factors can be seen in Figure 11.
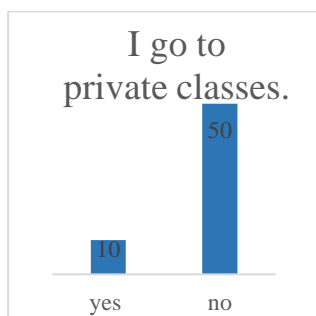
Figure 11. Results on an item in the SES questionnaire

Source: Own elaboration

Based on their self-evaluation, they do not usually go on holiday, to cinema or theatre. In some families, there is a permanently an ill person (2%), there are people who permanently work abroad (20%) and there are some unemployed relatives (10%).

Thirteen percent of the participants lives with their mother, and 2% lives with their grandparents without their parents.

SES is not taken into account in the analyses of the linguistic performance of the students in later phases, because there is no variation in the group and they all have low SES. In later phases the correlation is investigated between educational level of mothers and students' L2 achievement. Regarding L2 achievement and linguistic fresults no significant correlation could be introduced.

3.1.2   Language attitude and interview

Having seen the given answers by students to the 30 language attitude questions during data processing I felt a need to account for the reasons behind the answers.

In order to confirm the results of the language attitude test, I applied interviews (see interview questions in Appendix 9). As language attitude questionnaire and interview questions are both self-made and are similar in a way that both of them represents the feelings and attitudes about languages, the results are introduced together below. „Currently in many areas of social sciences we can see a peaceful coexistence of quantitative and qualitative methods" (Dörnyei 2011:30). I strongly agree with Dörnyei's thoughts and as I see it qualitative investigation unfolds the reasons and motivation behind the quantitative one, so I share these data together. I have chosen 4 students representing marks from 2-5 (coded 7, 13, 14 and 24), who gave the seemingly weird answers in the quantitative analyses and carried out four interviews only to see the tendencies in connection with English grades. Every person symbolises a grade from 2 to 5. The results of the language attitude test and the coded illustrating answers for interview questionscan be seen below: The L1 was Hungarian and L2 was English for all the students, who are 15 years old. Based on the questionnaires, I could not find anyone with a third language.

The parents L1 was Hungarian in 100% as well. The preference in languages was in 70% Hungarian and in 30% English.

7: I prefer English. When I listen to music I think it is easier to express something in English. It can be more colorful. (…) It is easy to learn English, and easy to express ourselves in English. It is easier to communicate in English with other nationalities, because English is used more often than Hungarian. Hungarian is unique and difficult and you can use round oath.

14: In English language the number of modern expressions is higher, that is the reason why I like it. In Hungarian there are many odd words. English is modern, a person can express himself in other way. Hungarian is fossil.

24: English is much more modern, spoken all around the world and is easier to learn, than Hungarian.

There are people who make distinction between American and British English. American is rough, British is polite. Hungarian is more difficult and sophisticated than English.

Almost two-thirds (68%) found Hungarian language easier, while 32% chose English as the easier language. 78% uses Hungarian more often, 20% English, just a small nuber (2%) indicated that both of the languages are used.

7: I play pretty lot and I write to chat programs of course in English 'cause everybody can understand it.

13: I use English if I have to.

14: In chat programs I communicate in English more often.

24: I communicate in English every week when I play.

Eight percent will teach only English, 32% only Hungarian and 60% will teach both languages to their kids in the future.

Thirteen percent is left handed, 87% is right handed of the participants. 15% started to learn English after the age of nine, 85% earlier. Those who started before the age of nine, went to kindergarten classes and private teachers in 100%.

L1 is always used at home and at school, mainly with their family on a daily basis. L2 is used in the school mainly, teacher is the L2 partner for 55%, friends for 42% and family for 3% of the participants.

7: If I watch films and series in English I learn slang and pronunciation. I gained experience in student exchange program.

13: I use English in the school, nowhere else.

14: I try to use English in more situations.

74

24: I often use English when I watch tv, or when I listen to music. I go to private classes and sometimes we go abroad.

Frequency of L2 usage is categorized in five sections. Forty-six percent said that they sometimes use L2, 35% often, 12% rarely, 5% always and hardly any (2%) indicated never. All the students have their first memories in Hungarian.

Nearly all of the respondents (98%) are more self-confident in Hungarian, 2% in English.

7: I am self confident in 100% when I speak in English. When I speak in Hungarian I am not self confident, because people say I stammer. In English I don't stammer. I haven't noticed yet. It feels so good to hear myself speaking English and when people say I speak English well.

13: I am self confident in Hungarian, but not in English. I just learn it. I am not good in it in the school. I have to learn a lot.

14: In school I am not self confident in English. Abroad I am, after a few days. My mother tongue is Hungarian. When I speak I am self confident, when I write I think it twice how to write a sentence.

24: It depends. I feel happy when I use English and I am calm. Maybe I am proud of my knowledge, only maybe because I am not so good.

Most of them (90%) read only in their mother tongue, 7% read only in English and 3% in both languages. A high number of these students (90%) listen to English music.

7: I am a fan of English music. My parents like it too, that is why I like it so much.

13: I listen to English and Hungarian bands.

14: I watch series on a daily basis and I play every week. If I listen to music I listen to English bands. Learning words is difficult for me but lately I developed a bit.

24: I listen to English music but I do not understand everything.

According to their self evaluation they are good in their mother tongue, however in English 55% avowed themselves intermediate, 27% weak and 18% good.

7: I do not want to be too smarty but I would give a 5 to my knowledge. I use English very often and I have many lessons in the school.

13: I have a 2 in English in school. I don't learn a lot.

14: My English is average. It is a 3. In school it is 4. I should learn more and I would be better in it.

24: I have 3 in English. I am lazy and I don't like learning, but I like films and music.

The reason of learning languages is in 78% its usefulness, 17% said that they have to learn, 12% likes the language, 3% learns it to play games.

7: My parents chose English in primary school and I think it was a really good decision. Daddy learnt English and he could use it, mommy learnt German and she couldn't use it. English is one of the most useful thing what we learn in school. You can use it everywhere, you need it. It is the first among subjects. I am sure people use it in the future. I am not sure that a business will be done with the help of history. Language is the most important.

13: English is the first. You will use it in the future.

14: We chose together. My family was not interested in German. I think English is a really useful subject before literature, maths and history.

24: Trade is the first subject for me, and than comes English.

In response to their personal feelings, participants indicated that they have a kind of dialect:

7: I speak somogyi dialect in Hungarian. I perfectly write lesz with double s. I cannot inflect as my parents and grandparents say. My mistakes are common in Hungarian. My spelling is awful. I have problems with capital letters. All in all I am really proud that I speak Hungarian, as it is a difficult language.

13:I speak and write easily. I have mistakes. I like languages but I do not like learning. Sometimes I use words as my grandparents use them. It is not typical but sometimes it happens. In the school we don't use dialects. But I have learnt about it.

14: I have a rural accent in Hungarian. When I was a small child I spent a lot of time at my grandparents at Nagyberény. My spelling is not bad. When I write an ambiguous word I think it twichow to write it. To sum up, irrespective of the language and our country I am proud of my mother tongue. I cannot imagine my life in another way.

24: I think I use no dialects. I speak Hungarian. I learn it in school and sometimes I have mistakes in it but I do not think I use dialect. Maybe my grandparents use it who live in a village. (Parapatics & Lengyel 2021).

The advantage of bilingualism for 65% is its usefulness, 33% highlighted its role in travelling and for 2% there is no advantage.

Considering disadvantages, the answers of the 60 participants can be seen in Fig. 14.
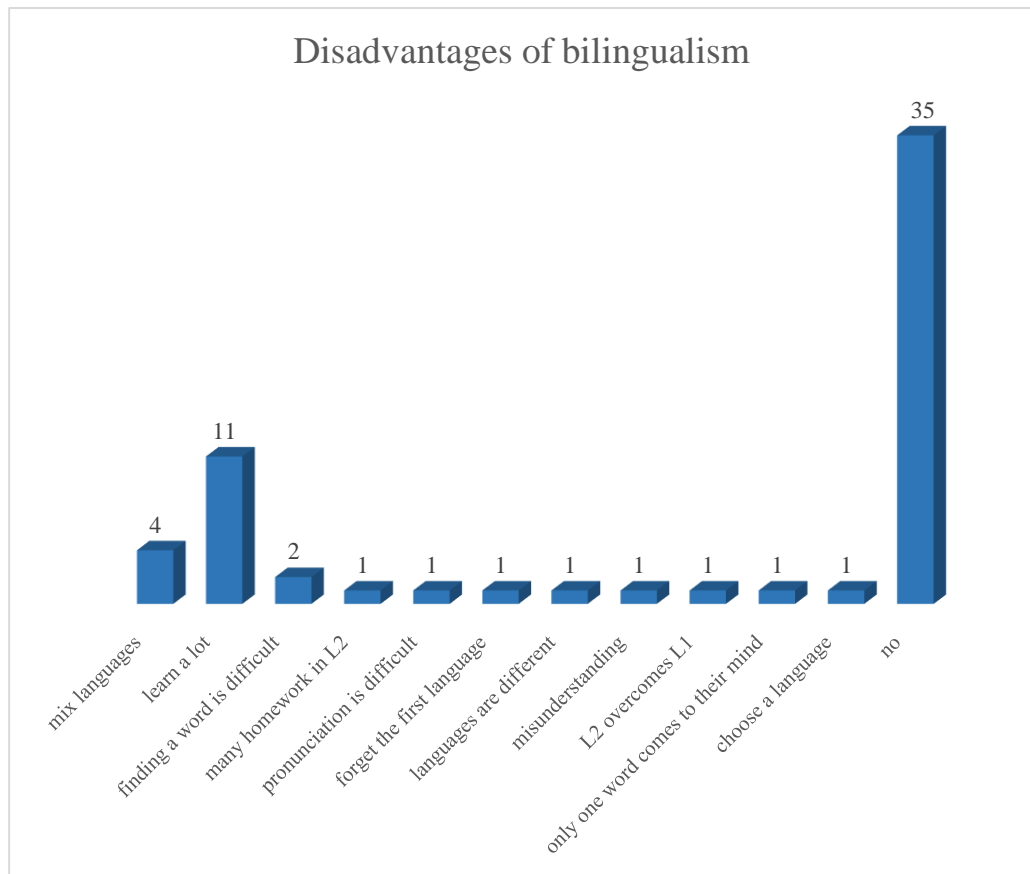
Figure 12. Sample of answers for the question of What are the disadvantages of bilingualism?

Source: Own elaboration

For 58%, there is no disadvantage of bilingualism, for 18% the problem is that students have to learn a lot to become bilingual, 7% mentioned that it is hard to be bilingual because you mix languages, 3% said that finding a word is difficult for a bilingual. Fourteen percent had different opinions on this question, which is apparent from Figure 12.

12 students out of the 60 participants answered in connection with learning tasks. 11 students said that in order to become bilingual you have to learn a lot and 1 said their is many homework in L2, so 20% do not want to learn much in order to get a better language knowledge and on the contrary that 98% find bilingualism advantageous.

3.1.3   Infocommunication Technology

Students answered 40 questions about the habits and usage of info-communication devices. Out of the 60 students, 33% got a mobile phone at the age of 10. Twenty percent got it at the age of 11, 13 % at the age of 12, 8% when they were 13, 7% at the age of 8-9, 5% at the age of 14, 3% at the age of 6. The most remarkable result to emerge from the data is that 2% at the age of 3, 15.

The majority of those who responded (96%) found mobile apps useful, 2% had no answer, 2% found it not useful.

Thirteen percent spends less than an hour using mobile phone, 37% 1-2 hours, 50% more than 2 hours using mobile phone a day, while doing sports means for 33% less than an hour, 43% 1-2 hours, 24% more than 2 hours a day.

For the question *What would you do without your mobile for a day?* 35% answered that they would do sports, 22% would use other IT tools, 13% had no answer, 13% would meet their friends, 5% would read, 5% would do nothing, 3% would sleep, 2% would eat and 2% would cook.

Just under one third of the participants (28%) finds it very important to have a mobile, for 68% it has average importance, 4% answered it is not important.

For 70% mobile can help with learning, for 30% it is not a help.

Only 10% said that the net sources are trustworthy, for 82% these are partly trustworthy, 8% answered they are not trustworthy.

The most frequently used application is Messenger (80%) and than Facebook (19%) on young people's mobile phones.

Table 14. reports the data on their writing habits:

Writing by hand, phone and computer						
How often do you write **by hand?**	55% daily	22% weekly	23% do not write by hand			
What do you write **by hand?**	77% school stuff	3% receipts	3% texts	2% to do list	15% no answer	
How often do you write **by phone?**	33% less than an hour	25% 1 hour daily	42% more than an hour			
What do you write **by phone?**	3% no answer	2% best wishes	2% everything	93% messages		
How often do you write **by computer?**	62% daily	22% weekly	16% monthly			
What do you write **by computer?**	17% no answer	2% composition	8% homework	2% search	4% everything	2% text	65% messages

Table 14. Writing habits of participants

Source: Own elaboration

To the question: *Where is your spelling the best?* 3% had no answer, 42% answered on computer, 22% on the phone, 33% by hand, while 15% has most errors on the computer, 57% on the phone and 28% by hand.

Forty-two% prefer writing by computer, 45% by phone and 13% by hand.

Seventy-two% sometimes uses abbreviations, 18% always do so, 10% never uses them. Mainly for long sentences or words 38% use them, 37% had no answer, while 5% tries to abbrreviate everything.

Sixty-two per cent of the participants is not confused by abbreviations, 20% is disturbed by them.

Seventy-eight% said that emoticons are good for expressing mood and feeling. 57% does not know all the emoticons, while 42% said that they know all of them.

In case of errors or misspelling, 80% of cases are not corrected by chat partners, 78% does not correct their own mistakes.

Sixty-eight per cent had no answer to the question: *What was the last mistake you remember?*, 2% were represented by the following categories: writing words together, accent, letter change, ly-j change, missing letters, comma, others had no answer.

For the reader, the worst mistake is when the writer writes the words together (63%).

Sixty-two% uses photo programs sometimes, 52% editing programs sometimes, 80% often uses music programs, 58% plays often.

From the given list of sentences and abbreviations (see Appendix 4.) 53% knew every expression. 8 and 9 expressions were known by 17-17%.

The most significant advantages of Facebook were: 38% keeps in contact with others, 23% gets to know people, 20% shares information, on the other hand, drawbacks for 30% that strangers can get at our data, 25% answers that there are only silly things on Facebook and 10% says that it contains much false information.

Eighty-seven per cent of the participants did not learn anything from chat programs, 8% learned something new and 5% had no answer.

3.1.4   Language aptitude

All the 60 participants completed the LLAMA B subtest – learning vocabulary – for measuring language aptitude. In my own research, the results of the 60 participants, as illustrated in Figure 13., are the following:
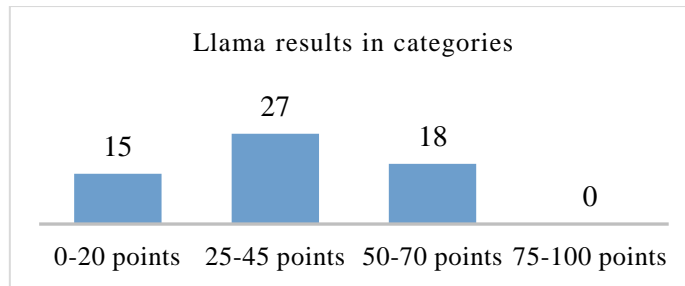
Figure 13. LLAMA results of participants

Source: Own elaboration

Each correct answer means 5 points. The maximum score you can have for the maximum 20 correct answers is 100 points.

The evaluation of the participant is done by the program, the result data is automatically saved in LlamaData.txt file and is given in %. At the end of the test it is displayed on the bottom panel.

Twenty-five per cent had very poor results, having 0-4 correct answers. 45% had average results, having 5-9 correct answers. 30% had good results with 10-14 correct answers and it is interesting to note that no one had excellent results. This is in line with the literature, where Meara (2005) mentions that most of the participants have average results.[32] Table 12. shows LLAMA statistics. Out of the 60 participants noone had 0 right answers. The lowest value was 1 and the highest was 14 correct answers.

1	minimum
14	maximum
5	mode
7	median
7.28	mean
3.48	standard deviation

Table 15. LLAMA statistics

Source: Own elaboration

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[32] http://www.lognostics.co.uk/tools/llama/llama_manual.pdf

frequency	number of correct results
1	1
4	2
3	3
7	4
8	5
3	6
7	7
7	8
2	9
4	10
6	11
3	12
2	13
3	14

Table 16. LLAMA results

Source: Own elaboration

As it is clear from the results above (Figure 16.), five correct answers were represented in the highest number (8), while 1 correct answer was represented in the lowest number (1). The number of correct answers is between 1-14. My results reflect normal distribution in the LLAMA language aptitude test.

3.1.5   Motivation

Participants were asked about their motivation and attitudes in language learning and they had to circle the best alternatives on a Likert-scale based on their agreement with the given statements. During the evaluation the answers were transformed into numeric scales from 1 to 6, representing the answers: strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree and strongly agree. The answers represented their personal feelings, so there were no good or bad answers[33] (Lengyel 2019b).

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[33] https://mersz.hu/dokumentum/m623tieisz__43

Analysing the scales provides conclusions on students' motivation towards language learning, foreign people, learning English, their anxiety, learning environment and parental support, which can be used by language teachers in their daily teaching practice. The results are summarised in Table 17.

AMTB statistics	AFLL	AEP	ALE (pos)	ALE (neg)	INT.O	INST.O	AEL	PS
Cronbach α	0.57	0.62	0.78	0.72	0.50	0.70	0.72	0.74
Means	4.91	3.25	3.80	2.60	4.27	3.77	3.24	3.40

Table 17. AMTB statistics
Source: Own elaboration

The reliability of scales can be seen in the first row. Cronbach α at AFLL 0.57 and INT.O 0.50 have lower values, but the reliability is appropriate in both of the cases, as the number of the investigated statements was low. (Horváth[34] 2014, Szepes et al. 2014, Rózsa et al. 2006)

The first scale is based on attitude in foreign language learning. The investigated statements were:

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[34] http://www.kulturaeskozosseg.hu/pdf/2014/3/10.pdf

If I were visiting a foreign country, I would like to be able to speak the language of the people.
I wish I could speak another language perfectly.
I often wish I could read newspapers and magazines in another language.
I would really like to learn a lot of foreign languages.
I enjoy meeting and listening to people who speak other languages.

Table 18. Investigated statement about foreign language learning in AMTB

Source: https://publish.uwo.ca/~gardner/docs/AMTBmanual.pdf

As it can be seen, the statements are about feelings and emotions based on the knowledge of foreign languages. The result was not salient, but was the highest mean number among scales (4.91). Participants would like to use foreign languages easily, in different spheres of life.

Salient results were neither at integrative (4.27), nor at instrumental orientation (3.77), though these were among the highest means of different scales.

Statements about learning English were divided into groups reflecting positive or negative attitudes.

Positive statements:

Learning English is really great.
I really enjoy learning English.
English is an important part of the school programme.
I plan to learn as much english as possible.
I love learning English.

Negative statements:

I hate English.
I would rather spend my time on subjects other than English.
Learning English is a waste of time.
I think that learning English is dull.
When I leave school I shall give up the study of English entirely because I am not interested in it.

Table 19. Positive and negative statements about learning English in AMTB

Source: https://publish.uwo.ca/~gardner/docs/AMTBmanual.pdf

The mean of positively worded group was 3.8 and was 2.6 at negatively group. Students accept that English is a significant subject in the school programme and think positively about learning it, but they do not really plan to learn it a lot. Having seen the lowest mean from the eight scales, I can say that the participants do not agree with the negative statements, so in a way they like English.

Anxiety in the English language class seemed to be low according to the scale result (3.24). This means that students are not embarrassed or nervous when they have to speak in English lessons in front of others.

The test revealed that on the average, parents do not give support to their children in learning English. The mean 3.4 shows that parents do not give maximum help or encouragement to their children in language learning.

The lowest result was gained in the scale of attitude towards learning English in case of negatively worded items, which means that students on the whole like learning English as their average result was 2.6 on a Likert scale to statements such as „I hate English." or „I would rather spend my time learning other subjects than English."

The highest number was represented at attitudes in learning foreign languages. Students would like to know English on a specific level where they do not need to use translations and they would like to communicate freely.

This survey led me to conclude that children and parents are aware of the role and importance of language learning but hardly any of them does something to improve the scolastic record. So it is not surprising that most of the students are not successful in language learning in these conditions and with these attitudes.

3.1.6   Creativity

In evaluating the results, I will demonstrate four categories in creativity: fluency, flexibility, reflexive flexibility and complexity. (Table 20.)

Fluency (F) is a quantitative index, which means the number of answers. Four as the lowest and 24 as the highest point (number of drawings), the results were really varied.

Most of the students tried to create a kind of drawing. But sometimes they found a category, they drew variations of it, eg. when they realized that an apple can be drawn they drew an orange after it. 24 as the highest value refers to detailed answer information.

Flexibility (X) reflects the categories/classes of answers. The highest number (16) refers to an ability of flexible change in viewpoints. One as the lowest value means that the participant gives answers according to one schema.

N=60	Fluency	Flexibility	Relative flexibility	Complexity
Mean	10,1500	7,2333	,7517	1,1833
Standard deviation	3,96948	3,22262	,26616	1,21421

Table 20. Statistics of fluency, flexibility, relative flexibility and complexity in TTCT

Source: Own elaboration

Relative flexibility (rX) is the quotient of flexibility and fluency (values were between 0,088-1). High numbers indicates that a person tried to do a task from different viewpoints, transmitted many possibilities and was flexible in using strategies to get a solution (Zétényi 1989).

