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Children 'Think Aloud' and 'Talk About' Vocabulary Strategies in an Integrated Memory-based Text Framework

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Abstract

The present study aimed at recording and comparing the vocabulary strategies employed by Greek students and bilingual immigrants in an integrated memory-based text framework. Moreover, an effort to correlate the language strategies employed by the participants with their academic performance was attempted. The sample consisted of 20 monolingual and 20 bilingual students of Albanian origin, who attended the 5th and 6th grade of three primary schools in Eastern Thessaloniki, Greece. The monolingual and bilingual students were matched according to their mark reports on academic performance. Qualitative techniques were used for data collection: a) an instrument for recording students' profiles and their difficulties in acquiring vocabulary and memorizing a text b) 'think aloud' protocols and retrospective interviews. The identification of the strategies, employed by monolingual and bilingual children in an integrated text framework resulted in the compilation of a strategy

model: a) exploration strategies, b) process strategies, c) memory strategies and d) confirmation/consolidation strategies. The correlation of the process strategies with the academic performance was statistically significant in monolingual students, as well as in bilinguals. A stronger positive correlation was found between the memory strategies and the monolinguals' academic performance, while a positive trend also emerged for bilinguals. Although the study is limited in scope, the strategies resulted from the analysis of the collected data, constitute a holistic process/approach of vocabulary acquisition in an integrated memory-based text framework.

Keywords: vocabulary acquisition, strategies, monolingual students, bilingual students, reading process, primary education.

1. Introduction

Language strategies have been defined in various ways; they are described as “any sets of operations, steps, plans, routines used by the learner to facilitate the obtaining, storage, retrieval and use of information” (Wenden & Rubin, 1987: 19) or “thoughts used by the learners so as to better help them understand, learn or remember new information” (Richards & Platt, 1992 in Griva, Chostelidou & Tsakiridou, 2011).According to Oxford (1990), learning strategies can facilitate the internalization, storage, retrieval, or use of the new language, and they can make the language learning more successful, self-directed and enjoyable. In addition, Ellis (1994) provided a definition, which includes mental and therefore unobservable processes. Following the existing several language learning strategy classification systems (e.g. O'Malley & Chamot, 1990; Rubin, 1987), Oxford (1990) expands those previous models by dividing them into six strategy categories: cognitive, memory, compensation strategies, as well as metacognitive, affective and social strategies, which were grouped into two major broad types: direct and indirect ones.

Memory strategies are included in the two most common classifications of learning strategies. O'Malley and Chamot (1990) place memory strategies among cognitive strategies and they are used for the acquisition, storage, retrieval and use of language information (reference in Pineda, 2010).

In the same line, Bellezza (1981) refers to the mnemonic "techniques" as cognitive procedures that aid the physical "transfer" of the information we want to memorize, to a form which is easier to remember.

Ahmed (1989) sees memorizing as a purely mechanical activity (oral and written repetition) while Gu and Johnson (1996) talk about repetition and encoding strategies referring to visualization, images and audio correlations (reference in doctoral thesis of Ruutmets, 2005). Schmitt (1997) argues that most memory strategies involve the association of the word, which must be maintained, to prior knowledge, by using some form of images or grouping.

In our study, we decided to adopt the broad term "memory strategies." That is, a memory strategy can be broadly defined as any mental process intentionally stimulated to achieve information storage and conscious recall. With the aid of various mnemonic tactics, the information is organized, transformed or maintained in such a way, as to ensure the most effective use of the limited capacity of our memory system. Given the variety of the language strategy classification systems, the purpose of this study was to record and compare the vocabulary strategies employed by Greek students and bilingual immigrants in an integrated memory-based text framework.

Vocabulary acquisition is more complex than knowledge of words and word meanings and it is related to students’ reading comprehension and academic success (Baumannn, Kameenui & Ash, 2003 in Griva, Geladari & Kamaroudis, 2010). Both vocabulary knowledge and reading comprehension are closely related, since vocabulary knowledge can help students comprehend texts and reading can contribute to vocabulary acquisition/ growth (see Nation, 2001). Cooper (1984) regarded vocabulary as being the key component to successful

reading while other researchers argue that "no text comprehension is possible, either in one's native language or in a foreign language, without understanding the text's vocabulary" (Laufer 1997: 20, cited in Anjomshoa & Zamanian, 2014).

Vocabulary acquisition strategies are a subcategory of language strategies and constitute knowledge about what students do in order to find out the meaning of new words, retain them in long-term memory and recall them when needed (Ruutmets, 2005).

Categories of classification can vary greatly in terms of learning context and relative immediacy of the vocabulary acquisition task. In the past, vocabulary acquisition strategies only comprised of memory strategies, because vocabulary acquisition was merely regarded as a process of memorizing a list of words. However, in recent years, vocabulary strategies have primarily aimed at cognitive and metacognitive student activation (Gu & Johnson, 1996).

Thompson (1987, with reference in Li, 2004), on the other hand, provides a taxonomy including six subcategories linked to a deeper word processing level: linguistic, visual, spatial, the physical response method, verbal processing methods and other memory enhancing techniques.

Gu and Johnson (1996) developed a taxonomy of vocabulary acquisition strategies, by integrating some previous classification systems, which included four categories:

a. *Metacognitive* strategies, including selective attention (identifying essential words for comprehension) and self-initiation (using a variety of means to make the meaning of the words clear).

b. *Cognitive* strategies, such as guessing (using background knowledge/linguistic cues), use of dictionaries and note-taking.

c. *Memory* strategies, such as rehearsal (using word lists/oral repetition/visual repetition, etc.) and encoding (association, imagery, visual, auditory, etc.).

d. *Activation* strategies, using new words in different context.

Schmitt (1997) divided the vocabulary acquisition strategies in five categories: determination, social, memory, cognitive and metacognitive. These strategies suggest ways for the discovery of the meaning of a new word, its consolidation and storage.

