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ENHANCING MEMORY ABILITY FOR LEARNING NEW VOCABULARY WORDS IN A FOREIGN LANGUAGE DURING EALRY SCHOOL YEARS USING KEYWORD METHOD

PhD. Thesis ABSTRACT

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CLUJ-NAPOCA

2013

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KEYWORDS: foreign language, mnemonics; vocabulary; memory; linguistic immersion.

PART 1: THEORETICAL BACKGROUND

1. INTRODUCTION

The need of learning a second language from an early age is a trend met in most urban schools and kindergartens in Romania. Many public educational institutions face a high demand from parents to offer language education programs to children before 3rd grade, which is the mandatory school age when children need to start learning a foreign language (www.edu.ro). This trend seems to be consistent across most Europeans countries, especially in those whose official language is not English, according to Special Eurobarometer 243 (2006). The thesis aims to address this need by assessing the efficiency of learning new vocabulary words using the Keyword Method in the classroom at an early school age.

2. EARLY SECOND LANGUAGE ACQUISITION

2.1. Bilingualism: advantages and disadvantages

While before the mid 20th century a common belief was that learning a second language wastes important cognitive resources, in the past decades several empirical studies showed that bilingualism has many advantages over the cognitive development. The bilingualism was associated with superior school performance (Peal & Lamnbert, 1962), with an increase of awareness of communication needs (Genesse, Tucker & Lambert, 1975), of inhibition ability (Byalistok & Martin, 2004), of creativity (Ricciardelli, 1992), of ability to learn a new foreign language (Kaushanskaya & Marian, 2009), and brain's aging process (Bialystok, Craik, & Freedman, 2007). Adesope et al. (2010) showed that bilingualism can improve children's attention, their ability of symbolic and abstract representation, and their working memory. The advantages of bilingualism go beyond improving one's cognitive abilities. Speaking a second language can improve social attitudes, and change interpersonal and intergroup perception. (Lambert, 1992).

Despite many distinct advantages, learning a second language may have some negative aspects as well, like "language attrition" (Levy et al., 2007), a smaller size of vocabulary in native language (Bialystok, 2008), and an increased risk of stuttering (Howell, Davis, and Williams, 2009). Yet, most of the aforementioned bilingualism drawbacks have been shown to occur when minority children are immersed in environments where the spoken language is different from their native language.

2.2. Early foreign language education

2.2.1. "The sooner the better" vs. "The later the better"

The first step towards learning a second language is the development of the ability to discriminate between the phonemes of that particular language. Byers-Heinlein, Burns and Werker (2010) showed that this was possible as early as the prenatal period. Does this mean that schools should consider introducing in the curriculum early foreign language education classes? A large body of research suggests that there is a sensitive period of pronunciation development which ends around puberty (Birdsong 1999; Fledge, Yeni-Komshian, and Liu 1999; Johnson and Newport 1989; Wiley, Bialystok and Hakuta 2005), but motivated and experienced learners with

exceptional linguistic abilities proved that they could overcome this limitation (Birdsong 1999). DeKeyser (2003, 2006) emphasizes on the difference between implicit and explicit language learning suggesting that the existence of a critical period in second language acquisition applies only to implicit learning mechanisms. The aforementioned conclusions support learning a foreign language in early childhood, especially of "native-like" pronunciation is desired.

On the other hand, a series of studies indicated that older students showed better learning performance compared with young students (Cenoz, 2006; Marinova-Todd, Marshall si Snow, 2000; Munoz, 2006; Snow si Hoefnagel-Hohle, 1978). The authors suggest that those who support early foreign language education often fail to consider the fact that the majority of adults don't have the same motivation, time and energy to learn a foreign language, as children do.

2.2.2. Early language immersion

The scientific literature abounds with studies supporting early language immersion programs (for a comprehensive analysis, see Genesse și Jared, 2008, Safty, 1988). Those programs the curriculum based activities are held (totally or partially) in a foreign language. Thus, the language is learned implicitly while children develop specific competences (e.g. grouping objects based on certain criteria). Even though data showed that there is a risk for children registered in language immersion programs to show language delays, studies indicated that over time, children in immersion programs catch up with their non-immersion peers (e.g. Turnbull, Hart și Lapkin, 2003). Other studies show that students from immersion programs help children benefit from cross-linguistic transfer (e.g. Gebauer, Zaunbauer și Moller, 2013).

Most of the literature on successful immersion linguistic programs comes from Canada, but similar successful experiences were met in similar European programs (e.g. Elvin, Maagerø si Simonsen, 2007 ; Hickey, 1999 ; Meier, 2010 ; Rivas, Sobrino și Peralta, 2010). Generally, the studies focused on the optimal starting time of immersion programs produced mixed results. On one hand, some studies indicated that late-immersion students shortly caught up with their early-immersion peers (Dornyei 2009, p. 250, Singleton, 2000). On the other hand, there are studies that show that early-immersion students registered in programs like that have superior performances compared with their late-immersion peers (Day și Shapson, 1988 ; Harley și Hart, 1997). Still, the children registered early in immersion programs might develop the risk of lower academic achievement compared with their non-immersion peers, since school success is dependent on the language level mastery (Bialystok, 2008). When Barac and Bialystok compared groups of monolinguals and bilinguals, they found that the bilinguals who were educated in their native language had the best school performance.

Thus, teaching new academic content in a foreign language might diminish students' school performance, at least on short term. That's why is important to consider strategies to optimize learning a foreign language through other methods than linguistic immersion.

3. SECOND LANGUAGE VOCABULARY ACQUISITION IN CHILDREN: A DEVELOPMENTAL PERSPECTIVE

Even though the history of second language education indicates that for a long time theories and research focused mostly on grammar teaching pedagogy (Zimmerman, 1997), the importance of studying the second language vocabulary gained much recognition in the past decades (Barcroft, 2004). One explanation is that while the lack of grammar knowledge sometimes makes communication more difficult, and unclear, the lack of vocabulary makes it impossible. Another reason for vocabulary development emphasis is that learning vocabulary does not imply ignoring learning the grammar. Conboy and Thal (2006) showed that learning a vocabulary in a foreign language is associated with improved grammar abilities. The findings are consistent with earlier studies (e.g. Senvatka &Healy, 1998) that suggested that grammar knowledge is already wired in the lexicon, and that it can be developed over time through language exposure. Thus, when addressing the second language vocabulary acquisition process, there is always a certain connection to the syntactic frame in which the vocabulary words are being presented.

3.1. Phonemic awareness as a cognitive pre-requisite for vocabulary acquisition

The second language vocabulary acquisition is strongly dependent by the phonemic awareness development (Tsao, Liu & Kuhl, 2004). This variable seems to be even more important than the frequency of language exposure (Bundgaard-Nielsen, Best, and Tyler, 2011) and it predicts the subsequent vocabulary development (Fernald & Marchman, 2012). The ability to distinguish between phonemes develops as early as prenatal period. Byers-Heinlein, Burns, and Werker (2010) and during the first year of life the child learns the approximate 40 phonemes which change the meaning of words (Kuhl, 2010). During this period, children's phonemic awareness develops not only by refining their perception of native sounds, but also by ignoring phonemic structures that are not characteristic to their native language and to the languages they have been exposed to. Kaushanskaya and Marian (2009) showed that bilinguals learn twice the number of words in a foreign language than their monolingual peers, indicating that children whose phonological processing skills are better developed, perform better in foreign language vocabulary learning tasks.

The phonological awareness eventually leads to the development of phonological constancy, defined by Best et al. (2009) as "the ability to recognize a word's identity across natural phonetic variations". The authors considered phonological constancy as being one of the milestones that facilitate a rapid vocabulary growth, and later, reading acquisition.