For the purpose of my study I investigated Complexity (C), as Papp[35] referred to is a number of drawings where more circles were used. The value changed between 0 and 5.
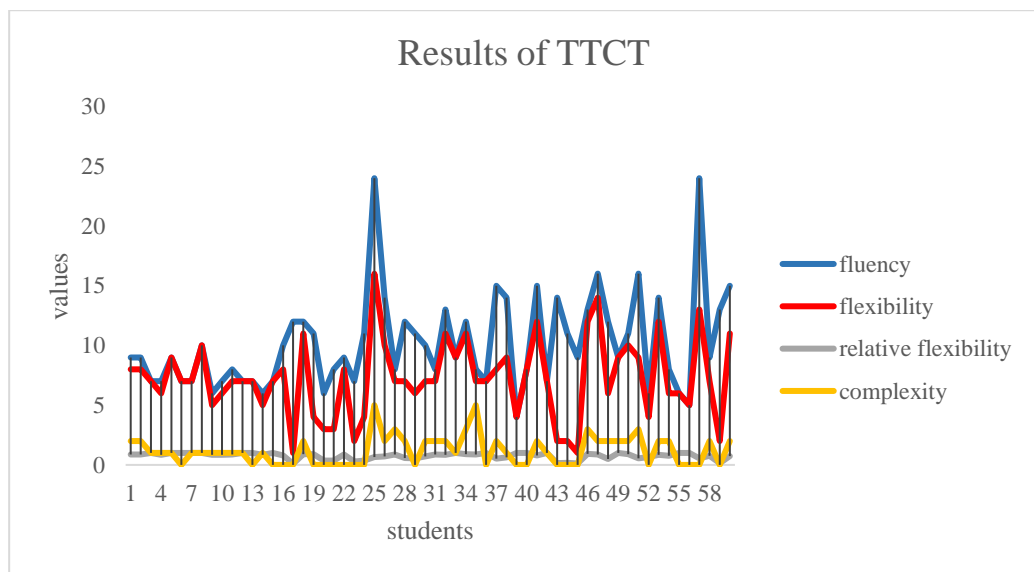
Figure 14. Results of TTCT

Source: Own elaboration

Figure 14. illustrates all the answers from the analysed four categories in TTCT. As it is clear from this figure that two students scored high and salient points in fluency.

„Evaluating the results the capital aspect is: the highest number is the best. … In achieving judgement of participants' intellectual abilities we get most of the pivots if we highlight participants' strong points" (Zétényi 1989: 13). In order to follow the original analysis, I illustrate the two best participants' (25 and 58) overall results in Tables 21 and 22.

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[35] http://www.kandosuli.hu/sites/default/files/files/TEHAZONOSITAS.pdf

40	16		
35	14		
30	12		5
25	10	1	4
20	8	0.8	3
15	6	0.6	2
10	4	0.4	1
5	2	0.2	0
F(24)	X(16)	rX (0.66)	C(5)
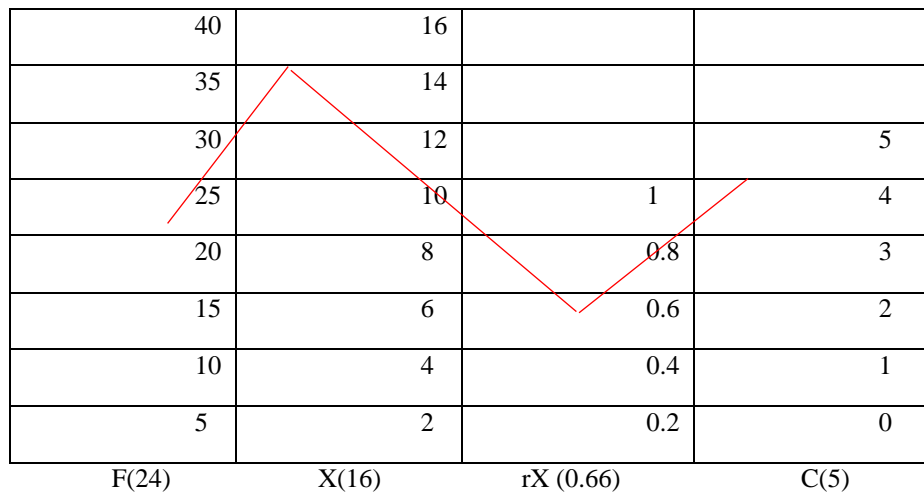
Table 21. Participant „25"results in TTCT

Source: Own elaboration

40	16		
35	14		
30	12		5
25	10	1	4
20	8	0.8	3
15	6	0.6	2
10	4	0.4	1
5	2	0.2	0
F(24)	X (13)	rX (0,54)	C(0)
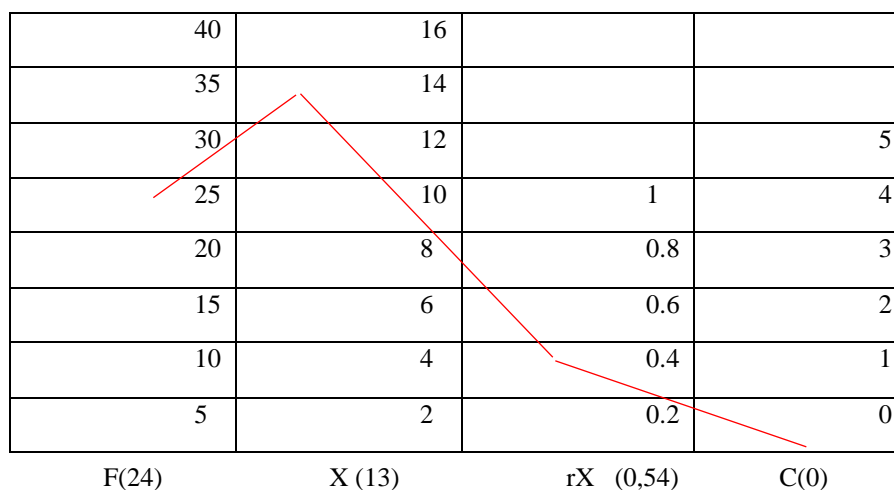
Table 22. Participant „58"results in TTCT

Source: Own elaboration

According to the above mentioned factors, these two students are able to give detailed answers, are flexible in changing topics, are able to have different viewpoints when solving a problem and flexibly apply strategies during solution of tasks.

3.1.7   Bidialectism

As I presupposed, not all the 99 words were known to the participants.[36] There were ten words which were known by half of the students (*szemerkél* (77,6%), *sámli* (77,6%), *cinege* (74%), *okádik* (70,7%), *csöpörög* (67,3%), *birka* (65,5%), *csibe* (62%), *zsugori* (56,9%), *barátfüle* and *bandzsa* (50%).

35 words were known and used by 10% of the participants,: *bélpoklos*, *réce*, *tutyi*, *zihál*, *töpörtő*, *fej*, *haj*, *vánkos*, *böllér*, *zsurmul*, *macskaméz*, *tutul*, *fukar*, *nyökög*, *pucok*, *nyervog*, *szemetel*, *kaccsa*, *kánya*, *pörc*, *ókula*, *bécsibicska*, *hüss*, *csuta vagy csutakomp*, *kövesztett*, *pocséta*, *disznóölő*, *pök*, *hant vagy hont*, *kitisztul*, *csuma*, *borjazik vagy borgyazik*, *csettent*, *májog*, *szege*. 31 words were known by less than 10%: *viselős*, *pislogat*, *szijács*, *bangócs*, *kopoz*, *ciha*, *bicske*, *cséve*, *kürt*, *lajtergya*, *hecsedli*, *biling*, *szodé*, *svártli*, *lehöl*, *köpcös*, *turcsi*, *csemcseg*, *elsemved*, *früstök*, *ripacsos*, *kerbenéző*, *pesszeg*, *bugyli*, *sziszereg*, *körmöz*, *seggvakaró*, *himpér*, *uritök*, *sámedli*, *kézfogó*. 22 words were not known at all : *buborcsék*, *buckó*, *csambillás*, *csigere*, *dönög*, *fosztás*, *fölöstököm*, *göbics* vagy *gübécse*, *hidas*, *ipam*, *kaszap*, *lehitál*, *napam*, *nevetlenujj*, *pattant*, *rapcsos*, *sanda*, *szelence*, *telhetetlen*, *tusa*, *türöttorrú*, *zsiba*; *szembogár*.

Students who knew most of the dialectal words were brought up in Siófok, their parents are from Siófok too and they meet their grandparents weekly.

The extremes were knowledge of 37 and 1 dialectal words. The informants know many dialectal words, which were documented half a century ago. Out of the 99 words there were only 22 which was unfamiliar to the students. (Parapatics & Lengyel 2021)

There were significant differences between the students because someone knew more than one third of the words, others only one word (Figure 15.).

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[36] Thanks to Andrea Parapatics for compiling and evaluating the bidialectism test
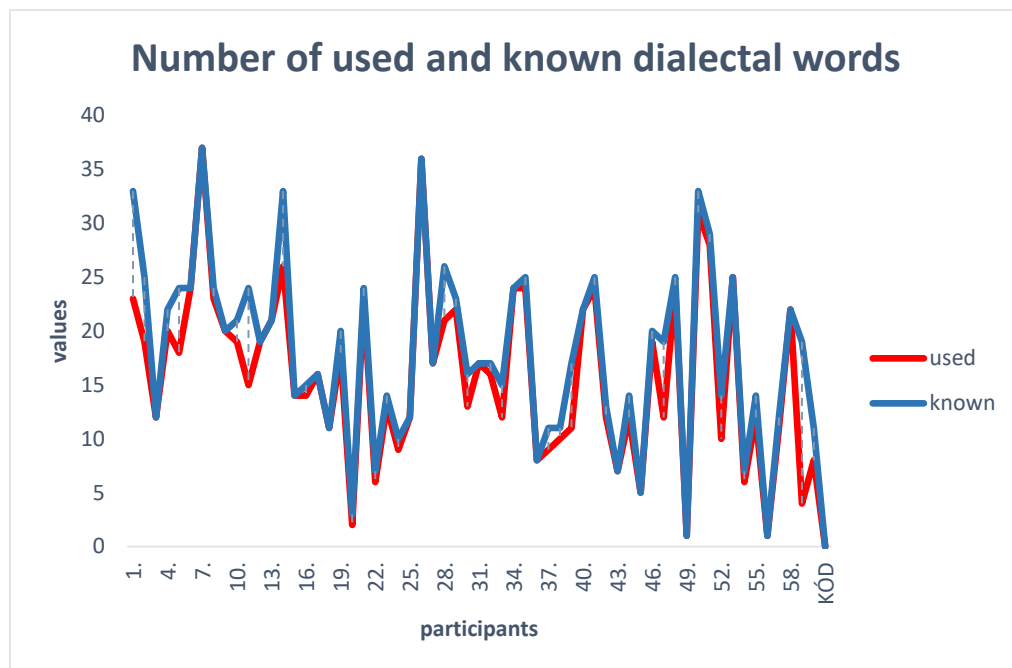
Figure 15. Number of used and known words in bidialectism questionnaire

Source: Own elaboration

Investigating the knowledge of dialectal words the following results can be shown. Five students know more than 30 words. The three students knowing the most words are from Siófok, their parents are from the same region and they meet their grandparents several times a week. 22 students know fewer than 30 but more than 20 words, 25 students know 10-19 words, 8 know fewer than 10.

In the future, it would be useful to investigate whether the advantages of bidialectism are demonstrable among Hungarian students in case of dialectal background. For this informants have to have developed metalinguistic competence and knowledge of standard and regional dialects (Parapatics & Lengyel 2021).

3.2 ERP results

Psychophysical[37] data show that from a total of 6480 data points (27 subjects, 240 trials), all reactions that were outside the 0.2-2 s time window (125 trials) were excluded. We found that the distribution of reaction times (RT) can be best approximated with an Inverse Gaussian (Wald) distribution, which we implemented during further modeling.
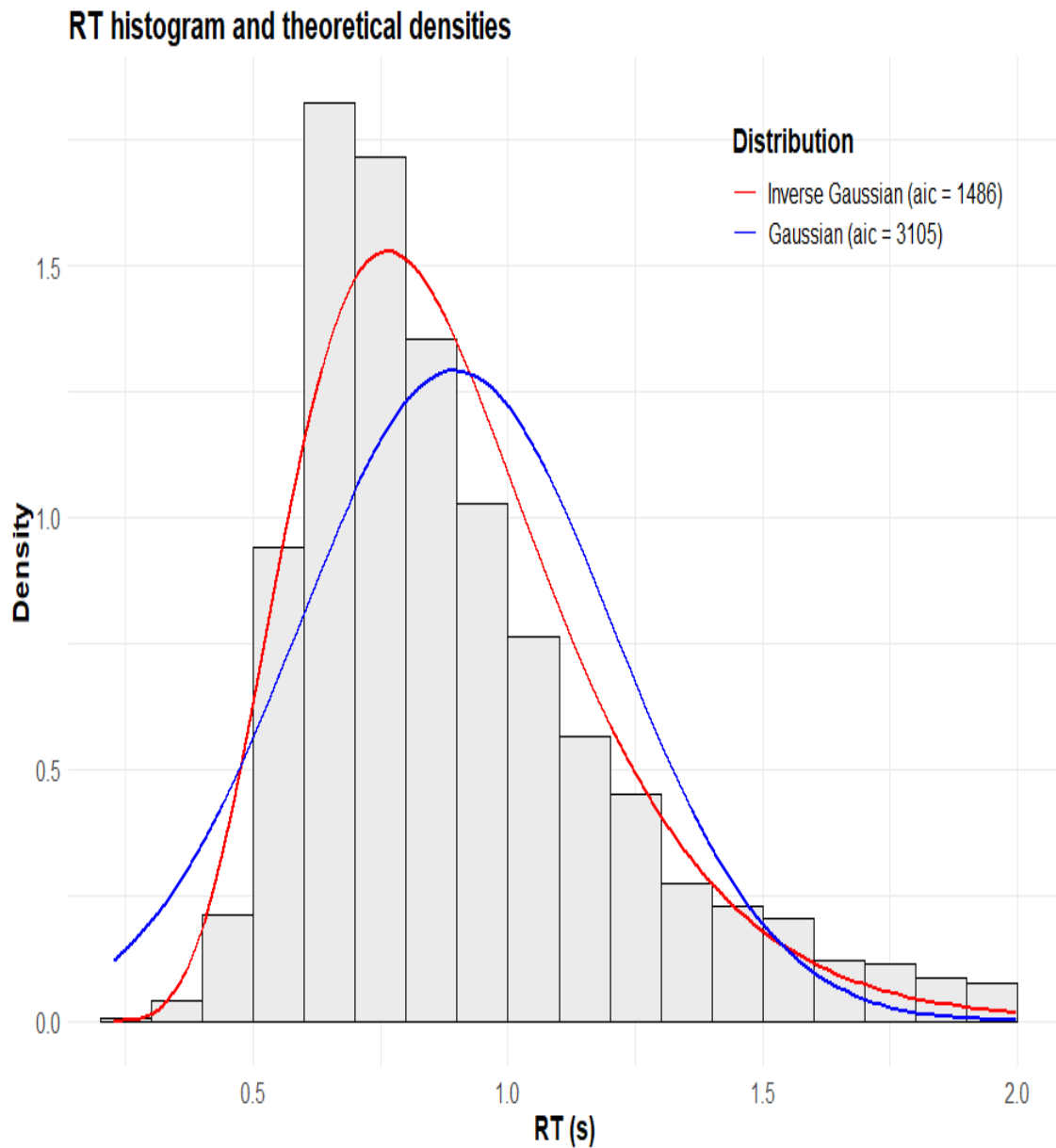
Figure 16. RT histogram

The average responses based on word language can be seen in the following histogram. Words with all English responses are on the right, and words with all Hungarian responses are on the left, while the more ambiguous words (mostly homographs) and pseudowords are in the middle.
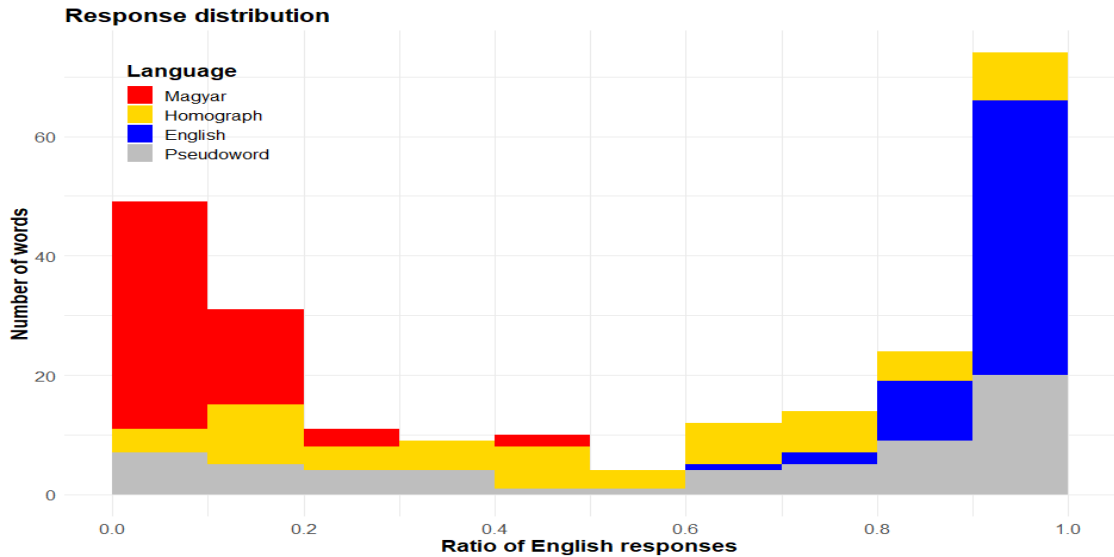
Figure 17. Average response distribution

Here we can see the same separated into two groups, based on English grades. We can observe a shift towards English responses for homographs with students who have good grades.
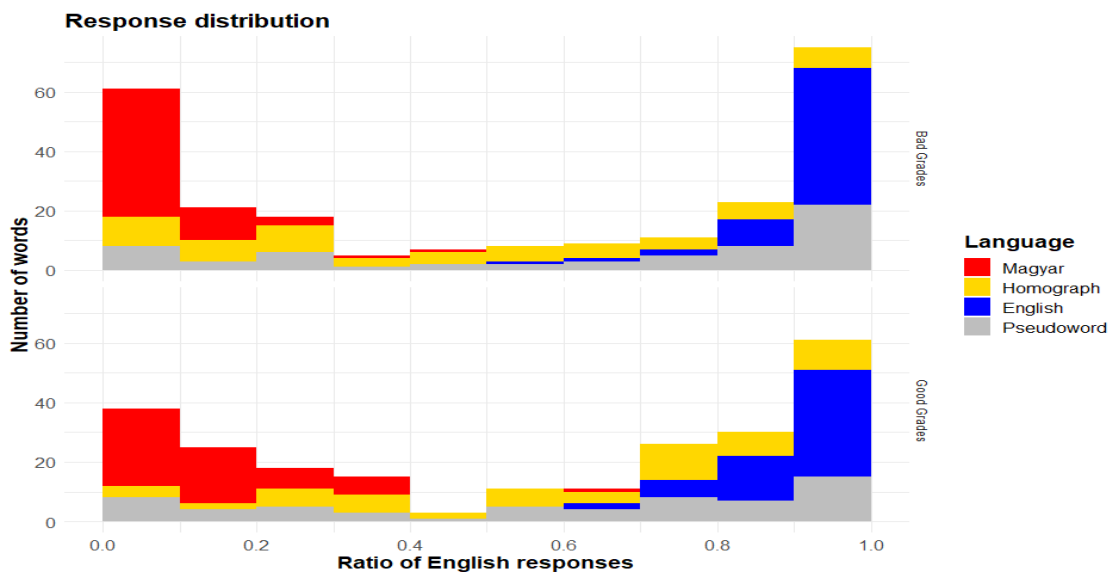
Figure 18. Bad/good grades' response distribution

To observe word-level effects, we can plot every single word based on its average RT and response language. We can see that there is an inverse U-shaped correlation, the more obvious the language of a word is (left and right ends), the quicker the RTs (downwards). It is also interesting to see, which English and Hungarian words strayed farthest from the good responses.
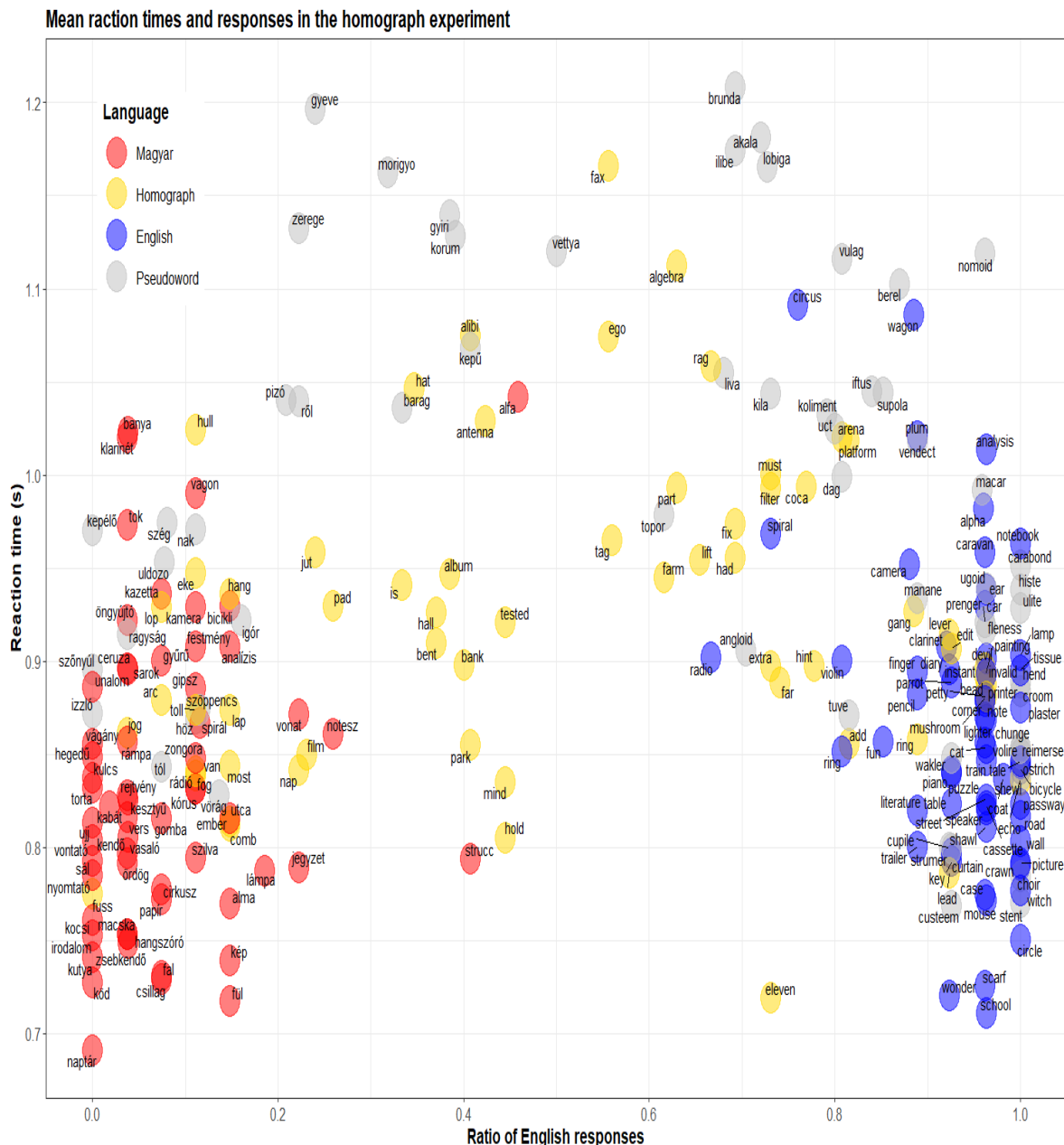
Figure 19. Mean reaction times in the homograph test