A relatively recent classification of vocabulary acquisition / teaching strategies is Nation's taxonomy (2001), in which we can identify three basic categories: a) *planning*: choosing what to focus on and when to focus on it, b) *sources*: finding information about words, c) *processes*: establishing Knowledge.

According to Cohen (1998),there are several ways of memorizing vocabulary: (a) the mechanical repetition, in which a word and its meaning are repeated until they are consolidated and can be recalled consciously, (b) the processing of the word structure, in which the word is analyzed according to its root, suffixes and the way it is inflected, (c) the use of semantic strategies by finding synonyms, semantic grouping or linking the word with the sentence that was found in or with another sentence and (d) the use of a mnemonic

technique in order to create a cognitive linkage, a cognitive mediator between an unknown word in a foreign language and its translation.

The oral and written repetitions appear to be the two most common ways students use for learning/acquiring vocabulary (Gairns & Redman, 1986; Schmitt 1997). Gairns and Redman (1986) attribute the use of repetition to the fact that it allows students to use the language more easily, which provides them with a sense of achievement.

We could say that memory strategies constitute the core of learning strategies, since they are designed to store and recall information, with the purpose of learning.

Flavell was the first to find that the repetition and organization strategies develop between the ages of 5 and 10 years old (Schneider, 1999). Schwenck, Bjorklund and Schneider (2009) demonstrated that when children grow older, they become more capable in the use of strategies that help encoding, storing and retrieving information.

In addition, it was noticed that the average number of strategies used increases with age (Bjorklund and Coyle, 1995) as well as there is a correlation between the strategies and the level of language proficiency (Anderson, 2005; Bruen, 2001; Phakiti, 2003). The differences between the most and least skilled students are identified in the number and range of strategies used, the way in which the strategies are applied and how suitable these strategies are. Students' understanding of what a task requires and how they could match a strategy to address these requirements appears to be an important factor of the effective use of learning strategies (Chamot, 2004).

The purpose of the present study, which was conducted from November 2015 until February 2016, was to record and compare the vocabulary strategies employed by Greek students and bilingual immigrants in an integrated memory-based text framework.

In particular, an attempt was made to: a) record the difficulties encountered by monolingual and bilingual students in vocabulary acquisition and text memorization, b) record and compare the strategies used by monolingual and bilingual students in vocabulary acquisition as well as text comprehension and memorization and c) explore the correlation of the strategies employed with students' academic performance.

2. Methodology

2.1. Participants

The sample consisted of a total of 20 Greek monolingual and 20 bilingual students from schools in Eastern Thessaloniki, northern Greece. The participants' selection criteria were:

a) The bilingual students were to be only of Albanian origin.

b) Monolingual and bilingual students had to be equivalent in academic performance.

c) Monolingual and bilingual students had to be taught by the same teacher.

d) Monolingual and bilingual students were not to have a diagnosis of learning disabilities.

The 45% of monolingual and bilingual students were attending the sixth grade and 55% of the total number of the students was attending the fifth grade.70% of all children (N = 28) were male and 30% (N = 12) were female. All bilingual students (100%) belonged to the category of "simultaneous bilingualism". The mean of their academic performance grade was 9.4 with a standard deviation of ± 0, 46. 82.5% of all students (N = 33) had high grades (9 to 10) and 17.5% (N = 7) had lower (8 to 8.9) according to their teachers' records.

2.2. Procedure

For the purposes of the present study, the following tools were used to ensure the multiple methods of data collection: a) an instrument of recording students' profile and exploring their difficulties in acquiring vocabulary and memorizing text, b) think aloud protocols and retrospective interviews were used to record students' strategies of acquiring vocabulary and comprehending-memorising a text. Moreover, the selection of the appropriate sample, the formulation of pertinent questions and the creation of a confidential environment by the researchers ensured the reliability and validity of the present study (Cohen, Manion and Morrison, 2007). Potential ethical dilemmas were dealt with the official permission of the Principals of the schools that participated in the study, the informative cover letter and the consent form signed by the parents of the students.

The study was conducted through the following stages:

1st stage

During the first stage, the *instrument of recording students' profile and exploring their difficulties in acquiring vocabulary and comprehending/memorizing text* was administered to the students. Its aim was to a) record students' demographic information (country of birth, years of residency in Greece, use of Greek and Albanian language in the family as well as in the school environment, parents' socio-educational status) and b) collect data related to their mnemonic profile, e.g. the difficulties encountered in vocabulary acquisition and text comprehension/ memorization, as well as the strategies used to address them.

2nd stage

A qualitative approach was adopted to collect data through the *"think aloud process"* (Pressley & Afflerbach, 1995) and the *retrospective interviews,* which are considered to be basic methods of exploring students' strategies and reading behaviours (Ericsson & Simon, 1999), since in-depth information of the participants' views and attitudes can be collected through a creative interaction between the interviewer and the interviewee (Griva & Stamou, 2014). Specifically, the*"think aloud process"* is an essential approach to the evaluation of metacognitive control and strategies employed when certain tasks are carried out, because it allows rich data to be collected, 'invisible' by other methods (Bereiter & Bird, 1985).

The *"think aloud process"* was employed in two stages. Firstly, every student, individually, was requested to read a list of nine (9) words, which enabled semantic grouping, try to remember them and when he/she would be ready, try to recall them. Immediately afterwards, the student was asked to verbalize how he/she learned the words, the difficulties he/she

encountered and the memory strategies he/she used. After the think-aloud sessions, semi-structured interviews were held with each student in order to attain better knowledge of their usual approach to memorizing process of vocabulary and the strategies employed. More specifically the semi-structured interviews were used, because this type of interview may include a series of questions in the form of general guidelines, but the researcher can change the order of questions or even ask additional ones during the interview process, if considered necessary (Bryman, 2004).

3rd stage

In the third stage, each student was requested to read an expository text in Greek, between 180-200 words, divided into two paragraphs and accompanied by two related pictures.

