Learning and Teaching A Foreign Language to Adults and Older Adults

Kovač, Nera

J. J. Strossmayer University of Osijek

Faculty of Humanities and Social Sciences

Study Programme: Double Major MA Study Programme in Hungarian Language and Literature – Communicology and English Language and Literature – Teaching English as a Foreign Language

Nera Kovač

Learning and teaching foreign language to adults and older adults

Master's thesis

Supervisors: Tanja Gradečak, Associate Professor

Ana Werkmann Horvat, Assistant Professor

Osijek, 2024

J. J. Strossmayer University of Osijek

Faculty of Humanities and Social Sciences

Department of English

Study Programme: Double Major MA Study Programme in Hungarian Language and Literature – Communicology and English Language and Literature – Teaching English as a Foreign Language

Nera Kovač

Learning and teaching foreign language to adults and older adults

Master's thesis

Scientific area: humanities

Scientific field: philology

Scientific branch: English studies

Supervisors: Tanja Gradečak, Associate Professor

Ana Werkmann Horvat, Assistant Professor

Osijek, 2024

Sveučilište J. J. Strossmayera u Osijeku

Filozofski fakultet

Diplomski studij mađarskog jezika i književnosti i engleskog jezika i književnosti

Nera Kovač

Učenje i poučavanje stranog jezika u odrasloj i starijoj životnoj dobi

Diplomski rad

Mentorica: izv. prof. dr. sc. Tanja Gradečak

Sumentorica: doc. dr. sc. Ana Werkmann Horvat

Osijek, 2024.

Sveučilište J. J. Strossmayera u Osijeku

Filozofski fakultet

Odsjek za engleski jezik i književnost

Diplomski studij mađarskog jezika i književnosti i engleskog jezika i književnosti

Nera Kovač

Učenje i poučavanje stranog jezika u odrasloj i starijoj životnoj dobi

Diplomski rad

Znanstveno područje: humanističke znanosti

Znanstveno polje: filologija

Znanstvena grana: anglistika

Mentorica: izv. prof. dr. sc. Tanja Gradečak

Sumentorica: doc. dr. sc. Ana Werkmann Horvat

Osijek, 2024.

Prilog: Izjava o akademskoj čestitosti i o suglasnosti za javno objavljivanje

Obveza je studenta da donju Izjavu vlastoručno potpiše i umetne kao treću stranicu završnoga, odnosno diplomskog rada.

IZJAVA

Izjavljujem s punom materijalnom i moralnom odgovornošću da sam ovaj rad samostalno napisao/napisala te da u njemu nema kopiranih ili prepisanih dijelova teksta tuđih radova, a da nisu označeni kao citati s navođenjem izvora odakle su preneseni.

Svojim vlastoručnim potpisom potvrđujem da sam suglasan/suglasna da Filozofski fakultet u Osijeku trajno pohrani i javno objavi ovaj moj rad u internetskoj bazi završnih i diplomskih radova knjižnice Filozofskog fakulteta u Osijeku, knjižnice Sveučilišta Josipa Jurja Strossmayera u Osijeku i Nacionalne i sveučilišne knjižnice u Zagrebu.

U Osijeku 28. lipnja 2024.

Nera Kovač, 0016129726

Ime i prezime studenta, JMBAG

Contents

Summary

This paper examines how adults and older adults learn languages, focusing on older adults. As this field of study is insufficiently researched, studies provide different results. The paper provides an overview of different findings, and an experiment was conducted for the purpose of writing this paper. The experiment investigates how adults aged 57 and above react to explicit approach to language teaching, as well as how they perceive language learning. The results demonstrate that learning, to some extent, occurred using both picture and direct translation in vocabulary teaching.

Key words: older adults, language learning, explicit and implicit approach, lexical decision task, vocabulary teaching

Sažetak

Ovaj rad proučava kako odrasli i stariji odrasli uče jezike, s naglaskom na starije. Kako je ovo područje istraživanja nedovoljno istraženo, istraživanja pokazuju drugačije rezultate. Rad pruža pregled različitih spoznaja i istraživanje je provedeno u svrhu izrade istog. Eksperiment istražuje kako odrasli u dobi od 57 godina i stariji reagiraju na eksplicitan pristup poučavanju jezika, kao i kako doživljavaju učenje jezika. Rezultati pokazuju da je došlo do učenja u nekoj mjeri koristeći i slike i direktan prijevod u poučavanju vokabulara.

Ključne riječi: stariji odrasli, učenje jezika, eksplicitni i implicitni pristup, zadatak leksičke odluke, poučavanje vokabulara

1. Introduction

The process of globalization brought the knowledge of the English language as one of its minimum requirements, and each additional language brings more benefits. This affects everyone, including adults and older adults, and according to the latest reports from the Croatian Bureau of Statistics[1], the most populated age group is 75 and over, followed by age groups ranging from 55 to 69. This age group, alongside with adults, is mostly neglected in language learning research. Back in 1991, Crandall claimed that most of the attention went towards teaching children and youngsters; this statement still reflects the current state, which can be seen through the works and books published, as well as the number of conducted research. Browsing through literature, when it comes to learning and teaching, it can be found that most of the work is concentrated on children and teenagers.

It is widely known that when people retire, they are in search of new hobbies, or they simply go back to their old hobbies they had to neglect during their professional lives and work overload. One of the activities they opt for is language learning, all of which is why there is a need for more research in this field. Learning does not stop with completing formal education, and all people regardless of age should have the same opportunity.

This paper provides an overview of some of the most important aspects of adult and older adult language learning, accompanied by a psycholinguistic experiment conducted on older adults with the purpose of understanding how they perceive languages and leading older adults' language teachers towards more effective teaching methods.

This paper contains a theoretical background where some of the key factors in language learning are provided, supported by theoretical claims and analyses of previous studies that are relevant to the experiment. After the theoretical background comes the detailed description of the experiment, after which the most important information for teaching is extracted and supplemented with general thoughts and observations, as well as the experience in teaching adults and older adults.

[1] https://podaci.dzs.hr/media/rh0njfqt/croinfig_2023.pdf

2. Theoretical background

2.1. Adults in education

As the process of globalization affected many aspects of life, it affected education and learning. Jarvis (2010: 37) noted that globalization requires people to adapt to the change, so in order to learn new skills one requires not only to acquire technology skills and information literacy but also learn a language. This author differentiates formal, non-formal, and informal learning [2]where in non-formal learning, the education of senior citizens has been established as a separate branch. According to Jarvis (2010: 54), the term 'adult education' carries a stereotypical meaning, it is seen as an activity that adults take up in their leisure time to develop their skills and knowledge. He categorizes learning in everyday life as a part of informal learning, claiming that when conversing with adults, asking what they have learnt, they cannot provide a concrete answer. This is explained as incidental, unplanned learning. As people get older, they do not ask as many questions as children do, which implies that they rely on their already existing knowledge (Jarvis, 2010: 64). Practice and practical knowledge are emphasized as the keys to adult education and lifelong learning, because knowing rules and theories does not mean that one is able to use them in practice. (Jarvis, 2010: 267).

Hilles and Sutton (2001) have extensively written on adult learners, their behaviour and needs in a classroom. While comparing adult and younger learners, they pointed out several differences, such as adult learners having their priorities sorted out in the sense that they would focus on their goals and work towards them (2001: 386). If the learning environment does not suit them, and their needs are not met, they might either seek a suitable setting, or simply abandon the whole process of learning (Hilles & Sutton, 2001: 388). Since they are not obliged by law to take part in educational settings, unlike children, they do not tolerate learning environments that do not improve their education. They mentioned as one of the benefits of having adult learners in a classroom the fact that they bring plenty of life experience and cognitive maturity (2001: 386), which aids the group's language learning process, but warned

[2] As defined by Tudor (2013), formal learning is institutionalized, provided by state and is compulsory education, non-formal learning is not compulsory, but it is intentional, the state is not involved (e.g. music schools, dance, language learning), whereas informal learning is mostly unintentional, incidental, through media, socialization, and similar; as Tudor states, it is probably the most common among adults.

about teachers not accommodating to the adult learners' needs, stating that adults do not enrol in adult schools only for its educational aspect, but also for its social aspect, as it is one of the places where adults get together, form new connections, friendships, sometimes even relationships. The teachers take this social aspect into consideration, but wrongly, they focus more on keeping the classroom atmosphere at an entertaining level to retain the number of students, which neglects their educational needs (ibid.).

Jarvis (2010: 56-59) also highlights the social component of learning languages, noting that adults learn by directly participating in the process of learning, according to which they are the most successful while being involved. He advocates adult education and lifelong learning as something that is not only based on educational knowledge, but rather made from various components that cannot be defined as just one, it is a complex structure including knowledge from various fields.

Describing the principles of andragogy, Andrilović (1976: 9-10) highlights maturity as an important factor in the process of learning, warning that maturity in adulthood is different for everyone, e.g., there is a difference in maturity comparing one 25-year-old individual, and the 60-year-old one. Furthermore, he claims that the role of basic abilities is more important in institutionalized adult education, than in that of children and youngsters. He mentions three different groups of traits, one of them being intellectual cognitive traits, which include factors in learning, such as the general ability to learn, the speed of learning, the quality of learning skills, intelligence, mental fitness, experience, richness of a language, belief, and memory (Andrilović, 1976: 13-19). He claims that the ability to learn should not be confused with the speed of task solving, and as the complexity of tasks rises, adults perform better than their younger counterparts. The speed of learning declines with age, as well as the speed of learning verbal and physical skills (Andrilović, 1976: 15), and although adults learn at a slower pace than their younger counterparts, it does not mean that they are cognitively not able to. The quality of learning increases with age, and an adult is less likely to make mistakes due to their meticulous approach. Intelligence decreases with age, while experience and motivation can compensate for its decrease (Andrilović 1976: 15-16). That age does not necessarily determine the success of language learning is shown in a longitudinal study by Kozar and Yates (2019), where they studied the progress of 24 adults learning English, who came to Australia at the age of 40 and

above. What was concluded is that the progress was most visible for those who had the highest exposure to the language, regardless of their age (Kozar & Yates, 2019).

