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

PhD Thesis Booklet

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## **1. Introduction**

Grosjean (1997) defined natural bilinguals as they are exposed to and use both of their languages on a daily basis, while instructed bilinguals are believed to use English only in education, mostly in classroom settings. In the XXI. century it is not the case in Hungary. Many L2 learners use English for fun in their everyday life playing computer-games, using social media, watching movies, listening to music, etc.

The aim of this research is to investigate whether linguistic creativity at the word level is in harmony with the school achievements of undermotivated students coming from underprivileged circumstances studying in a vocational school where English is just one of the compulsory school subjects. This study focuses on a multifactorial analysis of Hungarian students' English written word recognition. I used linguistic, non-linguistic, standardized and own tests (anagram solution, homograph recognition, 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 data of 15-year-old secondary vocational school students.

### **1.1 The acquisition of written L2**

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 (Cook and Bassetti 2005). Further, a writing system can be discussed both in terms of its script and its orthography. In the procedure of recognition 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. 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. For a detailed review on this topic see (De Groot 2011).

## 1.2 Criteria of successful language acquisition and language learning

In the literature there are numerous approaches to successful language learning. The question of: *What factors affect the success of language learning?* is constant in school circumstances. Bátyi (2014a) examined the reason behind being unsuccessful in learning languages in Subcarpathia. 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 & Sárosi (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).

## 1.3 Bilingual written 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).

Dijkstra and van Heuven in 1998 created BIA (Bilingual Interactive Activation) model, a connectionist, computational, localist model, focusing on visual word recognition. BIA emphasizes the orthographic representation of words and it is a language non-selective model on four levels: letter features, letters, orthographic 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 (De Groot 2011).

## 1.4 Influencing factors of general language skills in word recognition

I strongly believe that language teachers should keep in mind that in our era students and circumstances of teaching are permanently changing. Based on it my research focuses on the following influencing factors, which affect written word recognition.

### 1.4.1 Socio-economic status

Socio economic status has various approaches in terms of word recognition and language skills. „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.”<sup>1</sup>

### 1.4.2 Language attitude

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. „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).”<sup>2</sup>

### 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.”<sup>3</sup>

### 1.4.4 Language aptitude

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<sup>1</sup><https://www.apa.org/pi/ses/resources/publications/education>

<sup>2</sup><https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-437>

<sup>3</sup> <http://europeyou.eu/es/what-is-information-and-communication-technology/>

Being a further significant factor of word recognition, 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.

#### 1.4.5 Motivation

Motivation is a frequently examined field in scientific research. „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.

#### 1.4.6 Creativity

In the last few years, much more information on creativity has become available. However, as the literature suggests I have to differentiate between creativity and linguistic creativity, which is crucial because of the aim of the study. „Creativity not only contributes to increasing students’ motivation but also promotes problem solving and higher order thinking skill” (Szerencsi, 2010: 286).

„ Findings suggest that there is no correlation between results of creativity and linguistic creativity although daily contact of a second language might have a positive effect on linguistic creativity” (Sántha-Malomsoki 2016: 137).

#### 1.4.7 Bidialectism

Social, economical and technological processes caused serious changes in using mother tongue in the last decades. In the globalistaion era the factor of regionalism is becoming de-emphasized. This will lead us to a change in mother tongue’s variables. The foreign languages, mainly 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 next standards, using these platforms. (Parapatics & Lengyel 2021)

## 1.5 Electroencephalography – a tool for testing word recognition

In the past 20 years the number of electroencephalography experiments has grown. With this method one gets 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.<sup>4</sup>(De Groot 2011)

## 1.6 Testing linguistic skills

In the XXI<sup>st</sup> 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.

### 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)

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<sup>4</sup>[http://faculty.washington.edu/losterho/erp\\_tutorial.htm](http://faculty.washington.edu/losterho/erp_tutorial.htm)

### 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.

### 1.6.3 First syllables

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.

### 1.6.4 Word completion

De Groot in 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.

### 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” (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. Besides this it is in connection with school performance so results are needed twice: to get a picture of average abilities and about language skills too.



## 1.7 Research goals and hypotheses

The aim of my work is to broaden the current knowledge of influencing factors and its correlations of foreign language learning. My research questions 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 linguistic and non-linguistic types of fluency as an influencing factor of foreign language learning?*

I formulated my hypotheses based on the above mentioned research questions:

**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 achievements are better in written L2 word recognition tests.*

## 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 vocational 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 socio-economic status. Concerning family background, 28 students come from single parent families. Most of them are unmotivated, have no plans for the future and come to school out of obligation. Exceptions are rare. They do not have examples at home for the need of language knowledge or high qualification.