The student was asked, individually, to read the text, to memorize it and when he/she was ready, try to recall it. Immediately afterwards, the student was asked to verbalize his / her thinking, the way of memorizing the text, the difficulties encountered and the memory strategies he/she employed. As in the second stage, a retrospective interview followed the procedure.

2.3. Data analysis

The whole process was recorded, transcribed and analysed through a qualitative thematic analysis (Miles & Huberman, 1994). The verbal data were analyzed through two basic phases: *a) first and second level coding as well as pattern coding*. Codes resulted in groups of sub-categories, 'labeled' by a specific name, which were grouped into major categories. Then, similar concepts with common characteristics were clustered into basic 'themes'. *b) data display*. The data were displayed on individual tables and in crosschecking formats including the categories and codes (see tables 1-7).

At a second phase, the data were analysed quantitatively. The data processing included descriptive and inferential statistical analysis. Each strategy was rated with 0 (not employed) or 1 (employed). In the descriptive process, the absolute and relative frequency distribution of the responses was calculated for the analysis of the nominal variables (qualitative information). The correlation of the vocabulary strategies with the academic performance was examined by calculating Pearson correlation coefficient. All statistical analyses were carried out with the SPSS statistical software.

3. Results

3.1. Results from the instrument of students' profile

Twenty-five (25) codes resulted from the verbal data analysis obtained by administering the *instrument of recording students' profile and exploring difficulties in acquiring vocabulary and memorizing text*. Those codes were grouped into two basic categories: a) Difficulties in acquiring vocabulary and b) Difficulties in memorizing text (Table 1).

Students' difficulties in acquiring vocabulary and memorizing text

At a micro level of the text, a relatively large percentage of monolingual students (40%) and

half of the bilingual ones (55%) reported difficulties in spelling when acquiring vocabulary: *"I have difficulty in spelling, using the appropriate i, e, o..... because there are many i and I can't remember them"* (bilingual student 3) and another one said *"the new words, I can't write them well ..... I don't remember how they are written"* (bilingual student 14), while another student said: *"spelling .... there are many words and I can't remember them all ..... some of them are unknown"* (monolingual student 34).

15% of the total number of both the monolingual and the bilingual students reported having difficulty with the unknown words in a text, which make reading comprehension difficult and therefore the text cannot be memorized: *"When I come across an unknown word in a sentence ..... it blocks the sentence and I can't understand what it says"* (bilingual student 4) and another one said *"When I come across a word I don't know, I ask mum or dad, because otherwise I can't learn the text" (*monolingual student 34). Only bilingual students reported difficulties memorizing the morphosyntactic elements of the language, however with a very low frequency.

At a macro level of the text, 25% of the monolingual students and 25% of the bilingual ones reported difficulties in memorizing the unknown information, which they give priority in learning: *"When I read and I don't know something, I ask my dad. First, I learn what I don't know.... and then the familiar" (*monolingual student 24) and another one said: *"When I read something I don't know, I try to analyze it, to see what it says, to understand the meaning, to find other information on the Internet"* (bilingual student 6). A small percentage of bilingual students reported reading comprehension difficulties (15%) and expression difficulties while recalling (15%).

Table 1. Frequencies and percentages related to the students' difficulties in acquiring vocabulary and memorizing text

Categories	Codes	Monolingual students	Bilingual student
a) Difficulties in acquiring vocabulary (Microlevel)	SPEL=Spelling	N=8 (40%)	N=11 (55%)
	STRECW=Storage and recall of words	N=1 (5%)	N=2 (10%)
	STRANX=Stress and anxiety	N=1 (5%)	N=1 (5%)
	UNKWO=Unknown words	N=3 (15%)	N=3 (15%)
	PROUNW= Pronunciation of unknown words	N=1 (5%)	N=1 (5%)
	VERTE=Verb tenses	N=3 (15%)	N=3 (15%)

	VERINF=Verb inflection	N=1 (5%)	N=1 (5%)
	ADJINF=Adjective inflection	N=1 (5%)	N=2 (10%)
	NOINF=Noun inflection		N=2 (10%)
	NOART=Noun articles		N=1 (5%)
	MEAWO=Meaning of the word		N=1 (5%)
	PRON=Pronouns		N=1 (5%)
	DISOPR=Distinction of objects from the predicates		N=1 (5%)
	ADVE=Adverbs		N=1 (5%)
	STRAN=Stress and anxiety	N=1 (5%)	N=1 (5%)
	IDESINF=Identification of significant information	N=1 (5%)	N=1 (5%)
	STRINF= Storage and recall of information	N=1 (5%)	N=1 (5%)
	COMOIN= Compliance with the order of information	N=1 (5%)	N=3 (15%)
	UNKINF=Unknown information	N=5 (25%)	N=5 (25%)
	ROMEM= Rote memorization	N=1 (5%)	
	EXREC= Expression during recall	N=1 (5%)	N=3 (15%)
	REACO= Reading comprehension		N=3 (15%)
	METUW=Memorizing text with unknown words		N=3 (15%)
	MEDNA=Memorizing dates, names		N=1 (5%)
	TELEG=Text length		N=3 (15%)

3.2. Results from the qualitative analysis of think aloud protocols and retrospective interviews

3.2.1. Strategies of vocabulary acquisition and text comprehension/memorization

Students reported the employment of a series of strategies during the "think aloud sessions" and the retrospective interviews, at a macro and micro level of the text. A taxonomy of these strategies was attempted by the researchers (Rachanioti & Griva) incorporating four basic strategic categories: a) Exploration strategies, b) Process strategies, c) Memory strategies, d) Confirmation/Consolidation strategies.

3.2.2. Exploration Strategies

As shown in Table 2, at the initial stage of *Using context items*, a high percentage of bilingual students (58.8%) previewed the text images and tried to guess the content of the text, while a relatively lower percentage of monolinguals (41.2%) employed this strategy: *"I always look at the pictures before I read the text ……..…they show what the passage is about"* (bilingual student 7).