Language learning, and learning in general, along with being physically active, also have a positive effect on individuals' psychological state and wellbeing. (Narushima et al., 2013; Narushima et al., 2018; Jenkins & Mostafa, 2015)

2.1.1. Third Age University and Public Open Universities

In Croatia, adults and older adults who want to start or continue their education and develop new skills can join various courses and join various clubs for the retired or they can attend the Public Open University (Cro. Pučko Otvoreno Učilište, further: POU). It is important to note that POU is not intended only for adults, there are also various programmes for children. POU follows and supports, nowadays extremely popular and widespread, lifelong learning. The POU's official website provides essential information on what they offer in education, from formal education for adults, aiming at both employed and unemployed persons who want to learn either for personal growth, new skills or new job opportunities. They also offer non-formal education courses for foreign language learning, ICT, art and crafts. Currently, there are programmes for learning four languages: Croatian for foreigners, English, German, and Italian. Each programme offers courses from A1 to C2, and there is a possibility for online learning; for those who do not want to learn in a group, there is an option for individual classes.[3] POU is not the only institution where adults and older adults can learn a language, if they want to learn a language outside of this institution, they can simply do so by enrolling in a language course, where oftentimes they are placed in a group with young learners.

POU also highlights their non-formal education intended for senior citizens, where they offer various courses such as how to use a computer or a smartphone, history lessons, art, health, foreign languages, and others. This special education of senior citizens is realized through the Third Age University. Recently, the number of adults and older adults who opt for taking part in

[3] https://www.pou.hr/

lifelong learning at POU has been growing, with special interest shown in information technology and language learning.

2.2. The effects of ageing

When it comes to sensory and physical skills, Andrilović (1976: 14) warns that dexterity declines with age. Dexterity and mobility in general are not the only abilities that are affected by ageing; hearing loss and vision are also greatly impacted by ageing. How vision impairment is often overlooked in education proves Northway's and Dutton's extensive research on visual difficulties' effect on reading abilities, recruiting 108 learners, out of which 107 were diagnosed with visual difficulties, and one of the criteria for taking part in this research was learners making slow progress and struggling with literacy, while having no brain injury or no known learning difficulties (2010). These visual problems were not only related to the necessity of wearing glasses; they manifested in seven different areas, indicating that it may not be easy to recognize a learner with some visual problems. These learners had difficulties following the text, expressed feeling stressed, and reported headaches and fatigue. Their results show that visual difficulties are often accompanied by other difficulties such as auditory and motor difficulties (ibid.). Another comment on the physical effects of ageing in education is made by Merriam and Caffarella (as cited in Falasca, 2011), who, besides the loss of vision and hearing, highlight acute and chronic illnesses, fatigue and pain, which are often overlooked.

The area that is affected by ageing, but is of crucial importance to language learning, is cognition. Grady (2008) claims that older adults' brain shows different activation, such as less activity in regions that are responsible for memory and retrieval, where the insufficient activation results in overactivation of other regions, meaning that as adults age and some of their cognitive abilities decline, they compensate for it. This compensation is discussed and researched by Wingfield and Grossman (2006), who claim that age differences in language appear when older adults encounter fast speech and when they come across complex grammatical structures. Although there are difficulties and a decline in memory, especially in crucial working memory, which is the main memory mentioned in studies on adult language learning, the human brain is constructed from rich neural networks that are able to rewire and reorganize. (Wingman & Grossman, 2006) These are all factors that affect language learning in adulthood, crucial for understanding how to approach adult and older adult learning and teaching.

2.3. Individual differences

One of the factors that influences language learning are individual differences. Buss and Poley (1976: ix) offer an extensive elaboration of individual differences, listing key factors such as mental abilities, temperament and personality, motivation, culture and the environment and social class. Reporting on motivation, Buss and Poley (1976: 104) claim that studying motivation requires looking into the values, needs, interests, and attitudes of people. For language learning, Dörnyei offers five most important individual differences, which are personality, aptitude, motivation, learning styles and learning strategies (2006). Aptitude signifies special talent, or ability for language learning, where an individual is able to learn a language faster and more efficiently (Dörnyei, 2006: 45-46).

Learning styles can be, according to Oxford (2003: 273), separated into sensory style dimensions which are visual, auditory and kinaesthetic, social style dimensions such as extroverted and introverted, and also cognitive style dimensions such as concrete-sequential, abstract-intuitive, closure-oriented and open, as well as detail-focused and holistic. She also categorizes learning strategies as cognitive (analysing, reasoning, transferring information, taking notes and summarizing), metacognitive (organizing, evaluating and planning learning), social and affective, compensation strategies (guessing, inferencing), and memory strategies (grouping, structured reviewing) (Oxford, 1992: 177).

When it comes to motivation as one of the individual differences, intrinsic and extrinsic motivation can be differentiated. Intrinsic motivation comes from within, when individuals have a need or a strong desire to do something for themselves, what fulfils them. On the other hand, extrinsic motivation comes from an outer source, to do something out of necessity, and not because one has a wish to finish a task at hand. People are motivated to finish a task simply because they will gain something for it, or they will be punished if they do not complete the task (Reeve, 2010: 136-137).

Life situation and enrolment in further education can explain the motives for language learning (Bulatović et al., 1985: 163). The learners are motivated to learn a language to be able to advance, as well as to be able to potentially work abroad. Bulatović et al. (1985: 161) report on the results of empirical research, where they tested 20 participants who enrolled in language learning school. They (Bulatović et al., 1985: 164) report on the motivation of adult learners,

claiming that the learners opted for language acquisition as an integral part of elementary education (80.90 %) and learning about other nations and their culture (42.73 %). Moreover, they were even more motivated to learn a language in order to be able to follow foreign TV programmes and radio stations (14.55 %), read newspapers and magazines, as well as read foreign literature (5.45 %). Another motivation comes from a desire to talk to strangers, native speakers of a foreign language when travelling abroad (12.82 %). Some listed that their motivation behind language learning lies behind moving abroad for work (17.07 %) and continuation of their education (15.45 %). The participants were also asked to state their opinions on using audiovisual means in language learning classroom, where 72.72 % of participants stated that it is useful in language classroom, whereas 8.18 % said they are against it, and 19.10 % did not express their opinion. (Bulatović et al., 1985: 165)

Children are more likely to be extrinsically motivated to learn because of the educational system, where they are evaluated or get a sticker, praise or some benefits for successfully finishing a task (Reeve, 2010: 136). Adults are usually intrinsically motivated when it comes to language learning or learning in general; intrinsic motivation comes from psychological needs, personal interests and a natural desire for growth and development. This leads to individuals being motivated to learn something because they feel satisfied, and competent enough when finishing a task (Reeve, 2010: 137). Reeve (2010: 171-172, 192-194) also sees motivation as closely related to social needs such as achievement (for one's own satisfaction, to show competence), affiliation (wanting to get other people's approval), closeness (creating and maintaining relationships with others), and power (the effect on other people). In language learning, a prevalent social needs factor would be achievement, or, in other words, a wish to accomplish something. Summarizing this factor, Reeve discusses emotional reactions; when people express a high need for achievement, they react with emotions such as hope, pride and anticipation of satisfaction. In comparison, people who do not express high need for achievement usually react with negative emotions, such as anxiety, defence and fear of failure (Reeve, 2010: 173-199). Although this is a generalized statement, Reeve warns that these reactions are not fixed, in each situation they can have a different effect on people.

Investigating risk-taking attitudes across the adult lifespan, Rolison et al. (2013) looked into five different domains: the ethical domain, the financial domain, the health domain, the

recreational domain and the social domain. Each domain demonstrated a decline in risk attitude as the age was higher (Rolison et al. 2013: 876). Another research on risk-taking tendencies in general, financial, driving, recreational, occupational, and health domains demonstrated a significant difference in age and attitude towards taking risks, with insignificant gender differences (Liu et al., 2023). Deakin et al. (2004) conducted research on different age groups' risk-taking tendencies, and the results showed that older adults put more thought into making decisions, took more time and took fewer risks, and those risks they did take had the fewest consequences.

Reporting on individual differences, Dörnyei (2006: 53-54) touches upon the 'ideal' and the 'ought' to self, which Higgins (1987: 321-322) classifies as the actual self, the ideal self and the ought to self. The actual self is who people believe they are, the ideal self is who people wish and strive to become, and ought to self is who people think they should be, or what others expect from them. Higgins (1987: 322) offers different variations of each combination, where each discrepancy results in negative feelings; feeling sad and disappointed when failing to meet the expectations individuals set for themselves, also threatened and vulnerable when failing to meet the expectations they believe others expect of them (Higgins, 1987: 322-323). One of the discrepancies is the actual/own versus the ideal/other discrepancy, where individuals believe that they cannot reach the standard the others believe they should reach or that they failed in reaching the same. This results in feelings of shame, embarrassment and dejection, lowering self-esteem and discouraging the individual (ibid.). It should be noted that, although mature, adults and older adults still experience fear and anxiety of learning a language, which could also stem from different polarities and personalities under individual differences, such as extroverts and introverts.

Anxiety is one of the individual differences that affect language learning (Skehan, 1991: 292). Cohen and Norst (1989), conducting a small-scale study on adult's attitudes towards language learning, found that even those learners who claimed to be extroverts found public performance terrifying. These learners expressed feeling their self-esteem lowered when outperformed, they noted fear of failure and fear of making mistakes. Another work on fear factor comes from Trosset (1986: 184-185) who reports on her own experience, as well as the experience of others on learning Welsh, where the learners expressed fear of failure and shame.

Setting a goal is proportional to performance, the harder it is to achieve a goal, the better the performance (Reeve, 2010: 211); yet this can be compromised when it comes to setting goals too high. When a goal is hard to achieve, people can find themselves feeling overwhelmed, stressed, and under pressure. This leaves open space for failure, which affects one's emotional state. When this is affected, individuals can lose their creativity and intrinsic motivation (Reeve, 2010: 216). The neuroscientific research on extrinsic and intrinsic motivation conducted by Luria et al. (2020) demonstrates different brain region activation for each, with extrinsic motivation leaving a more fragmented pattern, less effective learning and difficulties recalling, whereas intrinsic motivation shows more structured memorization and recall.

Schiller and Dorner (2021) conducted a small-scale study on motivation behind English language learning. This study included 30 Hungarian citizens who are in the process of English language learning, aged 55-74. What was found is that older learners, compared to young adults, are not motivated to learn a language to get familiar with its culture, or get integrated, but because of the positive attitude towards the English language (Schiller & Dorner, 2021). In their study, they integrated essay writing on motivation, where the learners reported that their motivation rests upon the desire to be able to converse when travelling abroad. Since in this age group there are still people in work relationships, they also mentioned work purposes as their motive. According to Dörnyei (2006: 51), motivation fluctuates throughout the process of learning, it is not a static element. This should be taken into consideration in adult language teaching and learning.