3.2. Second language vocabulary acquisition from comprehensible input exposure to social interaction facilitated learning

Much of the research conducted in the 1980's tried to emphasize on the role of second language exposure in vocabulary development. Nagy, Herman and Anderson (1982) estimated that 10-15 exposures to unknown words from reading in native language can help the learner understand the meaning of that word, without explicit translation of its meaning. Krashen and Terrell (1983) expanded this approach and suggested that similarly, the second language

vocabulary is acquired unconsciously simply by learner's exposure to comprehensible input, especially through reading. Saffran, Aslin and Terrell (1996) supported these theories and conceptualized the "statistical language learning model", suggesting that children can use the statistical properties of linguistic input to learn the foreign language by themselves. Krashen's and Saffran's theories of vocabulary acquisition solely by exposure through comprehensible input were challenged by several subsequent studies. These studies (Elley, 1989; Horst, Cobb și Meara, 1998 ; Swanborn și de Glopper, 2002) showed that that the incidental vocabulary learning efficiency depends on the purpose of learning. The effects of contextual support of words acquisition through reading a story were investigated as well by Zahar, Cobb & Spada (2001) who estimated that it takes 29 years for an adult learner to learn 2000 new vocabulary words simply through input, thus showing that Krashen's input theory is limited.

Even though Krashen's input theory received multiple criticisms, it represents a milestone in the study of incidental second language vocabulary acquisition. Subsequent studies (Ellis & He, 1999, Gass, 1999) focused on this topic revealed its advantages and limits, indicating that social interaction can improve learners' performance. Kuhl (2007) defined this phenomenon as "Social Gating Hypothesis", suggesting that the diversity of learning situations that occur in a social context can increase attention/arousal, information access, sense of relationship and/or activation of brain mechanisms. Several studies conducted on the impact of television on children's linguistic performance confirmed this hypothesis (e.g. Conboy și Kuhn, 2010; Rosenberry, Hirsh-Pasek, Parish-Morris, și Golinkoff, 2009; Uchikoshi, 2006; Zimmermann et al, 2009).

3.3. Vocabulary in native and foreign language learners

Vocabulary size is among the most important indicators of second language vocabulary acquisition in children. It was found to be significantly correlated with listening comprehension (Staehr, 2009), which is a key component of the first stage of second language acquisition, according to the Krashen and Terrell (1983, p. 20). When assessing the vocabulary size, word families (which consist of a base word and its derivations) are usually considered. The receptive vocabulary which tends to be twice as large as the productive vocabulary (Marton, 1977), is generally used for the vocabulary size assessment.

Nation and Waring (1997) indicated that a 5-year-old native speaker has a vocabulary of about 5000 word families, and adds another 1000 word families each schooling year. They suggested that a child exposed to a foreign language by immersion in an educational environment after the age 5 will learn word families at the same rate with a native speaker of that language (1000 word families per year), but missing the acquisition of the first 5000 word families puts them at risk of never closing the gap between them and native speakers. On the other hand, Silverman (2007) showed that immigrant kindergartners learn target new vocabulary words at the same rate, but developed their general vocabulary size at a faster rate than their monolingual peers. Milton and Meara (1995) also reported that exceptional adult learners can learn up to 2650 base words per year, and that it takes them about 7 years to close the gap with their native peers, by learning the vocabulary size of a college-level educated person. The

contrasting conclusions between the above studies can be explained by individual differences in lexical processing and performance in second language acquisition.

Several studies showed that bilingual children tend to have a smaller productive vocabulary than their monolingual peers (Bialystok, Luk, Peets & Yang, 2010), but they have the same or even better understanding of the linguistic structure (Bialystok, 2008; Yan, & Nicoladis, 2009).

When addressing vocabulary development in children, we also need to consider its depth, or the degree of understanding a certain word. Even though the lexical depth doesn't contribute much in the initial stages of vocabulary development, it plays a crucial role in understanding vocabulary development in its more advanced stages (Read, 1998 ; Wesche și Paribakht, 1996).

3.4. Stages of second language vocabulary acquisition

Among the first and most important contributions in defining the stages of second language vocabulary acquisition was the theoretical model proposed by Krashen and Terrell (1983). The authors suggested that each second language learner goes through several stages of language acquisition. These are "pre-production", "early production", "speech emergence", "intermediate fluency", and "advanced fluency". Those stages are specific to everybody who learns a second language, but the length of each stage depends on several variables, like language exposure, or individual linguistic abilities.

3.5. The impact of memory development in middle-childhood on learning a foreign language

Learning a foreign language by children in their early school years can be optimized if certain developmental features of this particular age are accounted for. Foreign language teachers need to consider that around ages 6-7, children experience several cognitive developmental changes, like **language awareness**, the increase length of **attention span** and **inhibitory control (**Maguire, White, and Brier, 2011), the improvement of **metacognitive abilities**, and improvement in **working memory capacity** (Baddeley, 1986), or the development of children's abilities to organize information, like **cathegorization** or **the efficient use of memorizing strategies**, like mnemonics (Brehmer et al., 2007).

4. THE USE OF MNEMONICS FOR LEARNING THE VOCABULARY OF A FOREIGN LANGUAGE

4.1. A historic perspective over mnemonics

Among the first records of using the mnemonics were documented in Ancient Greece, when the poet Simionides of Ceos documented the „loci method". Later, mnemonics became more elaborate, and they shortly became a esoteric and ocult practice for only few who were initiated (Yates, 1966). Starting with the second half of the 20th century, mnemonics were studied scientifically in psychology labs. Today, mnemonics are seen as systematic procedures of transformation of difficult to remember stimuli into easy to remember stilmuli (Pressley, Levin, Delaney, 1982), or simply "cognitive learning strategies" (Brown, 2007).

4.2. Mnemonics used in learning foreign languages

Even though mnemonics proved useful in enhancing performances from different learning situations, a series of studies showed that their use in teaching a second language is rather seldom (Griffith & Parr, 2001; O'Malley et al, 1985). Thus, the performance of foreign language learning activities could be improved if mnemonics were used more frequently.

4.3. The impact of mental imagery on the efficiency of mnemonics

The mnemonics were used since antiquity, but starting with 60's and 70's, a series of studies showed the impact of imagery on memory (Bahrick și Wittlinger, 1975; Shepard, 1967; Standing, 1973). Paivio tried to explain why memory performance is higher when we are exposed to visual stimuli, using the "Dual code hypothesis" (Paivio, 1971). His hypothesis suggest that using imagery-based mnemonics improves the retention of items, but the retrieval from memory of these items is dependent on the degree of item's concreteness. DeBeni and Moe (2003) proved that imagery-based mnemonics are more efficient compared with verbal strategies, not just when we learn new words, but also when we study text fragments; DaSilva and Yassuda (2009) showed that the use of strategies based on mental images are more efficient compared with categorization strategies used by adults with a low education. The studies mentioned above show that mnemonic performance can be substantially improved when imagery is being used, especially compared with other non-imagery based strategies.

4.4. Types of mnemonics used in learning a foreign language vocabulary

The mnemonics' efficiency depends on several variables: a. to make sense; b. to be well organized; c. to produce efficient associations; d. to be easily visualized; to be able to draw attention (Higbee, 1978). Some strategies are simple and accessible (e.g. acronyms, and acrostics), while others are complex and more elaborate (Loci method, Keyword method, Total Physical Response).

