Morphological strategies training: The effectiveness and feasibility of morphological strategies training for students of English as a foreign language with and without spelling difficulties

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Abstract: The aim of this study was primarily to investigate the effects of morphological strategies training on students with and without spelling difficulties in English as a foreign language (EFL), but also to assess the feasibility of morphological strategies training in a classroom context. The intervention was piloted in the sixth grade of a Greek primary school: 23 Greek–speaking students, aged 11-12, were assigned to the treatment group receiving explicit teaching on inflectional and derivational morphemic patterns of English words. The control group, composed of 25 Greek–speaking students of the same age, attending a different classroom of the same school, was taught English spelling in a conventional (visual-memory based) way. Both quantitative and qualitative methods were employed to gain insights: a pre- and post-test, an observation schedule, a student questionnaire and a teacher interview. The pre- and post-test results indicated that the metamorphological training yielded specific effects on targeted morpheme patterns. The same results were obtained from a sub-group of nine poor spellers in the treatment group, compared to a sub-group of six poor spellers in the control one. The observation data revealed that the metamorphological training promoted students' active participation and the questionnaire data indicated that students got satisfaction from their training. Finally, interview data highlighted that teachers considered the intervention as a feasible way of improving students' morphological processing skills in spelling.

Keywords: morphological strategies training, EFL students, spelling intervention, spelling difficulties

1. Introduction

Until recently, spelling, compared to reading and oral skills, was a rather neglected area of psycholinguistic research. That was probably because spelling had been regarded as a school subject or as a 'pure' conventional aspect of written language rather than an area for scientific investigation (Perfetti, 1997). However, a strong psycholinguistic dimension to spelling has been revealed (see Treiman, 1993) and in the past decade there has been a keen interest in researching students' spelling development and difficulties as well as spelling instruction.

The importance of phonological processing skills to the acquisition of spelling, especially in the first stages of spelling development, has been well established (Bryant, Maclean, Bradley, & Crosland, 1990; Muter & Snowling, 1997; Tornéus, 1984; Treiman, 1993, 2000). To spell an unknown word, a child would have to be able to segment an oral word to its phonemes (Ball & Blachman, 1988; Byrne, & Fielding-Barnsley, 1989; Cataldo & Ellis, 1990), and to know how the letters represent each phoneme (Byrne & Fielding-Barnsley, 1989; Caravolas, Hulme, & Snowling, 2001; Treiman, 2000). 'Letter knowledge' is another predictive factor for spelling development in alphabetic scripts (Byrne & Fielding-Barnsley, 1989; Share, Jorm, MacLean, & Matthews, 1984). Moreover, 'orthographic knowledge', that is the ability to understand orthography and its constraints (e.g., the unacceptable letter sequences), is instrumental in spelling development (Brown & Ellis, 1994; Caravolas, Hulme, & Snowling, 2001; Snowling & Hulme, 1991; Treiman, 1993).

However, English orthography is not straightforward phonemic transcription of speech (Ehri, 1989). Compared to other alphabetic scripts, such as Finnish (Müller & Brady, 2001), Serbo-Croatian (Lucatela, Lucatela, Carello, & Turvey, 1999), Turkish (Öney & Durgunoğlu, 1997), and Italian (Cossu, Gugliotta, & Marshall, 1995), English orthography is considered as 'opaque' or 'deep' during the reading and spelling process, as grapheme-phoneme relationships contain many inconsistencies and irregularities. Comparatively speaking, during the reading process, the Greek orthography has been found to be 'shallow' or 'transparent' (Porpodas, 1999; Seymour, Aro, & Erskine, 2003). But during the spelling process, the Greek orthography can be characterized as rather opaque, since there is more than one letter corresponding to one phoneme; thus spelling quite often is not directly predictable from phonology (Petrounias, 1993).

Although English orthography is based on alphabetic principles, there is not always a reliable and consistent way of matching phonemes to letters, and vice versa. The same letters often represent different phonemes and the same phonemes often are transcribed by different letters (Fowler & Liberman, 1995). This usually happens because English orthography, apart from phonological information, carries a large amount of morphological information. Consequently, children need to discover the internal morphological structure of the words in order to master spelling.

Especially in the middle stages of spelling development, correct spelling involves awareness of the morphological components of words (Henderson, 1985; Ehri, 1986). Carlisle (1995) asserted that morphological awareness "focuses on children's conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure" (p. 194). In other words, morphological awareness refers to the ability to explicitly understand the smallest meaningful components of the words (morphemes). In a broader sense, morphological awareness includes the manipulation of morphemes, which are the smallest units of meaning and can be either free or bound. *Free morphemes* can be individual words (e.g. eye, wife, believe). *Bound morphemes* cannot stand alone as words but they have to be combined with other morphemes in order to make sense or to modify the meaning of a word. Bound morphemes can be either *prefixes* (e.g. de-, ex-, in-, intra-, sub-, un-), or *suffixes* (-er, -or, -tion, -ness, -y, -ful, -able, -ly) (Bauer, 1988; Carstairs-McCarthy, 2002; Moats, 2000).