2.4. Explicit and implicit approach to language learning

Studying neuroanatomical processes in adults' lexical and grammatical learning, Tagarelli et al. (2019) conducted an experiment where they aimed to discover which areas in the brain activate for lexical and grammatical learning, as well as whether procedural or declarative memory is used for learning the same. Declarative, explicit memory allows people to compare what they already know and to analyse the events and relationships among items, it is a term that refers to the memory that is used in everyday life for remembering and recollection of memories. Non-declarative, procedural, implicit memory includes emotional response, and unlike declarative memory, it is more unconscious. (Squire, 2004) Understanding which brain region is activated,

more precisely which memory is used in learning each language skill, could aid research in language learning. Accordingly, the neuroanatomical experiment demonstrated different areas and memories involved in learning different language components; in lexical learning, the implicit memory was activated, while in grammatical learning, explicit memory was used (Tagarelli et al., 2019). In several brain regions, overlaps in activation occurred (Tagarelli et al., 2019), indicating that there is a basis for a dominant approach, intertwined with an adjusted either implicit or explicit approach.

Ward and Shanks (2018), combining multiple research, conclude that explicit memory declines with ageing, while for implicit memory it is still uncertain. They argue that implicit memory is believed to be unaffected by the process of ageing, or at least much less affected compared to the explicit. Smalle et al. (2022) claim that due to high cognitive control, adults have limited access to implicit memory, unlike children and teenagers, making it difficult to learn in the same way. Based on the results of their study, they claim that: "depletion of the mature cognitive system can enhance implicit, statistical learning mechanisms that are used in early language acquisition" (Smalle et al., 2022: 6). This corroborates Ward and Shanks' (2018) claim that implicit memory could remain preserved in the process of ageing.

Another researcher, who dedicates a lot of her work to studying how adults learn is an associate professor of Spanish and Linguistics at Franklin and Marshall College, Jessica G. Cox. In 2015, she published a paper where she reflected on older adults and second language acquisition (SLA). She concluded that older adults perform better in the same task including the implicit condition, than in the explicit one; stating that procedural learning is relatively maintained in older adults, compared to the declarative one which declines with age (Cox, 2015). Procedural learning is unconscious learning which is acquired through task repetition, motor skills and habits, it is implicit (Koziol & Budding, 2012).

Despite claiming that older adults perform better in implicit conditions, Cox continued her work on older adults investigating the role of explicit instruction in language teaching. In 2015, collaborating with Sanz, she tested 21 late English/Spanish bilinguals, comparing young adults aged 19-27 and older adults aged 60+. Focusing on the effect of explicit instruction in Latin grammar, they conducted a pre-test, an immediate post-test and a delayed test. On the pre-test, young adults scored significantly better than the older adults, which was surprising to the

researchers given that both groups are late bilinguals and both groups were exposed to explicit information, isolated from the practice. Another finding is that the immediate post-test in Latin grammar showed younger adults scoring significantly better, claiming that this is due to the limited cognitive capacity of older adults. However, after two weeks older adults showed significant improvement, whereas young adults scored worse. (Cox & Sanz, 2015) Cox and Sanz (2015) discovered that with practice, this gap in the success of young and older adults can be closed.

In another study from 2017, Cox argues that it is not certain if the same type of instruction has the same effect on older adults, as it has on young adults. For this study, Cox recruited 43 participants aged 60+ who were monolingual and bilingual. The experiment explored the effect of explicit instruction in Latin grammar learning. The results showed little to no effect of explicit instruction on older adults, whereas bilinguals had an advantage, and had an overall better score regardless of the type of instruction.

Midford and Kirsner (2005) designed a study comparing the accuracy of young adults and older adults using the explicit and implicit approach. The result showed that both groups used implicit knowledge when solving complex tasks with no rules provided or when the rules were too complex. In the complex knowledge domain, the implicit approach was proven to be more functional, whereas in simple tasks solving or with simple rules, the explicit approach was used.

Pavičić-Takač writes extensively on vocabulary teaching and learning. When it comes to the explicit and implicit approach to vocabulary learning, she highlights explicit approach as the beneficial one, since there is no time to integrate implicit approach in the classroom. She also marks explicit approach as the fruitful approach to learning and teaching vocabulary (cf. Pavičić-Takač, 2008: 149; 2019: 120-122)

DeCarrico describes explicit vocabulary learning as students' engaging in activities that are strictly focused on vocabulary (2001: 286). According to her, this promotes independent learning, encountering words several times, combining new words and old ones, enables deep processing of the words, and eases imaging. DeCarrico (2001: 288) warns that, in explicit learning, new words should not be learnt in isolation, independently, by mere memorization, but in various contexts, using different exercises and activities. For implicit learning, DeCarrico

(2001: 289-290) states that it is focused on learning for specific purposes, such as using language to understand context. Furthermore, this can be achieved through extensive reading and independent study strategies, students should recognize clues and guess meaning from context. She suggests combining explicit and implicit learning for the maximum benefit of learning. This requires first encountering new words in different contexts with explicit learning, then practicing with implicit, incidental learning (ibid.).

Sonbul and Schmitt (2009) conducted research comparing implicit and explicit vocabulary teaching in reading. The results showed that implicit vocabulary learning was beneficial, but explicit vocabulary learning had better results, it was more beneficial, especially combined with reading. They claim that the results showed explicit instruction as an investment of time and a possibility to build large language repertoire (Sonbul & Schmitt, 2009: 257). Hennebry et al. (2013), investigating direct information provided after listening, also found that brief, direct and explicit information about new lexical items could be beneficial to learners.

2.5. Benefits of language learning

After comparing and summarizing various research studies on structural changes in the brain during learning, Li et al. (2014) concluded that even short language learning experiences are proven to greatly change grey matter density and white matter integrity in children, young adults and older adults. This benefits older adults, since grey matter's volume decreases after passing the age of 40, whereas the decrease in white matter can be found later (Giorgio et al., 2010). According to Gold (2015), bilingualism can delay the onset of Alzheimer's disease by protecting the memory circuit and improving other neural systems. Gold (2015: 11) states that the executive control functions of bilingual individuals are more preserved and deteriorate more slowly than the executive control functions of monolingual persons and that they have shown that they are more successful in performing tasks unrelated to the language domain.

Bialystok et al. (2007) examined 91 monolingual and 93 bilingual people and obtained results of different average ages of onset of Alzheimer's disease. In the mentioned research, the average age of onset of Alzheimer's disease in monolingual people is (rounded) 71 years; for monolingual men, the average age of onset of Alzheimer's disease is 71, and in monolingual

women 72. Unlike monolingual people, according to the same research, the average age of onset of Alzheimer's disease in bilingual people is (rounded) 76 years, with the average age of men 76 years and the average age of women 75 years. With this, Bialystok et al. (2007) conclude that the onset of dementia symptoms is delayed by 4.1 years in bilingual people, but they state that the same research and results cannot be applied to people who possess knowledge of a second language, but not enough to be fully bilingual.

To investigate the delay in the onset of Alzheimer's disease in multilingual individuals, Chertkow et al. (2010) conducted a study on 379 monolingual individuals and 253 multilingual individuals. The research was carried out on people who had been in education for approximately the same time; the average education of multilingual people is insignificantly lower than the average education of monolingual people, but the average age of diagnosis of Alzheimer's disease in monolingual people is one year less than in bilingual people (Chertkow et al., 2010). In this study, data on the age of diagnosis depending on the number of languages a person speaks is also provided, so for one language the average age is 77 years, for two languages 77, for three languages 79 and for four or more than four languages 81 years (Chertkow et al., 2010), which refutes the claims of Bialystok et al. (2007). Although the results of Chertkow et al. (2010) are different from those of Bialystok et al. (2007), which can primarily be attributed to the disproportionate number of research participants, more precisely to the significantly smaller sample of people who use more than one language in contrast to monolingual people, both studies prove that multilingualism has a role in delaying dementia and the onset of Alzheimer's disease.

Bilingualism has a neuroprotective effect, it protects brain regions from the effects of ageing. It has been found that, in the process of ageing, grey matter volume significantly decreased in monolinguals, compared to bilinguals (Abutalebi et al., 2014). Luk et al. (2011) found great preservation of white matter in bilingual older adults, concluding that it could compensate for the decrease of grey matter. Further investigating how language learning affects the brain, Klein et al. (2014) studied cortical thickness in monolinguals, simultaneous bilinguals and later, successive and sequential bilinguals. The age of participants ranged from 18 to 48, and what was shown is that monolinguals and simultaneous bilinguals did not show any brain changes, whereas those who acquired a second language later in life showed a thicker left

hemisphere, meaning that learning language later in life changes the brain structure (Klein et al., 2014). Additionally, Hofstetter et al. (2016) report on their research on brain changes during a short vocabulary learning process, where even a small portion of vocabulary learning demonstrated changes in the cortex.

3. Recent studies

As an introduction to the experiment, two recent studies from 2023, dealing with explicit and implicit approach to language learning, have been explored. One study focused on a different approach to teaching grammar, and the other one incorporates word recognition tasks.

Mara Van der Ploeg designed an experiment with her associates, criticising the lack of studies that specifically deal with explicit and implicit instruction in late life language learning. This deficiency provides mixed results; thus, their experiment had no hypotheses, they constructed this experiment solely by combining facts from the psychology of learning, memory, and applied linguistics. They separated 16 participants into two groups, one group was exposed to an explicit approach to teaching, and the other was exposed to an implicit one. They noted that the implicit approach was not always entirely implicit, and the same goes for the explicit one. The participants who were in the implicit group were provided with several example sentences, while the explicit group was provided with a direct explanation. In short, they define the implicit condition as meaning-focused, while the explicit is form-focused. The experiment was supposed to include 30 participants in total, but 14 participants had to give up due to various reasons; one participant gave up strictly because of the group he was assigned to used an implicit teaching method. At the end of the study, it was concluded that the participants had had better results being exposed to explicit teaching (Van der Ploeg et al., 2023). The participants expressed their wish for communicative classes, thus they were mostly spent speaking. (ibid.).

The second study dealing with explicit and implicit approaches is Chiara Deneckere's, conducted from a psychological perspective. For this experiment, she recruited 30 young adults, and 30 older adults aged 60-85. Deneckere’s experiment tested multiple areas, primarily focusing on the working memory and word recognition task. Her hypotheses claimed that younger adults will outperform older adults in working memory, and that older adults would outperform younger adults in the word recognition task with an implicit approach. She corroborated her hypotheses, justifying older adults scoring better in word recognition task as a proof that the understanding of implicit instruction and implicit learning capabilities are not affected by ageing (Deneckere, 2023).