We can subdivide again based on the grades to observe, which words behave differently due to English proficiency.
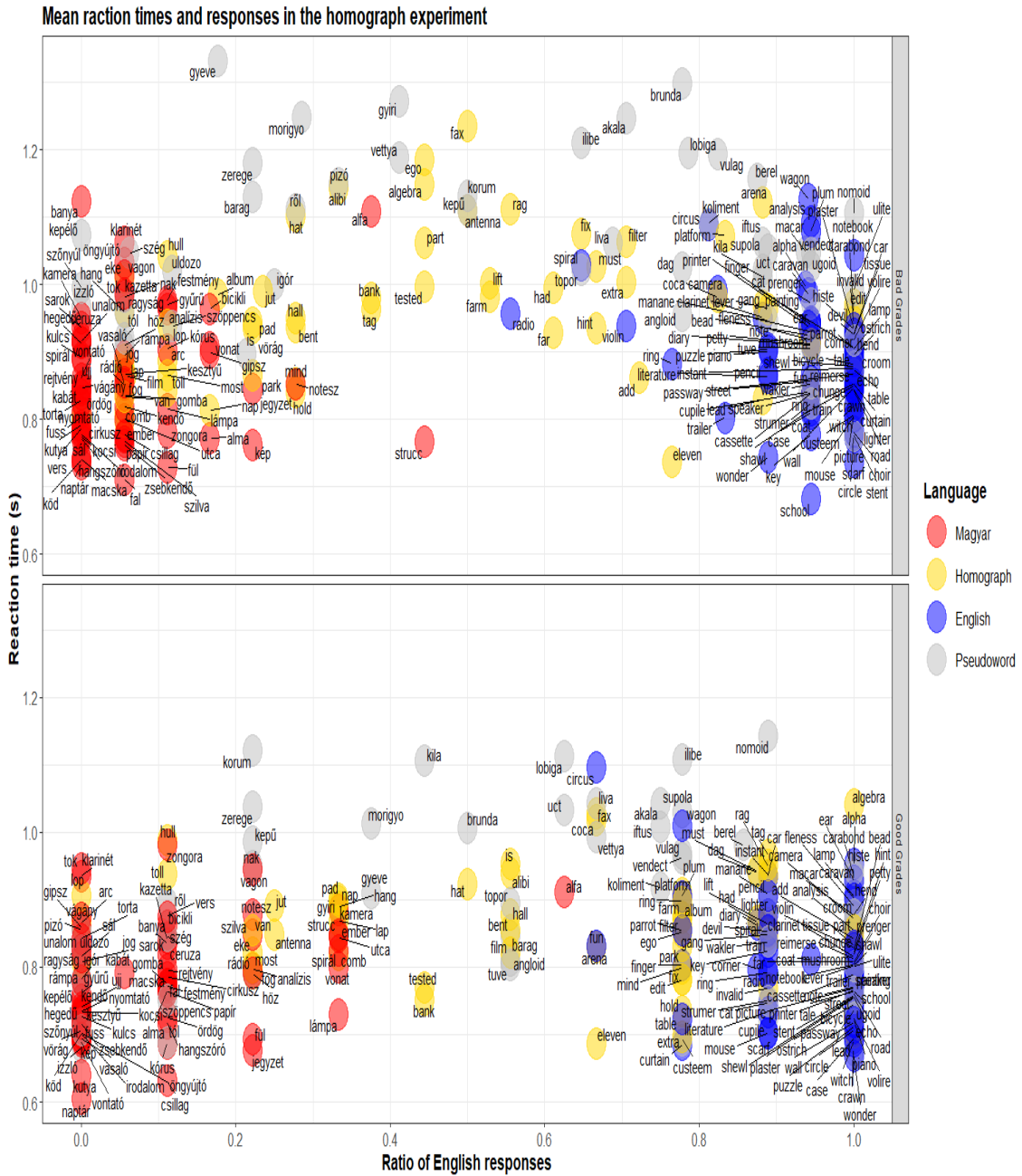
Figure 20. Mean reaction times based on grades

There are many participants. It iseems to be crucial to note that a factor has different effects on different participants, for example in a case of making a decision on a pseudoword one participant can be deceived others not. To model Reaction Times, a Generalized Linear Mixed-effects Model was fitted to the reaction times, with an Inverse Gaussian function, and identity link. The model formula in Wilkinson notation was the following: rt ~ lang * resp * grade2 + log(num) + (1 | sub) + (1 | word)

The model fitted without any problems, and a post-hoc ANOVA yielded the following effects: Analysis of Deviance Table (Type II Wald chisquare tests)

Response: rt

Chisq Df Pr(>Chisq)

	Chisq	Df	Pr(>Chisq)	
lang	38.1912	3	2.575e-08	***
resp	0.0262	1	0.871484	
grade2	1.8766	1	0.170724	
log(num)	3.1769	1	0.074688	.
lang:resp	1.3539	3	0.716369	
lang:grade2	14.3213	3	0.002499	**
resp:grade2	5.4522	1	0.019544	*
lang:resp:grade2	12.5695	3	0.005666	**

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Despite the apparent differences in the RTs between participants with good and bad grades, there was no significant main effect of grades. The differences seem to arise in the interaction of the fixed effects, namely how students with different grades responded to words of a specific language. The following data is about the comparisons of the design's levels, searching where the difference is between students with good/bad results. This is evidenced by post-hoc contrasts of marginal means:

The most apparent differences are found for pseudowords and homographs, where students with good grades show much faster RTs.
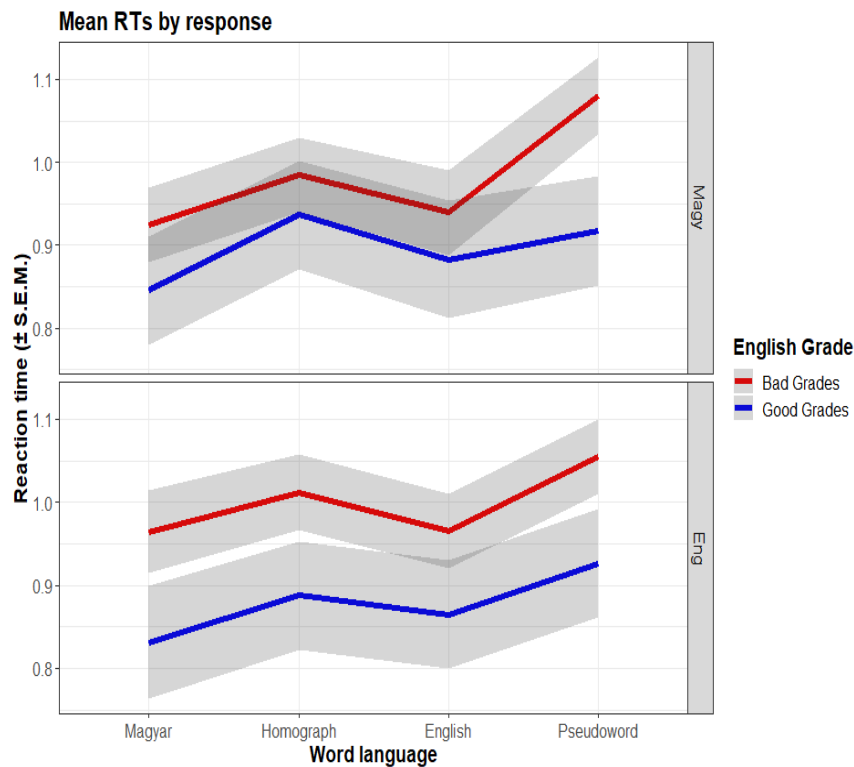
Figure 21. Mean RTs by responses

To focus on language related ERP components, we only show two time windows in detail:

150-300 ms for the N170 component (orthographic processing)

300-450 ms for the N400 component (semantic processing)

Although there were no significant differences between real and pseudowords in the N170 component, a big wave emerged at 325-400 ms latencies, at both left occipitotemporal and frontal areas. This could be attributed to the pseudowords lacking semantic representations and thus evoking an N400 effect. See grand averaged ERP waveforms from the aforementioned areas below:
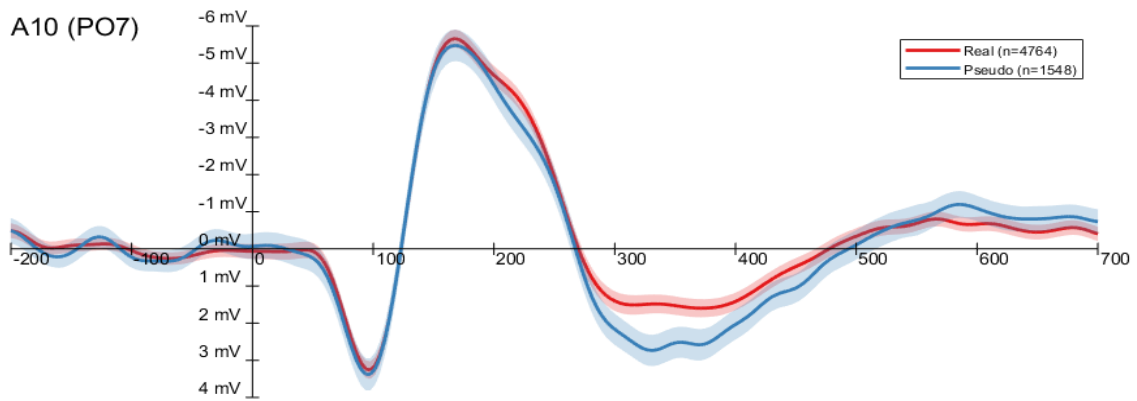
Figure 22. Orthographic processing
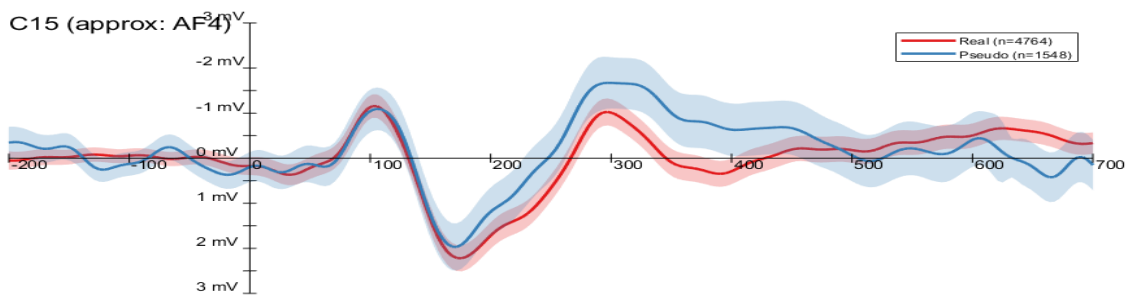
Figure 23. Semantic processing

When comparing the electrophysiological responses to English and Hungarian words, we found that they differ significantly in the N170 time window. On closer examination, the Hungarian N170 seems to have a second peak after 200 ms, making the waveform wider. This is completely missing for English:
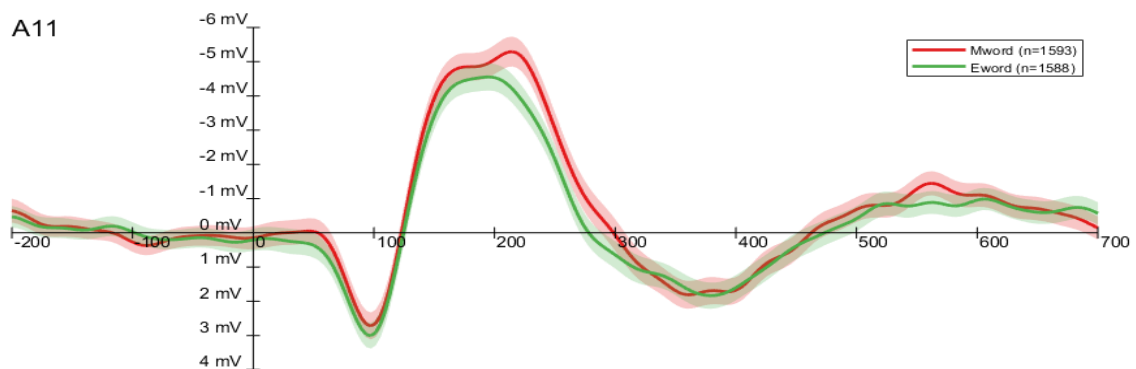
Figure 24. English words

Homographs in the same channel location seem to elicit an in-between N170 waveform, that does not differ significantly from either language. This could point to a parallel processing of word forms, where the English and Hungarian pathways differ, but homographs show sublexical structures that can flow through both paths.
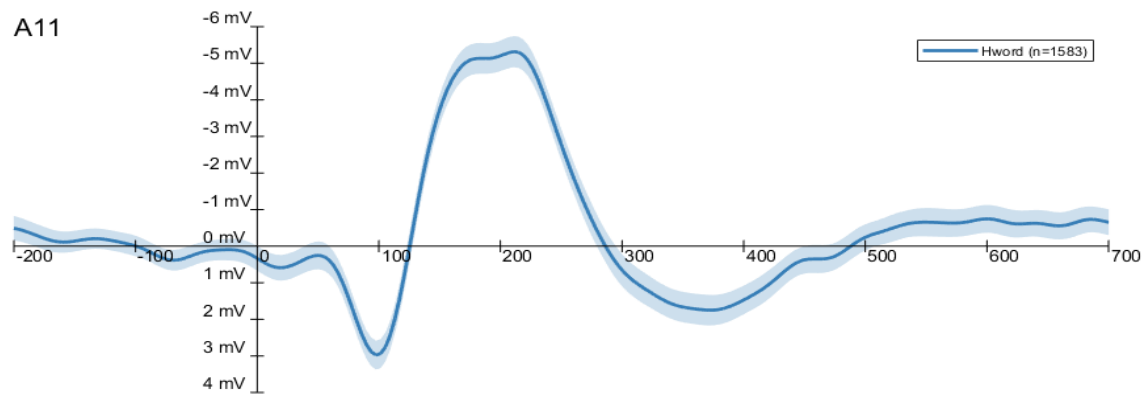
Figure 25. Hungarian words

There was no evidence of differences in the later semantic components. When we only include the correct responses for both languages, although we expected to see an enhancement of this effect, we observed very similar differences.
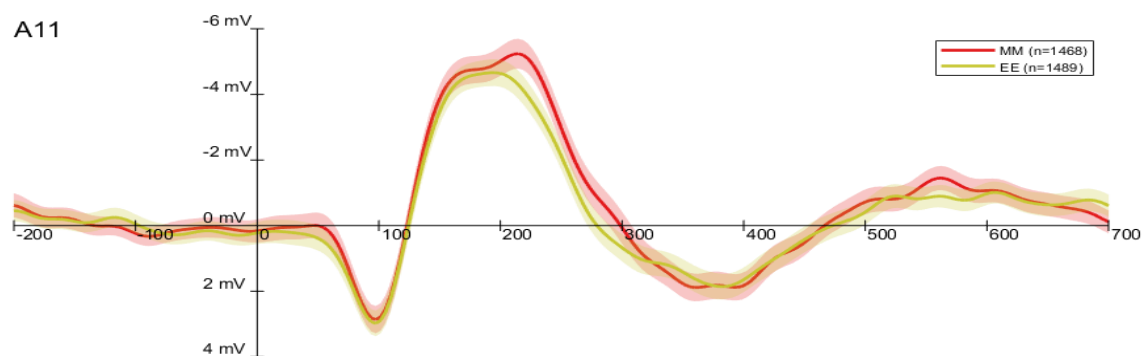
Figure 26. Correct responses for both languages

The next question was, whether the neural responses to homographs differ when they are recognized as English or Hungarian words. We found no significant differences in the ANOVAs, but the ERP waveforms show an interesting pattern: in both cases we see the second peak of N170 is evident, but both the width and the amplitude are larger in the case of Hungarian responses. This could point out that although in both cases, the words can be interpreted as English or Hungarian (suggested by the two-peaked waveform), those will berecognized as Hungarian, that elicit a more prominent second peak.
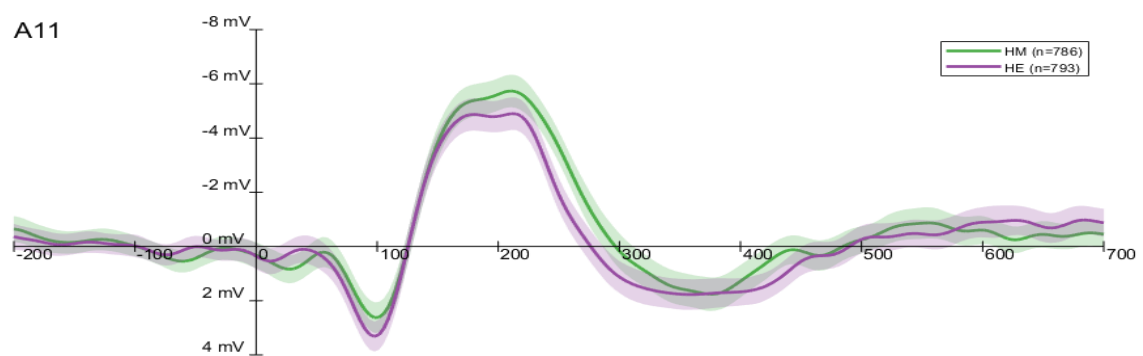
Figure 27. N170 for homographs

Similarly, in spite of statistical evidence, the same pattern is present for pseudowords:
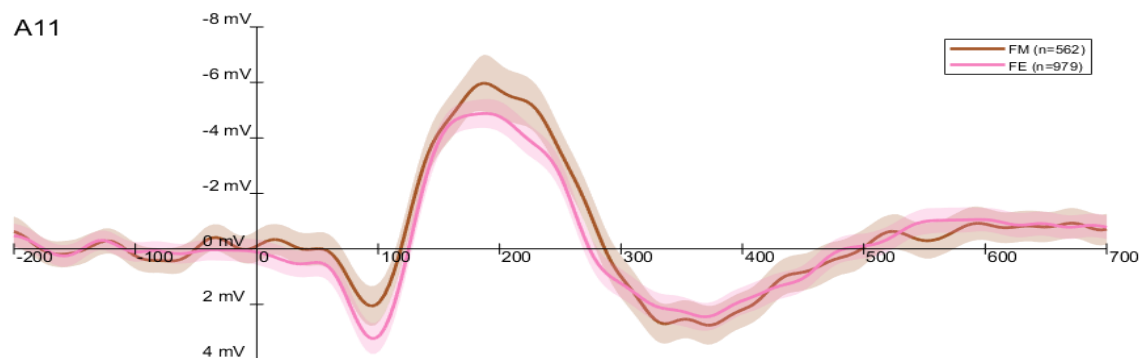
Figure 28. N170 for pseudowords

Considering the context, we can further divide the trials based on the previous response, as in a priming paradigm. For example, if the previous response was Hungarian, we would expect the processing network to be tuned for further Hungarian words. If this is the case, then a second Hungarian stimulus would be processed with more ease, resulting in smaller waves, a phenomenon known as repetition suppression. Although we found no statistical evidence by ANOVAs, we can see a promising tendency of this in the ERP waveforms:
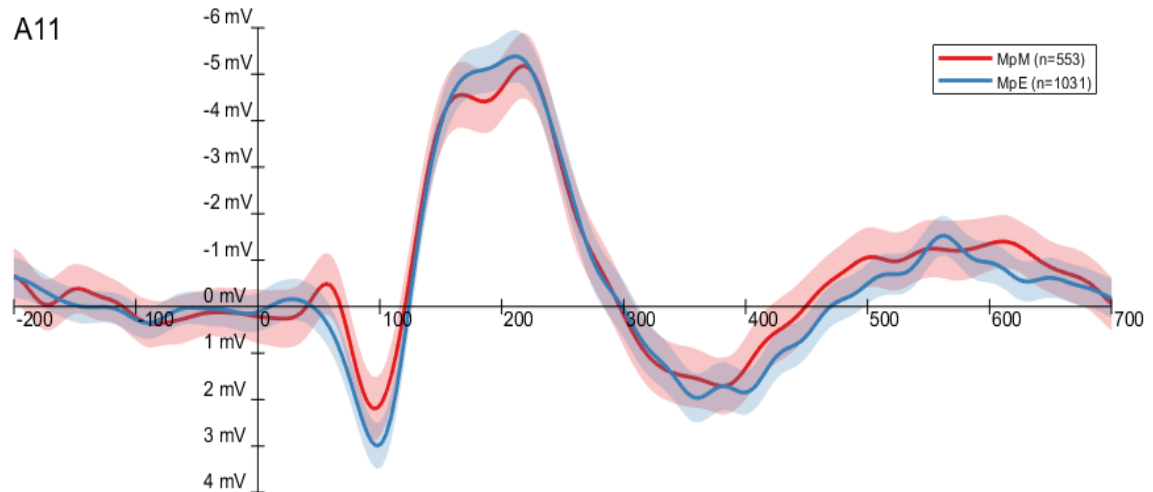
Figure 29. Previous response 1.
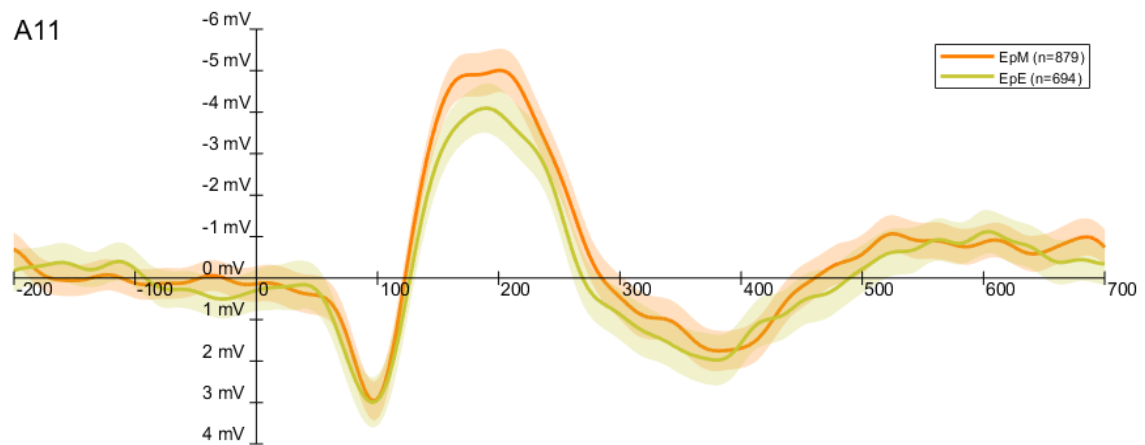
Figure 30. Previous response 2.