While reading the text, an important part (75%) of the bilingual students underlined the unknown words, while only a low percentage (25%) of the monolingual students employed this strategy: *"First time I read the text, I underline the unknown words.……because I can't understand what the passage says*" (bilingual student 5).

Regarding the second subcategory of strategies, *Searching for in-text information,* more than half *(*63.6%) of the monolingual students showed interest in 'skimming' the text to get an idea, while only a relatively small percentage of bilinguals (36.4%) used this strategy: *"I quickly read through the passage……. to have an idea what the passage is about"* (monolingual student 2).

In the third subcategory, *Using Sources and Support*, a high percentage of monolingual students (56.3%) addressed their parents to find out the meaning of unfamiliar words or unknown information, while the equivalent percentage of bilinguals was relatively lower (43.8%): *"If I don't know what a word means, I ask my mother"* (monolingual student 2). Also a high percentage of bilingual students (66.7%) reported asking their teacher about the meaning of the unfamiliar words, whereas only the 33.3% of the monolinguals declared they used this strategy (Table 2).

Table 2. Frequencies and Percentages of 'Exploration strategies' Categories used by primary school students

Exploration Strategies			
Using Context Items	Group	N	%
1) Guess the meaning from the pictures	Monolinguals	7	41,2%
	Bilinguals	10	58,8%
2) Read the title	Monolinguals	3	50,0%
	Bilinguals	3	50,0%
3) Underline the unknown words	Monolinguals	3	25,0%
	Bilinguals	9	75,0%
Searching for in-text information			
1)Skim the text	Monolinguals	14	63,6%
	Bilinguals	8	36,4%
2) Read the text first and then skim the pictures	Monolinguals	7	53,8%
	Bilinguals	6	46,2%
3) Identify new information	Monolinguals	6	50,0%
	Bilinguals	6	50,0%
Using Sources and Support			
1)Ask parents about the meaning of the unknown words or the text	Monolinguals	9	56,3%
	Bilinguals	7	43,8%
2)Ask the teacher about the meaning of the unknown words	Monolinguals	4	33,3%
	Bilinguals	8	66,7%
3) Use the dictionary to define the meaning of a word	Monolinguals	0	,0%
	Bilinguals	8	100,0%
4)Search for information on the Internet	Monolinguals	0	,0%
	Bilinguals	3	100,0%

Process strategies

The second basic thematic strand was named *Process strategies* and includes two (2) categories: *Process strategies* at the macro level of the text and *Process strategies* at the micro level of the text. *Process strategies* at the macro level include two (2) subcategories: the *Holistic Approach strategies* and the *Supporting strategies*. *Process strategies* at the micro level include the *Word Processing Strategies* and the *Grouping and Encoding Strategies* (Tables 3 & 4).

Regarding the *Process strategies* at the macro level of the text, two (2) are the dominant

strategies in the subcategory of the *Holistic Approach strategies*: Underlining the important information was employed by 46.2% of the monolingual students and 53.8% of the bilingual students:*"I underline the important information……it's what I have to remember"*(monolingual student 7).A considerable number of the respondents (53.1% of the monolingual students and 46.9% of the bilingual ones) used the segmentation of the text, to facilitate comprehension and memorizing:*"I read and learn every paragraph separately……it's easier to remember that way"*(monolingual student 13).

Regarding the *Supporting strategies*, the same percentage of the monolingual and bilingual students (50%) identified the information they considered important: *"I read and recognize the important information to be remembered"*(bilingual student 8).A large number of the monolingual students (78.6%) distinguished known from unknown information, while only the 21.4% of the bilingual students employed the above strategy: *"I read ……..and at the same time I think what I know and what I don't know"* (monolingual student 15)

Table 3. Frequencies and Percentages of 'Process strategies at the macrolevel' categories used by primary school students

Process strategies			
Process strategies at the macro level of the text			
Holistic Approach strategies	Group	N	%
1)Underline the information the teacher suggests	Monolinguals	5	55,6%
	Bilinguals	4	44,4%
2) Underline the most important information	Monolinguals	6	46,2%
	Bilinguals	7	53,8%
3) Underline the most important information with parental help	Monolinguals	2	66,7%
	Bilinguals	1	33,3%
4)Reread parts of the text	Monolinguals	6	54,5%
	Bilinguals	5	45,5%
5)Skip the known information	Monolinguals	7	87,5%
	Bilinguals	1	12,5%
6)Decide to memorize the whole text all in one	Monolinguals	5	71,4%
	Bilinguals	2	28,6%
7)Break down the text into paragraphs	Monolinguals	17	53,1%
	Bilinguals	15	46,9%
8)Break down the paragraphs into manageable pieces	Monolinguals	4	57,1%
	Bilinguals	3	42,9%
Supporting strategies			
1) Identify the important information	Monolinguals	7	50,0%
	Bilinguals	7	50,0%
	Total	14	100,0%
2) Number the paragraphs	Monolinguals	1	100,0%
	Bilinguals	0	,0%
3) Add subtitles/subheadings to every paragraph	Monolinguals	3	75,0%
	Bilinguals	1	25,0%
4)Distinguish the known from unknown information	Monolinguals	11	78,6%
	Bilinguals	3	21,4%

Considering the *Process strategies* at the micro level of the text, the subcategory *Word Processing Strategies* related to students' choice to learn all the words together or classify them into groups received the highest percentage (52.9% of the monolingual students and 47.1% of the bilinguals) as the most favourite strategy: *" I decide to learn all the words together if they are not many …..or separate them into groups"* (bilingual student 9).In the subcategory of *Grouping and Encoding Strategies,* two strategies were employed with high frequency. Grouping the words to facilitate memorizing was employed by a high percentage of the respondents (52.6% of the monolingual students and 47.4% of the bilingual ones): *"I*

learn the words in groups…..it's easier to memorize them that way" (monolingual student 9).Making a mental picture of a word was reported by a greater percentage of bilingual students (63,2%) compared to the monolingual ones (36.8%): *"I imagine,.....make a picture in my mind…..it helps me remember the word"* (bilingual student 9).