The results from these two recent experiments could indicate that older adults' vocabulary learning is more successful using an implicit approach, and their grammar learning is more successful using an explicit approach.

4. The experiment

This experiment tested how older people, native speakers of Croatian, react to explicit instructions in English vocabulary learning. It included a quantitative and qualitative analysis, attempting to get a better overview of older adult language learning.

4.1. Aims, research questions and hypotheses

The experiment aimed to raise awareness about the under-researched field of older adult learning, and to test methods that would make language learning easier for older adults. The experiment included three research questions:

RQ1: What is the relationship between explicit vocabulary teaching methods and older adults' reaction time in the lexical decision task?

RQ2: What is the relationship between explicit vocabulary teaching methods and older adults' accuracy in the lexical decision task?

RQ3: How do older adults experience language learning?

Given that this field does not include many works that could serve as a basis for creating concrete expectations of this study, two general hypotheses were made:

H1: There will be differences in the degree of learning English words based on explicit instructions between two groups: the group exposed to illustrated equivalents and the group exposed to corresponding translation.

H2: The accuracy and reaction times across the two groups will differ depending on the training phase they were exposed to.

4.2. Stimuli

The experiment included two tasks created using a free psycholinguistic software named PsytoolKit (Stoet, 2010, 2017). In each task, a different experimental treatment was integrated: one created for learning words using their illustrated equivalents, and the other for learning

words with their corresponding translation. The method used in testing was a lexical decision task, where the participants had to decide whether the word shown on the screen exists in the English language, or not. The stimuli included 96 words in total; 48 real words: 24 words for learning, further referred to as 'known' words, and 24 that the participants did not see beforehand, further referred to as 'unknown' words. Both 'known', and 'unknown' words were selected based on their complexity, filtered using the N-Watch software (Davis, 2005) based on which their CELEX frequency had to be below 70 (Table 1), since the experiment aimed to include those words that do not appear too frequently. The other 48 words were non-existent words, pseudowords, that look like words in the English language, but they are not. These words were created using The ARC Non-word Database[4] (Rastle et al., 2002), which will further be referred to as 'non-words'. Some of the pseudowords used were *chagues*, *thrays*, *stoun*, *clorbs*, *crand*, *toafed*, *stilch*, *plood*, etc.

Table 1: CELEX frequency examples

stimuli	**CELEX freq**
fairy	10.95
coal	42.51
forest	68.10
knight	11.28
ladder	13.58

4.3. Participants

For the purpose of this study, 50 participants in total were recruited. The participants had to be native speakers of Croatian language and older than 57. Previous English language knowledge was not obligatory, but in the case of the existent knowledge, it had to be lower than the B1 level. They were either personally contacted or through other participants, the data was gathered in four different cities: two in Slavonia and two in Central Croatia. The experiment was reviewed and approved by the Ethical Committee at the Faculty of Humanities and Social Sciences in Osijek (URBROJ: 2158-83-06-24-2).

[4] http://www.cogsci.mq.edu.au/research/resources/nwdb/nwdb.html

4.4. Procedure

Both the translation and the illustration tasks had four phases: the first phase was the learning phase, the second phase was repetition, the third phase was practice, and the final, fourth phase, was the test. Before each phase, the participants could read the instructions shown on the screen. The learning phase consisted of 'known' words that the participants were supposed to get familiar with and remember as much as they could. The repetition phase incorporated the same principle, but the same words were shown in a different order. The font used is Arial size 40.

translation group	picture group
	

Figure 1: Learning and repetition phase stimuli example

Figure 1 demonstrates how the words were presented to the participants, as the left column with the direct, translated equivalent illustrates what the translation groups' stimuli looked like, whereas the right column with the illustrated object shows what the picture groups' stimuli looked like.

The practice consisted of 22 new words, some of which were real English words, and the other ones were pseudowords. Table 2 offers an abbreviated list of example words from the practice phase.

Table 2: Practice phase words example

real words	pseudowords
luck	jolse
time	poont
person	puice
way	glauz
child	gewc

day	drulv
thing	vurlt
life	kwea
woman	fef
world	spole

The test phase consisted of the 96 words already mentioned, 24 ‘known’ words, 48 ‘non-words’, and 24 ‘unknown’ words. The examples of words within each condition are shown in Table 3.

Table 3: Test words examples

Word	**Condition**
clover	known
brain	known
ladder	known
switch	known
charger	known
forest	known
glove	known
fairy	known
nettle	unknown
dwarf	unknown
hawk	unknown
wraith	unknown
mold	unknown
dread	unknown
weed	unknown
fawn	unknown
chagues	non-word
dwops	non-word
thrays	non-word

gnoils	non-word
gwawks	non-word
smames	non-word
gragued	non-word
cugs	non-word

The ‘known’ word list was made by selecting the words of approximately equal length and neutral complexity, then filtering them by checking their CELEX frequency. The ‘unknown’ word list was also made through length selection, but without filtering with their CELEX frequency. After the ‘known’, ‘unknown’ and ‘non-word’ word lists were made, two experimental treatments were designed for two different study groups. Upon completing the experimental treatment construction, the participants were contacted and personally tested. The participants were tested individually using the laptop, and the experiment lasted for about 10 minutes, with the questionnaire and the interview taking up to 25 minutes, depending on the participant. Before they were tested, the participants got all the information about the experiment and its purpose. The learning and repetition phases have included words shown on the screen for 5000 milliseconds, one by one, either with their illustration or translation, depending on the group. The delay between words was 300 ms and after each word, there was a cross shown in the middle of the screen to get the participants' attention on where to look during the testing. The purpose of these phases was for the participants to get familiar with the words and try to remember as much as they could. The practice phase served as a warm-up before the real test, where the participants had to press either the left or the right arrow, the left arrow if they thought the word does not exist in the English language, and the right arrow if they thought the word exists in the English language. They were told to press quickly, since the task was time sensitive; each word was shown on the screen for 3000 ms, after which it disappeared, and the next word was shown. If the participant failed to press the key on time, the word was marked as incorrect, and the reaction time recorded 3000 ms. During the testing, which came after the practice phase and the participants were once again asked to press either the right or the left key, observations of participants’ reactions were noted.

The participants filled in the questionnaire subsequently, after which a spontaneous interview took place. The participants were willing to share their language learning experience, reflecting on the courses they had taken, their language classes in school or any form of formal education, or talking about what suits them the most, commenting on what language courses should include. Upon testing the last participant, the data was grouped and analysed.

4.5. Quantitative analysis and results

The data was analysed using linear mixed-effects model analyses using the lme4 (Bates et al., 2015) package in R (R Development Core Team, 2011). Fixed effects in the analysis were condition ('known', 'unknown', 'non-words') and group ('translation', 'picture'), and random effects were participant and item. Comparisons between conditions were run using the lsmeans R package. For the analysis of the accuracy results, the generalized linear effects model with a binomial distribution was used. Prior to the analysis, 6 participants had to be excluded due to high inaccuracy (50% and lower), leaving 44 participants in total, practice trials were removed, all incorrect and missed answers were removed, and all non-words. Low threshold was tolerated since the majority of participants had no prior knowledge of the English language, and the purpose of the study is not to have participants with overall high accuracy, but to see if these methods are suitable for learners. Items *purse* and *hammer* were also excluded due to technical difficulties. To calculate degrees-of-freedom in results for contrasts, the Kenward-Roger (1997) method was used.

4.5.1. Questionnaire results

Since 6 participants were excluded from the analysis of the test results, their questionnaires were removed. Out of 44 participants, 23 participants were left in the 'translation' group, and 21 in the 'picture' group. The minimum age of participants was 57, and the maximum age was 83. The mean age of all participants was 64.89 (SD 7.28); the mean age in the 'translation' group was 66.09 (SD 7.64, median 65, mode 65), and in the 'picture' group 63.57 (SD 6.80, median 61, mode 58). As required, all the participants were native speakers of the Croatian language,

including 3 bilingual participants: 2 speakers of Slovenian and one of Hungarian. 28 participants had learnt the English language, out of which 15 were from the 'picture' group, and 13 from the 'translation' group. Other foreign languages learnt were German, Russian, French, Italian, Hungarian, Latin and Esperanto. From the 'picture' group, 17 participants learnt some other language, whereas the 'translation' group had 14 learners of other language. There were 11 learners from the 'picture' group who learnt both English and one additional language, while in the 'translation' group there were 5 participants. Only one participant had no second language.

4.5.2. Experiment results

4.5.2.1. Accuracy results

As shown in Table 4, there was a significant main effect of condition ($p < 0.001$), and no significant effect of group ($p = 0.856$). There was no significant interaction between the condition and the group ($p = 0.101$).

Table 4: LME for accuracy

	Estimate	**Std. Error**	**z value**	**Pr(>|z|)**
(Intercept)	252.388	0.38062	6.631	<0.001 ***
Condition unknown	-171.708	0.37114	-4.626	<0.001 ***
Group translation	0.07631	0.41969	0.182	0.856
Condition unknown: Group translation	0.45725	0.27901	1.639	0.101

As shown in Table 5, comparison test showed a significant effect for the 'known' condition in both the picture group ($p < 0.001$) and translation group ($p < 0.001$), compared to the 'unknown' condition. There was no significant effect of group in the 'known' condition ($p = 0.856$) and no significant effect of group in the 'unknown' condition ($p = 0.168$).

Table 5: Paired comparison accuracy results – condition and group

contrast	**group**	**estimate**	**SE**	**df**	**z ratio**	**p value**
known-	picture	1.72	0.371	inf	4.626	<0.001

unknown						
known-unknown	translation	1.26	0.366	inf	3.447	<0.001
contrast	**condition**	**estimate**	**SE**	**df**	**z ratio**	**p value**
picture-translation	known	-0.0763	0.420	inf	-0.182	0.8557
picture-translation	unknown	-0.5336	0.387	inf	-1.379	0.1680

The results shown in Table 4 and Table 5 indicate that there was no statistically significant difference in accuracy between groups, but there was a significant difference in accuracy between conditions in both groups.