Similarly for pseudowords, we would expect to see smaller amplitudes if the preceding response matches the current response, but peculiarly, the tendency is reversed:
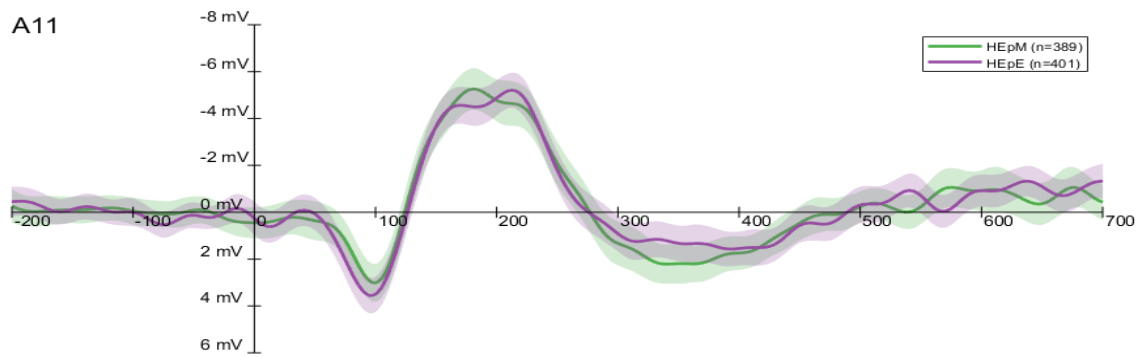
Figure 31. Previous response 3.
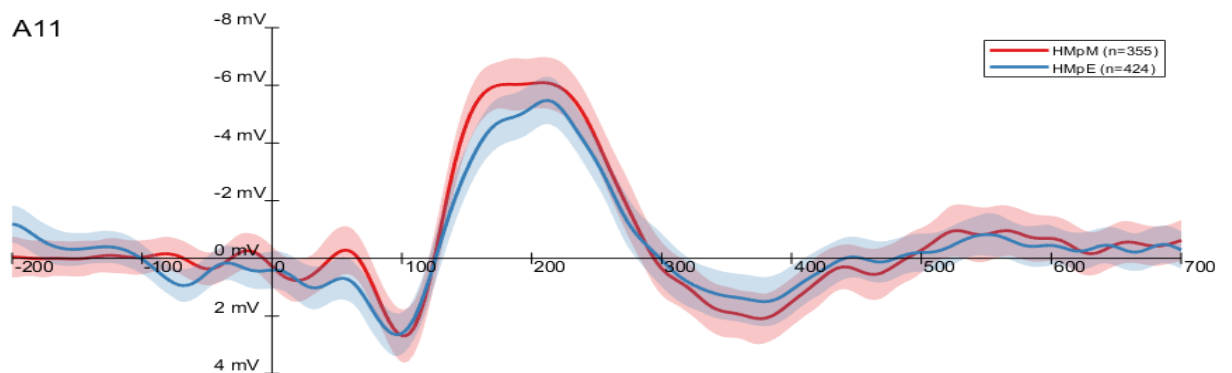
Figure 32. Previous response 4.

Unfortunately, the sample sizes were not high sufficient to compare ERPs based on English proficiency.

3.3   Results on linguistic skills

3.3.1   Anagram test

As regards anagram test, it was found that in some cases, participants created the words that were well known and frequent. The most frequent words came first in their dominant language.

However, the most striking result to emerge from the data is that they recognized some homographs sooner not in their mother tongue, but in their second language. My particular interest is based on the reason behind this. From the several possibilities there were some cases in which students did not recognize all the words they could have, such as in the case of anagram 'arb'. This test revealed that there was no occurence of recognized words like *bra*, or *ate*. Past forms of verbs were exceptionally rare, anyway (Tabe 23.).

Hungarian word	Anagram	English word
rab	13. arb	bar; bra
tea	22. aet	eat; tea; ate
tar	26. atr	rat; art

Table 23. Example answers in both languages in the anagram test

Source: Own elaboration

From the three letters 'arb' it was possible to create *rab* in Hungarian ('prisoner' in English). In English two words were possible; *bar* and *bra*. However, *bra* did not appear at all. *Bar* appeared in 100% of cases in the English answers. Checking the word frequencies of the related words in the corpora of the two languages, I could find that in COCA, *bar* is 15.7 times more frequent than *bra*, which supports the result.From 'atr' it was possible to create 3 words: *tar* in Hungarian ('bald' in English) and *art* or *rat* in English. The two English words came up in a nearly similar percentage. This result contradicts the results of frequency in COCA, as *art* is twice as frequent as *rat*. In our data, they are represented in nearly 50-50%.

Hungarian answers illustrate that in some cases the answers came up in the same percentage. All in all, in Hungarian *tol* ('push' in English) came out in 50% as it happened with *olt* ('extinguish'). *Lot* appeared in the same percentage as an English word. Regarding the frequency of these words, there is a huge difference: *tol* is 1.9 times more frequent than *olt*, but among the Hungarian answers these words appeared in the same proportion.

The differences between the processing of Hungarian and English words, credited to Hungarian (Table 24.).

Anagrams	Hungarian	English
M	28.21	15.05
SE	1.01	0.96
Significant difference	$t(59)$ –6.841, p .05, r –.902	

Table 24. Processing of anagrams
Source: Own elaboration

As it is clear from the significant difference, students recognized anagrams more in Hungarian than in English.

Focusing on the extreme and salient results Participant 36 wrote 40 words in English and only 4 words in Hungarian and Participants 18 and 19 produced results in Hungarian, which were under ten.

Regarding the word classes, nouns were most frequently used (76%), then came verbs (15%) and a small minority of adjectives (5%).

Many more words were recognised in Hungarian (L1) than in English (L2). Nearly twice as many Hungarian words were created by the end of the test.

There were surprising results regarding homographs. Despite the participants' linguistic background, these words were recognised as English in an unexpectedly high proportion.

Tan is a homograph (Figure 33.), as it is a meaningful content word both in the Hungarian ('a kind of doctrine') and English (denoting a skin colour) languages. *Ant* (which is not a homograph) was possible to create too. These data are in harmony with the results of the frequency rate in both languages.

Tan is much more frequent in Hungarian (in HNC it has a frequency index: 11516, from the 187,6 million), than *tan* in English (in COCA from more than one billion it has a frequency index: 4877) and this result is the same in the test.
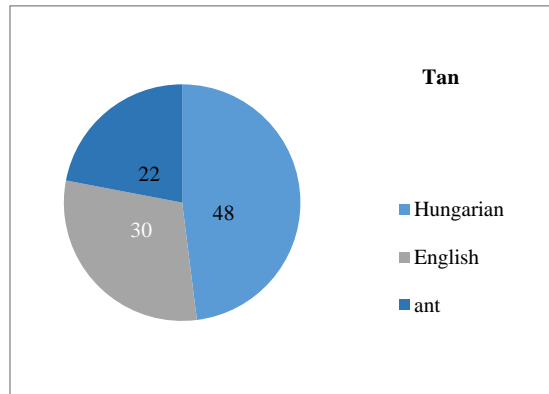
Figure 33. 'Atn' anagram results
Source: Own elaboration

'Ingr' triggered unexpected answers. A homograph *ring* can be made from the letter string (Figure 34.), having different meanings in both languages. However, it was recognised as an English word in 73%.
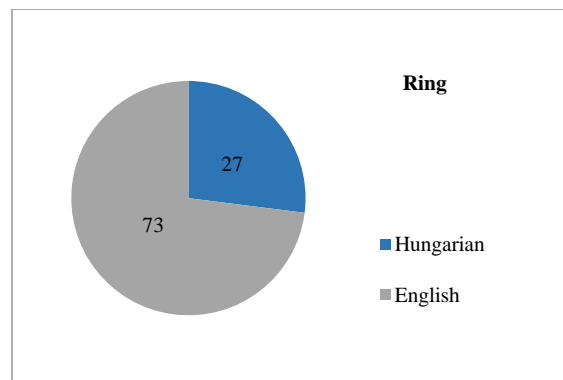
Figure 34. 'Ingr' anagram results
Source: Own elaboration

Homograph *tea* appeared in both languages in a nearly similar percentage (Figure 35), but the anagram was recognised as verb *eat* in a higher number. This was unexpected as nouns are more frequent on the average than verbs.
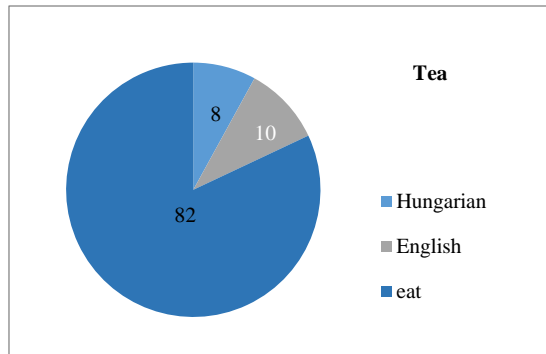
Figure 35. 'Aet' anagram results
Source: Own elaboration

'Top' was the most significant signal of word frequency effect. It is 1.45 times more frequent in English than in Hungarian according to the data of the two corpora. In my own test, the result was 4.53 times more frequent in English than in Hungarian (Figure 36.) .
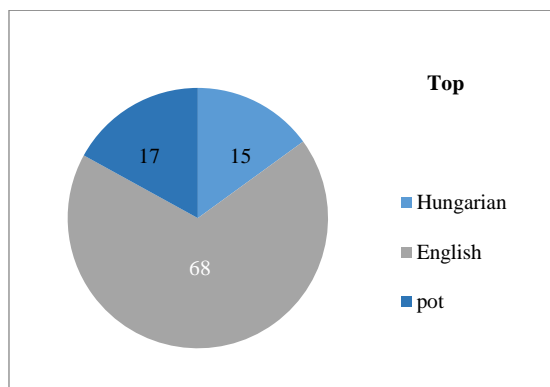
Figure 36. 'Otp' anagram results
Source: Own elaboration

My work has led me to conclude that word frequency effect is more determining, than language proficiency level in bilingual visual word recognition. My two research questions were: (i) Is it always the L1 that gets activated sooner and better; and (ii) What language gets activated when interlingual homographs appear? For the first question the answer is no. Having the example *ring* we can see that for the participants, it was an English word in 73% and a Hungarian word in 28%. In case of homographs, the results are in line with the previous ones, so the Hungarian language was not always dominant.

We can determine that sometimes L2 (English language) becomes dominant in anagram solving activities. (Lengyel 2019a)
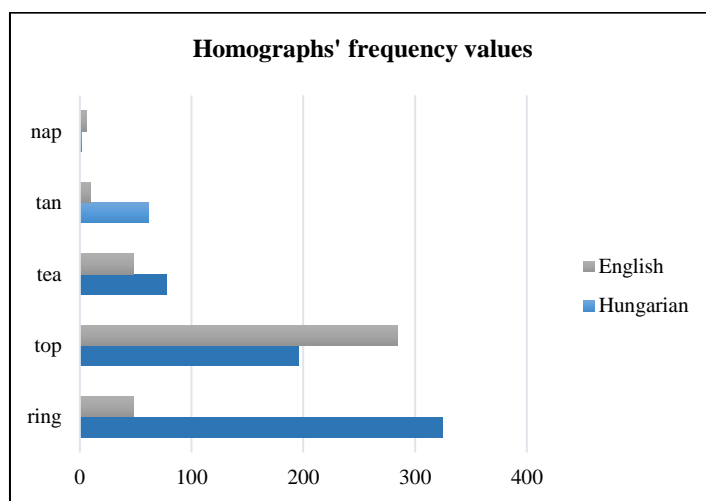
Figure 37. Frequency results of homographs in both languages

Source: Own elaboration

The most striking result to emerge from the data is that despite the instructed foreign language learner state of the participants, some of the interlexical homographs were recognized not in the mother tongue but in the foreign language. This is unexpected, as the English language proficiency of the participants is much lower than the Hungarian one. In the cases where more options were possible to create from a letter string, the more frequent words came first (Figure 37.). These are significant factors and prove that word frequency is more important in word recognition than language proficiency.

3.3.2   Homograph test

In the homograph test, the task is to create meaningful sentences in Hungarian or English, which include the given homographs. In the results analysis I focused on language distribution, parts of speech, frequency and modality.

1.Mind	
Do you mind opening the window? *Mind elmegyünk a buliba.*	
2.Most	
Most of us went biking. *Most nem kérek kávét.*	
3.Must	
You must close the door! *A must finom.*	
4.Van	
My father has a van. *Van egy autóm.*	

Table 25. Example answers in the homograph test in both languages

Source: Own elaboration

It is clear from the examples (Table 25.) that students tried to give short and meaningful sentences. Regarding the language distribution results are as follows:

Homographs	Hungarian	English
M	14.98	6.25
SE	.71	.71
Significant difference	$t(59) = -6.8, p < .05, r = -.608$	

Table 26. Processing of homographs

Source: Own elaboration

Students recognized homographs nearly twice as much in Hungarian than in English (Table 26.).
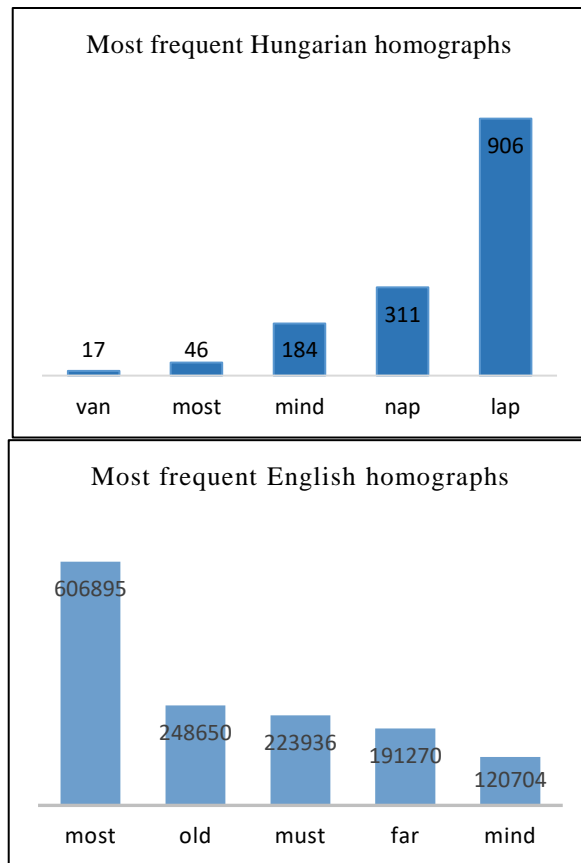
Figure 38. Most frequent homographs in both languages

Source: Own elaboration

From the given list *van, most, mind, nap, lap, old, must, far* were the most frequent (Figure 38.) In Hungarian, the smallest number means the most frequent value, while in English the greatest number indicates the most frequent word.
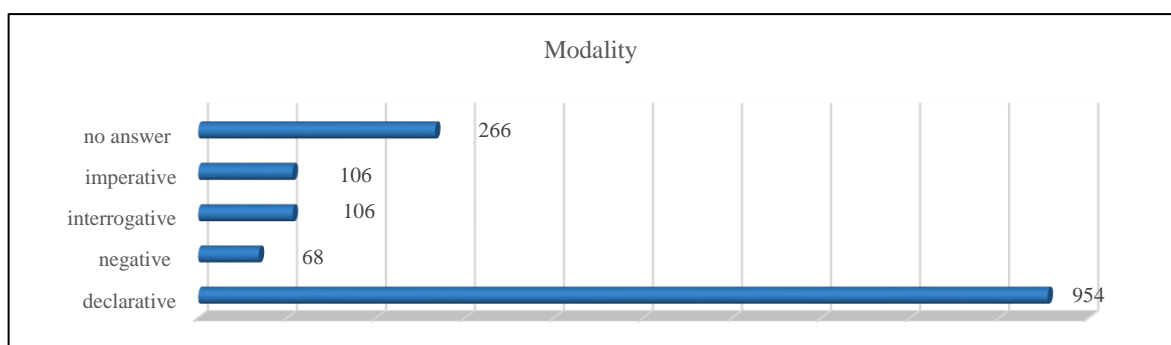
Figure 39. Modality of sentences in the homograph test

Source: Own elaboration

Remarkably students applied most declarative sentences, which was followed by no answer category. Imperative, interrogative and negative sentences appeared in small numbers (Figure 39.).

Changes of the given words resulted in that they were not accepted as it was not a correct solution of the task. There were specific examples for this: create a new word: tan-tankönyv (theory-book), translation of the word: ring-gyűrű, affixation: vet-elvet (vet=throw, elvet=throw away), letter change: vet-wet (v-w), conceptual transfer: Must the money! (correct: need), cognate: The *must* (grape juice) is delicious.(English sentence, Hungarian word), *Test*et (dolgozat) írunk ma.(Hungarian sentence, English word).

Regarding the parts of speech, my results show that, if a given homograph is a noun in Hungarian and a verb in English, more Hungarian answers appeared, no matter what was the frequency result (e.g.: *park* appeared as Hungarian noun in 75%, as English verb in 25%; or *comb* as Hungarian noun in 100% as English verb in 0%).

If both possibilities are nouns, more Hungarian answers appeared, as Hungarian is the mother tongue of the participants (e.g.: *nap* appeared as an English noun in 5.2% while as Hungarian noun in 94.7% or *lap* as English noun in 5.6% while as Hungarian noun in 94.3%).

3.3.3   First syllable test

Turning now to the next test, students had to create meaningful words from given first syllables. The results show that words with two syllables appeared in most of the cases. It is similar to the finding of Laczkó (2014), who investigated students in the 10th and 12th classes.

In the agglutinating Hungarian language, the proportion of longer words is dominant, In the mother tongue students from classes 10, 12 activated two syllable words. These were followed by words with 3 and 4 syllables. Longer words with 5 or 6 syllables were evanescent.

The distribution of activated words shows that in total, Hungarian language appeared in 51%, English in13%. For the first syllable *li-* in Hungarian appeared the *lila* and *liget*, or in English for *sa-*: *salary* and *salad*.

First syllables	Hungarian	English
M	25.7	6.88
SE	1.44	.57
Significant difference	$t(59) = 11.6, p < .05, r = -.12$	

Table 27. Processing of first syllables

Source: Own elaboration

First syllables were processed more as Hungarian words than as English (Table 27.)

The category of no answer appeared in bigger proportion than English language, in 34%. In English to- and ze- in Hungarian fin- and ne- were those syllables which reached the highest point in no answers. Considering parts of speech the most frequent was noun (39%), and in 13% adjectives.

Incorrect answers appeared in 2%, I call words as incorrect answers if they contained spelling or ortographical mistakes. More mistakes appeared in English than in Hungarian, for example from the first syllable *I-* someone created *inside*, or from *pri-* *prince*. In Hungarian *ilyed* from *i-*. Another language appeared unexpectedly: *fin-* became *finden* which is not correct as it is in German.

In this word recognition test, the results were in line with those of the previous research as most of the students activated shorter words. Although the mother tongue of the participants is Hungarian I presupposed the activation of longer words, long Hungarian words scarcely appeared. The longest Hungarian word was *regenerálódik*.

3.3.4   Word completion

Let us now look at the test period, where participants had to complete letter strings into meaningful words in English or in Hungarian.

Word classes results reflect the following distribution: 58% nouns, 25% verbs, 9% adjectives, 4% no answer, 3% adverbs and 1% others (conjunctions and numerals).

The distribution of languages is similar to the previous test results, as Hungarian is the dominant language in the recognition.

Word completion	Hungarian	English
M	24.26	18.93
SE	.84	.84
Significant difference	$t(59) = -3.27, p < .05, r = -.86$	

Table 28. Processing of letter strings

Source: Own elaboration

Participants recognized more letter strings in Hungarian than in English (Table 28.)

Hungarian	Letter strings	English
díva	d_v_	dove
		dive
füst	f_st	fist
fest		fast
húg	h_g	hug
heg		hag
hág		hog
híg		

Table 29. Example answers in word completion test

Source: Own elaboration

The mother tongue of the participants so there were more Hungarian answers in total: Hungarian: 1456, English: 1137. In case of interlexical homographs (9) the mother tongue option will be more frequent. Mother tongue has positive effect on the number of Hungarian answers (Table 29.), but no effect on the number of Hungarian-English interlexical homographs. Test words' frequency and word frequency in the corpus are not equal. Word length has effect on the appearance of L2.