Table 4. Frequencies and Percentages of 'Process strategies at the microlevel' categories used by primary school students

Process strategies			
Process strategies at the micro level of the text			
Word Processing Strategies	Group	N	%
1)Underline words	Monolinguals	5	45,5%
	Bilinguals	6	54,5%
2)Focus on the unknown words	Monolinguals	2	25,0%
	Bilinguals	6	75,0%
3)Guess a word/phrase from the context	Monolinguals	0	,0%
	Bilinguals	1	100,0%
4) Learn the unknown words all together or in groups	Monolinguals	9	52,9%
	Bilinguals	8	47,1%
5)Translate a word/phrase from L2 to L1 and vice versa	Monolinguals	0	,0%
	Bilinguals	3	100,0%
6)Paraphrase a word/phrase in L1	Monolinguals	0	,0%
	Bilinguals	1	100,0%
Grouping and Encoding Strategies			
1)Group the unknown words in nouns, verbs and adjectives	Monolinguals	1	50,0%
	Bilinguals	1	50,0%
2)Group the unknown words according to the number of their syllables	Monolinguals	1	100,0%
	Bilinguals	0	,0%
3) Pair the words	Monolinguals	7	63,6%
	Bilinguals	4	36,4%
4) Group the unknown words according to their order	Monolinguals	10	52,6%
	Bilinguals	9	47,4%
5)Group the unknown words according to their first letter	Monolinguals	0	,0%
	Bilinguals	2	100,0%
6) Group semantically the unknown words	Monolinguals	6	66,7%
	Bilinguals	3	33,3%
7)Make a mental picture	Monolinguals	7	36,8%
	Bilinguals	12	63,2%
8) Associate a word with an object	Monolinguals	2	50,0%
	Bilinguals	2	50,0%

3.2.3. Memory strategies

The *Memory strategies* (Tables 5 & 6) included in the third thematic strand are those mental processes deliberately incited to facilitate storage and conscious recall of the information both at text and word level. They include four subcategories: a) Repetition at a macrolevel of the text, b) Oral and written repetition at a microlevel of the text, c) Imagery at a macrolevel of the text, d) Imagery at a microlevel of the text.

Half of the monolingual students (50%) as well as half of the bilinguals (50%) preferred to employ rereading and oral repetition at a macrolevel to retain the text information. A considerable number of bilingual students (56.3%) and a lower percentage of the monolingual ones (43.8%) repeated the text while skimming: *"I repeat the passage and at the same time I look inside the book"* (monolingual student 5). A significant percentage (51.4%) of the monolingual students and 48.6% of the bilingual ones employed rereading to achieve storage and recall at a microlevel of the text: *"I read the words again and again to memorize them"* (monolingual student 12) More than half of the monolinguals (52%) and a slightly lower percentage of bilinguals (48%) used oral repetition for learning vocabulary: *"I say the words aloud again and again to memorize them"* (monolingual student 10). In addition, the written repetition of the words was used by a high percentage of both monolingual (52.9%) and bilingual students (47.1%): *"I write down the words many times……to learn them….. and remember them"* (monolingual student 12). Furthermore, an outstanding part of the bilingual students (70.6%) learned the words in the order they were presented, compared to a mediocre percentage (29.4%) of monolingual ones.

Table 5. Frequencies and Percentages of the 'Memory strategies' categories used by primary school students

Memory strategies			
Repetition at a macrolevel of the text	Group	N	%
1)Reread the text and repeat it orally	Monolinguals	3	37,5%
	Bilinguals	5	62,5%
2) Reread and orally repeat every paragraph separately and then all the paragraphs together.	Monolinguals	16	50,0%
	Bilinguals	16	50,0%
3) First memorize the new information	Monolinguals	8	88,9%
	Bilinguals	1	11,1%
4) Repeat the text while reading	Monolinguals	7	43,8%
	Bilinguals	9	56,3%
5) Reread, repeat and memorize only what the teacher highlights	Monolinguals	1	100,0%
	Bilinguals	0	,0%
6)Write down the most important information	Monolinguals	1	50,0%
	Bilinguals	1	50,0%
Oral and written word repetition (microlevel of the text)			
1)Reread the words	Monolinguals	19	51,4%
	Bilinguals	18	48,6%
2) Repeat the words orally while skimming	Monolinguals	13	52,0%
	Bilinguals	12	48,0%
3)Memorize the words in the order they are presented	Monolinguals	5	29,4%
	Bilinguals	12	70,6%
4)Memorize the words in his/her own order	Monolinguals	1	25,0%
	Bilinguals	3	75,0%
5)Rewrite the words many times	Monolinguals	18	52,9%
	Bilinguals	16	47,1%

Regarding the imagery and the associations at a textual level (table 6), a considerable number of the respondents (51.7% of the monolingual students and 48.3% of the bilingual ones) used their imagination and made images while reading the text: *"When I read a text, I imagine pictures ……I remember the pictures and then I can remember the text"* (bilingual student 14). A low percentage (34.8%) of bilingual students associated their readings with prior knowledge, whereas the percentage of monolinguals using this strategy was almost double (65.2%): *"I recall things I know from the past, when I read a text……it helps me remember the new information"* (monolingual student 15).Another favourite strategy of this category, employed by a high percentage (56%) of the monolingual students and a slightly lower percentage (44%) of the bilinguals, was the mental consecutive order of the text information:

" I try to remember what information is first, what comes next ……inside the passage"(monolingual student 18). In the fourth subcategory '*Imagery and associations at a microlevel of the text'*, the respondents showed no interest in any specific strategy.