4.5. Using Keyword method to learn new vocabulary words in a foreign language

The Keyword Method (KWM) is one of the most extensively researched methods used in foreign language vocabulary learning. Initially introduced by Atkinson & Raugh (1975), the method was developed to facilitate learning of vocabulary words by establishing an acoustic and an imagery link between a new word and a familiar one. With this two-step method, the learner initially associates the sound(s) or look of the new word spoken in a foreign language with the sound(s) or look of a familiar keyword spoken in a native language, creating an acoustic or orthographic link. Then, a mental image (the imagery link) is formed that connects the meaning of the new foreign language word with the image of the keyword. Interacting pictures can also be provided to facilitate visualization.

Evidence on the efficiency of the KWM was shown in a variety of learning circumstances. The successful implementation of the method for foreign vocabulary learning was demonstrated for young children (e.g. Avila & Sadoski, 1996; Elhelou, 1994; Pressley, 1977; Wyra, Lawson & Hungi, 2007), teenagers (e.g. Rodriquez & Sadoski, 2000), adults (e.g. Atkinson & Raugh, 1975; Beaton, Gruneberg, Hyde, Shufflebottom & Sykes, 2005; Saggara & Alba, 2006; Shapiro & Waters, 2005) and the elderly (e.g. Gruneberg & Pascoe, 1996). The

KWM was shown to be equally effective for good and poor vocabulary learners (Presley et. al, 1980); it has also proven efficient in teaching abstract vocabulary to students with learning disabilities (Mastropieri, Scruggs & Fulk, 1990), teaching simple sentences in a foreign language (Kasper & Glass, 1988), on teaching science concepts (Rosenheck, Levin & Levin, 1989), teaching the names of state capitals (Levin, Shriberg, Miller, McCormick & Levin, 1980), or in teaching facts such as names and accomplishments of people (Shriberg, Levin, McCormick, & Pressley, 1982). The KWM has also been used to facilitate learning of a variety of foreign languages. Most experiments have focused on English speaking subjects learning Spanish (e.g. Sagarra & Alba, 2006, Wyra et al. 2007). The method has also been applied on subjects speaking or learning other languages such as Russian (Atkinson & Raugh, 1975), German (Desrochers, Wieland & Cote, 1991), Dutch (VanHell & Mahn, 1997), Tagalog (Thomas & Wang, 1996), Chinese (Wang & Thomas, 1992), Arab (Elhelou, 1994), Latin (Shapiro & Waters, 2005), and Italian (Hogben & Lawson, 1994). No studies investigated the application of the KWM on Romanian-speaking subjects.

Despite the large body of research supporting the advantages of the KWM, its utility and effectiveness have been questioned on several occasions. For instance, Hall, Wilson, and Patterson (1981) showed that free study can produce results superior to KWM when applied to college students. Hall (1988) also argued that the KWM's efficiency can be influenced by items' characteristics, and cautions that, depending on circumstances of the study, it can lead to poorer performances when it is exclusively used as a vocabulary learning method. Wang and Thomas (1995) indicated that, unless it benefits from repeated testing and rehearsals, KWM becomes fragile over time and its long-term effectiveness can be questioned. Other studies (Hogben & Lawson, 1994; VanHell & Mahn, 1997; Willerman & Melvin, 1979) have indicated that the KWM can produce similar or inferior results compared to traditional learning methods (rote learning), and the experienced language learners benefit less from the KWM than the inexperienced learners. Some authors (Beaton et al., 2005, Wyra et al., 2007) have helped explain these contradictory results by pointing out that these critics have used different procedures, testing protocols, and item characteristics than the studies supporting the KWM.

Out of the large number of studies on the KWM, only a few have investigated its classroom utility specifically, and their reports have been mixed, as well. Kasper (1993) proved that the KWM could be used efficiently in a classroom and argued that it needs to be treated as a tool to help students succeed as foreign language learners by helping them learn a large number of vocabulary words in a short time, and facilitating the transition from individual vocabulary to its application in sentences. Campos, Gonzales and Amor (2003) have indicated that the KWM is less effective than rote learning when applied to adolescents and adults in classroom settings. Their findings are consistent with those of Levin, Pressley, McCormick, Miller and Shriberg (1979), who found that the KWM does not work well when applied in high school classrooms, but can have significant positive effect when applied to elementary school classrooms. Authors also found that inexperienced high school learners can benefit more from the KWM than their more experienced peers. Positive results on the KWM's classroom performance were found by Avila and Sadoski (1996), who showed that the KWM is superior to the traditional method when applied to elementary school children (5^{th} graders) and when teachers provide students pictures with interactive images. Rodriguez and Sadoski (2000) used a combination of the KWM with context learning (inserting foreign language words in sentences written in native language) on

adolescents in foreign language classrooms. The results of the combination the KWM/context were superior to rote rehearsal, context learning and the KWM individually.

The studies above suggest that the KWM's successful application in the classroom context needs to be regarded with caution, and that the KWM can be efficient especially if applied to elementary school children and when interacting pictures are used. However, using interacting pictures in the classroom context can have its limits. The first, would be the unavailability of the KWM interacting pictures needed for each lesson and adapted to a particular curriculum. Second, assuming the sets of interacting pictures are available, purchasing those instruments would represent an extra expense for the classroom materials funds, which can be limited as well. Third, it takes a lot of time and artistic skills for a teacher to draw the two interactive pictures themselves, which would dramatically diminish the number of teachers both willing and able to do it.

Therefore, the current research aims to find out efficient and easy to use strategies that would help teachers use the KWM in the classroom.

PART 2: EMPIRICAL STUDIES

5. ORIGINAL CONTRIBUTION OF THE CURRENT RESEARCH

This paper does not question the benefits of facilitating a visual link between the new word and the keyword, as originally prescribed by Atkinson and Raugh (1975). Creating a visual link would require deeper cognitive processing, which would consequently result in a better retention of the new words. In the same time, as mentioned above, producing an interactive picture to facilitate the development of visual link might be challenging for classroom teachers. Thus, this paper aims to clarify the necessity of displaying an interacting picture representing the two words. Even though not emphasizing on the image link would probably diminish the KWM's positive impact on retention, the lack of necessity of interacting pictures would significantly simplify the job of a teacher. This way the teacher would simply access a clip art bank or an on-line pictures gallery, and show students two pictures representing the new word and the keyword simultaneously.

In order to assess whether the KWM is still efficient even when diminishing the impact of a major component (image interaction) three variables were considered:

a. *Imagery value.* Given the fact that visual stimuli usually produce strong memories (Shepard, 1967, Standing 1973), and considering the advantages of dual coding in learning (Paivio,1971), it can be argued that the efficiency of the KWM can depend on the imagery value of the word being taught (Shapiro &Waters, 2005). Shapiro and Waters (2005) indicate that concrete words with high imagery value (e.g. apple) can be recalled better than more abstract words (e.g. happiness). This helps to explain previous findings (e.g. Desrochers, 1982) which showed that the KWM is more effective when

more concrete words are used. In both experiments presented in this paper, only concrete words with high imagery value were used.

b. *Phonemic overlapping.* Recollection can be improved when there is a high degree of phonemic overlap between the new word and the keyword (Presley & Levin, 1981). In our study, most words have a rather high degree of phonemic overlapping (e.g. Italian 'carta', translated as 'paper', and Romanian 'cartea', translated as book).

c. *Images provision.* In the KWM application as originally prescribed by Atkinson and Raugh (1975) and most subsequent studies, subjects were asked to self-generate a mental image of the interaction between the new word and the keyword. Some studies used interacting pictures for the keyword condition. Evidence showed that when students are provided with pictures, the efficiency of the KWM relative to self generating words increases (Thomas & Wang, 1996), even for obscure words (Sharkin, Mohr & Glover, 1983). Shapiro and Waters (2005) also indicated that the ability to create a visual image is among the most important parts of a successful the KWM application. Beaton et al. (2005) emphasized the fact that the quality of keyword images can significantly affect the efficiency of the KWM over rote learning. In both experiments below, pictures of the new word and the keyword were provided to students.