3.3.5   Verbal fluency test

The following boxplots indicate the results of verbal fluency tetsts (Figure 40.).
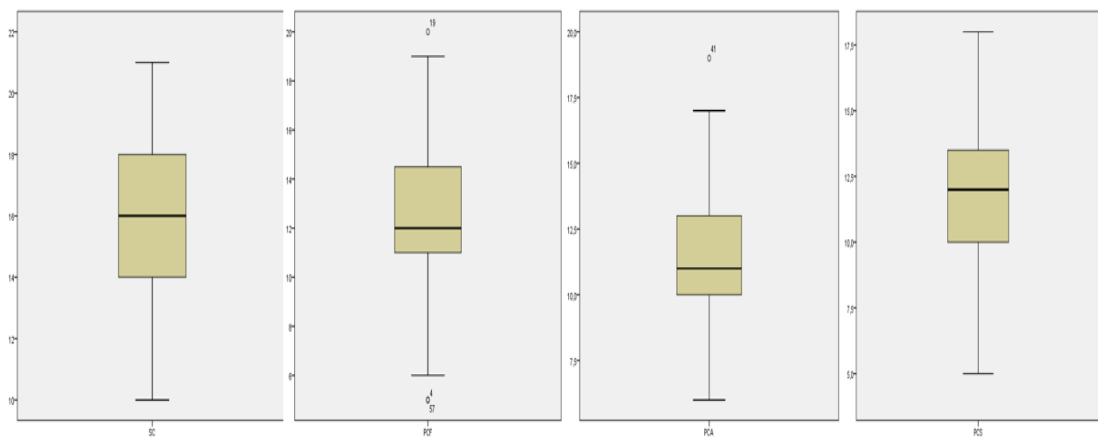
Figure 40. Boxplots of verbal fluency tests

Source: Own elaboration based on SPSS

First is the semantic fluency, where students had to list animals in one minute. The mean is 16, there are no extreme answers, the lowest number of listed animals is 10, while the highest is 21.

In case of letter F in phonetic fluency subtest, where students had to list words beginning with F, the mean is 12,56, the lowest number of given answers is 5, which is a salient value. This was valid for participants 4 and 57. One person (participant 19) gave twenty words beginning with F.

Interestingly with letter A one participant gave nearly 20 words (19), which was above other participants number of answers. The mean of this category was the lowest 11.71.

Answers began with letter S were between 5 and 18. The mean was 11.86, and there were no extreme or salient number of answers (Table 30.).

Statistics on verbal flency tests	mean	median	standard deviation	minimum	maximum
Semantic fluency animals	16,0667	16,0000	2,73624	10,00	21,00
Letter fluency F	12,5667	12,0000	3,08834	5,00	20,00
Letter fluency A	11,7167	11,0000	2,55841	6,00	19,00
Letter fluency S	11,8667	12,0000	2,84317	5,00	18,00

Table 30. Statistics of verbal fluency tests

Source: Own elaboration

Having a look at the specific letters in the phonetic test, we can highlight the following data.

One person answered with numerals four times after each other in case of letter 'F'. These were forty, forty-four, forty-five, five.

With letter 'A' one participant answered with actor, actress after each other, what is a typical sign of connection in the mental lexicon.

With letter 'S' one person mentioned 8 verbs after each other. (stop, sit, sleep, swim, speak, spend, see, say).

Returning to the research questions and hypotheses posed at the beginning of this study, it is now possible to give answers (Table 31.).

correlations of factors	verbal fluency	ERP	anagram	homograph	first syllable	word completion	L2 achievement	LLAMA	AMTB	TTCT	interview	SES	ICT	language aptitude	bidialectism
verbal fluency										**POS.**					
ERP															
anagram							**POS.**								
homograph															
first syllable															
word completion															
L2 achievement															
LLAMA															
AMTB															
TTCT			**POS.**												
interview															
SES															
ICT							**NEG.**								
language attitude						**NEG.**									
bidialectism															

Table 31. Findings of correlational analysis of affecting factors

Source: Own elaboration

Chapter 4. Discussion

The current thesis represents a new, multifactoral investigation among linguistic and non-linguistic factors of foreign language learning. It studies the possible correlations with the help of a variety of standardized and self-made tests, which were completed in written, digital or oral forms. (Table 32.)

FOREIGN LANGUAGE LEARNER (N=60)				
LINGUISTIC DATA			**NON-LINGUISTIC DATA**	
STANDARDIZED	SELFMADE		STANDARDIZED	SELFMADE
VERBAL FLUENCY	EEG (N=28)		LLAMA	INTERVIEW
	ANAGRAM	**L2 ACHIEVEMENT IN SCHOOL**	AMTB	SES
	HOMOGRAPH		TTCT	ICT
	FIRST SYLLABLE			LANGUAGE ATTITUDE
	WORD COMPLETION			BIDIALECTISM

Table 32. The framework

Source: Own elaboration

To my knowledge, no previous research has been carried out between bidialectism and foreign language learning (SLA) and with similar research design or population. I focused on a special school type – non-elite, vocational school – where most of the 15 year old students come from disadvantaged background and are undermotivated, moreover, lack of parental support in learning foreign languages. English is among the compulsory subjects in this school type, so it is just one subject the students have to take a school leaving exam in. Vocational training is put forward, which is due to the profile of the school.

It is fundamental to note about the respondents' SES that most of their parents have secondary school certificate, most of them are factory workers. In these families the good school achievement is not a priority. Only a few of the students go to private classes, and none of them go to theatres or cinemas. As Fejes and Józsa (2005) defined this position, it is an unfavorable situation concerning cultural circumstances. The majority of respondents live with their parents, the minority live in one parent family, in average flats. They have an own mobile phone, room and TV set. In the vast majority of families there is no ill person, or a relative who works abroad, neither who is unemployed. Bialystok finds connection between the educational level of parents as a SES factor and school achievement. My study did not conclude so as the statistical data does not show significant correlation.

Hungarian is in a significant status as this language is preferred and found easier by most of the students in contrast to English. Their mother tongue is Hungarian and first foreign language is English. All of them came from Hungarian monolingual families, where the parents' first language is Hungarian too. Mostly the students started to learn English after the age of 9 in school. Most of them use Hungarian more often than English. More than half of them would like to teach both of the languages to their children. Their mother tongue, Hungarian is always used and nearly every sphere of life, while English is only sometimes used mainly in school and with language teacher. The first memory of the participants is connected to Hungarian. Nevertheless, there are a few participants, who feel more self-confident in English than in Hungarian in situations based on communication. The reason behind it maybe originates from the correction. students are expected to Hungarian as their mother tongue since the beginning of their life. Their language use is corrected in educational settings, when they learn and use Hungarian language from different aspects, (see the results at 3.1.2 where students evaluated their Hungarian knowledge) at home, where their parents and grandparents correct their mistakes in language use and among friends, who sometimes correct their mistakes (see 3.1.3 about the correction of chats). These features may contribute to the feelings of students and their self-confidence in different languages. Most of the students' preference towards their mother tongue can explain their poor school L2 achievement and low motivation.

This substantiates previous findings in the literature. Tódor and Dégi (2016) highlighted positive attitude towards a language can lead to increased motivation which than result in better learning achievement. Their attitude is stronger and more positive towards Hungarian than English, so their poor school results may root here. As a tendency I can say that those who prefer English have better marks and better school achievement. Students' approach and attitude can affect the success of language learning, which depends on the educational level of parents and students opinion about the importance of language knowledge as it is emphasized by Novák and Fónai (2020), and as my study has also revealed it. Their language knowledge is good in Hungarian and intermediate in English according to their self evaluation. A high number of students read only in Hungarian, but most of the participants listen to English music. The majority learn English as a foreign language because it is useful. Considering bilingualism two third of students say that the advantage of it is its usefulness, while it has no disadvantage according to more than half of the students.

Some students got their first ICT tool (mobile phone) at the age of 3, while there are some who got it after the age of 14. Half of the respondents spend more than two hours using their mobile phone a day, which is for many of them is a kind of help in learning. Time spent with sports is lower. ICT seems to be relevant factor in students' life as if they were not allowed to use mobiles for a day, they would watch tv or surf the net. The majority find mobile apps useful, but they do not trust totally in internet sources, according to them it is not a trustworthy source. They do not use educational sites, instead messenger and they communicate on it. The written language is applied out of school by phone and on computer. Students communicate offline and online. Handwriting seems to be old fashioned, while electronic typing is becoming a daily activity. When student write by hand emotional importance is emphasized. Most of their time they use digital chat programs. They do not really care about spelling, and in most of the time they type. They typically use abbreviations of words and sentences in writing and the use of emoticons is not a problem. They tolerate their partner's spelling mistakes. Sometimes they do not notice their own mistakes as they do not really care about it. Some of them can recall the last mistake. A typical spelling problem is when they write words together as one word.

They use mobile phones for chatting at any time of the day and they use their phones in a creative way, as they often apply photo and video apps on it. When using social media, they are not interested in information, they just keep contact with their friend and family on it. Critical language use is not typical in this age group. On the average they are flexible, creative and they tolerate mistakes.

Having seen the contradictory results of my findings and literature background on the effects of ICT usage on scool achievement I think the following aspects should be applied in the following research. Positive effects of ICT was mainly introduced by scientific conclusions for students. As Decanou (2018) says ICT improves students' school achievement, Acquah & Klein (2018) argue that it provides learner autonomy, Kupchyk & Litvinchuk (2021) conclude that it gives language learning experience outside the classroom. Based on these findings I should think that fruitful effects of ICT usage can be experienced only after a specific age when students' attention, memory and consciousness constantly develop. In the future it would be a new field to define what is this exact age from which the facilitatory effect can be pointed out. Defining what is ICT used for seems to be another crucial factor in investigating its positive effects on school achievement. Is it better to use ICT for entertainment, for fun, when a person passively gazes at the screen or when the person is conscious about the aim of the activity and actively uses the given ICT too? Moreover, there may be some skills which are essential for positive effects. It is possibly connected to the ability to read and write. In the future these factors must be investigated.

As expected from their 3,03 end of year result in English as a foreign language their langauge aptitude is mostly average. The weakest result was one correct answer, while the best result was 14 correct answers on LLAMA language aptitude test, vocabulary teaching subtest. Based on the remarkable difference between students in LLAMA test results I share Singleton's (2017) view on aptitude, that it is an individual trait, an innate advantage what learners have in language learning, so the focus is on the individual. As the circumstances in the present study were the same for the participants, the big difference may be ascribed to individual traits as Singleton referred to. The best score here is imputable to the best participant in creativity, bidialectism and all linguistic tests, as this student gave most of the answers in English.

Regarding the specific components of AMTB, the majority of students have the most positive attitudes towards foreign language learning which may reflect that they are aware how important language knowledge is. This is in good agreement with Tánczos and Máth's conclusion (2005), that every third student learns language because of a constraint, and this constraint is a need for language knowledge. As they maintain, with the lack of inner motivation it is impossible to be a successful language learner. Attitude towards foreign language learning was followed by integrative orientation in test results. Positively worded items in attitudes towards learning English got the third highest result in the test. This category consisted statements about English such as: *English is a significant part of school programme*. This result supports the previous findings about constraints as an affective factor of language learning. The low results in negatively worded items in AMTB scale of attitudes towards learning English confirms, that they like English language. Attitudes towards English people, instrumental orientation and anxiety in English lessons had average results. The poor L2 achievement of most of the students on the one hand can be explained by the lack of their parents' support in practising English, which has a low result in the AMTB test. On the other hand the reason of poor achievement is in connection with school requirements. Nowadays language education in secondary schools is predominantly grammar centred and written based, focusing on the requirements of the school leaving exam. Students during their studies have to do tests on a regular basis. In most of the cases teachers accept only those words in vocabulary tests that were supposed to learn for the given day/test. Instead of accepting the synonym of words, only the expected/ previously given ones are scored. In this atmosphere students learn about the leanguage not learn the language. Motivation may disappear because of the failures.

My findings are in line with Bátyi's results. She stated that from parents no real motivation or positive, supportive attitude can be perceived. Parents think that motivation is exclusively the task of the school (Bátyi 2014b). As Novák and Fónai say in 2020 teachers and parents have important role in motivating students. Maybe this is one of the missing factors in case of my participants, in order to obtain better school results.

„Tests currently used within the framework of the public education system (final exams, national competitions, entrance exam exercises) are not suited to the goals of either the Framework Curriculum or the NAT system: they do not reflect a communicative approach i.e. they do not strive to create genuine or realistic language situations, they do not use authentic texts, or if they do, those are heavily altered, they neglect receptive skills, including listening comprehension etc. Furthermore, the correction and assessment guidelines for these exams are not thoroughly established, and so the results cannot even be compared"[38] (Petneki 2009).

These students have average creative skills and their relative flexibility is average as well. The results of creativity and previously mentioned motivation, are in connection and this is in line with Szerencsi's (2010) statement, creativity not only contributes to increasing students' motivation but also promotes problem solving and higher order thinking skill. The student who got highest points in creativity test was the best in flexibility and complexity and was in the first 3 in fluency and relative flexibility.

As for their bidialectism, my findings are in harmony with those of Smith and Durham (2012). Only a few of the speakers are dialectal: most of them use virtually no dialect forms. According to their findings (and my results) there is a dialect shift and in the future there may be a move from local to standard in language use especially in foreign language teaching/learning. The students proved to know only one third of the given dialectal words, which reflects a poor dialectal background. I find it important to highlight that in accordance with Vangsnes et al. (2017), my results also reflect that students who have strong bidialectal background are above the general in foreign language skills.

In visual word recognition the ones that are better at English consider homographs more often to be English words than Hungarian. This is in line with Navracsics & Sáry (2013), who presumed after analysing their data that their Hungarian participants, who had a high proficiency level in English did the same because they wanted to emphasize that the given words existed not only in Hungarian but also in English.

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[38] https://ofi.oh.gov.hu/teaching-and-learning-090617/teaching-foreign

This tendency appeared only in case of homographs, while Hungarian words were decided to be Hungarian, and English words were deemed to be English by both groups. Pseudowords' results showed that good students cannot be deceived as often as weaker ones. Students with lower proficiency levels have a bias towards considering pseudowords as English words. To sum up, language proficiency has effects on the results of language decision tests. As homographs are similar in both languages the status of the word is different as in the cases of other words (anagrams etc.). In the recognition of homographs consciousness seems to be important to differentiate between languages.

In case of first syllable test, as I expected no English word appeared with 6 syllables. With 5 syllables Hungarian words were: *oroszországi, biológia, gravitáció, monoteista, navigáció, világbajnokság*, English words were *unavailable* and *nationality*.

In Hungarian *anya* and *apa* were the most frequent words. As it can be find in the Magyar Nemzeti Korpusz *anya* is more frequent and it appeared in bigger number in the test too. In English from e- *eleven* has the 8966 frequency index while *elephant* has 5509, in the Corpus of Contemporary American. This result is similar in the test and in the corpus too, as in both places *eleven* is more frequent.

The structure of cognitive knowledge in the mental lexicon can be pictured with the following word pairs from the test. The syllable *i-* someone created *ibolya which was followed by il-* and *illatos*. The words *lovász – madarász* from *lo-* and *ma-* indicate a connection in the mental lexicon. This phenomena turned up only in Hungarian.

In view of Hungarian as the mother tongue, it is interesting that homographs (same form and different meaning) were written in the English column so they identified them as English words.

O*pera* as Hungarian figured 0 times, while as English 3 times. The word *random* had 3 Hungarian and 12 English answers. The frequency index of Hungarian *opera* is 15544 (where smaller numbers indicate higher frequency), in the case of English language it is 12209 (where the bigger number indicates higher frequency.

Despite the exact explanation of the task, the German language appeared too. From the syllable *fin-* a student created *finden.* It is likely that he or she knows German language on a specific level. In this case he or she cannot exclude this word if this activates first. Besides the two target languages another language can be activated no matter what the proficiency level is. Another reason can be that he or she uses this word more often in German than in the other two languages.

The appearance of words *oskola* and *likas* warn us the importance of investigating dialects. Checking the hypothesis we can claim that as the participants are Hungarian monolinguals the proportion of Hungarian language will be dominant. This was supported by the results of the test.

In word completion test L1 has positive effect on the number of Hungarian answers, but no effect on the number of Hungarian-English interlexical homographs, while word length has effect on the appearance of L2.

Naturally, L1 gets activated sooner, however, in the case of interlexical homographs, the Hungarian language was not always the more frequent one. The linguistic tests showed that irrespective of a few extreme answers the students responded twice as much in Hungarian than in English. The test results revealed that word frequency effect is more determining than language proficiency in bilingual written word recognition tests. This is in line with Mayer (1983) findings on the influencing factors of anagram solution, who stated that, word frequency is among the influencing factors of word recognition. Lengyel (1997) has the same findings, as he mentions frequency as determining factor of word recognition at the first place as do Navracsics & Sáry (2013) who argue on the process of word recognition and mention frequency first among affective factors and than wordlike effect, context, currency, age of acquisition, word length, grammatical category.

My study is based on De Groot's (2011) broad interpretation of word recognition, so the research focuses on the whole procedure from perception to all the knowledge stored with its lexical representation. Perception is followed by activation and completion/production in a chosen language. The word recognition in my linguistic tests investigating interlexical homographs happens according to the BIA model of word recognition.

From the visual input the participant recognizes the letter features, letters, words and than comes language node, which activates one language and inhibits the activation of another language. All in all, first the students rely on phonology, makes a decision which language to activate on the sublexical level, it is formed by frequency effect and then comes the language choice. Participants will choose the word to which it is faster to access.

My study is not a lexical decision task as not existing words are given, and not a word naming one where a given picture activates a word. My study uses letter strings without priming, and participants have to recognize possible words in either of their language.

Based on these findings my answers for the research questions and hypotheses are:

RQ#1: Is there any kind of connection between linguistic and non-linguistic aspects of bilingual word recognition?

In some specific cases of my study, the answer is yes, there is.

In investigating any possible correlation between non-linguistic factors and L2 school achievement, which was represented by students' end of last year evaluation, I found varied results. As data were not normally distributed I applied non parametric Spearman correlation test. Language attitude test contained an important section about language preference. (Which language do you prefer?) The given answers to this factor showed negative correlation with L2 achievement in school. Focusing on the possible correlation of linguistic and non-linguistic results of secondary school students I found no significant connection concerning English marks as linguistic results and language aptitude, verbal fluency and creativity.

With the help of non parametric Spearman test, no significant correlation was highlighted neither between the age of appearance of ICT devices and language aptitude nor between age of appearance of ICT devices and verbal fluency results. These stand for the statement that the early appearance of ICT devices especially mobile phones have no clear connection with language aptitude and verbal fluency. Info communication devices do not facilitate language aptitude and verbal fluency in phonetic and semantic aspects.

On the contrary the appearance of mobile phone as an ICT device negatively correlates with L2 achievement in school. This significant correlation signs an important connection between ICT usage and English marks.

Prior to testing I supposed that L2 achievement in school as a formal evaluation of language knowledge correlates with non-linguistic affective factors of language learning and teaching Having gained another set of linguistic data during testing I was interested in the connection between non-linguistic factors and results in anagram solution. Based on not normal data distribution I adopted a non parametric, Spearman test.

As contrariwise to my expectations, my experiment demonstrated that creativity and anagram solution as a linguistic and non-linguistic pair of factors are positively correlated. Among other factors no correlation was found.

Regrettably no signs of correlation was found between dialectal background and linguistic test results. This means that those students, who use more dialectal words do not proprtionally produced more English answers in linguistic tests. In addition to this result I investigated the connection of used and known dialectal words (included in test on bidialectism). There is a strong positive correlation between the number of known and the number of used dialectal words. This means that the more dialectal words you know the more you use. This correlation may indicate that students do not want to hide their dialectal background if they have any.

I investigated the correlation between the educational level of mothers' and students' L2 achievement. Regarding the educational level I had four categories: 7 classes in primary school, primary school certificate, secondary school certificate and university degree. I applied the parametric, Pearson correlation test. In contrast with earlier findings (Bialystok 2004) the analysis did not identify any significant correlation between educational level of mothers' and students' L2 achievement in school so my results do not support previous research in this area.

Contrary to my expectations I did not find significant correlation between language preference and written word recognition test results. This number indicates that preference towards a language (in this study English or Hungarian) does not correlate with number of results in an anagram test. So those who prefer English do not give more answers in English on the average.

RQ#2: Do L2 achievement in school and linguistic test results correlate?

Yes, they correlate in my sample.

With the help of a non parametric investigation I gained the following results. Data was not normally distributed, Spearman test shows correlation between a linguistic factor: number of anagrams recognized in English and L2 school achievement in English. The strong correlation justifies the common linguistic background behind English marks and linguistic tests (i.e. anagram solution) as a kind of playful tool in L2.

RQ#3: What kind of coherence is there between the linguistic and non-linguistic types of fluency as an influencing factor of foreign language learning?

Significant correlation was found between phonetic fluency and creativity's subcategory, fluency.

Data was not normally distributed so a parametric, Spearman correlation was applied. Five categories of results were observed, verbal fluency test results in semantic subtest, phonetic subtest with letters FAS and TTCT written fluency results from repeated circles subtest. The result is significant only between phonetic fluency regarding letter A and fluency in creativity . These results account for each other as different types of fluency. Our study was unsuccessful in proving correlation between semantic fluency based on names of animals, phonetic fluency based on letter F and S and results of TTCT repeated circles test results.

Hypothesis No. 1.

There is a significant correlation between specific non-linguistic factors of foreign language learning and L2 achievement in school.

My results show that some of the previously listed non-linguistic factors and L2 achievement in school are related. The individual traits and personal skills of the foreign language learner determine the success of foreign language learning.

As it is clear form the data, negative correlation was found between L2 school achievement and two subcategories of non lingistic factors, such as language attitude and age of appearance of ICT devices. There is significant correlation between fluency as a subcategory of creativity and verbal fluency.

On the contrary what Bialystok (2004) stated, I found no correlation between the educational level of parents and L2 school achievement. The background of the students was homogeneous as more than two thirds of the parents had secondary school certificate.