Table 6. Frequencies and Percentages of the 'Memory strategies' categories used by primary school students

Memory strategies	Group	N	%
Imagery at a macrolevel of the text			
1) Think of the text pictures to recall the information	Monolinguals	0	,0%
	Bilinguals	2	100,0%
2) Put the text information in a consecutive order	Monolinguals	14	56,0%
	Bilinguals	11	44,0%
3)Associate with prior knowledge	Monolinguals	15	65,2%
	Bilinguals	8	34,8%
4)Associate with personal experiences	Monolinguals	6	42,9%
	Bilinguals	8	57,1%
5) Imagine pictures of the text information	Monolinguals	15	51,7%
	Bilinguals	14	48,3%
6) Draw pictures	Monolinguals	0	,0%
	Bilinguals	2	100,0%
Imagery at a micro level of the text			
1) Invent a new word that sounds similar to the forgotten one	Monolinguals	2	50,0%
	Bilinguals	2	50,0%
2) Use key words to recite the text	Monolinguals	3	37,5%
	Bilinguals	5	62,5%
3) Use new words in different context	Monolinguals	4	66,7%
	Bilinguals	2	33,3%
4) Mentally picture the word spelling	Monolinguals	2	40,0%
	Bilinguals	3	60,0%
5) Mentally picture the written word order	Monolinguals	1	16,7%
	Bilinguals	5	83,3%

3.2.4. Confirmation/Consolidationstrategies

The fourth basic thematic strand "*Confirmation/Consolidation strategies"* includes the application of strategies which confirm/consolidate the memorization of information either through self-activation or with support. It is the final stage of the whole memorization process and includes self-activating and support strategies at a micro level of the text as well as at a micro level (Table 7). In the subcategory called *Self-activating strategies,* oral repetition without skimming the text was dominant in both monolinguals and bilinguals (44% and 56% respectively): *"If I say the words or the text, without forgetting anything or looking inside the book, it means I have memorized everything"*(bilingual student 18). In addition, a high percentage (52.2%) of the monolingual students reported that they reread the text or the vocabulary when they couldn't recall it.

In the subcategory 'Support strategies', 52.9% of the monolingual students recited the lesson with parental presence for receiving confirmation, while the bilinguals employed that strategy in a slightly lower percentage (47.1%): *"My mother holds the book and I repeat the words or the text……she tells me whether I need to study more"*(bilingual student 17). A mediocre percentage of bilingual students (30.8%) reported that their mother dictated the vocabulary to them. On the contrary, the percentage of the monolinguals students using the same strategy (69.2%) was outstanding: *"My mother says the words and I write them down. If I make mistakes, I have to read them again"*(monolingual student 16).

Table 7. Frequencies and Percentages of the 'Confirmation/Consolidation strategies' categories used by primary school students

Confirmation/Consolidation strategies			
Self-activating strategies at a micro and micro level of the text	Group	N	%
1) Ask questions to myself	Monolinguals	1	33,3%
	Bilinguals	2	66,7%
2) Recite all the text paragraphs together, without skimming the text	Monolinguals	11	44,0%
	Bilinguals	14	56,0%
3) Write down the words to confirm their memorization	Monolinguals	9	81,8%
	Bilinguals	2	18,2%
4) Repeat aloud or subvocally every group of words separately	Monolinguals	7	58,3%
	Bilinguals	5	41,7%
5) Reread the text information or the words I cannot recall	Monolinguals	12	52,2%
	Bilinguals	11	47,8%
6) Repeat the text or the words before I go to school	Monolinguals	1	50,0%
	Bilinguals	1	50,0%
Support strategies at a micro and micro level of the text	Group	N	%
1)Recite every paragraph as it is exactly written and then all the paragraphs together with parental presence	Monolinguals	5	50,0%
	Bilinguals	5	50,0%
2) Recite the text using my own words with parental presence	Monolinguals	9	52,9%
	Bilinguals	8	47,1%
3) Answer questions on the text my mother makes	Monolinguals	5	62,5%
	Bilinguals	3	37,5%
4) Write down the words, the parent dictates	Monolinguals	9	69,2%
	Bilinguals	4	30,8%

3.3. Results from the quantitative analysis

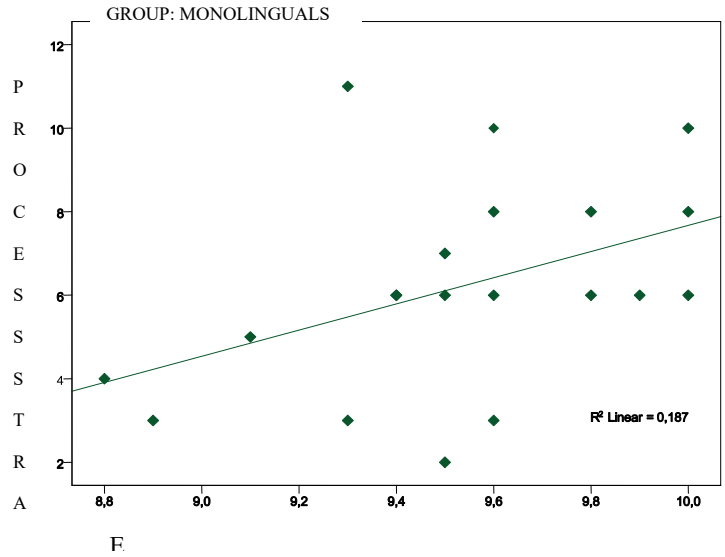
The quantitative analysis of the data revealed some statistically significant positive correlations (Table 8). In particular, the *Process strategies* positively correlate with the general grade of the academic performance in both monolingual students [r (20) = 0,433 and p = 0,057] and bilinguals [r (20) = 0,499 and p = 0,025]. A stronger positive correlation of Memory strategies with the general grade of the academic performance revealed for monolingual students [r (20) = 0,676 and p = 0,001], while a positive trend for bilinguals

emerged [r (20) = 0,384 and p = 0,095].