Another issue addressed in this article is the control method. Most studies used rote rehearsal (simple repetition of the translation of the new word) or self study (subjects could choose their own method of study during a certain amount of time) as control methods. None of the studies cited in this article compared the KWM to a control method that included pictures. However, given the powerful value of visual stimuli in learning new material, and speculating that a method using visual stimuli would have an advantage over a method not using visual stimuli, assessing the efficiency of the KWM against a control method that uses pictures as well was needed. Therefore, pictures were used in this study as a supporting tool to rehearsal, while students were asked to repeat the new word.

The use of pictures in the control setting also makes sense from a classroom perspective and improves the degree of ecological validity in both experiments. Students in foreign language classes usually use text books with pictures attached to new words. Language teachers sometimes display pictures with the help of a projector or use pictures displayed on posters or textbooks to introduce the new words. Therefore, assessing the classroom validity of the KWM without including pictures in the control group would likely make the experiment less ecologically valid.

Another concern addressed in this study is the amount of time spent on using the KWM. Teachers have a limited instructional time. Using a new method (e.g. the KWM) that would demand significantly more instructional time than a traditional method, would probably make the new method less desired by teachers, and more difficult to implement in the classroom setting. The first experiment addresses the KWM's implications on the effectiveness of instructional time usage by assessing the difference between the time spent on teaching the words with the help of a single picture vs. a pair of pictures (representing the new word and the keyword).

Finally, most studies on the KWM compared it against rote rehearsal. The current study investigates the efficiency of a method (experimental) using a pair of pictures representing the new word and its keyword meaning against a method (control) using just a picture representing the new word, when rehearsal is being used in both treatments. This paper does not try to suggest that rote rehearsal (even when pictures are displayed) of words lists would be a standard practice

in foreign language classrooms. However, it suggests that when a rather large list of vocabulary words (e.g. more than 15) needs to be introduced to students in a short amount of time, an initial presentation of items' pronunciation together with pictures representing their meaning using the KWM and Power Point might help improve retention and might facilitate learning of those items through subsequent different methods (e.g. learning from context). This type of presentation can also be used when reviewing the newly introduced vocabulary words. Thus, the KWM is not contrasted to a more traditional vocabulary learning method (like rote rehearsal), but its efficiency is assessed as a supporting tool to rehearsal.

6. STUDY 1: THE NECESSITY OF IMAGERY INTERACTION DURING THE USE OF KEYWORD METHOD

6.1. The objectives and study hypothesis

The first study aimed to assess the efficiency of KWM when applied to children (ages 8-9) individually, when they are being shown two non-interacting images (representing the meaning of the new word and the meaning of the keyword).

The study's hypothesis was the following:

The memory ability involved in learning new words in a foreign language is improved when school age children are shown individually, simultaneously, non-interactive images representing the new word in a foreign language and a known keyword in the native language, without.

6.2. Method

A within-subjects experimental design was chosen for this study, involving two variables: learning method (KWM vs. control) and assessment time (immediate vs. delayed – after 7 days). Thirty-one Romanian-speaking 2nd and 3rd graders (age 8 – 10 years, 11 boys and 20 girls) participated in the first study. They had to learn new vocabulary words in English. All students were Romanian native speakers and none of them was raised in a bilingual family. None of the students lived abroad or were immersed in an English speaking environment. The students were not selected based on evidence on prior performance criteria, such as cognitive ability, language learning aptitude or school grades. However, all students were registered in regular education classes in regular schools. All students had limited experience with the English language. Two series of 5cm x 10cm flash cards were used in this experiment. The flash cards contained pictures (but not written words) representing the new vocabulary words to be learned. The A series flash cards had one picture of the new word and they were used in the control treatment (e.g. picture of tent for the word "tent"). The B series flash cards were used in the experimental condition. They had two images: the image of the new word (e.g. "chin"), and the image of a keyword (e.g. the number five – translated "cinci" in Romanian, and pronounced "chin-ch"). To avoid creating a visual link between them, the two pictures were placed on the upper left corner of the card (new word), and on the lower right corner respectively (keyword), while they were

separated by a 2 mm thick diagonal line that was traced between them. Furthermore students were not encouraged to visually associate the two images when instructions were given.

Each participating student had to learn a total of 46 vocabulary words in English, in two different treatments: picture of the new word + picture of a keyword (experimental), and picture of the new word alone (control). In each treatment there were selected 23 concrete, high-imagery monosyllabic nouns. In no case were the words' translations or pronunciations phonologically similar with any Romanian word. Prior to the experiment, the imagery value of the words was assessed on a sample of 28 second graders. They were asked to rate the imagery value of the words on a scale from 1 to 7 (1 lowest, and 7 highest). The imagery score means was 6.71 for the experimental words group and 6.74 for the control words group. Results indicated that both groups used high imagery but no statistically significant different ($p>.05$) items.

The effectiveness of the KWM was assessed by testing students individually, when an illustration with two separate pictures (and not one interactive picture) representing the two words was shown to learners in the keyword condition. During the experiment the learning time spent in each condition was measured. The same number of rehearsals and similar instructions were used in both the KWM and control method.

Each participant had to learn a total of 46 new words in both conditions (23 keyword and 23 control). The testing lasted about 30 minutes for each condition. To control for "carryover effects", the two conditions were counterbalanced: the first 18 subjects started the learning stage under the KWM treatment then continued under control treatment, while the next 13 subjects started under control treatment and continued under the KWM treatment.

The recognition of all 46 to-be-learned English words was verified prior to the learning stage. The words were read out loud by the test administrator and the participating students were asked to translate them into Romanian orally. Items that were translated correctly were removed from the next experimental stages. Four repetitions were used in both Keyword and control treatment.

Students were asked to do their best to remember each word, and they were told that they would be tested at the end of the learning session.

The learning stage was timed in each treatment. The time average spent in the learning stage under the KWM treatment was 13 minutes and 37 seconds, while the time average spent using the control method was 11 minutes and 56 seconds. A 14.08% increase of instructional time was needed for the KWM, relative to the control treatment.

After the learning stage and a two-minutes break, the new words were assessed (T1). Seven days later (T2), subjects were assessed again without prior notice. The procedures were identical to the ones used during the immediate assessment stage.

6.3. Results

To assess the effect on each learning condition, a 2 (time) x 2 (treatment) repeated-measures analysis of variance (ANOVA) was conducted, with percent correct scores as the dependent variable.

Results indicate that the KWM was more effective than the control method ($F(1,30) = 186.35$, $p < .001$, $\eta_p^2 = .861$) (see Table 1). A significant main effect for the KWM was obtained when subjects started learning first in the KWM treatment ($F(1,17) = 125.88$, $p < .001$, $\eta_p^2 = .881$), as well as when they started leaning in control treatment ($F(1,12) = 70.11$, $p < .001$, $\eta_p^2 =$

.854), indicating that the "carryover effect" on within-subjects design didn't influence this experiment.

The analysis of variance also yielded a main effect for assessment time, $F(1,30) = 51.89$, $p < .001$, $\eta_p^2 = .634$. The data show a significant performance decrease seven days after the immediate assessment, in both the KWM and Control treatments (see Table 1).

There was a significant interaction effect between the vocabulary learning method and assessment time $F(1,30) = 9.66$, $p < .01$, $\eta_p^2 = .244$, due to the fact that the performance decrease was larger in the KWM treatment than in the control treatment.