In this specific type of secondary school and this generation of students these results signal that in order to achieve better results in L2 learning, verbal fluency, creativity and creative skills should be taken into account in a larger amount during the process of foreign language teaching.

In the future it would be interesting to study the effects of these correlating factors on each other. The results of this future test would led language teachers to the cardinal milestone of areas which must be developed in case of students with low L2 results.

Hypothesis No. 2.

Creativity contributes to L2 word recognition.

This statement was verified.

In L2 written word recognition procedures creativity is a fundamental factor. Fluency in creativity showed positive correlation with linguistic test results of written word recognition tests. The more creative you are the more L2 answers you have in word recognition tests.

As Hofweber & Graham (2017) highlight linguistic creativity is an ability to create linguistic combinations and it is a creative use of language. Exposure to L2 literature can support linguistic creativity. Poetry is a help for speakers to transmit emotional state and opinions. In my test series, student with the best results in linguistic and creativity tests took part in an interview too.

From the participant's answers it is clear that the good results of his creativity and linguistic tests are in connection with his free time habits.

He is exposed to English on a daily basis. According to his self evaluation he reads books only in English and he listens to English music on a regular basis in his free time. His example shows that linguistic creativity promotes L2 word recognition. As language teacher one must not forget that behind creativity there is huge amount of exposure to L2, which is a basis of good test results.

Hypothesis No. 3.

Students with better L2 school achievments are better in written L2 word recognition tests.

This hypothesis has a stable verification.

L2 school achievement strongly correlate with written L2 word recognition test results. Based on the common linguistic background, English knowledge, the better students in English as a foreign language produce more answers in English in word recognition test.

This is the result what I have been waiting for. Irrespective of the possible individual differences of students, their mental and physical state, I can say that all the good students (having 4/5 in English) produced better results in linguistic tests. The better someone is in English the better results he or she achieves in linguistic tests. As school achievement is about a years work of students it would be surprising if those students achieved better results who are weaker in English. As it can be seen all the hypotheses were proven.

Chapter 5. Conclusion

In this thesis I investigated the connections and correlations of specific linguistic and non-linguistic factors of bilingual word recognition. The aim of the research was to find correlations of L2 school achievement with general language skills and to highlight which linguistic or non-linguistic factors contribute to the success of L2 written word recognition, in order to get answers to my question: Which factors of language learning must be developed among weak students of English to achieve better results.

The research has succeded in highlighting aspects of L2 learning which must be crucial for teachers to focus on and improve.

The results of this study highlight those aspects of L2 learning which must be crucial for teachers to focus on and improve and implicate that a playful approach to L2 (i.e. anagram solution) can enhance written word recognition as a crucial part in language learning process. The appearance of ICT tools and positive attitude towards the foreign language can affect L2 school achievement. So teachers must be attentive to create a positive attitude in children towards the foreign language and foreign language learning, moreover they are advised to apply various and playful language teaching methods supplemented with many forms of ICT, especially in the era of digital teaching in order to provide their students with every necessary component to successful foreign language learning.

In the past there were numerous models about factors of successful language learning, aiming to promote efficient language learning. As a new approach I tried to combine the investigation of linguistic and non-linguistic affecting factors of L2 learning based on qualitative and quantitative analysis. This thesis has led me to conclude three important findings.

(i) The age of appearance of ICT devices and language attitude negatively correlate with L2 school achievement. The earlier ICT devices appear in students' life, the worse L2 school achievment they have.

(ii) Linguistic tests of written word recognition are in positive correlation with creativity. The more creative students have the better results in written word recognition tests.

(iii) A strong correlation can be observed between L2 school achievement and L2 word recognition. The better students in English have better results in written word recognition tests.

Based on these findings and statistic results, I can say that there is a correlation between non-linguistic and linguistic factors of language learning. A better or stronger status in non-linguistic components of L2 learning (i.e.: creativity) predicts a better L2 school achievement and better L2 written word recognition. As the present sttudy found correlation between linguistic and non-linguistic factors of language learning I strongly believe that teachers during the language teaching procedure must focus not only on language skills and linguistic development but on non-linguistic factors of L2 learning too. As word recognition is a fundamental element of reading and writing, improving the influencing factors of this process must be wholly utilized.

There are some limitations of the current study. Firstly, given that our findings are based on a limited number of students (N=60) the results from such analyses should consequently be treated with the utmost caution. Secondly, participants fulfilled the tests from one age group and out of the 60 participants 55 were boys. Thirdly, during the research only some specific leading affective concepts of foreign language learning were used, some of them simply partially.

Another notable limitation of the research is that the surveys were not conducted on the same day. Intelligence and memory were not taken into account in the research, though they are vital parts of influencing factors of language learning and word recognition. Last but not least no control group was present in the study.

I have to stress the diversified implications for the future. To further this research a greater number of age-matched participants from other secondary vocational schools should be investigated. In the future, additional factors/skills/attributes of language learners must be focused on (i.e. IQ, diligence, memory, etc.) in order to get a whole picture of the correlation of linguistic and non-linguistic aspects of language learning.

Based on that Ellis (2008) defines intelligence as a universal resource of cognitive abilities and Ghonchepour & Moghaddam (2018) find positive correlation between intelligence and learners' English development it seems to be fruitful to investigate the role of IQ in English/Hungarian word recognition as well with a specific test: Raven's Overall Verbal Intelligent Test (1960), or Raven's Progressive Matrices as it is independent of language and reading/writing skills and it is simple to use. Another possibility could be Mensa Hungariqa, which is an adaptive test for 17 year old students and was standardized for secondary school students generation. It is freely accessible on the internet and contains non verbal tasks for measuring fluid IQ and problem solving.

For measuring memory, Children's Memory Scale (CMS) from Morris J. Cohen (1997) is a perfect tool. It is a tool of assessment of learning and memory for students between 5 and 16. It is a standardized psychological/neuropsychological test which can be administered individually and produce results on declarative learning and memory functions.

As only less than the half of the participants, N=28 took part in the ERP test, in the future much more students should be investigated in order to broaden the scope of the study.

A highly important issue to resolve for further studies is the investigation of correlations and effects of ICT usage on L2 achievement, as our era demands a widespread knowledge of ICT platforms and appropriate usage of ICT tools.

The latter two aspects seem to be crucial as digital teaching and learning has unexpectedly appeared by 2020. Teachers, students furthermore parents have to adjust to the requisites of these brand new (language) teaching-learning circumstances, in which the tasks and methods are constantly changing but the aim is the same: the foreign language knowledge.

Today's educational setting in L2 teaching and learning has wholly transformed. ICT became a dominant factor in L2 learning. Covid 19 brought a totally new challenge to teachers, students and parents as well. All the participants in teaching and learning procedures have to be aware of the latest trends and able to use digital platforms in order to get the adequate information. In this era new materials, methodologies and forms of motivation are needed, because as Navracsics writes in her book (2004: 9): „Knowing languages is not a virtue but fundamental human requirement.".

References:

Acquah, E. O. & Katz, H. T. (2020). Digital game-based L2 learning outcomes for primary through high school students: A systematic literature review. *Computers & Education* 143. 1-19.

Ágoston, Gy. (1985). Tézisek az iskolai tehetségnevelésről. *Pedagógiai Szemle* 2, 137-142.

Albert, M. L. & Obler, L. K. (1978). *The bilingual brain: Neuropsychological and neurolinguistic aspects of bilingualism.* New York*:* Acamedic Press.

Alizadeh, M. (2016). The Impact of Motivation in English Language Learning. *International Journal of Research in English Education* 1, 11-15.

Alkhrisheh, H. & de Bot, K. (2019). The effect of maturity and gender on verbal fluency in Jordanian University Students. *Alkalmazott Nyelvtudomány* 19, 1.

Altman, C., Goldstein, T. & Armon-Lotem, S. (2018). Vocabulary, Metalinguistic Awareness and Language Dominance Among Bilingual Preschool Children. *Frontiers in Psychology* 9.

Antoniou, K. & Katsos, N. (2017). The effect of childhood multilingualism and bilectalism on implicature understanding. *Applied Psycholinguistics* 4, 787–833.

Antoniou, K., Kambanaros, M., Grohmann, K. K. & Katsos, N. (2014). Is Bilectalism Similar to Bilingualism? An Investigation into Children's Vocabulary and Executive Control Skills. In: Orman, W. & Valleau, M. J. (Eds.) *Proceedings of the 38ᵗʰ annual Boston University Conference on Language Development* 1, 12–24.

Appel, R. & Muysken, P. (1987). *Language Contact and Bilingualism*. London: Edward Arnold.

Atar, C. (2018). The effects of learning a second language on the first: The case of increased metalinguistic awareness. *Journal of Language and Linguistic Studies* 14 1, 242-260.

Aworanti, O. A. (2016). Information and Communications Technology (ICT) in Nigeria Educational Assessment System - Emerging Challenges. *Universal Journal of Educational Research* 4 6, 1351-1356.

Bacsa, É. (2014). *Az egyéni különbségek szerepe a hallás utáni szövegértés fejlődésében a korai nyelvtanulás időszakában*. Phd értekezés. Szegedi Tudományegyetem. Szeged.

Barkóczi, I. & Klein, S. (1968). Gondolatok az alkotóképességről és vizsgálatának egyes problémáiról. *Magyar Pszichológiai Szemle* 25, 508-512.

Barnucz, N. & Fónai, M. (2020). Az IKT eszközök használata az idegennyelv oktatásban hátrányos helyzetű tanulók iskoláiban. *Információs társadalom* 20. 1, 7-28.

Bassetti, B. (2006). *Learning Second Language Writing systems.* Entry in the Subject Centre for Language, Linguistics and Area Studies Website.

Bátyi, Sz. (2014a). Attitudes, stereotypes and intercultural contact. In: Bátyi, Sz., Navracsics, J. & Vígh-szabó, M (Eds.) *Papers in language acquisition, language learning and speech Research Studies in Psycholinguistics 4.* Budapest: Gondolat Kiadó. 148-159.

Bátyi, Sz. (2014b). Az attitűd és a nyelvtanulás két esete. In: Navracsics, J. (Ed.) *Transzdiszciplináris üdvözletek Lengyel Zsolt számára*. Budapest: Gondolat Kiadó. 141-151.

Bátyi, Sz. (2017a). The Impact of Attitudes in Language Retention of Russian as a Foreign Language in Hungary: Some lessons to be learnt from attrition studies. In: Pfenninger, S. E. & Navracsics, J. (Eds.) *Future Research Directions in Applied Linguistics*. Bristol: Multilingual Matters. 265-285.

Bátyi, Sz. (2017b). The role of attitudes in the development of Russian as a foreign language: A retrospective study. *Studies in Second Language Learning and Teaching* 7 1, 149-167.

Bhide, A., Schlaggar, B.L. & Barnes, K. A. (2014). Developmental differences in masked form priming are not driven by vocabulary growth. *Frontiers in Psychology* 5. 667.

Bialystok, E. (2001). Bilingualism in Development. Cambridge: Cambridge University Press.

Bialystok, E. (2004). The Impact of Bilingualism on Language and Literacy Development. *The Handbook of Bilingualism* 577-601.

Bialystok, E. (2011). Coordination of executive functions in monolingual and bilingual children. *Journal of Experimental Child Psychology*. 110 3, 461-468.

Bialystok, E.; Fergus M. C. & Freedman, M. (2007). Bilingualism as a protection against the onset of symptoms of dementia. *Neuropsychologia* 45 2, 459–464.

Blumenfeld, H. K. & Marian, V. (2005). Covert Bilingual Language Activation Through Cognate Word Processing: An Eye-tracking Study. *Proceedings of the Annual Meeting of the Cognitive Science Society.* 27, 286-291.

Bokander, L. & Bylund, E. (2020). Probing the Internal Validity of the LLAMA Language Aptitude Tests. *Language Learning* 70 1, 11-47.

Brysbaert, M., Lagrou, E. & Stevens, M. (2017). Visual word recognition in a second language: A test of the lexical entrenchment hypothesis with the lexical decision times. In: Abutalebi, J. & Clahsen, H. (Eds.) *Bilingualism: Language and Cognition* 20 3, Cambridege: Cambridge University Press 530-548.

Brysbaert, M., Van Dyck, G. & Van de Poel, M. (1999). Visual word recognition in bilinguals: Evidence from masked phonological priming. *Journal of Experimental Psychology: Human Perception and Performance* 25 1, 137-148.

Carroll, J. B. (1973). Implications of aptitude test research and psycholinguistic theory for foreign language teaching. *International Journal of Psycholinguistics* 2, 5-14.

Carroll, J. B. & Sapon, S. M. (1959). Modern Language Aptitude Test: MLAT: Manual

Carter, R. (2004). *Language and Creativity.* The Art of Common Talk. London: Routledge.

Czeizel, E. (1997). *Sors és Tehetség*. Budapest: Minerva Kiadó.

Cook, V. J. & Basetti, B. (2005). An introduction to researching Second Language Writing Systems. In: V.J. Cook & B. Basetti (Eds.) *Second Language Writing Systems* Clevedon: Multilingual Matters 1-67.

Crookes, G. & Schmidt, R. W. (1991). Motivation: Reopening the Research Agenda. *Language Learning* 41, 4

Csizér, K. (2012). A második nyelvi motivációs énrendszer, az önszabályozó tanulás és az énhatékonysági képzetek szerepe a nyelvtanulási motivációban: egy kérdőíves vizsgálat angol szakos egyetemisták körében. *Iskolakultúra* 22 11, 24-33.

Csizér, K. & Dörnyei, Z. (2002). Az általános iskolások idegennyelv tanulási attitűdjei és motivációja. *Magyar Pedagógia* 3, 333–353.

Csizér, K. – Dörnyei, Z. – Németh, N. (2004). A nyelvi attitűdök és az idegennyelvi motiváció változásai 1993 és 2004 között Magyarországon. *Magyar Pedagógia* 4, 393–408.

Cummins, J. (1979). Linguistic interdependence and the Educational Development of Bilingual children. *Review of Educational Research* 49 2, 222-251.

De Groot, A. M. B. (1983). *Lexical context effects in visual word recognition*. PhD Dissertation.

De Groot, A. M. B. (2011). *Language and Cognition in Bilinguals and Multilinguals.* New york: Psychology Press. Taylor & Francis Group.

Deaconu, A., Dedu, E. M., Igret, R. S. & Radu, C. (2018). The Use of Information and Communications Technology in Vocational Education and Training—Premise of Sustainability. *Sustainability* 10 5, 1466.

Delaney, M. (2016). *Special Educational Needs*. Oxford: Oxford University Press.

Diependaele K., Lemhöfer K., & Brysbaert M. (2013). The word frequency effect in first- and second-language word recognition: a lexical entrenchment account. *Exp. Psychol*. 66, 843–863.

Dijkstra, A., Van Heuven, J.. & Ten Brinke, S. (1998). Interlingual homograph recognition: Effects of task demands and language intermixing. *Bilingualism: Language and Cognition* 1, 51-66

Dijkstra, T; van Heuven, W. J. B. (2002). Modeling bilingual word recognition: Past, present and future In: *Cambridge University Press Bilingualism: Language and Cognition* 5 3, 219-224.

Dörnyei, Z. (1994). Understanding L2 motivation: On with the Challenge! *The Modern Language Journal* 78, 515–523.

Dörnyei, Z. (1998). Motivation in second and foreign language learning. *Language Teaching*. 31, 117-135.

Dörnyei, Z. (2007). *Research methods in applied linguistics: Quantitative, qualitative and mixed methodologies*. Oxford: Oxford University Press.

Dudley, E. & Osváth, E. (2016). *Mixed-ability Teaching*. Oxford: Oxford University Press

Duncan, L.G., Casalis, S. & Colé, P. (2009). Early Metalinguistic Awareness of Derivational Morphology: Observations from a comparison of English and French. *Applied Psycholinguistics* 30, 405-440.

Dweik, B. S. & Qawar, H. A. (2015). Language choice and language attitudes in a multilingual Arab-Canadian community: Quebec, Canada: A Sociolinguistic Study. *British Journal of English Linguistics* 3 1, 1-12.

Ehrensberger-Dow, M., & Perrin, D. (2009). Capturing translation processes to access metalinguistic awareness. *Across Languages and Cultures* 10 2, 275-288.

Ellis, R. (2008). The study of second language acquisition (2nd ed.). Oxford: Oxford University Press.

Fejes, J. B. & Józsa, K. (2005). A tanulási motiváció jellegzetességei hátrányos helyzetű tanulók körében. *Magyar Pedagógia* 105 2, 185-205.

Fejes, J. B. & Józsa, K. (2007). Az iskolai eredményesség és a tanulási motiváció kulturális jellemzői. *Iskolakultúra* 6 7, 83-96.

Ferguson, C. A. (1959). Diglossia. *Word* 15 2, 325-340.

Ferris, D. R. (2010). *Second Language Writing Research and written corrective feedback in SLA*. Studies in Second Language Acquisition Cambridge, Cambridge University Press 32. 181-201.

Flores, J. F. F. (2015). Using Gamification to Enhance Second Language Learning. *Digital Education Review* 27, 32-54.

Gardner, Robert C. (1975). Motivation in second language acquisition. *The Canadian Modern Language Review* 3, 218–233.

Gardner, Robert C. (1985). *Social psychology and second-language learning: The role of attitudes and motivation*. Edward Arnold. London.

Gardner, Robert C. – Lambert, Wallace E. (1972). *Attitudes and Motivation in Second Language Learning.* Newbury House. Rowley.

Gardner, R. C., Tremblay, P. F., & Masgoret, A. M. (1997). Towards a full model of second language learning: An empirical investigation. *Modern Language Journal 81* 3, 344-362.

Ghasemi, B. & Hashemi, M. (2011). ICT: Newwave in English language learning/teaching. *Procedia Social and Behavioral Sciences* 15, 3098–3102.

Ghaznavi, M. R., Keikha, A. & Yaghoubi N. (2011). The Impact of Information and Communication Technology (ICT) on Educational Improvement. *International Education Studies* 4 2, 116-125.

Ghonchepour, M & Moghaddam, M. P. (2018). The role of intelligence in learning English as a foreign language. Research in English Language Pedagogy. 6 1, 25-38.

Giacomo, A. D., Coppola, A., Tricarico, T., Terrenzio, V., Margari, M., Petruzelli, G. M. & Fancesco, C. (2018). Socioeconomic status and imitation on language acquisition
in a sample of preschool children. *Riv Psichiatr* 53 4, 199-204.

Göncz, L. (2003). A metanyelvi képességek fejlődése egynyelvű és kétnyelvű gyerekeknél *Alkalmazott Nyelvtudomány* 3 2, 5-20.

Grainger, J. (1993). Visual word recognition in bilinguals. In: R. Schreuder & B. Weltens (Eds.) *Studies in bilingualism 6. The bilingual lexicon*. John Benjamins Publishing company 11-25.

Grainger, J. & Dijkstra, T.(1992). On the representation and use of information in bilinguals. In: Harris R. J. (Ed.) *Cognitive processing in bilinguals*. Amsterdam: North-Holland 207-220.

Grosjean, F. (1997). The Bilingual individual. *Interpreting* 2 1-2, 163-187.

Gudykunst, W. B. & Scmidt, K. L. (1987). Language and Ethnic Identity. *Journal of Language and Social Psychology* 6, 3-4

Hackmann, D. A. & Farah, M. J. (2009). Socioeconomic status and the developing brain. *Trends Cogn Sci.* 13 2, 65-73.

Harsányi, I. (1994). *Tehetségvédelem*. Budapest: Magyar Tehetséggondozó Társaság.

Herdina, P. & Jessner, U. (2002). *A dynamic model of multilingualism. Perspectives of change in psycholinguistics*. Clevedon: Multilingual Matters.

Hofweber, J. & Graham, S. (2017). Linguistic creativity in language learning: Investigating the impact of creative text materials and teaching approaches in the second language classroom. *Scottish Languages Review* 33, 19-28.

Horváth, L. (2014). Informális tanulás a munkahelyen: A tudásmegosztás kompetenciájának fejlesztése. *Kultúra és Közösség* 5, 3.

Ihemere, K. U. (2006). An Integrated Approach to the Study of Language Attitudes and Change in Nigeria: The Case of the Ikwerre of Port Harcourt City. In: Arasanyin, O.F. & Pemberton M.A. (Eds.) *Selected Proceedings of the 36th Annual Conference on African Linguistics* 194-207.

Jessner, U. (2006). *Linguistic awareness in multilinguals*. Edinburgh: Edinburgh University Press Edinburgh.

Jessner, U. (2008). A DST Model of Multilingualism and the role of Metalinguistic Awareness. *The Modern Language Journal* 92, 270-283.

Jurcak, V., Tsuzuki, D. & Dan, I (2007). 10/20, 10/10, and 10/5 systems revisited: Their validity as relative head surface based positioning systems. *Neuroimage* 34, 1600-1611.

Kaushanskaya, M. & Marian, V. (2007). Bilingual language processing and interference in bilinguals: Evidence from eye tracking and picture naming. *Language Learning* 57 1, 119-163.

Keating, G. D. (2017). L2 proficiency matters in comparative L1/L2 processing research. *Bilingualism, language and cognition* 20 4, 700-701.

Khaled, B. (2007). Participants, Texts and Processes in ESL/EFL Essay tests: A Narrative Review of the Literature. *The Canadian Modern Language Review* 64 1, 99-134.

Kirk, N. W., Kempe, V., Scott-Brown, K. C., Philipp, A. & Declerck, M. (2018). Can monolinguals be like bilinguals? Evidence from dialect switching. *Cognition* 170, 164-178.

Kiss, J. (2001). Az alkalmazott dialektológia: a nyelvjárások és az anyanyelvoktatás. In: J. Kiss (Ed.) *Magyar dialektológia.* Budapest: Osiris Kiadó. 145–156.

Kiss, J. (2017). A nyelvjárások. In: Tolcsvai Ngay, G. (Ed.) *A magyar nyelv jelene és jövője.* Budapest: Gondolat Kiadó. 199-221.

Klein, W. (1986). *Second Language Acquisition.* Cambridge, Cambridge University Press.