Table 8. Process and Memory strategies in relation to the academic performance grade

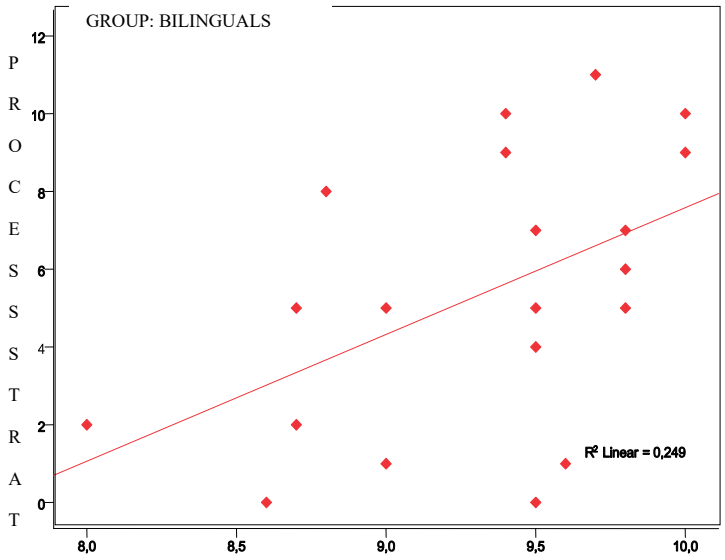
GROUP			General Grade of Academic performance
Monolinguals	*Process strategies*	Pearson Correlation	0,433
		p (2-tailed)	0,057
		N	20
	Memory strategies	Pearson Correlation	0,676**
		p (2-tailed)	0,001
		N	20
Bilinguals	*Process strategies*	Pearson Correlation	0,499*
		p (2-tailed)	0,025
		N	20
	Memory strategies	Pearson Correlation	0,384
		p (2-tailed)	0,095
		N	20

The correlation among the variables of the "Process strategies", monolingualism and the general grade of academic performance (r = 0,433, R^2 = 0,187) is shown in Graph 1. The coefficient of determination shows that the academic performance is affected 18.7% by the monolingual students' Process strategies.



Graph 1. Correlation of Process strategies, monolingualism and general grade of academic performance

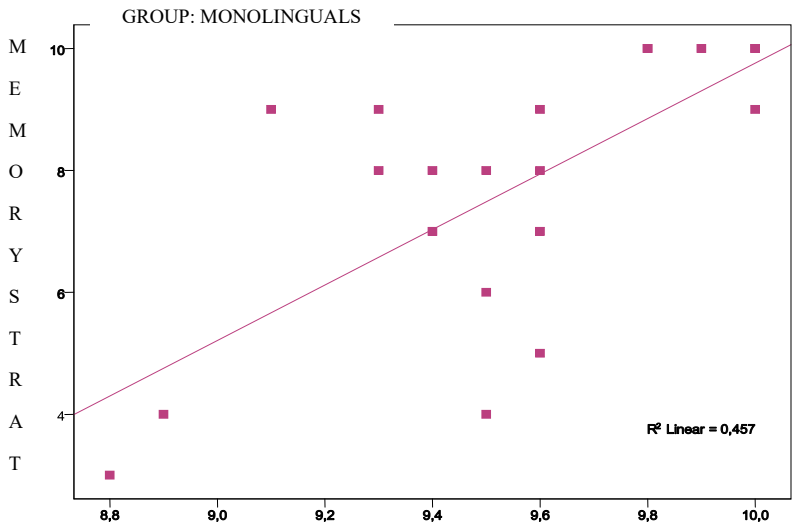
The correlation among the variables of the Process strategies, bilingualism and the general grade of academic performance (r = 0,499, R^2 = 0,249) is shown in Graph 2. The coefficient of determination shows that the academic performance is affected 24.9% by the bilingual students' Process strategies.



Graph 2. Correlation of Process strategies, bilingualism and general grade of academic performance

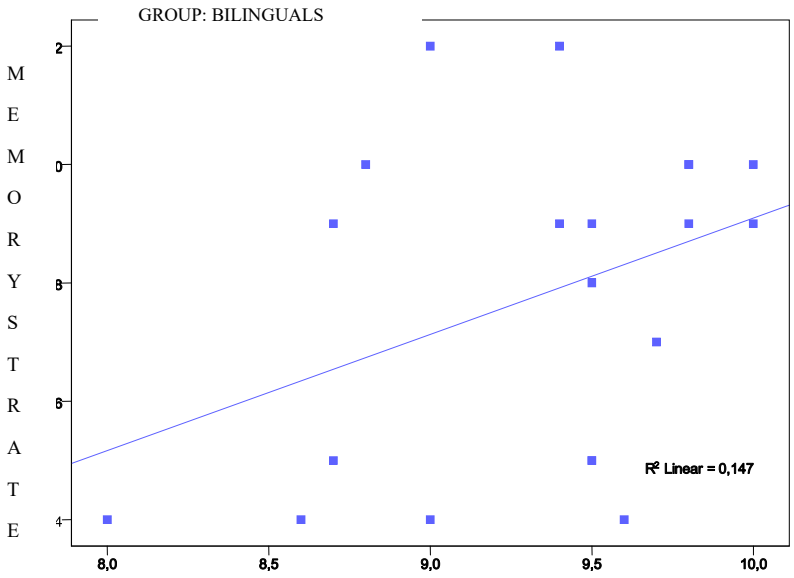
The correlation among the variables of Memory strategies, monolingualism and the general grade of academic performance (r = 0,676, R^2 = 0,457) is shown in Graph 3. The coefficient of determination shows that the academic performance is affected 45.7% by the monolingual

students' Memory strategies.



Graph 3. Correlation of Memory strategies, monolingualism and general grade of academic performance

Graph 4 shows the correlation among the variables of Memory strategies, bilingualism and the general grade of academic performance ($r = 0{,}384$, $R^2 = 0{,}147$). The coefficient of determination shows that the academic performance is affected 14.7% by the bilingual students' Memory strategies.



Graph 4. Correlation of Memory strategies, bilingualism and general grade of academic performance

Regarding the Exploration and Confirmation/Consolidation strategies, no significant correlation was found with the academic performance in both groups (Table 9).