6.4. Discussion

The purpose of the first experiment was to evaluate the efficiency of learning new foreign language vocabulary words through a method (experimental) that used simultaneously two non-interacting pictures representing the new word and the meaning of a keyword, against a method (control) that used only a picture of a new word. Both experimental and control conditions involved the same participants (within subject experimental design), the same number of repetitions, and both used pictures to represent the meaning of the new word. The variable added to the experimental method was the keyword picture. Most importantly, the two pictures in the keyword treatment were presented separately on the same flash-card, with no interaction. The subjects were not instructed to imagine a link between them.

The results indicate that the addition of a keyword image improves word learning (about 2:1 ratio), as demonstrated by both immediate and seven-days-later assessments.

However, the decrease of recall performance seven days later was stronger in the KWM than in control treatment, suggesting that probably the differences in recall performance between the KWM and control treatment would be smaller after a longer period of time, or that control treatment would eventually have better results after a certain period of time. The results indicate that the efficiency of the KWM can diminish over time. Still, the results encourage the use of a keyword image as a tool supporting rehearsal in short-term foreign vocabulary learning situations considering that the KWM treatment yielded a more significant main effect over the control condition seven days later.

Since data from the first study confirmed that the KWM is effective when two images with no interaction are being presented to elementary school students in a one-on-one setting, subsequent studies were considered necessary to assess its effectiveness in a regular classroom environment, its impact over a longer period of time, and whether there was a difference in performance when applied to older students.

7. STUDY 2: THE IMPACT OF USING KEYWORD METHOD IN THE CLASSROOM

7.1. Objectives and hypothesis

The objective of this study was to conduct a group assessment of the efficiency of memorizing new words in a foreign language with the help of keywords, in a regular foreign language classroom.

The study had the following hypothesis:

The memory ability involved in learning new words in a foreign language is improved when non-interactive pairs of images representing the new word and its keyword, are presented to groups of students in a classroom setting.

7.2. Method

This experiment assessed the efficiency of the KWM in the classroom for learning vocabulary words in Italian as a foreign language. The same group of words was learned by two different groups of participants, assigned to one of two different treatments (between-subjects design).

One hundred and one 3rd graders (age 9-10 years) from 4 different classrooms belonging to the same Romanian urban elementary school participated in this experiment. Students were randomly assigned by classes to one of the two treatments: experimental (picture representing the meaning of the new word + picture of its keyword) and control (picture representing the meaning of the new word). There were 52 participating students (28 boys, 24 girls) in the experimental treatment, and 49 in the control treatment (24 boys, 25 girls). After the distribution, the two groups were controlled for memory ability, phonemic awareness ability, and general performance on a semester standardized native language test. The general academic performance in native language skills was assessed using the grades of the standardized semester test converted in percentages. There was no significant difference ($p > .05$) between the experimental (91.54 %) and the control (92.83%) group.

There were 15 to-be-learned Italian concrete nouns in this experiment, the same for each treatment. Eleven of them were two-syllable words, while the remaining four were three-syllable words. Overall, the imagery value of the 15 words was high ($M = 6.30$) on a scale from 0 to 7, as indicated by a group of 28 third graders. The pronunciation of each to-be-learned word had a highly acoustical similarity with the pronunciation of their Romanian keywords. However, none of the 15 to-be-learned words resembled with their Romanian translation.

Students were told that they would participate in a one-time Italian-language class and would receive extra credit for their work. They received instruction and were tested in groups by classes, in the same classroom within their school setting. Before the learning session began, the test administrator read out loud all 15 new vocabulary words, and the students were asked to write or mark off the Romanian translation of each word.

A Microsoft Power Point presentation was used to introduce students to the new words. An average of 9 minutes was needed for the presentation of the 15 items for 3 times to the experimental groups and 7.5 minutes for the control groups. After the presentation of the 15 items, a 5-minute distraction activity was conducted prior to the same-day assessment (T1). After the completion of the math activity, the test administrator assessed the students (T1) by reading out loud the words in a different order than the one presented in the learning session. Each word was read out twice, with a 5-seconds interval between them. Students were asked to write the Romanian translation of each word they remembered. One week later, the students were assessed again (T2) through the same procedure without prior notice.

7.3. Results

A 2 (time) x 2 (treatment) repeated-measures analysis of variance (ANOVA) was conducted, to compare the recall performance (percent correct) of participants from the experimental and control treatments.

The analysis indicated no significant main effect for time F (1,99) = .120, $p > .05$, η_p^2 = .001, and a significant main effect for treatment F (1,99) = 18.33, $p < .001$, η_p^2 = .156. Results also indicated a significant interaction effect between time and treatment F(1,99) = 4.09, p = .46, η_p^2 = .040 (see Table 1).

7.4. Discussion

The purpose of the first experiment was to evaluate the efficiency of learning new foreign language vocabulary words through a method (experimental) that used simultaneously two non-interacting pictures representing the meaning of the new word and of a keyword, against a method (control) that used only a picture to represent the meaning of the new word.

Results indicated that groups of students in a classroom setting remember better the new vocabulary words when their pronunciation is associated with paired (but not interacting) pictures (new word + keyword), compared with the presentation of single pictures. This outcome was possible when all items were concrete nouns with high imagery value, paired with highly acoustical similar keywords.

There was no significant main effect for time between T1 and T2 indicating that the recall performance did not decrease significantly after one week. This can be explained by the low number of items (15) to be remembered. Another study conducted with a larger number of items might clarify the generalizability of these findings.

The experimental group had a statistically significant better performance in both T1 and T2. However, results from T2 suggested that over a longer period of time the differences in recall performance between the two treatments would be smaller, and an intersection is possible. This hypothesis can be clarified with a subsequent study addressing the efficiency of the KWM over a longer period of time.

An average of 20% more instructional time was needed to introduce the new words using the KWM relative to the control method. This might represent an inconvenience for teachers considering the limited instructional time. However, in our study the experimental group had a performance score of about 50% higher than the control group (see Table 1), suggesting that the efficiency of learning the new vocabulary words might compensate for the time loss. It is also possible, that the more teachers use the KWM, the less instructional time they would need to introduce the new words.

The first study indicated that when teaching elementary school students foreign language concrete nouns with high imagery value, using paired pictures representing the new word and a highly acoustical similar keyword a significant short term performance improvement can be expected even when the pictures are not interacting with each other.

8. STUDY 3: THE IMPACT OF USING KWM BY STUDENTS IN DIFFERENT AGE GROUPS

8.1. Study's objectives and hypothesis

The first two studies assessed the performance of elementary school students (ages 8-10). Some of the aforementioned studies (see 4.5.) showed that it was possible that students in their early school years might have a better performance in learning a foreign language when mnemonics are being used, compared with older students and adults. The first objective of this study was to compare the performance of older (grade 8) and younger (grade 2) students. The second objective was to assess the memory performance of students after a longer (one month) period of time, compared with previous studies.

The hypotheses of this study were as follows:

Memory performance of younger students is higher compared with the one of older students when they use KWM to learn new vocabulary words in a foreign language.

The memory performance when learning new vocabulary words in a foreign language is higher when KWM is being used, compared with presentation of individual pictures or words' spelling, even a month later.

8.2. Method

In this experiment the KWM was compared against two traditional vocabulary learning methods (three levels within-subjects design), while the performance of elementary school students was compared to the performance of middle school students (two levels between-subjects design).