## 2.2 Material

I applied a series of questionnaires and tests, some of which were linguistic and some were non-linguistic.

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	Do you listen to English music?
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, E. P.	fluency, flexibility, relative flexibility in thinking	Complete the following circles with drawings!

		Torrance 1966)		
	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....
	digital	language decision EEG test (N=28)	words and pseudowords in Hungarian and English	comb, <del>teper</del>
Self made	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	d_v_ .....

			Hungarian from blanked words	
<b>L2 school achievement</b>				2-3, 4-5

Table 1. Frame of the study

Source: Own elaboration

### 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 the participants. 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.

## 3. Results

*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. 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. 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. 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.

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

Yes, they correlate in my sample. Spearman test shows correlation between a linguistic factor: number of anagrams recognized in English and L2 school achievement. 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.

### **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 from the data, negative correlation was found between L2 school achievement and two subcategories of non-linguistic 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.

### **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.

### **Hypothesis No. 3.**

*Students with better L2 school achievements 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.

#### **4. Discussion**

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. Most of them have already been abroad, but it is not usual to go on holiday for them. 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.

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 plurality 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.

Most of the students' preference towards their mother tongue can explain their poor school L2 achievement and low motivation. 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. 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 by 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 friends 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.

As expected from their 3,03 end of year result in English as a foreign language their language aptitude is mostly average. The weakest result was one correct answer, while the best result was 14 correct answers on 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 were the same for the participants, the big difference may be ascribed to individual traits.

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 Tánzos 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 can be explained by the lack of their parents' support in practising English, which has a low result in the AMTB test. 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 it is exclusively the task of the school. (Bátyi 2014b) As Novák and Fónai (2020) say teachers and parents have important role in motivating students. Maybe this is the missing factor in case of my participants, in order to obtain better school results.

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.

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. The students proved to know only one third of the given dialectal words, which reflects a poor dialectal background.

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 & Sáy (2013), who presumed after analysing their data that their Hungarian participants, who had a high proficiency level in English did the same as those who have low proficiency because they wanted to emphasize that the given words existed not only in Hungarian but also in English. This tendency was seen 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 language decision. Naturally, L1 gets activated sooner, however, in case of interlexical homographs, Hungarian language was not always the dominant 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.



All in all 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. (ii) Linguistic tests of written word recognition are in positive correlation with creativity. (iii) A strong correlation can be observed between L2 school achievement and L2 word recognition.

## **5. Conclusion**

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.

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. 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. 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. 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.

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### **Further resources:**

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](http://ap.elte.hu/wp-content/uploads/2012/09/APA_2010_3-4.pdf)

**Related conference presentations:**

2019:

June: Summer School of Psycholinguistics Balatonalmádi

2018:

November: Day of Science Veszprém

October: IATEFL Budapest

June: Summer School of Psycholinguistics Balatonalmádi

2017:

October: IATEFL Budapest

September: Global Education Teaching and Learning Conference Dubrovnik

August: Multilingual Summer School Oslo

May: Summer School of Psycholinguistics Balatonalmádi

**Related publications/articles:**

2021:

Parapatics, A. & Lengyel, Z. A regionális nyelvi háttér és a második nyelv elsajátításával kapcsolatos motivációk vizsgálata. Egy kísérlet tanulságaiból. *Anyanyelv-pedagógia* XIV. 1.

2019:

Lengyel, Z. Szakgimnazisták idegennyelv tanulási motivációjának vizsgálata. *A nyelv-tanítás, tanulás, reprezentáció, feldolgozás. Pszicholingvisztikai tanulmányok VI.*

Lengyel, Z. Anagram based L2 activation. *Indonesian Research Journal in Education*

Lengyel, Z. Vizuális szófelismerés teszt angolul tanulók körében. *Tudományágak integrált szerepe. Tanulmánykötet*

**Related publications/book reviews:**

2019:

Marie Delaney Special Educational Needs in *Alkalmazott Nyelvtudomány*

Anna Mystkowska Wiertelak & Mirosław Pawlak Willingness to communicate in *Training and Practice*

2018:

Edmund Dudley & Erika Osváth Mixed ability teaching in *Alkalmazott Nyelvtudomány*

Tammy Gregersen & Peter D. MacIntyre Optimizing language learners nonverbal behavior in *Alkalmazott Nyelvtudomány*

2017:

Simone E. Pfenninger & Judit Navracsics Future research Directions for applied linguistics in *Anyanyelv-pedagógia*