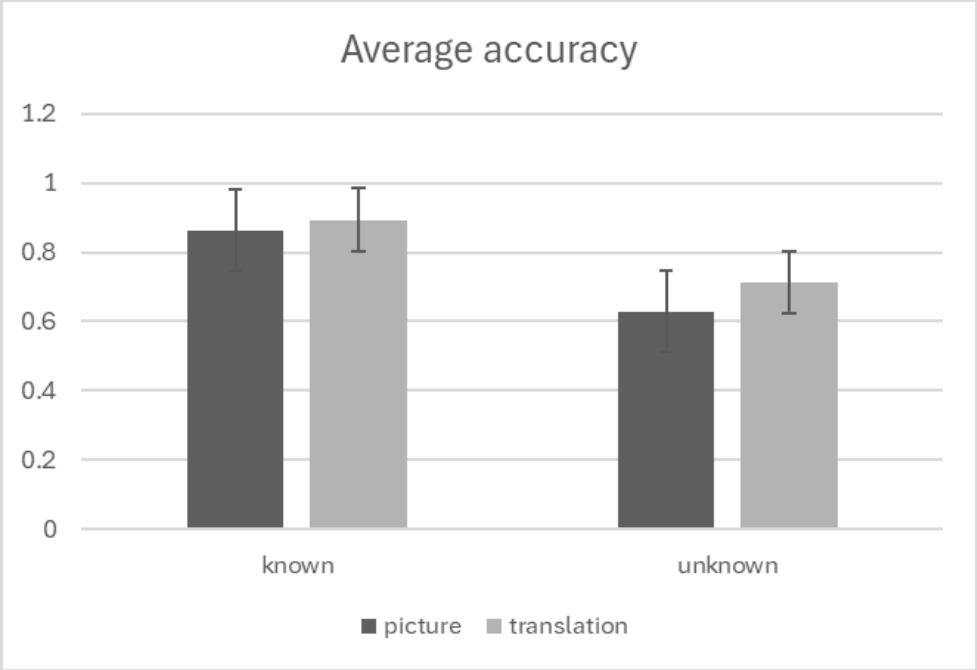

Figure 2: Accuracy results

As illustrated in Figure 2, a slight difference between the translation and the picture group can be seen, with the translation group demonstrating slightly higher accuracy.

4.5.2.2. Reaction time results

As shown in Table 6, there was a significant main effect of condition ($p = 0.00206$), and no significant effect of group ($p = 0.353$). There was no significant interaction between the condition and the group ($p = 0.818$).

Table 6: LME for reaction time

	Estimate	**Std. Error**	**df**	**t value**	**Pr(>|t|)**
(Intercept)	1.223.124	72.697	53.679	16.825	<0.001 ***
Condition unknown	142.326	44.612	76.339	3.190	0.00206 **
Group translation	89.703	95.516	44.991	0.939	0.35267
Condition unknown: Group translation	-9.859	42.784	1.415.967	-0.23	0.81779

As shown in Table 7, comparison test showed a significant effect for the 'known' condition in both picture group ($p = 0.002$) and translation group ($p = 0.003$), compared to the 'unknown' condition. There was no significant effect of group in the 'known' condition ($p = 0.353$) and no significant effect of group in the 'unknown' condition ($p = 0.413$).

Table 7: Paired comparison reaction time results – condition and group

contrast	**group**	**estimate**	**SE**	**df**	**t ratio**	**p value**
known-unknown	picture	-142	44.6	79.7	-3.189	0.0020
known-unknown	translation	-132	42.5	66.2	-3.118	0.0027
contrast	**condition**	**estimate**	**SE**	**df**	**t ratio**	**p value**
picture-translation	known	-89.7	95.5	45.5	-0.939	0.3526

picture-translation	unknown	-79.8	96.7	47.7	-0.826	0.4132

The results shown in Table 6 and Table 7 indicate that there was no statistically significant difference in reaction time between groups, but there was a significant difference in reaction time between conditions in both groups.

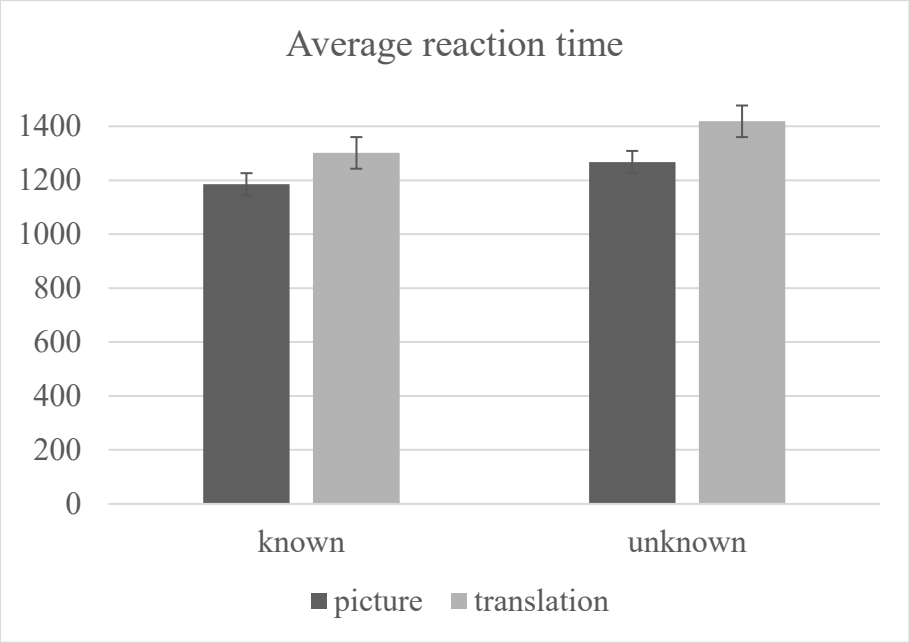

Figure 3: Reaction time results

As illustrated in Figure 3, a slight difference between the groups is evident again, this time with the translation group demonstrating slightly higher reaction time, compared tto the picture group.

The contrast between ‘picture’ and ‘translation’ group showed no significant difference in both reaction time and accuracy, while significance was found in condition for both groups in reaction time and accuracy results, with higher significance in accuracy.

4.5.3. Qualitative analysis: Observations during experiment and follow-up conversations

The participants' prevalent reaction to the experiment was anxiety. More people were to participate, but some gave up before the experiment started. Most of the participants showed signs of stress, such as shaking hands, frustrated reactions to possibly wrong answers, and stuttering; it is important to note that, even though the participants had had all the information about the experiment, and even before they marked their consent on the designated place, they had been asked if they were alright with taking part in it. Furthermore, they were aware that no one could see what they were pressing, they were given privacy, and they were informed that no one would know which questionnaire and results were theirs, since they got a unique code at the end of the survey. Several participants asked if they could retake the test, stating that they knew what they had to press, and that they were aware of their mistakes. Another observation was that the participants read the words they saw on the screen aloud during the test phase, some even uttered their equivalents in Croatian. The participants were also connecting the words they saw with words from other languages, or even saying what it reminded them of in Croatian, Bosnian or Serbian. There were participants who claimed that the word *hammer* exists because of a term denoting a special type of paper in art - *hamer papir*.

During the conversation, the participants who had learnt German, and had no prior English knowledge, confessed to using the knowledge of the German language for compensation and guidance in deciding whether the word exists or not. This mnemonic method used in vocabulary learning is called *linkword* method, which is incorporated into the keyword method, where people link words in a foreign language to those that remind them of a word either in their native language or the language they know, learners can also use ridiculous mental imagery to remember the word (Beaton et al., 1995). Many participants who had experience in language learning outside of formal education highlighted the importance of the communicative approach and a meaningful conversation in language courses, stating that language courses should include more of that. A few participants expressed dissatisfaction with the lack of attention on the correct pronunciation, they struggled with pronouncing the words because no one showed them how they should position their mouth to pronounce them correctly. This inadequate attention to the learners' needs resulted in them leaving the course, which corroborates Hilles and Sutton's claim from 2001 that if the learning environment does not suit the learner's needs and foundations for improving their education, they abandon it; confirming that even though it is an older source,

there are still applicable items. During the test phase, when two or more participants took the test one after another in a group setting, they were curious about who scored better, and they were hoping to know the results so that they could see if they scored better than the other participant(s). There were participants whose will to learn English came back during the experiment, which they openly talked about; moreover, several days after the testing took place, these participants sent messages as a 'thank you' note for conducting the experiment, accompanied by pictures of them where they took English textbooks and started learning.

4.6. Discussion

The hypotheses were partially confirmed, there was a difference between groups, but the difference is not statistically significant, with the 'translation' group scoring better than the 'picture' group. The 'translation' group, on the other hand, has insignificantly higher reaction time, meaning they took longer to respond. Testing how people react to nonwords in lexical decision tasks, Yap et al. (2015) found that the reaction time was higher when longer words with more morphemic elements were presented. Kroll and Stewart (1994: 150-151) state that picture naming in the second language requires more processing, first it has to go through conceptual memory, and then it can be linked with the word from the native language. To test how pictures and words are perceived in learning, they conducted an experiment. They discuss word naming as much faster than picture naming, but as for the memory, the participants were more likely to remember pictures, than translations (Kroll & Stewart, 1994). Another study comparing translation and pictures in vocabulary learning comes from Carpenter and Olson (2012: 99), who claim that participants failed to recall Swahili words with pictures, but they were well encoded. However, the results of the present experiment show significant difference between the known and unknown words in both accuracy and reaction time, implying that learning has taken place to some extent, and that these explicit teaching strategies could be used in older learners' vocabulary teaching. Although this type of exercise was shown to be useful, it still does not confirm if that is the right method applicable to each learner. For example, six participants being excluded from the analysis imply that not everyone could learn successfully using this approach. It should be noted that these results of lexical decision tasks are just indicative, they do not imply direct learning, in accordance with DeCarrico (2001: 288), who stated that new words should not

be learnt by mere memorization, but in various contexts, using different exercises and activities. Referring back to Midford and Kirsner's (2005) study, there is a similarity with their results and conclusion on using explicit approach when tasks are simple or the rules are easy to follow and understand, which could explain the positive effect of explicit approach in this experiment.

According to the questionnaire results, there were more participants that have some other language as their second language, and there were more participants with language learning experience in general in the 'picture' group, compared to the 'translation' group. The observation and the conversation after the experiment showed how important successful language learning is to older adults, and how important it is to get to know the learners in order to be able to find the best approach and help them during the process. As expected, the participants in the present experiment had anxiety prior to and during the testing, which manifested in their hands shaking, muttering, and in minor signs such as reading the instructions multiple times and checking whether they got them right. The reaction to the instructions demonstrated the importance of instructions in class, especially if the learners were asked to perform in front of the others.