The school performance of 174 students, attending 6 different classrooms (three 2nd grades and three 8th grades) from the same urban school in Romania, was assessed in order to select the top learners in each grade level. Three teachers from each classroom (one of whom was a foreign language teacher) were asked to make a list with the top 10 students in each classroom based on their academic performance. The following criteria used for academic performance were considered: the retention of new content presented during classroom activities, the attention span displayed during classroom activities, the degree of participation in classroom activities, and the results from pop-quizzes. The teachers were specifically instructed not to rate the students' performance based on classroom behavior, homework assignments, or grades obtained on summative assessments. All teachers had at least one year experience with the respective class. After cross referencing the lists from each teacher, a number of 24 second graders (7 -8 years, 7 males, 17 females) and 21 eighth graders (13 - 14 years, 11 male, 10 female) were selected to participate in the experiment. None of the students took Italian classes, spoke Italian, or had been immersed in an Italian-speaking environment for more than 1 week.

Three groups of 10 Italian concrete nouns with high imagery value (see selection criteria below), used in three different treatments, were selected as new vocabulary words for the

experiment. Each group of 10 items contained eight two-syllable nouns and two three-syllable nouns.

The two groups of second and eighth graders participated in the experiment in separate sessions, within the school setting. A Microsoft Power Point presentation was used to introduce students to the new words.

After each new word was repeated 3 times, and after a two minute break, the teacher assessed the students (T1) by reading out loud the words in a different order than the one presented in the learning sessions. Students were asked to write down the Romanian translation of each word they remembered. The students were assessed again without prior notice one week later (T2), then one month later (T3), using the same procedure as in the same-day assessment session.

8.3. Results

A 3(time) x 3(treatment) x 2(grade) mixed analysis of variance (ANOVA) was used to compare the recall performance (percent correct) of participants in both age groups.

The analysis indicated a significant main effect for time $F(2,86) = 36.86$, $p < .001$, $\eta_p^2 = .462$. More precisely, post-hoc pairwise comparisons with Bonferroni corrections indicated that participants' performance was better in T1 than in T2 ($p < .001$), and better in T1 than in T3 ($p < .001$), but no significant difference in performance was found between T2 and T3 ($p > .05$) (see Table 2).

Results also indicated a significant main effect for treatment $F(2,86) = 193.02$, $p < .001$, $\eta_p^2 = .818$. The post-hoc Pairwise comparisons with Bonferroni corrections indicated that participants' performance was better in K treatment compared with P treatment ($p < .001$) and W treatment ($p < .001$), but no significant difference could be found between P and W treatment ($p > .05$) (see Table 2).

The between subjects analysis indicated a significant main effect for grade $F(1,43) = 33.99$, $p < .001$, $\eta_p^2 = .441$. Although 2nd graders had a better performance in K treatment than 8th graders in both control treatments, overall the 8th graders had a better performance in T1 ($M = 52.20$, $SD = 25.70$), in T2 ($M = 41.69$, $SD = 25.10$) and in T3 ($M = 41.52$, $SD = 25.85$), than 2nd graders in T1 ($M = 31.30$, $SD = 27.42$), in T2 ($M = 22.78$, $SD = 23.03$), and in T3 ($M = 24.44$, $SD = 24.77$) (see Table 2).

No interaction effect was found between time and grade $F(2,86) = 1.21$, $p > .05$, $\eta_p^2 = .027$, between method and grade $F(2,86) = 1.62$, $p > .05$, $\eta_p^2 = .036$, between time and method $F(4,172) = 0.48$, $p > .05$, $\eta_p^2 = .011$, and between time and method and grade $F(4,172) = 2.10$, $p > .05$, $\eta_p^2 = .046$.

As Table 2 indicates, the difference between the experimental (K) and control (P and W) treatments was larger in 2nd graders (an average of about 3:1 ratio) than in 8th graders (about 2:1 ratio).

8.4. Discussion

Overall, the use of the KWM proved to be more effective than both control methods when applied to 2nd and 8th graders in all cases, that is after short (T1), medium (T2) and long

term (T3) evaluation of the group instruction. Even after 28 days, the recall rate in 2nd and 8th graders was higher for words learned in K treatment than the immediate recall performance in any of the control methods. The results lead to the conclusion that the methodology used in this experiment supports a positive long-term effect of the KWM.

The 8th graders had a general better recall performance compared with 2nd graders, in all assessment times. This can be explained by the fact that older students have a higher cognitive performance and better developed strategies for memorizing new words than elementary school children. However, the K treatment helped 2nd graders have better performance than 8th graders in P and W treatment, indicating that the use of keyword pictures can facilitate young students to outperform older students using traditional learning methods.

The performance of the two age groups indicated that 2nd graders benefit more from the use of the KWM, having a better performance (about 3:1 ratio) than 8th graders (about 2:1 ratio) relative to control methods. These findings are consistent with studies referenced earlier in this article that indicate that the KWM is more efficient for less experienced, and supports the use of the KWM for children and/or inexperienced learners. The results show that the KWM is more efficient because of the general poor performance of 2nd graders relative to 8th graders in the control methods, and not because the KWM helped younger students have better performance than the older students (see Table 2).

The higher performance ratio between the experimental and control methods in the 2nd study compared with the 1st study might be explained by several hypotheses. It is possible that when students have the opportunity to chose between several learning methods, their attention focuses more on the easier-to-learn method (picture + keyword) while less cognitive resources might be directed towards the more difficult learning task (picture alone, or word alone). Since the pronunciation of the new words from the 1st study had a highly acoustical similarity with the pronunciation of their keyword, another possible reason for the different performance ratio in the two studies can be that students in the control treatment of the 1st study could have made the associations with a keyword by themselves (consciously or not). It is also likely that students' performance in different learning treatments was more balanced when the list was shorter (15 items in the 1st study) than longer (30 items in the 2nd study). Thus, the KWM might be more resistant to retroactive interference than the presentation of a single picture or word's spelling, when learning longer words lists.

The longer words list in the 2nd study can also explain the significant performance decrease between T1 and T2. While in the 1st study there was no significant effect for time between T1 and T2 probably due to the short list of items, in the 2nd study the longer list of items might have been the cause of the significant performance decrease in all treatments after a week. However, even if the 1st study suggested that the learning performance in the two treatments might intersect over an extended period of time, the 2nd study contradicted this hypothesis. No significant differences in performance could be found between T2 and T3 in any of the treatments, indicating that the KWM is not as fragile over time as previous studies suggested (e.g. Wang & Thomas, 1995) if the methodology described in this paper is used.

9. STUDY 4: KWM VS. TOTAL PHYSICAL RESPONSE

9.1. Study's objectives and hypothesis

The forth study focused on the efficiency of learning new vocabulary words in a foreign language, by comparing two mnemonics used in teaching foreign languages to young students: KWM and total physical response.

The study's hypotheses were as follow:

Keyword Method is superior to Total Physical response when teaching foreign language vocabulary words to children ages 6-7.

The learning performance ratio between KWM and single picture presentation is higher in younger (6-7) than older (8-14) students.

9.2. Method

This experiment used a within-subjects design to compare the efficiency of learning different nouns lists in a foreign language (English) under three different experimental conditions: keyword method (K), total physical response (TPR) and single picture presentation (P). Thirty-four pre-primary school children (ages 6-7, 11 boys, 23 girls) from 3 different Romanian rural schools were selected to participate in this study. Each participant had to learn a total of 30 concrete nouns in English, grouped in three different lists of 10 items each.