Klimova, B. F. (2014) *Teacher intervention in the process of L2 writing acquisition* Procedia - Social and Behavioral Sciences 143, 238 – 242.

Koda, K. (2005). *Insights into second language reading. A cross-linguistic approach.* Cambridge: Cambridge University Press

Korat, O. (2005). Contextual and non-contextual knowledge in emergent literacy development: A comparison between children from low SES and middle SES communities. *Early childhood research quarterly* 20 2, 220-238.

Kormos, J. (2013). New conceptualizations of language aptitude in second language attainment. In: Granena, G., & Long, M. H. (Eds.), *Sensitive Periods, Language Aptitude and Ultimate Attainment* Amsterdam: John Benjamins. 31-152.

Kupchyk, L. & Litvinchuk, A.(2020). Constructing personal learning environments through ICT- mediated foreign lanuage instruction. *Journal of Physics: Conference Series* 1-16.

Laczkó, M. (2014). A mentális lexikon a szóasszociációk tükrében a tinédzserek anyanyelv- és idegennyelv-elsajátítási folyamatában. *Anyanyelv-pedagógia* 2.

Leivada, E. (2017). Seven factors in 'dialect' design. *Conference Paper on Structural and Developmental Aspects of Bidialectism Workshop.* Tromsø, Norway, 25–26 October

Lemhöfer, K. & Dijkstra, T. (2004). Recognizing cognates and interlingual homographs: Effects of code similarity in language-specific and generalized lexical decision. *Memory & Cognition* 32 4, 533-550.

Lemhöfer, K., Dijkstra, T., Schriefers, H., Baayen, R. H., Grainger, J., & Zwitserlood, P. (2008). Native language influences on word recognition in a second language: A megastudy. *Journal of Experimental Psychology: Learning, Memory, and Cognition 34* 1, 12-31.

Lengyel, Zs. (2019a). Anagram Based L2 Activation. *Indonesian Research Journal in Education* 3 2, 300-318.

Lengyel, Zs. (2019b). Szakgimnazisták idegennyelv tanulási motivációjának vizsgálata. In Bátyi, Sz. (Szerk.*) A nyelv –tanítás, tanulás, reprezentáció, feldolgozás. Pszicholingvisztikai tanulmányok* VI. 70-83.

Lengyel, Zs. (1997). *Bevezetés a pszicholingvisztikába.* Veszprém: Veszprémi Egyetemi Kiadó.

Léwy, N., & Grosjean, F. (2008). The Léwy and Grosjean BIMOLA model. In: Grosjean, F. (Ed.), *Studying bilinguals*. Oxford: Oxford University Press 201–210.

Liu, M. & Zhao, S. (2011.) Current Language Attitudes of Mainland Chinese University Students. *Journal of Language Teaching and Research* 2 5, 963-968.

Li, S. (2016). The construct validity of language aptitude. *Studies in Second Language Acquisition* 38 4, 801–842.

Ma, X., Ma, L., & Bradley, K. D. (2008). Using multilevel modeling to investigate school effects. In A. A. O'Connell & D. B. McCoach (Eds.), *Multilevel modeling of educational data*. Charlotte, NC: Information Age. 59-110.

Ma, G. H. & Wen, Q. F. (1999). Factors affecting English Writing of Chinese University students*. Foreign Language Teaching and Research* 4, 34-39.

Masgoret, A. M., & Gardner, R. C. (2003). Attitudes, motivation, and second language learning: A meta-analysis of studies conducted by Gardner and associates. *Language Learning, 53*, 167-210.

McClelland, J. L., & Elman, J. L. (1986). The TRACE model of speech perception. *Cognitive Psychology* 18, 1–86.

Mathuranath, P. S., George, A., Cherian, P.J., Alexander, A. Sarma, S. G. & Sarma P.S. (2003). Effects of age, education and gender on verbal fluency. *Journal of Clinical and Experimental Neuropsychology* 25 8, 1057-1064.

Mayer, R. E. (1983). *Thinking, problem solving and cognition*. San Francisco: W.H. Freeman.

Meera, K. P. & Remya, P. (2010). Effects of extensive reading and creativity on achievements in English language. *E-journal of all India Association for Educational Research* 22 1, 16-22.

Mészáros, A. & Kas, B. (2008). A kognitív funkciók megismerésének szerepe a nyelvfejlődési zavar diagnosztikájában. *Gyógypedagógiai Szemle* 36 2, 86–104.

Mező, F., & Mező, K. (2017). Az originalitás mérő és becslő módszereinek konkurens validitása. *Különleges Bánásmód* 3 3, 27-38.

Miller, L. (2017). The relationship between language proficiency and language attitudes Evidence from young Spanish-English bilinguals. *Spanish in Context* 14 1, 99–123.

MNyA. = A magyar nyelvjárások atlasza 1–6. Deme László – Imre Samu (Eds.) Akadémiai Kiadó. Budapest. 1968–1977.

Molnár, Gy. (2007). Hátrányos helyzetű diákok problémamegoldó gondolkodásának longitudinális követése. *Magyar Pedagógia* 107 4, 277-293.

Müller, B., Richter, T., Karageorgos, P., Krawietz, S. & Ennemoser, M. (2017). Effects of a Syllable-Based Reading Intervention in Poor-Reading Fourth Graders. *Front. Psychol.* 8, 1635.

Mystkowska-Wiertelak, A. & Pawlak, M. (2017). *Willingness to communicate in Instructed Second Language Acquisition Combining a Macro- and Micro-Perspective.* Bristol: Multilingual Matters.

Navracsics, J. (2004). *A kétnyelvű gyermek.* Budapest: Corvina.

Navracsics, J. (2007). Word classes and the bilingual mental lexicon. In: Lengyel, Zs. & Navracsics, J. (Eds.) *Second Language Lexical Processes: Applied linguistic and psycholinguistic perspectives.* Clevedon: Multilingual Matters. 17-39.

Navracsics, J. & Sáry, Gy. (2013). Vizuális szófelismerés a kétnyelvűségben. *Alkalmazott Nyelvtudomány* 13 1-2, 75-91.

Navracsics, J., Sáry, Gy., Bátyi, Sz., & Varga, Cs.. (2014). Testing Linguistic Awareness Among Learners of Hungarian. In: Pawlak M., & Aronin L. (Eds) *Essential Topics in Applied Linguistics and Multilingualism. Second Language Learning and Teaching.* Springer. 111-128.

Navracsics, J. & Sáry, Gy. (2017). Phonological and semantic awareness of bilinguals and second language learners: potential implications for second language instruction. In: Pfenninger, S. E. & Navracsics, J. (Szerk.) *Future Research Directions for Applied Linguistics.* Bristol: Multilingual Matters. 53-73.

Norman, T., Degani, T. & Peleg, O. (2016). Transfer of L1 visual word recognition strategies during early stages of L2 learning: Evidence from Hebrew learners whose first language is either Semitic or Indo-European. *Second Language Research* 32 1, 109–122.

Novák, I. & Fónai, M. (2020). Gimnáziumi és szakgimnáziumi tanulók idegennyelv-tanulási eredményessége. *Iskolakultúra* 30 6, 16-35.

Oxford, R. & Shearin, J. (1994). Language Learning Motivation: Expanding the Theoretical Framework. *The Modern Language Journal* 78 1, 12-28.

Pace, A., Luo, R. Hirsh-Pasek, K. & Golinkoff R. M. (2017). Identifying Pathways Between Socioeconomic Status and Language development. *Linguist* 3, 285-308.

Parapatics, A. (2019). Ambivalent Attitudes to Regional Dialects in Hungary: Investigating Students and Teachers. *Indonesian Research Journal in Education* 2, 340–357.

Parapatics, A. & Lengyel, Zs. (2021). A regionális nyelvi háttér és a második nyelv elsajátításával kapcsolatos motivációk vizsgálata: Egy kísérlet tanulságaiból. *Anyanyelv-pedagógia* (in press)

Perfetti, C. A. (1985). *Reading Ability.* New York: Oxford University Press.

Pfenninger, S. E. (2017). Not so individual after all: An ecological approach to age as an individual difference variable in a classroom. Special Issue, de Bot and Bátyi (Eds.), "Individual differences in SLA", *Studies in Second Language Learning and Teaching* 7 1, 19-46.

Piniel, K. & Csizér, K. (2013). L2 motivation, anxiety and self-efficacy: The interrelationship of individual variables in the secondary school context. *Studies in Second Language Learning and Teaching* 4, 523-550.

Pishghadam, R., Khodadady, E. & Zabihi, R. (2011). Learner creativity in foreign language achievement. *European Journal of Educational Studies* 3 3, 465-472.

Pléh, Cs. & Lukács, Á. (2014). *Pszicholingvisztika 1-2*. Budapest: Akadémiai Kiadó

Polonyi, T. É. & Mérő, D. (2007). A sikeres nyelvtanulás tényezői. *Alkalmazott Pszichológia* 2, 88–117.

Quist, P. (2008). Sociolinguistic approaches to multiethnolect: Language variety and stylistic practice. *International Journal of Bilingualism* 12 1-2, 43-61.

Ramirez, G., Chen, X. & Pasquarella, A. (2013). Cross-Linguistic Transfer of Morphological Awareness in Spanish-Speaking English Language Learners: The facilitating Effect of Cognate Knowledge. *Topics in Language Disorders* 33 1, 73-92.

Rogers, V. E., Meara, P, Aspinall, R. Fallon, L., Goss, T., Key, E. & Thomas, R. (2005). Testing aptitude. Investigating Meara's LLAMA test. *EUROSLA Yearbook* 16, 179 – 210.

Rogers, V. E., Meara, P., Barnett-Legh, T., Curry, C., & Davie, E. (2017). Examining the LLAMA aptitude tests. *Journal of the European Second Language Association*, 1 1, 49–60.

Ross, J. & Melinger, A. (2016). Bilingual advantage, bidialectal advantage or neither? Comparing performance across three tests of executice function in middle childhood. *Developmental Science* 4, 1–21.

Rózsa, S., Nagybányai-Nagy, O., Oláh, A. (Eds.) (2006). *A pszichológiai mérés alapjai. Elmélet, módszer és gyakorlati alkalmazás.* Bölcsész Konzorcium, Budapest.

Ruzikulovna, K. K.; Gaffarovna, Y. Z.; Burievna, N. S.; Akramovna, D.K. & Ruzievna K. G. (2020). The use of ICT in foreign language learning and teaching. *Journal of critical reviews* 13. 7. 1060-1063.

Sántha-Malomsoki, Á. (2016). The Effect of Second Language Proficiency on Linguistic Creativity. *Képzés és Gyakorlat* 14 1-2, 137-153.

Sarris, M.E. & Panagiotakopoulos, C. T. (2013).   Linguistic Effects on Anagram Solution: The Case of a Transparent Language. *World Journal of Education* 3-4, 41-51.

Shao, Z., Janse, E., Visser, K. & Meyer, A. S. (2014). What do verbal fluency tasks measure? Predictors of verbal fluency performance in older adults. *Frontiers in Psychology* 5.

Singleton, D. (2017). Language aptitude: Desirable trait or acquirable attribute? Studies in Second Language Learning and Teaching 7 1, 89-103.

Smith, J. & Durham, M. (2012.) Bidialectism or dialect death? Explaining generational change in the Shetland Islands, Scotland. *American Speech* 87 1, 57-88.

Sominé, H. O. (2011). Az anyanyelv elsajátítás és az idegnnyelv tanulás összefüggéseinek megközelítései-egy közös értelmezési keret lehetősége. *Magyar Pedagógia* 111 1, 53-77.

Somogyi, L. (2017). Homográfhatás egy kétnyelvű szemantikai tesztben. *Pannon Tanulmányok 4*, 83-97.

Sternberg, R. J. (1984). Toward a triarchic theory of human intelligence. *Behavioral and Brain Sciences* 7, 269-287.

Szepes, M., Czeglédy, E., Urbán, R., Horváth, K. & Balogh, P. (2014). A Szülői Konfliktusok Észlelését Mérő Skála hazai alkalmazásával szerzett tapasztalatok. *Mentálhigiéné és Pszichoszomatika* 15 2, 139-170.

Szerencsi, K. (2010). The Need for Linguistic Creativity in Foreign Language Classroom Discourse. *Acta Philologica Universitatis Sapientiae* 2, 286-298.

Szirmai, H., (2003). A matematikai és a nyelvi képességek közötti összefüggés vizsgálata. *Új Pedagógiai Szemle* 53 5, 24-37.

Taft, M., Xu, J. & Li, S. (2017). Letter coding in visual word recognition: The impact of embedded words. *Journal of Memory and Language* 92, 14–25.

Talebian, S., Mohammadia, H. M., & Rezvanfar A. (2014). Information and communication technology (ICT) in higher education: advantages, disadvantages, conveniences and limitations of applying e-learning to agricultural students in Iran. *Procedia - Social and Behavioral Sciences* 152, 300 – 305.

Tánczos, J. & Máth, J. (2005). Attitűdbeli és motivációs sajátosságok az idegennyelv tanulásában. *Iskolakultúra* 15 12, 43-47.

Tánczos, T. (2012). A végrehajtó funkciók szerepe az iskolában és a verbális fluencia tesztek *Iskolakultúra* 22 6, 38-51.

Tari, A. (2015). *Generációk online*. Budapest: Tercium Kiadó Kft

Tódor, E. M. & Dégi, Zs. (2016). Language Attitudes, Language Learning Experiences and Individual Strategies. What Does School Offer and What Does It Lack? *Acta Universitatis Sapientiae, Philologica* 8 2, 123–137.

Tombaugh, T. N., Kozak, J., Rees, L. (1999). Normative Data Stratified by Age and Education for Two Measures of Verbal Fluency: FAS and Animal Naming *Archives of Clinical Neuropsychology* 14 2, 167–177.

Van Avermaet, P. (2006). *Socially disadvantaged learners and language education*. Strasbourg, France: Council of Europe, Language Policy Devision

Vangsnes, Ø. A., Söderlund, G. B. W. & Blekesaune, M. (2017). The effect of bidialectal literacy on school achievement. *International Journal of Bilingual Education and Bilingualism* 3, 346–361.

Weinreich, U. (1953). *Languages in Contact, findings and problems*. New York: Linguistic Circle of New York.

Wysokiński, A., Zboralski, K,, Orzechowska, A., Gałecki, P., Florkowski, A., Talarowska, M. (2010). Normalization of the Verbal Fluency Test on the basis of results for healthy subjects, patients with schizophrenia, patients with organic lesions of the chronic nervous system and patients with type 1 and 2 diabetes. *Archives of medical science* 6 3, 438–446.

Zétényi, T. (1989). *A kreativitás tesztek tesztkönyve I-II*. Budapest: Munkaügyi Kutatóintézet.

Zhang, J. (2008). A Comprehensive Review of Studies on Second Language Writing *HKBU Papers in Applied Language Studies* 12, 89-123.

Zhu, Y. & Pik Ki Mok, P. (2020). Visual recognition of cognates and interlingual homographs in two non-native languages. *Linguistic Approaches to Bilingualism* 10 4, 441-470.

Further resources:

A kreativitás mérésének lehetőségei online tesztkörnyezetben. Published in 2015 by Attila Pásztor

http://www.edu.uszeged.hu/kkcs/sites/default/files/legfrissebb/2015/Pasztor_2015_Kreativitas_online_merese.pdf

A nyelvjárások. Published in 2017 by Jenő Kiss

http://real.mtak.hu/75696/1/Tolcsvai_Magyarnyelv_199_Kiss.pdf

A szocializációs közösség hatása a kétnyelvű mentális lexikonra. Published in 2011 by Szilvia Bátyi

http://karpataljaiadatbank.net/images/pdf/batyi%20szilvia.pdf

A verbális fluencia és munkamemória életkori változásai és szerepük az iskolai teljesítményben. Published in 2014 by Tímea Tánczos

http://doktori.bibl.u-szeged.hu/2197/1/Disszertacio_Tanczos.pdf

Attitude Motivation Test Battery International AMTB Research Project. Published in 2004 by R. C. Gardner Ph.D.

https://l1attrition.files.wordpress.com/2019/06/robert-gardner-attitude-and-motivational-test-battery.pdf

Covert Bilingual Language Activation through Cognate Word Processing: An Eye-tracking Study. Published in 2005 by Henrike K. Blumenfeld and Viorica Marian

https://escholarship.org/content/qt9049m68c/qt9049m68c.pdf

Informáls tanulás a munkahelyen: a tudásmegosztás kompetenciájának fejlesztése. Published in 2016 by László Horváth

http://www.kulturaeskozosseg.hu/pdf/2014/3/10.pdf

LLAMA Language Aptitude Tests The Manual. Published in 2005 by Paul Meara

http://www.lognostics.co.uk/tools/llama/llama_manual.pdf

Second language writing system word recognition. Published by Christine Elliott

http://www.ncolctl.org/files/second-Language.pdf

Tehetségazonosítás – Teérted. Published in 2015 by Zsuzsanna Papp

http://www.kandosuli.hu/sites/default/files/files/TEHAZONOSITAS.pdf

The Attitude Motivation Test Battery Technical Report. Published in 1985 by R. C. Gardner Ph.D

http://publish.uwo.ca/~gardner/docs/AMTBmanual.pdf

Új módszer a kreativitás megállapítására: A Tóth-féle kreativitás-becslő skála. Published in 2006 by László Tóth & Zoltán Király

http://www.magyarpedagogia.hu/document/Toth_MP1064.pdf

Raven matrices - Alkalmazott Pszichológia XII évfolyam 4. szám. Published in 2010.

http://ap.elte.hu/wp-content/uploads/2012/09/APA_2010_3-4.pdf

List of referred websites:

http://corpus.nytud.hu/mnsz/index_eng.html

http://europeyou.eu/es/what-is-information-and-communication-technology/

http://faculty.washington.edu/losterho/erp_tutorial.htm

http://logopedia.reblog.hu/cimke/verb%C3%A1lis+fluencaerbális

http://www.lognostics.co.uk/tools/llama/

http://www.psychologytoday.com/us/blog/life-bilingual/201601/the-bilingual-advantage-where-do-we-go-here

https://amp.en.google-info.cn/39427010/1/hungarian-dialects.html

https://en.wikipedia.org/wiki/Bilingual_lexical_access

https://en.wikiversity.org/wiki/Psycholinguistics/Models_of_Speech_Perception

https://kerettanterv.oh.gov.hu/06_melleklet_912_szki/index_szakkozep.html

https://lltf.net/aptitude-tests/language-aptitude-tests/pimsleur-language-aptitude-battery/

https://mensa.hu/tesztiras/online-iq-probateszt/

https://mersz.hu/dokumentum/m623tieisz__43

https://ofi.oh.gov.hu/teaching-and-learning-090617/teaching-foreign

https://onlinelibrary.wiley.com/doi/abs/10.1111/lang.12368

https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-437

https://whsgraphicdesign.wordpress.com/2015/09/09/creativity-test-2

https://www.apa.org/pi/ses/resources/publications/education

https://www.english-corpora.org/coca/

https://www.euroslajournal.org/articles/10.22599/jesla.24/

https://www.jbe-platform.com/content/journals/10.1075/eurosla.16.07rog

https://www.llas.ac.uk/resources/gpg/2662

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3282524/

https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Cognition-%26-Neuro/Children%E2%80%99s-Memory-Scale/p/100000155.html

https://www.researchgate.net/figure/The-Bilingual-Interactive-Activation-model-The-BIA-model-is-an-example-of-how-an_fig1_228380914

https://www.researchgate.net/figure/The-Bilingual-Model-of-Lexical-Access-BIMOLA-as-proposed-in-Thomas-and-Van-Heuven_fig7_259641224

https://www.researchgate.net/figure/The-Semantic-Orthographic-Phonological-Interactive-Activation-model-SOPHIA-adapted_fig6_259641224

https://www.sk.com.br/sk-krash.html

https://www.teachingenglish.org.uk/article/language-aptitude

https://www.thefreedictionary.com/Bidialectism

Appendices

1. End of year school results in English

Questionnaires and tests on general language skills:

2. socioeconomic status

3. language attitude

4. infocommunication technology

5. language aptitude (LLAMA test)

6. motivation (AMTB test)

7. creativity (Torrance test)

8. bidialectism

9. interview

Tests on linguistic skills:

10. anagram

11. homograph

12. first syllable

13. word completion

14. words in ERP test

Appendix 1. End of term school results in English

1.	2	**21.**	2	**41.**	3
2.	3	**22.**	2	**42.**	3
3.	3	**23.**	2	**43.**	3
4.	2	**24.**	2	**44.**	4
5.	5	**25.**	2	**45.**	3
6.	3	**26.**	4	**46.**	4
7.	5	**27.**	3	**47.**	3
8.	2	**28.**	3	**48.**	2
9.	2	**29.**	2	**49.**	5
10.	5	**30.**	4	**50.**	2
11.	3	**31.**	4	**51.**	2
12.	2	**32.**	4	**52.**	3
13.	4	**33.**	5	**53.**	3
14.	3	**34.**	2	**54.**	3
15.	3	**35.**	5	**55.**	3
16.	2	**36.**	2	**56.**	4
17.	2	**37.**	3	**57.**	3
18.	3	**38.**	2	**58.**	3
19.	3	**39.**	3	**59.**	4
20.	3	**40.**	3	**60.**	3

Appendix 2. Questionnaire on socioeconomic status

Válaszolj a következő kérdésekre!

1.   Anya legmagasabb iskolai végzettsége

a.   0-7 osztály

b.   8 osztály

c.   középiskola

d.   főiskola/egyetem

2.   Anya foglalkozása

…………………………………………………..

3.   Apa legmagasabb iskolai végzettsége

a.   0-7 osztály

b.   8 osztály

c.   középiskola

d.   főiskola/egyetem

4.   Apa foglalkozása

…..

5.   Egy háztartásban élő személyek száma összesen

…………………………………………………..

6.   Egy háztartásban élő 18 év alatti személyek száma

…………………………………………………..

7.   Egy háztartásban élő nyugdíjas személyek száma

……………………………………………………

Húzd alá a megfelelőt!