In the post-experiment phase, the participants openly expressed dissatisfaction with their success which was based on their self-assessment. It was clear that completing the test successfully meant greatly to them, especially when they showed eagerness to have better results than their friends or spouses. Another sign was several participants asking to retake the test, which averted the intended purpose of the research to the participants wanting to complete the task successfully for their own satisfaction. This is an important aspect, as the adults are self-aware and sensitive to mistakes, they care deeply about their performance, which goes in line with already mentioned Higgins's self-discrepancy theory. The participants were warned that their results were anonymous, that not even the researcher would know which score was theirs, and despite that they wanted to solve the task with the best result, showing once more that they do it for themselves and their own feel of self-worth. One of the characteristics of adult learners is their need for approval, whether it is to prove to themselves and/or others that they are capable of learning and acquiring a qualification (McGivney, 2004), with the need to build self-identity and development of full potential (Malcolm, 1980). This fear of failure could lead to higher reaction time, since many of the participants in the current study took some time to think before they pressed the key, which occurred despite the warnings that it is time limited and they did not

have time to think, they were instructed to solve it based on how they felt. This could also be due to the fear of technology, e.g., Vaportzis et al. (2017) surveyed 18 older adults aged 65-76 on their attitudes towards tablets and technology in general, where the participants expressed feeling inadequate compared to the younger generations, not competent enough to handle technology, insufficient instructions or instructions too difficult to comprehend. The fear of technology and insecurity had also been seen during this experiment, where participants were not sure which key was for what, nor where to find those keys, some were not even sure where the 'space' key was, and some had put a lot of thought on the position of their fingers. The participants who took the test when there was at least one more participant wanted to talk during the learning and testing phase, confirming the importance of the social, affective aspect in older adults' language learning. Their connecting the words with the words from another language or saying what they remind them of indicates another strategy that can be used for language teaching and learning: using mnemonics.

The spontaneous conversation with participants was a crucial part of the experiment. During the conversation, the participants could express their experiences, and share their thoughts on what could be done better in language classrooms, since they left their classes due to their needs not being met. For example, they highlighted the need for a more meaningful, communicative approach in the classroom, which was also stated in a study by Van der Ploeg et al. (2023), where participants asked for communicative classes. The participants from the present experiment also stated the need for teachers to pay attention to the right pronunciation, which would help them in the process of learning. This leads to the conclusion that in adults' and older adults' classrooms there should be clear, open communication between the teacher and the learner; teachers should get to know their learners and their motivation behind enrolling, as well as their needs, along with communicating if the approach suits the learner or if they would like it to be different.

4.7. Limitations and implications for future research

One of the biggest limitations of this study is the number of participants. The results of this experiment with this number of participants showed only a minor portion of what method could

be applicable in teaching older adults. Furthermore, the use of technology was a struggle for many, they first had to be instructed where was the left and where was the right key on the keyboard, then keep in mind when to press either left or right under a limited amount of time. Many participants complained that the words in the test moved too quickly; when they had finally pressed the key they wanted to, the intended word already moved on and the next word was shown on the screen. This technological aspect seemed to be as equally stressful to them as deciding which key to press. Individual differences may have also affected the results, for example, there could be participants with different learning styles who did not benefit from this type of instruction, participants with different aptitudes, and those whose anxiety could have affected their performance. Taking everything into consideration, future research should include more participants, the technology used should either be adjusted or completely removed, and different types of tasks should be employed. This experiment implemented two explicit instructions, which differ only in the level of explicitness, meaning that future research should consider testing how older adults react to the implicit instructions. If possible, future research should be, at least to some extent, a longitudinal study.

The age imbalance between groups occurred, with the ‘translation’ group being generally the older group, which should be more balanced in future research. This could have potentially affected the results, mainly reaction time.

5. Personal experience in teaching older adults and further implications

5.1. Hungarian language teaching experience

Prior to conducting this research, entirely unrelated to the experiment, teaching Hungarian language to a group of six beginner learners aged from 59 to 66, and one 83 years old took place. The teaching was first vocabulary oriented, and the learners' motivation was to learn for self-improvement, while the oldest learner expressed a wish to be able to communicate with native speakers in a casual conversation. Despite their strong motivation, they often doubted themselves. This was manifested in their proclaiming, when faced with an obstacle, that they would never be able to learn the language. These situations require teachers to provide enough reassurance in the process and praise with encouragement since they like to know that they are making progress and are heading in the right direction. The group appreciated humour during classes, especially when commenting on the tasks, where they made remarks either about their own or their colleagues' work. Adult and older adult learners are eager to learn, but they also want to talk, and activities where they can combine learning and talking could aid their language learning process; moreover, it would provide the communication that those participants who attended the English language courses reported as an insufficiently applied method. The learners valued correct pronunciation and would want to repeat each word out loud until their pronunciation improved. This favours the experiment participants' attitude toward the importance of pronunciation; therefore, it should be taken into consideration when teaching. As already mentioned in the theoretical part, in teaching adults and older adults, it is important to get to know the learners, to determine the motivation behind their language learning and to recognize their needs. Another observation made during the teaching is that they are meticulous, they want to write the words correctly and legibly, thus they take longer to write them down. During this course, the learners were never rushed, and they were always given time to do everything at their own pace since the reason behind the slow pace was not 'slacking off'', but rather them requiring more time, which reduced their anxiety and stress of being left behind.

5.2. Teaching adults and older adults versus teaching teenagers

For the purpose of this paper, a statement was taken from a teacher who has long experience in teaching each age group, from teaching children to teaching seniors[5]. Teaching adults and older adults for this teacher was interchangeable, since they were often put in the same group, varying from 45 to 60+ years. The teacher points out that the main difference between teaching teenagers and adults was their motivation; teenagers were forced to be in the class, having multiple subjects which they could not even be interested in, while adults and older adults opted for education with a specific interest or a goal to achieve. This greatly affected their attitude towards work, and it determined their approach to it. Teenagers often believed that they acquired certain skills by completing just one task, whereas adults insisted on repeating the exercise until they were completely assured that what they were doing was right.

For teaching adults, the teacher advises preparing multiple similar materials for repetition and practice. This resulted in having different results in the knowledge depth. For teenagers, their knowledge ended up being shallow and stayed at the level of recognition or being insecure when it came to the independent task solving. The adults, on the other hand, were able to demonstrate their long-term knowledge and skills. Youngsters were much faster; however, they were not interested in the process behind everything, while adults learned at a slower pace, frequently asking questions, and wanting to learn in depth. The teacher explains that this could be the reason why gaining new knowledge at a younger age may seem faster. Both groups, however, faced obstacles when they were asked to complete a task using a different approach, where it may have seemed like they were at the beginning, starting all over again. When asked how adults should be approached when presenting new material, the teacher answered that it should be done step by step, and not directly, but by using an entirely adjusted, simplified approach.

Another difference between teenagers and adults was that teenagers rarely showed their emotions when they accomplished something, gained a new skill, whereas adults showed visible excitement, happiness and satisfaction for their accomplishment. Regarding the affective part and humour, the teacher points out that older adults valued humour and often used humoristic comments, joking about their own knowledge or their progress. These associations, according to the teacher, helped them solve problems because they memorized specific terms or steps. On the

[5] Personal communication.

other side, it was difficult to use humour in the classroom with teenagers because it either ended up in them using rude remarks towards one another, or they often did not understand the references; for example, they did not know who Tarzan is.

Adult learners, unlike teenagers, willingly helped each other, they organised help among themselves, if something was not clear, they did not fret about asking questions.

5.3. Insight from pre-service teachers

This section provides an overview of a study from Gabryś-Barker in 2020, who conducted a research on thirty-eight students in their final year of study, pre-service teachers specializing in teaching English as a foreign language. The purpose of this study was to gather insight into how pre-service teachers see older adults in the process of learning languages. Comparing the results with a previous study from Jaroszewska conducted in 2013, where older adults themselves expressed the motives behind learning foreign languages, Gabryś-Barker (2020) found how pre-service teachers were unaware of the reasons why seniors really learned languages. Furthermore, the students showed to be completely unaware of seniors facing physical difficulties, such as loss of hearing, vision, cognitive abilities depletion, as well as unawareness of their affective and motivational factors, such as loss of confidence, self-doubt, anxiety, and similar. When it comes to the preparation of materials, the students provided a list of materials that would be used in teaching class to young learners, indicating that older adults, according to the students, should have the same approach. (Gabryś-Barker, 2020)

This study shows the need for more research in this field, the need for raising awareness of older adults' needs in education. The results and conclusions from this study, compared to the conversations from the experiment in section 4, show that oftentimes the part where mature learners express their needs and motivation is neglected, potentially leaving teachers oblivious to learners' wishes. Them being mature and complete does not necessarily mean that they can learn with any approach and in any way.

5.4. Maximising older adults' language learning

Another experience from older adults' language classroom is brought by Kieran Donaghy (n.d.). He points out that senior learners are highly motivated, they are motivated intrinsically, they rarely skip class, they are very active during the class, and they do their homework. He continues with their attitude towards language learning, stating that they have a positive attitude, they treat others involved in the process with respect. He also mentions other teachers saying it is a pleasure to teach older adults because they are diligent, kind and considerate. Despite these factors making older adults sound as perfect students, they struggle with other factors, as Donaghy states, such as hearing difficulties, where he advises speaking clearly so that the learner can see teacher's face and paying attention to the volume and the number of repetitions of any auditory or audiovisual material. Visual difficulties that come with age are also highly probable in the older adults' classroom, where Donaghy suggests using larger font sizes for texts, learners sitting close to the board, paying attention to the writing that the teacher uses, and providing enough light in the room.

As for the cognitive decline, Donaghy suggests using memory exercises, including various repetitions in class and giving the students more time. As already mentioned, and discussed (e.g. Trosset, 1986; Cohen & Norst, 1989; present research), Donaghy comments on adults' fear of failure and anxiety, where the teacher's task should be minimising anxiety and building trust and self-confidence. This goes in line with what participants said after the experiment, implying that it is crucial to make language classrooms feel safe for older learners. To achieve this, Donaghy lists the following solutions:

1 Finding out learners' motivation for language learning and adjusting to it

2 Using techniques that build empathy between everyone involved in the process

3 Redirecting focus from error correction to promoting language production

4 Avoiding timed tests, which make older learners more stressed

5 Giving enough time for task completion

6 Creating a friendly and relaxed atmosphere

6. Conclusion

The population of adults and older adults is increasing, and more and more people opt for language learning after formal education and in their retirement. Language learning is a powerful tool in fighting Alzheimer's disease and dementia since it helps in decreasing ageing effects on brain function. Moreover, it has a positive effect on overall mental health.