The experiment had four stages: initial assessment, intervention, next day assessment, and two-weeks-later assessment. Each participating child's receptive vocabulary knowledge of the 30 to-be-learned words was assessed individually prior to the intervention. Then, each group of students from the three schools, had a one-time English lesson, aimed to help them learn 30 English vocabulary nouns. The lesson consisted in a 30 minutes average group activity conducted in a regular classroom. The vocabulary words were introduced in one of the three treatments, as follows: keyword method (K) treatment (10 words), total physical response (TPR) treatment (10 words) and picture (P) treatment (10 words). After a 2 minutes break, the teacher review the 30 new words by presenting each word again in each treatment, then she ended the lesson. In total, there were 4 repetitions of each word. The day following the intervention, each child was assessed again under the same conditions he/she was assessed prior the intervention. The assessment procedure was repeated two weeks after the intervention.

9.3. Results

A 2(time) x 3 (treatment) repeated-measures analysis of variance (ANOVA) was conducted, to compare the recall performance (percent correct) of participants from the experimental and control treatments. The analysis indicated no significant main effect for time $F(1,33) = 3.04$, $p > .05$, $\eta_p^2 = .084$, but significant main effect for treatment $F(2,66) = 58.11$, $p < .001$, $\eta_p^2 = .638$. Results also indicated no significant interaction effect for time and treatment $F(2,66) = 3.15$, $p > .05$, $\eta_p^2 = .087$. Post-hoc pairwise comparisons with Bonferroni corrections indicated that the learning performance of vocabulary words presented in K treatment was

significantly better ($p < .05$) than the words presented in TPR and P treatment, and there was no significant difference in performance between TPR and P treatment ($p > .05$).

9.4. Discussion

The present study aimed at assessing the efficiency of the Keyword Method and the Total Physical Response Method when learning new vocabulary words in a foreign language, compared with a more traditional method consisting of simultaneously modeling the correct pronunciation of the new word while presenting the learners a picture representing its meaning. In order to maximize the effect of the two mnemonic treatments, the keywords in the K treatment had a high degree of phonemic overlapping, and the words in the TPR treatment were all body parts, easy to manipulate.

Results indicated an overall poor retention rate, compared with similar studies conducted with older children (see Dolean, 2013b). The findings can be explained by the fact that at this young age the cognitive abilities are limited, and the group learning skills are yet to be developed. Also, the rather large number of items used in this experiment, might be another cause for an overall poor memory performance, due to the retroactive interference. The results can be explained as well by the low socio-economic status of the participating children, and by the fact that English was not just unfamiliar to students, but it also belongs to a language family different than the native language of the participants. The last two hypotheses can be further clarified by a replication study with participating students belonging to a higher socio-economic status and/or a target language belonging to a language family closer to the participants' native language (e.g. Italian, Spanish).

Results showing a significant effect for K treatment compared with the TPR and P treatments indicate that the Keyword method is far more superior to the other methods when the vocabulary to-be-learned words are concrete nouns, with high imagery value, and when the new word and its keyword have a high degree of phonemic overlapping. They also showed that there was no significant difference in performance between the TPR and P treatments, indicating that TPR is not as efficient at this age as anticipated. Even though TPR is a sensory-motor method, and consequently more appropriate for children, results are consistent with Asher's (1967) findings indicating that children's performance rate in TPR is significantly less effective than the one of adults. However, the slight increase of TPR performance after two weeks, compared with the decrease of performance in K and P treatments indicate that learning through movements might help learners process the information at a deeper cognitive level.

The study shows that formal (explicit) teaching of vocabulary words to young children will result in a general poor learning performance, and probably much repetition is needed for children to reach the desired performance. However, if formal (explicit) teaching is the only learning option available, then educators might need to consider improving the teaching efficiency by using the keyword method when high quality keywords are available, even when the paired pictures are not interacting with each other.

10. CONCLUSIONS AND IMPLICATIONS

10.1. Teaching early a foreign language

The research aimed to address one of the frequently met needs in our contemporary society: teaching a foreign language during the early school years. Since a second language can be distinguished as early as prenatal period of development, it can be safely assumed that it is never too early to consider children's exposure and introduction to a foreign language.

A large body of research argues for and against the appropriateness of early foreign language education. Most of those studies agree that pronunciation has an age-related decline, and that the sooner we learn a foreign language, the better our chances to develop a 'native-like' accent.

When it comes to assessing the efficiency of time spent to learn a foreign language, empirical evidence proves that children learn it fastest during or after puberty. However, the data showing that young age groups (especially the group 3-5 years old) scored the lowest on the formal tests assessing foreign language learning skills, can raise questions regarding the efficiency of foreign language formal lessons during kindergarten when the target language is not accessible outside the classroom. This apparently contradictory information supports the conclusion that while organizing foreign language lessons in early childhood might not be a very effective use of children's time, organizing activities that mimic a 'natural foreign language environment' can help children have long term benefits in acquiring a second language. Successful immersion programs in kindergarten can help children develop skills 'in a foreign language' and do not necessarily need to aim at helping them 'learn a foreign language' explicitly. The data presented above require a clear distinction between different types of psychological mechanisms involved in acquiring a second language. Foreign language lessons are conducted explicitly, while immersion-type programs address foreign language education implicitly. Foreign language lessons provide knowledge, which the speaker is supposed to retrieve consciously using the declarative memory. Immersion-type programs focus on developing foreign language skills, which are automated and whose retrieval relies on procedural memory. While foreign language lessons taught explicitly can be assessed fairly accurately using a knowledge-based test, the retrieval of language skills and knowledge from procedural memory is not an equally easy task. Therefore, registering children to kindergarten foreign language programs with the sole (or main) purpose of learning a second language and then assessing foreign language skills using a knowledge-based test might be a difficult, if not impossible measuring-task to be done accurately (e.g. Name the animals you learned today at kindergarten). Yet, registering children in kindergarten foreign language programs that emphasize learning different subjects and developing age-appropriate skills in a foreign language will help improve second language acquisition, but will not necessarily help mastering it. When we set the goals for mastering a second language, we need to consider the conversational/academic distinction in achieving language proficiency introduced by Cummins (1979). While Basic Interpersonal Communicative Skills (BICS), or social language, are considered to be achieved in 2-3 years, Cognitive Academic Language Proficiency (CALP), also known as academic language, takes 5-7 years to be mastered.

While the contextualizing language provided in immersion-type programs makes it easier for children to learn the social language implicitly, it takes explicit foreign education lessons for foreign language skills to achieve academic proficiency. The findings indicating that the implicit learning ability is more influenced by the age constraints and the lack of efficiency of explicit foreign language lessons at this age encourage the idea of developing implicit foreign language activities in kindergarten. Thus, early foreign language education programs might benefit best if they are designed to provide implicit language learning experiences.

A final consideration that needs to be addressed here regarding the immersion programs is the academic proficiency of school subjects taught in a foreign language. While a total immersion program might entail the risk that students would not have the best possible academic experience due to their lack of understanding the meaning of the new concepts (e.g. teaching the concept of 'triangle' for the first time in a foreign language, will not have an equivalent translation in the native language), a partial immersion program (teaching only certain subjects) might be able to eliminate those risks. To be successful, such a partial immersion program might be geared predominantly to the practical abilities/elective classes (e.g. culinary arts) and use the foreign language to give specific instructions ('Take one spoon of flour') in order to teach specific skills ('How to bake a cake'), while using concepts in a foreign language that students are already familiarized with in their native language. When kindergarten children are involved in activities that are aimed at developing specific age-related skills (e.g. pitch discrimination through songs, or hand-eye coordination through connecting dots) their time can be considered as being used efficiently. The use of their time is optimized when they perform the same activities in a foreign language (e.g. sing the songs in a foreign language, or receive instructions in a foreign language on how to connect dots and use a pencil, being already familiarized with the concepts of both 'dots' and 'pencil' in their native language).