8.   saját szobám van   saját szobám nincs

9.   saját tévém van   saját tévém nincs

10.   saját telefonom van   saját telefonom nincs

11.   lakásban élünk   házban élünk

12.   különórára járok   különórára nem járok

13.   jártam már külföldön   nem jártam külföldön

14.   nyaralni járunk   nyaralni nem járunk

15.   moziba járok   moziba nem járok

16.   színházba járok   színházba nem járok

17.   Van-e tartósan beteg a családban?

Igen   Nem

18.   Van-e külföldön dolgozó családtag?

Igen   Nem

19.   Van-e tartósan távol élő/dolgozó családtag?

Igen   Nem

20.   Van-e munkanélküli a családban?

Igen   Nem

21.   Egyszülős családban élsz?

Igen   Nem

22.   Nagyszülőkkel élsz?

Igen   Nem

23.   Egyedül élsz?

Igen   Nem

Appendix 3.   Questionnaire on language attitude

Válaszolj a következő kérdésekre, ahol □ jelet látsz, ott pipáld ki a megfelelő választ!

1.,Életkor:

……………………év

2.,Nem:

□férfi   □nő

3.,Milyen kezes vagy:

□jobb   □bal

4.,Első nyelved:

□Angol   □Magyar   □mindkettő

5.,Második nyelved:

□Angol   □Magyar

6.,Édesanyád első nyelve:

□Angol   □Magyar

7.,Édesapád első nyelve:

□Angol   □Magyar

8.,Második nyelv elsajátításának helyszíne:

□iskola   □otthon

9.,Második nyelv elsajátításának életkora :

………………… éves kortól

10.,Melyik nyelvet kedveled jobban?

□Magyar   □Angol

11., Melyik nyelv a könnyebb?

□Magyar   □Angol

12., Melyik nyelvet használod gyakrabban?

□Magyar   □Angol   □mindkettő

13., Melyik nyelvet fogod megtanítani a gyermekednek?

□Magyar   □Angol   □mindkettő

14.,Mikor használod az első nyelvedet?

□soha   □ritkán   □néha   □gyakran   □mindig

15.,Kivel használod az első nyelvedet?

□barátok   □család   □tanárok

16.,Hol használod az első nyelvedet?

□otthon   □iskolában   □mindkét helyen

17.,Milyen gyakran használod az első nyelvedet?

□soha   □néha   □minden nap

18.,Mikor használod a második nyelvedet?

□soha   □ritkán   □néha   □gyakran   □mindig

19.,Kivel használod a második nyelvedet?

□barátokkal   □családdal   □tanárokkal

20.,Hol használod a második nyelvedet?

□otthon   □iskolában   □mindkét helyen

21.,Milyen gyakran használod a második nyelvedet?

□soha   □néha   □minden nap

22.,Melyik nyelvhez köthető az első emléked?

□Magyar   □Angol

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23.,Melyik nyelv tudásában vagy magabiztosabb?

□Magyar □Angol

24.,Milyen nyelven hallgatsz zenét?

□Magyar □Angol

25., Milyen nyelven olvasol?

□Magyar □Angol

26.,Véleményed szerint milyen a magyar nyelvtudásod?

□gyenge □közepes □jó

27., Véleményed szerint milyen az angol nyelvtudásod?

□gyenge □közepes □jó

28., Miért tanulsz angolul?

□mert muszáj □mert tetszik □mert hasznos □mert a szüleim akarják □játékok miatt

29.,Véleményed szerint mi a kétnyelvűség előnye?

………………………………………………………………………

30., Véleményed szerint mi a kétnyelvűség hátránya?

………………………………………………………………………

Appendix 4.   Questionnaire on usage of ICT devices

Válaszold meg a következő kérdéseket!

1.   Hány éves korodban kaptál először saját mobilt?

………………………………………………………..

2.   Hasznosnak tartod az appokat?

igen   nem

3.   Melyik a telefonodon leggyakrabban használt funkció?

………………………………………………………..

4.   Mennyi időt töltesz telefonhasználattal egy nap?

a.   kevesebb, mint 1 óra

b.   1-2 óra

c.   több, mint 2 óra

5.   Mennyi időt töltesz sporttal egy nap?

a.   kevesebb, mint 1 óra

b.   1-2 óra

c.   több, mint 2 óra

6.   Mit csinálnál először, ha egy napig nem telefonozhatnál?

………………………………………………………

7.   Mennyire fontos szerepet játszik az életedben a telefon?

a.   nagyon fontos

b.   átlagos

c.   egyáltalán nem fontos

8.   Segít a telefon a tanulásban?

igen   nem

9.   Mennyire megbízhatóak a netes tartalmakat?

a.   teljesen

b.   részben

c.   egyáltalán nem

10.   Rakd sorrendbe használati gyakoriság szerint a következőket, kezd a leggyakoribbal! Facebook Messenger Viber Instagram Wikipedia

1.,

2.,

3.,

4.,

5.,

11.   Milyen gyakran írsz kézzel a szabadidődben?

a., naponta

b., hetente

c., nem írok kézzel

12.   Mit írsz kézzel?

………………………………………………………………

13.   Milyen gyakran írsz telefonon a szabadidődben?

a., napi néhány perc

b., napi egy óra

c., napi több óra

14.   Mit írsz telefonon?

………………………………………………………….

15.   Milyen gyakran írsz számítógépen a szabadidődben?

a., naponta

b., hetente

c., havonta

16.   Mit írsz számítógépen?

…………………………………………………………

17.   Véleményed szerint melyik esetben írsz a leghelyesebben?

a., számítógépen

b., telefonon

c., kézírással

18.   Véleményed szerint melyik esetben írsz a legtöbb hibával?

a.,számítógépen

b., telefonon

c., kézírással

19.   Hogy szeretsz a legjobban írni?

a., számítógépen

b., telefonon

c., kézzel

20.   Telefonon történő íráskor milyen gyakran rövidítesz szavakat, mondatokat?

a., minden alkalommal előfordul

b., néha

c., soha

21. Milyen gyakran használsz rövidítéseket?

a., minden alkalommal

b., néha

c., soha

22. Mit érdemes rövidíteni egy chat beszélgetés során?

…………………………………………………………

23. Téged zavarnak a rövidítések?

igen   nem

24. Mire jó az emotikon?

…………………………………………………………

25. Minden emotikon jelentését ismered?

igen   nem

26. Javítják a társaid az üzenetekben levő helyesírási hibáidat?

igen   nem

27. Te javítod mások hibáit?

igen   nem

28. Mi volt a legutóbbi helyesírási hiba, amire emlékszel?

…………………………………………………………

29. Melyik a leginkább zavaró hiba chatelés során?

a., egybe-külön írás

b., j-ly tévesztés

c., kis-nagybetű tévesztés

30.   Milyen gyakran kell visszakérdezned az üzenetek jelentésére?

a., minden alkalommal

b., néha

c. soha

   31. Kivel chat-elsz legszívesebben?

a., párommal

b., barátaimmal

c., családommal

32.   Melyik napszakban chatelsz legtöbbet?

a., reggel

b., délután

c., este

33.   Milyen gyakran használsz fotó programokat telefonon?

a., gyakran

b., néha

c., soha

34.   Milyen gyakran használsz szerkesztő programokat telefonon?

a., gyakran

b., néha

c., soha

35.   Milyen gyakran használsz zenei programokat telefonon?

a., gyakran

b., néha

c., soha

36.   Milyen gyakran játszol telefonon?

a., gyakran

b., néha

c., soha

37.   Mit jelentenek magyarul a következők?

LOL………………………………….WOW…………………………………………

COOL………………………………..HUG…………………….…………

GOOD LUCK…………………………..I MISS YOU………………   ………….

WELCOME……………………………PLEASE……………………………....

I AM BUSY…………………………HOW YOU DOIN'……………………

  38., Mi a Facebook legnagyobb előnye?

………………………………………….

  39.,Mi a Facebook legnagyobb hátránya?

………………………………………...

  40.,Tanultál valamit a chat programokból?(pl. új szót) Ha igen, mi az?

…………………………………

Appendix 5. Sample page of LLAMA Language Aptitude Test

http://www.lognostics.co.uk/tools/llama/

Appendix 6. Sample of Attitude Motivation Test Battery

Following are a number of statements with which some people agree and others disagree. Please circle one alternative below each statement according to the amount of your agreement or disagreement with that item. The following sample item will serve to illustrate the basic procedure.

a. Spanish football players are much better than Brazilian football players.

| Strongly Disagree | Moderately Disagree | Slightly Disagree | Slightly Agree | Moderately Agree | Strongly Agree |

In answering this question, you should have circled one alternative. Some people would have circled "Strongly Disagree", others would have circled "Strongly Agree", while others would have circled any of the alternatives in between. Which one you choose would indicate your own feeling based on everything you know and have heard. Note: there is no right or wrong answer.

1. I wish I could speak many foreign languages perfectly.

| Strongly Disagree | Moderately Disagree | Slightly Disagree | Slightly Agree | Moderately Agree | Strongly Agree |

2. My parents try to help me to learn English.

| Strongly Disagree | Moderately Disagree | Slightly Disagree | Slightly Agree | Moderately Agree | Strongly Agree |

3. I don't pay much attention to the feedback I receive in my English class.

| Strongly Disagree | Moderately Disagree | Slightly Disagree | Slightly Agree | Moderately Agree | Strongly Agree |

4. I don't get anxious when I have to answer a question in my English class.

| Strongly Disagree | Moderately Disagree | Slightly Disagree | Slightly Agree | Moderately Agree | Strongly Agree |

5. I look forward to going to class because my English teacher is so good.

| Strongly Disagree | Moderately Disagree | Slightly Disagree | Slightly Agree | Moderately Agree | Strongly Agree |

Appendix 7.   Torrance test of repeated circles

Egészítsd ki a következő köröket általad készített rajzokkal!
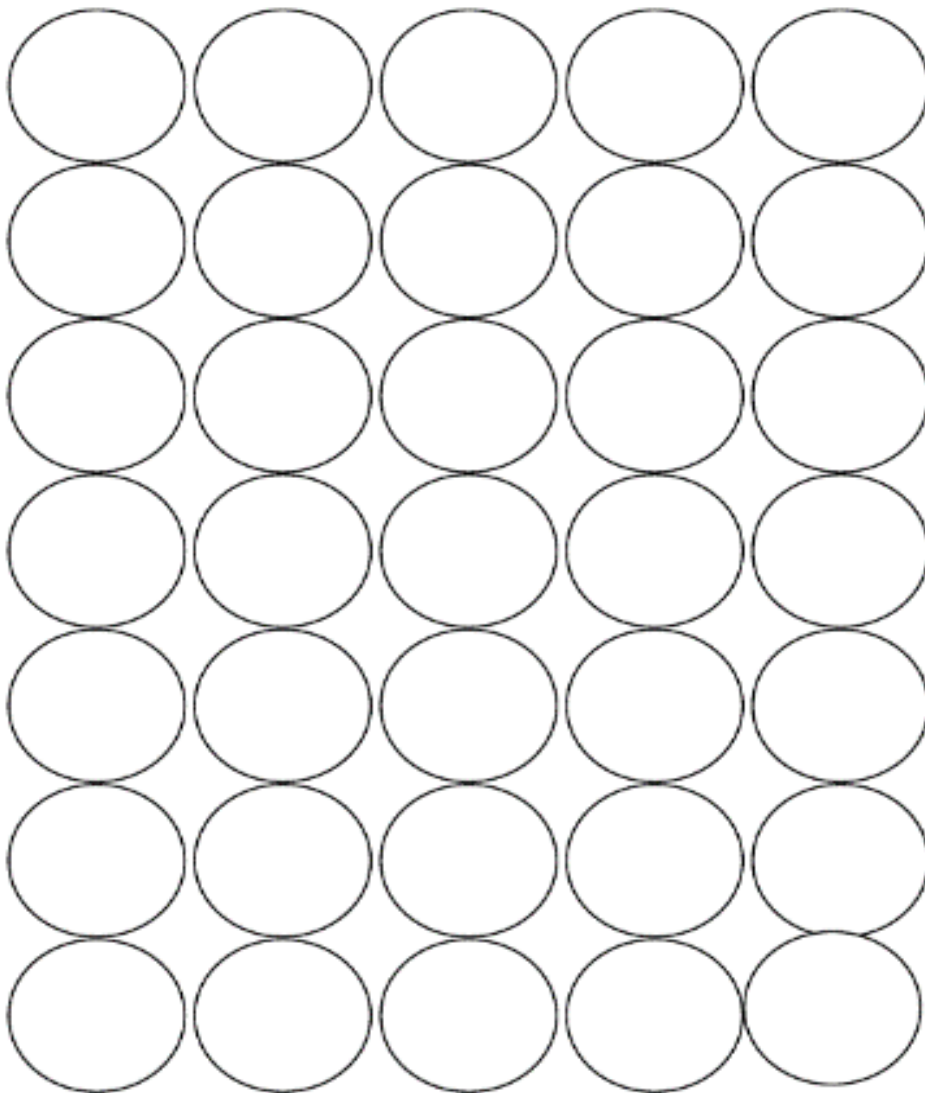
Appendix 8.   Sample of questionnaire on bidialectism

Töltsd ki a következő tesztet értelem szerűen! Az első 4 oldalán az első két oszlopban pipát vagy ikszet, a második két oszlopban szöveges választ használj!

	Használod ezt a szót?	Szüleid vagy nagyszüleid használják?	Mit jelent?	Másképp is szoktad mondani? **Ha igen:** hogyan?
fej (kukoricáé)				
haj (kukoricáé)				
fosztás				
csuma				
tusa				
csuta, csutakomp				
zsurmul				
hecsedli				
biling				
uritök				
macskaméz				
kaccsa (szőlőnek)				
segvakaró				
himpér				
szelence				
bicske				
hant, hont				
kézfogó				
bécsibicska				
sámli				
sámedli				
ciha				
vánkos				
kürt				

	Használod ezt a szót?	Szüleid vagy nagyszüleid használják?	Mit jelent?	Másképp is szoktad mondani? **Ha igen:** hogyan?
lajtergya				
szijács				
bugyli, bugyuli				
kaszap				
cséve				
buckó				
hidas				
birka				
csibe				
zsiba				
réce				
májog				
pesszeg				
zihál				
tutul, tutoll				
lehitál				
körmöz				
nyervog				
sziszereg				
buborcsék				
kopoz				
böllér				
barátfüle				
töpörtő				
szege (kenyérnek)				

Appendix 9.   **Sample of interview questions**

1. Kivel használod az angol nyelvet?
2. Nézel angol nyelvű sorozatot?
3. Hallgatsz angol nyelvű zeneszámokat?
4. Vannak külföldi barátaid?
5. Melyik nyelv a modernebb az angol vagy a magyar?
6. Milyen érzés angolul tanulni?
7. Általános iskolában ki választott idegen nyelvet?
8. Magabiztos vagy, amikor angolul beszélsz?
9. Hol a helye egy rangsorban az angol nyelvnek a tantárgyak között?
10. Hányasra értékeled az angoltudásod?
11. Mi az anyanyelved?
12. Ezen belül milyen változatot beszélsz?
13. Volt rá példa, hogy kijavítottak, amikor magyarul beszéltél?
14. Milyen a helyesírásod?
15. Büszke vagy rá hogy tudsz magyarul?
16. Büszke vagy rá hogy beszélsz angolul?
17. Minden magyar egyformán beszél magyarul?
18. Szebben vagy csúnyábban beszélsz magyarul az átlagnál?
19. Milyen nyelven van először emléked?
20. Vannak további terveid ezekkel a nyelvekkel?

Appendix 10.   Test on anagrams

Alkoss értelmes angol vagy magyar szavakat a következő anagrammákból! Azt az egy szót írd be a megfelelő oszlopba, ami először eszedbe jut!

Magyar szó	Anagramma	Angol szó
	1. amla	
	2. dda	
	3. ickk	
	4. ornt	
	5. enm	
	6. lef	
	7. elef	
	8. emes	
	9. ettn	
	10. iam	
	11. iad	
	12. isme	
	13. anth	
	14. ordab	
	15. rma	
	16. kra	
	17. sha	
	18. ajr	
	19. ilba	
	20. abh	
	21. arb	

	22.epac	
	23.rac	
	24.rach	
	25.ardk	
	26.daat	
	27.eald	
	28.rokd	
	29.lle	
	30.ingr	
	31.nit	
	32.atn	
	33.sak	
	34.aet	
	35.arb	
	36.tink	
	37.alb	
	38.apn	
	39.atr	
	40.otp	
	41.tepera	
	42.osn	
	43.orst	
	44.repe	
	45.tlo	

Appendix 11.   Sample of homograph test

Foglald teljes, értelmes mondatba a következő homográfokat angol vagy magyar nyelven! Használd a megfelelő írásjeleket! A megadott szót ne alakítsd át!

4   mind

………………………………………………………………………………

5   most

………………………………………………………………………………

6   must

………………………………………………………………………………

7   eleven

………………………………………………………………………………

8   van

………………………………………………………………………………

9   nap

………………………………………………………………………………

10   tan

………………………………………………………………………………

11   park

………………………………………………………………………………

12   vet

………………………………………………………………………………

13   ring

………………………………………………………………………………

14   rest

………………………………………………………………………………

15   test

………………………………………………………………………………

16   add

………………………………………………………………………………

17   hat

………………………………………………………………………………

18   kit

....

19   lap

....

20   hold

....

21   comb

....

22   mint

....

23   hint

....

24   old

....

25   fog

....

26   far

....

27   hall

....

28   lead

....

Appendix 12.   Test on first syllables

Fejezd be a szavakat angol vagy magyar nyelven! Csak egy teljes szót írj be a megfelelő oszlopba!

első szótag	magyar szó	angol szó
1. an		
2. ba		
3. bi		
4. cin		
5. cu		
6. dol		
7. don		
8. e		
9. fin		
10. g		
11. glo		
12. gra		
13. ho		
14. i		
15. il		
16. in		
17. ju		
18. ke		
19. ko		
20. le		
21. li		
22. lo		

23.ma		
24.man		
25.mon		
26.na		
27.ne		
28.nor		
29.o		
30.or		
31.os		
32.pra		
33.prac		
34.pri		
35.ran		
36.re		
37.ri		
38.sa		
39.si		
40.sta		
41.to		
42.tra		
43.tu		
44.u		
45.ug		
46.un		
47.vi		
48.vul		
49.ze		

Appendix 13. Sample of test on word completion

Töltsd ki a következő betűsorokat, hogy értelmes magyar vagy angol szavakat kapj! Csak azt a szót írd be a megfelelő oszlopba, ami először eszedbe jut! Csak egy nyelven alkoss szót, azon a nyelven válaszolj, amin először eszedbe jut egy szó a megadott betűkkel. Tulajdonneveket ne írj, a helyesírásra és az írásképre ügyelj!

Magyar szó	betűsor	Angol szó
	6. d_v_	
	7. f_st	
	8. h_g	
	9. eg_	
	10.k_t	
	11._nd_r	
	12.in_	
	13.sa_	
	14.fu_	
	15.ren_	
	16.te_t	
	17.h_n	
	18.v_n	
	19.b_n	
	20.rop_	
	21.p_nt	
	22.r_nt	
	23.t_mb	
	24.f_r	
	25.n_d	
	26.j_r	

	27.r_bb_n	
	28.l_p	
	29.k_nd	
	30.c_r	
	31.s_m	
	32.t_p	
	33.h_t	
	34.g_t	
	35.b_n	
	36.sl_g	
	37.p_p_	
	38.r_g	
	39.r_z_r	
	40.r_b	
	41.g_nd_r	
	42.p_rt	
	43.d_g	
	44.h_ll	
	45.b_t	
	46.p_p_l	
	47.l_ng	
	48.l_p_l	
	49.t_m_t_	
	50.h_ng_r	

Appendix 14.   Words in ERP test

	magyar	homograph	angol	pseudo H	pseudo E
1	kesztyű	comb	curtain	topor	custeem
2	alma	eleven	mouse	kepű	angloid
3	papír	most	parrot	vörág	strumer
4	torta	ember	wonder	barag	vendect
5	unalom	park	circle	kila	croom
6	csillag	van	table	liva	stent
7	kutya	hold	school	szég	dag
8	vasaló	toll	road	ről	hend
9	rámpa	is	tale	macar	brunda
10	köd	nap	fun	tól	ulite
11	lámpa	film	lamp	berel	manane
12	fül	ring	ear	höz	ugoid
13	szilva	platform	plum	vulag	cupile
14	strucc	add	ostrich	nak	shewl
15	gomba	album	mushroom	gyiri	chunge
16	utca	algebra	street	vettya	reimerse
17	bicikli	alibi	bicycle	pizó	crawn
18	rádió	pad	radio	kepélő	volire
19	festmény	antenna	painting	supola	uct
20	kazetta	arc	cassette	uldozo	tuve
21	notesz	arena	notebook	gyeve	zerege
22	alfa	bank	alpha	szöppencs	histe
23	tok	bent	case	lobiga	ilibe
24	kamera	echo	camera	korum	nomoid
25	banya	eke	witch	akala	fleness
26	fal	edit	wall	morigyo	koliment
27	öngyújtó	ego	lighter	ragyság	liftus
28	naptár	extra	diary	szőnyúl	carabond
29	vonat	far	train	igór	wakler
30	zsebkendő	farm	tissue	izzló	prenger
31	hangszóró	fax	speaker		
32	kép	filter	picture		
33	gyűrű	fix	ruler		
34	kabát	fog	coat		
35	gipsz	fuss	plaster		
36	zongora	gang	piano		
37	hegedű	hall	violin		
38	klarinét	lift	clarinet		

39	kórus	jog	choir		
40	jegyzet	lap	note		
41	irodalom	bead	literature		
42	vers	hang	verse		
43	nyomtató	hat	printer		
44	rejtvény	hull	puzzle		
45	spirál	lead	spiral		
46	ceruza	lever	pencil		
47	kendő	mind	shawl		
48	sál	must	scarf		
49	vágány	part	passway		
50	kocsi	rag	car		
51	analízis	tag	analysis		
52	ördög	tested	devil		
53	kabát	petty	coat		
54	ujj	coca	finger		
55	macska	jut	cat		
56	sarok	lop	corner		
57	cirkusz	had	circus		
58	vagon	hint	wagon		
59	vontató	instant	trailer		
60	kulcs	invalid	key		