In order to make language learning easier and more efficient for older adults, it is important to search for the best approach to language teaching. The general difference in approach is using either implicit, explicit, or a combination of those two. Being an under-researched field of study, findings on implicit and explicit instruction in adults' and older adults' language learning yielded different results; for some, implicit approach has proven to be more beneficial, whereas for others, it was the explicit approach (e.g. Tagarelli et al., 2019; Cox, 2015; Cox & Sanz, 2015; Midford & Kirsner, 2005; Deneckere, 2023; Van Der Ploeg et al., 2023). The studies imply that, with the process of ageing, implicit knowledge and capabilities remain almost unaffected, meaning that older adults retain the ability for implicit instruction.

To explore how vocabulary is learnt at an older age, and how they perceive languages, an experiment was conducted. Six participants had to be excluded due to high inaccuracy, leaving 44 participants distributed into two groups, one for learning English words with their picture equivalents, and one for learning English words with their translation. This means that stimuli were both explicit, with the picture stimulus being to some degree less explicit. The difference between groups was shown to be not significant, with the 'translation' group scoring a bit better than the 'picture' group, but their reaction time was higher. The significant factor is condition, where the difference between the 'unknown' and 'known' words in both reaction time and accuracy shows that some type of learning took place using explicit approach. Qualitative data show that participants prefer communication in the classroom, and that during the testing phase, the participants showed signs of stress and anxiety. Some participants expressed renewed motivation for learning the English language.

With previous research on the best approach to adult and older adult teaching being highly insufficient, the key factor is to get to know the learners and adjust the class to their needs, which requires communication, patience, and understanding.

7. Bibliography

Abutalebi, Jubin; Canini, Matteo; Della Rosa, Pasquale A.; Sheung, Lo Ping; Green, David W.; Weekes, Brendan S. (2014). Bilingualism protects anterior temporal lobe integrity in aging. *Neurobiology of Aging*, 35(9), 2126–2133. https://doi.org/10.1016/j.neurobiolaging.2014.03.010

Andrilović, Vlado (1976). *Kako odrastao čovjek uči*. Školska knjiga.

Bates, Douglas; Mächler, Martin; Bolker, Ben; Walker, Steve (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, 67(1), 1–48. https://doi.org/10.18637/jss.v067.i01

Beaton, Alan; Gruneberg, Michael; Ellis, Nick (1995). Retention of foreign vocabulary learned using the keyword method: a ten-year follow-up. Second Language Research, 11(2), 112–120. http://www.jstor.org/stable/43103448

Bialystok, Ellen; Craik, Fergus I.; Freedman, Morris (2007). Bilingualism as a protection against the onset of symptoms of dementia. *Neuropsychologia*, 45, 459-464. doi:10.1016/j.neuropsychologia.2006.10.009

Bulatović, N. Ranko; Cvetković, Živorad; Despotović, Lj. Miomir; Dragojev, Sima; Galić, Mlađen; Govedarica, Čedo; Grubešić, Dušanka; Kačavenda, Nada; Medić, Snežana; Žarkov, Miroslav (1985). *Osnovno obrazovanje odraslih: istraživanje osobenosti nastave*. Andragoška biblioteka.

Buss R., Allan; Poley, Wayne (1976). *Individual Differences: Traits and Factors*. Gardner Press.

Carpenter, Shana K.; Olson, Kellie M. (2012). Are pictures good for learning new vocabulary in a foreign language? Only if you think they are not. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 38(1), 92–101. https://doi.org/10.1037/a0024828

Chertkow, Howard; Whitehead, Victor; Phillips, Natalie; Wolfson, Christina; Atherton, Julie; Bergman, Howard (2010). Multilingualism (but not always bilingualism) delays the onset of Alzheimer disease: evidence from a bilingual community. *Alzheimer disease and associated disorders*, 24(2), 118–125. https://doi.org/10.1097/WAD.0b013e3181ca1221

Cohen, Yaier; Norst, J. Marlene (1989). Fear, Dependence and Loss of Self-Esteem: Affective Barriers in Second Language Learning Among Adults. *RELC Journal*, 20(2), 61–77. doi:10.1177/003368828902000206

Cox, Jessica (2015). Older adult learners and SLA: Age in a new light. In C. Sanz & B. Lado (Eds.), *Individual differences, L2 development, and language program administration: From theory to application* (pp. 90–107). Cengage.

Cox, Jessica G.; Sanz, Cristina (2015). Deconstructing PI for the ages: Explicit instruction vs. practice in young and older adult bilinguals. *International Review of Applied Linguistics in Language Teaching*, 53(2). doi:10.1515/iral-2015-0011

Cox, Jessica G. (2017). EXPLICIT INSTRUCTION, BILINGUALISM, AND THE OLDER ADULT LEARNER. *Studies in Second Language Acquisition*, 39(1), 29–58. doi:10.1017/S0272263115000364

Crandall, C. Richard (1991). *Gerontology: a Behavioral Science Approach* (2nd ed.). McGraw-Hill, Inc.

Davis, J. Colin (2005). N-Watch: A program for deriving neighborhood size and other psycholinguistic statistics. *Behavior research methods*, 37, 65-70.

Deakin, Julia; Aitken, Michael; Robbins, Trevor; Sahakian, J. Barbara (2004). Risk taking during decision-making in normal volunteers changes with age. *Journal of the International Neuropsychological Society*, 10(4), 590-598.

DeCarrico, S. Jeanette (2001) "Vocabulary Learning and Teaching." In *Teaching English as a Second or Foreign Language,* edited by Celce Murcia, Marianne, 285-293. 3rd edition. Heinle & Heinle.

Deneckere, Chiara (2023). *How do Explicit and Implicit Processes Interact with Language Learning in the Aging Brain?* (Master dissertation, Ghent University).

Donaghy, Kieran (n.d.). How to maximise the language learning of senior learners. *TeachingEnglish*. https://www.teachingenglish.org.uk/professional-development/teachers/understanding-learners/articles/how-maximise-language-learning (Accessed on 15 June 2024)

Dörnyei, Zoltán (2006). Individual differences in second language acquisition. *Themes in SLA Research*, 19, 42–68. doi:10.1075/aila.19.05dor

Gabryś-Barker, Danuta (2020). Teaching foreign languages to seniors: Some insights from pre-service EFL teachers. *Linguística: Revista De Estudos Linguísticos Da Universidade Do Porto.* https://www.academia.edu/90412465/Teaching_foreign_languages_to_seniors_Some_insights_from_pre_service_EFL_teachers (Accessed on 11 June 2024)

Giorgio, Antonio; Santelli, Luca; Tomassini, Valentina; Bosnell, Rose; Smith, Steve; De Stefano, Nicola; Johansen-Berg, Heidi (2010). Age-related changes in grey and white matter structure throughout adulthood. *Neuroimage*, 51(3), 943-951. https://doi.org/10.1016/j.neuroimage.2010.03.004

Gold, T. Brian (2015). Lifelong bilingualism and neural reserve against Alzheimer's disease: A review of findings and potential mechanisms. *Behavioural Brain Research*, 281, 9-15. doi:10.1016/j.bbr.2014.12.006

Grady, L. Cheryl (2008). Cognitive Neuroscience of Aging. *Annals of the New York Academy of Sciences*, 1124(1), 127–144. doi:10.1196/annals.1440.009

Hennebry, Mairin; Rogers, Vivienne; Macaro, Ernesto; Murphy, Victoria (2013). Direct teaching of vocabulary after listening: is it worth the effort and what method is best? *The Language Learning Journal*, 45(3), 282–300. doi:10.1080/09571736.2013.849751

Higgins, E. Tory (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review*, 94(3), 319–340. doi:10.1037/0033-295x.94.3.319

Hilles, Sharon; Sutton, André (2001) "Teaching Adults." In *Teaching English as a Second or Foreign Language,* edited by Celce Murcia, Marianne, 385-397. 3rd edition. Heinle & Heinle.

Hofstetter, Shir; Friedmann, Naama; Assaf, Yaniv (2016). Rapid language-related plasticity: microstructural changes in the cortex after a short session of new word learning. *Brain Structure and Function*, 222(3), 1231–1241. doi:10.1007/s00429-016-1273-2

Jarvis, Peter (2010). *Adult Education and Lifelong Learning: Theory and Practice* (4th ed.). Routledge.

Jenkins, Andrew; Mostafa, Tarek (2015). The effects of learning on wellbeing for older adults in England. *Ageing & society*, 35(10), 2053-2070.

Kenward, G. Michael; Roger, H. James (1997). Small sample inference for fixed effects from restricted maximum likelihood. *Biometrics*, 53(3), 983-997. https://doi.org/10.2307/2533558

Kozar, Olga; Yates, Lynda (2019). Factors in language learning after 40: Insights from a longitudinal study. *International Review of Applied Linguistics in Language Teaching*, 57(2), 181-204. https://doi.org/10.1515/iral-2015-0113

Koziol, F. Leonard; Budding, Deborah Ely (2012). Procedural Learning. *Seel, N.M. (eds) Encyclopedia of the Sciences of Learning*. Springer, Boston, MA. https://doi.org/10.1007/978-1-4419-1428-6_670

Kroll, F. Judith; Stewart, Erika (1994). Category Interference in Translation and Picture Naming: Evidence for Asymmetric Connections Between Bilingual Memory Representations. *Journal of Memory and Language*, 33(2), 149–174. doi:10.1006/jmla.1994.1008

Li, Ping; Legault, Jennifer; Litcofsky, Kaitlyn A. (2014). Neuroplasticity as a function of second language learning: Anatomical changes in the human brain. *Co*rtex, 58, 301–324. doi:10.1016/j.cortex.2014.05.001

Liu, Yunrui; Bagaïni, Alexandra; Son, Gayoung; Kapoor, Madlaina; Mata, Rui (2023). Life-course trajectories of risk-taking propensity: A coordinated analysis of longitudinal studies. *The Journals of Gerontology: Series B*, 78(3), 445-455. https://doi.org/10.1093/geronb/gbac175

Luk, Gigi; Bialystok, Ellen; Craik, Fergus I. M.; Grady, Cheryl L. (2011). Lifelong Bilingualism Maintains White Matter Integrity in Older Adults. *Journal of Neuroscience*, 31(46), 16808–16813. doi:10.1523/jneurosci.4563-11.2011

Luria, Ela; Shalom, Maya; Levy, Daniel A. (2020). Cognitive Neuroscience Perspectives on Motivation and Learning: Revisiting Self-Determination Theory. *Mind, Brain, and Education*. doi:10.1111/mbe.12275

Malcolm, K. Shepherd (1980). *The Modern Practice of Adult Education-From Pedagogy to Andoragogy. Revised And Updated*, Cambridge Adult Education.