The conclusions drawn from the studies above help identify an optimal period of teaching a foreign language.

If 'teaching a foreign language' consists of organizing meaningful age appropriate activities held in the target language, using concepts that children are already familiar with in their native language, then teaching can occur as early as children are registered in educational programs (i.e. kindergarten). Those programs help teaching age appropriate skills and they can help ensure a consistent exposure of the child to a particular foreign language, allowing them to develop a 'native–like' accent and acquire the foundations for a proficient acquisition of a foreign language later in life, without misusing children's school hours. Indeed, a partial immersion program that included activities like those presented in the previous paragraphs will help children being exposed to a foreign language to learn it implicitly, without burdening the curriculum with extra hours, and at the same time minimizing the risks of comprehension difficulties. Such programs would develop phonemic awareness, vocabulary and general communication skills, facilitating second language acquisition proficiency later in life.

If teaching consists of organizing explicit foreign language lessons, aimed to reach an academic proficiency, then the best use of the instructional time to organize those activities would probably be around puberty. Since drawing a definite and clear boundary between the two age groups is a very difficult task to do, it is probably best to consider using implicit learning

activities at a younger age and gradually develop them into fully explicit language learning lessons around puberty.

Considering that few kindergarten/elementary school teachers have credentials in teaching a foreign language, and then it seems important to focus the research on methods that can help young students learn explicitly a foreign language within the school environment.

10.2. The impact of using Keyword Method on learning new vocabulary words in a foreign language

Learning new vocabulary words in a foreign language is important not only because it improves vocabulary size, but also because it help learn implicitly grammar rules. That's why, studying the vocabulary of a foreign language plays an important role in the process of learning a foreign language especially during its beginning stages.

Using KWM to learn new vocabulary words is a technique frequently used. Yet, few studies reported its successful usage in the classroom. One of the reasons might be the difficulty of generating interactive pictures to represent the new (foreign) words and its keyword (in the native language). That's why the main objective of the first study was to assess the necessity of providing interactive pictures. Results showed that when memorizing conditions are optimized (concrete nouns with high imagery and phonological overlap), the association of the two pictures can produce results that are significantly better than control condition, even when they are not interacting with each other. These findings can be helpful to foreign language teachers, because it means that they can easily access and use pictures in digital format (e.g. clipart galleries) or use internet search engines (e.g. Google images) to find two pictures, without the need of creating an interactive picture between them.

The second study showed that using a non-interactive keyword picture can improve memory ability for learning new vocabulary words in a foreign language within the classroom as well. The results are encouraging for foreign language teachers because they have high ecological validity and they show teachers that they can use easily the KWM if they have a computer connected to a video projector. The application of KWM in the classroom was also easy to use, because the directions given by the teacher were very few and easy to follow.

The results of the third study were not consistent with previous studies that showed that mnemonics can help young students have better performance compared with older students. However, results suggested that mnemonics can help younger students (2^{nd} grade) benefit more than older students (8^{th} grade), probably because the young students don't have the cognitive maturity and the study skills older students have. Results suggest that KWM can benefit more if used with young and inexperienced learners.

The third study also showed that KWM can have higher performances even a month after the learning session, and the forgetting rate is the highest within the first 7 days. These results suggest that the KWM is sustainable in time.

The results of the forth study also suggest that children in their early school years (6 years old) can benefit even more from KWM. This phenomenon can be explained by the low

performance in the control method of young children. This study also showed that TPR is not as effective as KWM, despite being a suitable sensory-motor method for this age.

The results of the four studies do not suggest we'll always benefit from KWM when learning new vocabulary words. They suggest however, that we can anticipate a significant increase of memory performance when we use pictures with keywords as an auxiliary tool to rehearsal or the simple presentation of new items, when the new words are concrete nouns with high imagery value, and high phonological overlapping. Results indicate that when we consider the conditions above, we can anticipate a dramatic increase of students' performance in the classroom, from early elementary school to late middle school.

The words used in the four experiments were selected to properly illustrate the efficiency of KWM without the interaction of the two pictures. However, the optimized experimental treatment limits the generazibility of the results. Yet, previous studies have shown successful use of KWM when learning obscure words with low phonological overlap (Sharkin, Mohr & Glover, 1983), when learning verbs (Miller, Levin, & Pressley, 1980), and abstract words (Mastropieri, Scruggs, & Fulk, 1990). The only variable that seems to affect the efficiency of KWM signifficantly was the imagery value of words (Shapiro & Waters, 2005). Results above suggest that the methodology used in the four experiments can lead to superior memory performance when we use pictures with keywords to help memorizing new vocabulary words, even though performance might be less dramatic.

Another limitation of KWM in the classroom might be the fact that the teacher needed 14-20% more time to present the words to students when using keyword pictures. This might be an apparent disadvantage for a foreign language teacher, with a limited time to reach curriculum goals. On the other hand, when the new words are within the optimized criteria presented above, the efficiency of learning a new language using KWM would probably compensate the time loss.

In sum, adding a keyword picture to the picture of the new vocabulary word increases retention performance in foreign language classes. However, considering previous successful applications of the KWM in other different subjects (e.g. L1 Language Arts, Science, Social Studies), the findings of this study can probably help increase the effectiveness of instruction in most lessons that introduce new vocabulary words.

10.3. Original contribution of the research

Keyword Method was the subject of a large body of research starting with mid 70'. Those studies investigated its impact on a diverse population (see 4.5.). However, none of the studies mentioned above did not focus on the impact KWM has on Romanian speaking population. Thus, the application of KWM on Romanian students is one of the first original contributions of this thesis.

Probably one of the most important contributions of this paper is dismantling the necessity of imagery interaction between the picture of the new word and the picture of a keyword, even though the purpose of this study was not to undermine its value. However, the lack of necessity of interacting imagery helps considerably teachers' classroom activity, by

encouraging them to consider an easier alternative to present the new words to students, or to rehearse the weekly vocabulary words.

Another original contribution of this thesis is the control condition used in the four experiments. Traditionally, KWM was compared with rote rehearsal or individual study of a words list. In the above studies, KWM was not contrasted against, but used as a support to learning by rehearsal. Also, another particular aspect of the control condition was that visual stimuli were used in both experimental and control conditions, considering the impact of visual stimuli on memory (see 4.3.). Thus the paper limited the impact of a confounding variable in methodology (the presence vs. the absence of visual stimuli).

One sensitive issue concerning KWM's classroom application represents the time invested in using this method. The first two studies compared the time used in the experimental and control condition. The results showed that an average of 14-20% more time was necessary to introduce the new words using KWM; however, the memory efficiency improved by more than 100%, under optimal conditions, thus compensating the time loss.

The use of technology in the classroom is a contemporary research interest. Study 2 and 3 used Microsoft PowerPoint presentations to introduce students the new vocabulary words. This methodology facilitates significantly the effort the teacher is expected to make when organizing the materials for the classroom activities. This is the first research that uses Microsoft PowerPoint to teach students using KWM.

Results from all studies were consistent with previous studies, indicating that KWM benefits mostly to young children (see 4.5.). Studies 3 and 4 suggest that this strategy is to be optimally used when teaching foreign language to children in their early school years.

Finally, another original contribution of this thesis is the comparative analysis of efficiency of KWM contrasted with Total Physical Response. Surprisingly, the Total Physical Response not only had a significantly lower efficiency in memorizing the new vocabulary words, but also had a similar performance with memorizing the single picture presentation of the new words. Results suggest that learning new words using KWM it is possibly one of the most efficient mnemonic strategies for learning new vocabulary words in a foreign language by children in their early school years.

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