Table 9. Exploration and Confirmation strategies in relation to academic performance grade

GROUP			General Grade of Academic performance
Monolinguals	*Exploration strategies*	Pearson Correlation	0,435
		p (2-tailed)	0,055
		N	20
	Confirmation/Consolidation strategies	Pearson Correlation	0,172
		p (2-tailed)	0,468
		N	20
Bilinguals	*Exploration strategies*	Pearson Correlation	0,301
		p (2-tailed)	0,198
		N	20
	Confirmation/Consolidation strategies	Pearson Correlation	0,406
		p (2-tailed)	0,075
		N	20

4. Discussion

In the present study, the strategies employed by monolingual and bilingual students to aid the acquisition of vocabulary as well as the text comprehension and memorization, were comparatively examined in an integrated word and text framework. In addition, an effort to examine the correlation of those strategies with the academic performance was attempted, as it is often believed that the use of strategies is closely linked to the learning outcome. Based on the systematically analyzed data, the researchers compiled a taxonomy of strategies consisting of four basic thematic strands: a) exploration strategies, b) process strategies, c) memory strategies, d) confirmation/consolidation strategies. Those strategies, resulted from the analysis of the collected data, constitute a holistic framework for vocabulary acquisition in an integrated memory-based reading process.

The findings indicated that bilingual readers experience difficulties (both at micro and macro level of the text) in comparison to their monolingual peers. Most of the bilingual students skimmed the pictures of the text and made a guess about the text content before the reading process, while the percentage of the monolingual students employing this strategy is quite smaller. This is because bilingual students are usually less proficient in L2 and they have

poorer vocabulary knowledge than their monolingual peers (Bialystok, Craik & Luk, 2008). Due to these language difficulties/problems, they utilized *the Context's items,* namely pictures, to compensate for their possible language deficit. Furthermore, the majority of the bilingual students appeared to focus on the micro level of the text, by identifying and underlining the unknown words during the *exploration reading* stage, which supports the low language level of the specific group (Griva, Alevriadou & Geladari, 2009). On the contrary, the monolingual peers, who obviously do not face particular difficulties at the micro level of the text, employed this strategy at a very low rate (Anastasiou & Griva, 2009). Similarly, a few bilingual students skimmed the text to be informed about the content and it appears that they do not use comprehension strategies at the beginning of the reading process; instead they appeared to focus on individual words (Salataci, 2002). On the contrary, most of the monolingual students were found to employ a number of strategies related to searching for in-text information.

Regarding the *Process* strategies at a macro level of the text, the findings revealed that several monolingual Greek students highlight the most important information, thus supporting findings of previous studies that considered 'underlining important information in the text as a common behavior (Anastasiou & Griva, 2009; Bell & Limber, 2009; Lonka, Lindblom-Ylänne & Maury, 1994). To facilitate the process of understanding, both bilingual and monolingual students adopted the strategy of 'breaking the text down into parts', thus helping the working memory to store information from one or more sentences and construct the meaning (Carretti, Borella & De Beni, 2007; Geladari, Griva & Mastrothanasis, 2010).

It is worth mentioning that 'using imagery to remember the words' was mostly referred by the majority of the bilingual students in comparison to their monolingual peers. The findings of the present study are consistent with those of previous studies demonstrating the importance of imagery in vocabulary memorization (Gu & Johnson, 1996; Schmitt, 1997; Sökmen, 1997) and text comprehension and memorization (Leutner, Leopold & Sumfleth, 2009). The use of imagery by a high percentage of bilingual students may be interpreted by the fact that bilingual students seem to perform better in visuospatial memory and non verbal tasks (Hedden & Gabrieli, 2010). In the same line, a relatively recent research (Gyselinck, De Beni, Pazzaglia, Meneghetti & Mondoloni, 2007) has confirmed the correlation of visuospatial memory with imagery.

Moreover, oral and written repetitions appeared to be the two most common strategies adopted by both the monolingual and bilingual students in order to retain information at the macro and micro level of the text. Our findings indicated that the oral repetition at micro and macro levels of the text is used equally by half monolingual and bilingual students during the text memorization process, but also as a 'confirmation' strategy through self-activating. That strategy has been examined and regarded as a self-regulatory process of memorizing in previous studies (Hartwig & Dunlosky, 2012; Karpicke, Butler & Roediger, 2009; Wissman, Rawson & Pyc, 2012).

Between-academic achievement comparisons of the Process strategies used by each group revealed a positive correlation of the 'Process strategies' with the academic performance in

both monolingual and bilingual students. However, 'Process strategies' proved to have less impact on the academic performance of the monolingual students than that of the bilinguals'. This may be explained by the fact that bilinguals have better metalinguistic awareness than monolinguals, being capable to realize that words can have more than one meaning or that the meaning of a word can change in another language (Bialystok, 1986; Moore, 2006; Clarkson, 2007; Griva & Stamou, 2014).

A stronger positive correlation of Memory strategies with academic performance emerged in monolingual students, while a positive trend was also observed in bilingual peers. However, the Memory strategies affected the academic performance of the monolingual students at a significantly high percentage, whereas the academic performance of the bilinguals proved to be very little affected by the same strategies. This may be explained by the fact that bilingual students have difficulty using verbal repetition strategies, which are considered to be partly related to verbal working memory (Minear & Shah, 2006).

Conclusion

Considering the aforementioned findings, we suggest that the academic performance of both monolingual and bilingual students could be improved by implementing a strategy training program aiming to help them overcome their weaknesses in acquiring vocabulary and comprehending – memorizing a text. Systematic training in a series of strategies will enable students to choose those which they feel comfortable with and employ them for carrying out a task.

Given the limited number of the target population and the restricted context of conducting this study, the results of the present study cannot be regarded conclusive.

A larger sample of both bilingual and monolingual students should be included in a further study, in order to comparatively investigate the strategies employed for vocabulary acquisition as well as reading comprehension and text memorization in a more valid way. Further research in primary education, overcoming the limitations observed, is needed to confirm the results obtained.

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