McGivney, Veronica (2004). Understanding persistence in adult learning. *Open Learning: The Journal of Open, Distance and e-Learning*, 19(1), 33–46. doi:10.1080/0268051042000177836

Merriam, B. Sharan; Caffarella, S. Rosemary (1999). *Learning in adulthood: A comprehensive guide* (2nd ed.), San Francisco: Jossey-Bass Publishers.

Midford, Richard; Kirsner, Kim (2005). Implicit and Explicit Learning in Aged and Young Adults. Aging, *Neuropsychology, and Cognition*, 12(4), 359–387. doi:10.1080/13825580500246894

Narushima, Miya; Liu, Jian; Diestelkamp, Naomi (2013). The Association Between Lifelong Learning and Psychological Well-Being Among Older Adults: Implications for Interdisciplinary Health Promotion in an Aging Society. *Activities, Adaptation & Aging*, 37(3), 239–250. https://doi.org/10.1080/01924788.2013.816834

Narushima, Miya; Liu, Jian; Diestelkamp, Naomi (2018). Lifelong learning in active ageing discourse: Its conserving effect on wellbeing, health and vulnerability. *Ageing & Society*, 38(4), 651-675. https://doi.org/10.1017/S0144686X16001136

Northway, Nadia; Dutton, N. Gordon (2010). Undetected visual defects in adult literacy. *Learning Connections*. Glasgow: Scottish Government.

Oxford, L. Rebecca (1992). Research on Second Language Learning Strategies. *Annual Review of Applied Linguistics*, 13, 174. doi:10.1017/s0267190500002452

Oxford, L. Rebecca (2003). Language learning styles and strategies: Concepts and relationships. *IRAL - International Review of Applied Linguistics in Language Teaching*, 41(4). doi:10.1515/iral.2003.012

Pavičić-Takač, Višnja (2008). *Vocabulary Learning Strategies and Foreign Language Acquisition*. Multilingual Matters Ltd.

Pavičić-Takač, Višnja (2019). *Razvoj Leksičke Kompetencije u Inome Jeziku* (2nd Ed). Filozofski fakultet Osijek.

Rastle, Kathleen; Harrington, Jonathan; Coltheart, Max (2002). 358,534 nonwords: The ARC Nonword Database. *Quarterly Journal of Experimental Psychology*, 55A, 1339-1362.

Reeve, Johnmarshall (2010). *Razumijevanje motivacije i emocija* (4th ed.). Naklada Slap.

Rolison, J. Jonathan; Hanoch, Yaniv; Wood, Stacey; Liu, Pi-Ju (2013). Risk-Taking Differences Across the Adult Life Span: A Question of Age and Domain. *The Journals of Gerontology: Series B*, 69(6), 870–880. doi:10.1093/geronb/gbt081

Schiller, Emese; Dorner, Helga (2021). Factors influencing senior learners' language learning motivation. A Hungarian perspective. Journal of Adult Learning, *Knowledge and Innovation*. https://doi.org/10.1556/2059.2020.00003

Skehan, Peter (1991). Individual Differences in Second Language Learning. *Studies in Second Language Acquisition*, 13(02), 275. doi:10.1017/s0272263100009979

Smalle, Eleonore H. M.; Daikoku, Tatsuya; Szmalec, Arnaud; Duyck, Wouter; Möttönen, Riikka (2022). Unlocking adults' implicit statistical learning by cognitive depletion. *Proceedings of the National Academy of Sciences of the United States of America*, 119(2), e2026011119. https://doi.org/10.1073/pnas.2026011119

Sonbul, Suhad; Schmitt, Norbert (2009). Direct teaching of vocabulary after reading: is it worth the effort? *ELT Journal*, 64(3), 253–260. doi:10.1093/elt/ccp059

Stoet, Gijsbert (2010). PsyToolkit: A software package for programming psychological experiments using Linux. *Behavior research methods*, 42, 1096-1104.

Stoet, Gijsbert (2017). PsyToolkit: A novel web-based method for running online questionnaires and reaction-time experiments. *Teaching of Psychology*, 44(1), 24-31.

Squire, R. Larry (2004). Memory systems of the brain: A brief history and current perspective. *Neurobiology of Learning and Memory*, 82(3), 171–177. doi:10.1016/j.nlm.2004.06.005

Tagarelli, M. Kaitlyn; Shattuck, F. Kyle; Turkeltaub, E. Peter; Ullman, T. Michael (2019). Language learning in the adult brain: A neuroanatomical meta-analysis of lexical and grammatical learning. *NeuroImage*, 193, 178–200. https://doi.org/10.1016/j.neuroimage.2019.02.061

Trosset, S. Carol (1986). The social identity of Welsh learners. *Language in Society*, 15(02), 165. http://www.jstor.org/stable/4167746

Tudor, Sofia Loredana (2013). Formal–non-formal–informal in education. *Procedia-Social and Behavioral Sciences*, 76, 821-826. https://doi.org/10.1016/j.sbspro.2013.04.213

Van Der Ploeg, Mara; Lowie, Wander; Keijzer, Merel (2023). The Effects of Language Teaching Pedagogy on Cognitive Functioning in Older Adults. *Behavioral Sciences*, 13(3), 199. https://doi.org/10.3390/bs13030199

Vaportzis, Eleftheria; Giatsi Clausen, Maria; Gow, J. Alan (2017). Older adults perceptions of technology and barriers to interacting with tablet computers: a focus group study. *Frontiers in psychology*, 8, 1687. https://doi.org/10.3389/fpsyg.2017.01687

Ward, V. Emma; Shanks, R. David (2018). Implicit Memory and Cognitive Aging. *Oxford Research Encyclopedia of Psychology*. https://doi.org/10.1093/acrefore/9780190236557.013.378

Wingfield, Arthur; Grossman, Murray (2006). Language and the aging brain: patterns of neural compensation revealed by functional brain imaging. *Journal of neurophysiology*, 96(6), 2830-2839. https://doi.org/10.1152/jn.00628.2006

Yap, J. Melvin; Sibley, E. Daragh; Balota, A. David; Ratcliff, Roger; Rueckl, G. Jay (2015). Responding to nonwords in the lexical decision task: Insights from the English Lexicon Project. *Journal of experimental psychology. Learning, memory, and cognition*, 41(3), 597-613.

16 Personalities https://www.16personalities.com/ (Accessed on 5 June 2024)

ABC Nonword Database http://www.cogsci.mq.edu.au/research/resources/nwdb/nwdb.html (Accessed on 6 April 2024)

Croatia in figures https://podaci.dzs.hr/media/rh0njfqt/croinfig_2023.pdf (Accessed on 5 January 2024)

Pučko otvoreno učilište https://www.pou.hr/en/o-ucilistu/o-nama (Accessed on 1 June 2024)

8. Appendices

1 Questionnaire:

The participants were handed a paper version of the questionnaire that was to be filled by writing, since it seemed appropriate for the group. It was designed using Aptos font size 16, so that the participants can easily read what is written. The instructions for the questionnaire and its purpose were once again written at the top of the paper. First, the participants had to write down their unique code they received after finishing the test, which would be matched with their results. The participants are asked to write down their age, their mother tongue, or mother tongues if they have more than one, have they already learnt English language, and if so, where and how long, have they learnt any language other than English, and if yes, which one, how long and where. The questionnaire consists of six questions in total.

Poštovani sudionici, pred Vama se nalazi upitnik o Vašem iskustvu s učenjem stranih jezika. Upitnik je anoniman, a podaci će se koristiti isključivo u svrhe izrade diplomskog rada, za usporedbu s rezultatima eksperimentalnog dijela.

Ovdje upišite kod koji vidite prikazan na ekranu:

_____

1. Dob: _____
2. Materinji jezik/-ci:
   _____
3. Jeste li već učili engleski jezik? DA
   NE
4. Ako da, gdje ste ga učili i koliko dugo?

_____
_____

5. Jeste li već učili neki drugi strani jezik? DA NE

6. Ako da, navedite o kojem jeziku/kojim jezicima se radi, koliko dugo ste učili i jeste li učili samostalno ili u školi:

_____
_____

_____
_____

2 Test words:

Word	**Condition**
clover	known
curtain	known
brain	known
camel	known
beard	known
bowl	known
cookie	known
ladder	known
switch	known
onion	known
coal	known
purse	known
charger	known
forest	known

glove	known
knight	known
stamp	known
shadow	known
stream	known
pollen	known
tape	known
towel	known
trash	known
fairy	known
beach	unknown
pack	unknown
cream	unknown
theatre	unknown
razor	unknown
clock	unknown
rust	unknown
nettle	unknown
dwarf	unknown
case	unknown
hawk	unknown
pillow	unknown
table	unknown
wraith	unknown
mold	unknown
writer	unknown
salmon	unknown
throat	unknown
nature	unknown
teacher	unknown

hammer	unknown
dread	unknown
weed	unknown
fawn	unknown
chagues	non-word
dwops	non-word
thrays	non-word
gnoils	non-word
gwawks	non-word
smames	non-word
gragued	non-word
cugs	non-word
stoun	non-word
splest	non-word
choof	non-word
whelms	non-word
haked	non-word
clorbs	non-word
feach	non-word
spotch	non-word
oach	non-word
dorst	non-word
koob	non-word
crand	non-word
chourts	non-word
zuss	non-word
slosed	non-word
scranked	non-word
gheich	non-word
rhurke	non-word

toafed	non-word
crapsed	non-word
drush	non-word
strarp	non-word
dooned	non-word
larms	non-word
shround	non-word
grourn	non-word
snurfs	non-word
wofts	non-word
flince	non-word
stilch	non-word
phrup	non-word
trebe	non-word
crolt	non-word
flane	non-word
plail	non-word
skoal	non-word
plood	non-word
chuth	non-word
rerns	non-word