Morphological awareness insights in English can be prevented mainly because of phonological changes in root morphemes when adding derivation and inflexion morphemes (e.g. decide and decision, loaf and loaves) in oral language, and partly because of unclear boundaries among morphemes (e.g. bake and baking, heavy and heavier) in written language. This causes confusion and difficulties for L1 Greek students, who learn English as a foreign language. The allomorphs of English plural morphemes (e.g. churches, dogs, fans), which are *phonologically conditioned* allomorphs, can also cause problems to Greek students. Similarly, so can the allomorphs of past tense morpheme –ed in some English words (e.g. walked, bagged, robbed). In addition, students can face difficulties with some *morphologically conditioned* allomorphs such as perceive, perception, perceptive.

Morphological information processing is defined as the ability to apply knowledge of morphology both to listening and reading comprehension as well as spelling. Because of the irregularities and inconsistencies of English orthography, a student is required to become aware of these peculiarities. Several studies have focused on the importance of morphological knowledge use in spelling tasks (Carlisle, 1987; Henry, 1993; Sénéchal, Basque, & Leclaire, 2006) and the developmental changes in this use (Carlisle, 1987; Kemp, 2006; Walker & Hauerwas, 2006). Correlational and longitudinal studies have focused on the strength and nature of the relationship between spelling skills and morphological awareness in oral and written tasks (e.g. Muter & Snowling, 1997; Nunes, Bryant, & Bindman, 1997, 2006).

Studies with reference to English as a second/foreign language have indicated the close connection between children's morphological awareness and spelling. For example, Babalola and Akande (2002) noted some orthographic and morphological problems faced by learners of English as a foreign language, and claimed that "English is not free of inconsistency in the area of morphology. There are ambiguities which usually compound learners' problems" (Babalola & Akande 2002, p. 250).

A study, conducted with Greek children, found that there is a strong and specific connection between children's morphological awareness and their morphological spellings (Bryant, Nunes, & Aidinis, 1999). Comparison studies drew attention to the differences in morphological awareness and spelling accuracy between children with learning disabilities (dyslexia) and without learning disabilities (e.g. Carlisle, 1987; Egan & Pring, 2004; Tsesmeli & Seymour, 2006). However, only a few intervention studies (e.g. Arnbak & Elbro, 2000; Henry, 1989, 1993; Tsesmeli & Seymour, 2007) have examined how training in children's morphological awareness can affect their spelling.

Overall, there is a general agreement among researchers that morphological strategies training should be a teaching method for developing students' spelling skills, as well as word recognition and reading comprehension abilities. There are still questions about the teachability of morphologically-based spelling skills that are particularly relevant to primary school students with spelling difficulties. There is also another question regarding the teaching methodology that is unanswered: What is/are the best way(s) to teach morphological awareness and/or morphological processing strategies? To date, there is no available evidence to answer this question. Thus, there is a need for conducting intervention studies in the authentic context of general classroom or special education settings.

2. The Implementation of Morphological Strategies Training

Twenty three (23) students, involved in the treatment group, were taught spelling through the Morphological Processing Spelling Approach (MPSA) in a classroom, where English is taught as a foreign language (EFL). The control group (25 students) attended a different classroom of the same school and followed the regular English spelling program. Each session lasted for 45 minutes.

2.1 The Program of the Morphological Processing Spelling Approach

The Morphological Processing Spelling Approach (MPSA) is a type of morphological processing strategies training included in the spelling program. MPSA provides explicit and systematic metamorphological instruction in word-level skills, when students do dictation from a meaningful text. By drawing students' attention to the inflexional and derivational morphology, the principal aim of the MPSA is to help students, especially the poor ones, develop morphological knowledge and morphological strategies through the spelling process. The rationale and purpose, the materials, the processes and their objectives are described in detail in a separate article (Anastasiou, Griva, & Efremidou, submitted). In this article, the basic procedures are described briefly.

For the intervention, seven English dictation texts were carefully designed by the researchers in cooperation with the English language teacher and implemented during seven 45 minute sessions extended into a period of two school terms. Material that was too different from the language norms the students had been learning was avoided so it included language patterns the class had already dealt with in terms of the

grammar, vocabulary, and spelling. Each dictation text included a specific morphemic pattern recycled in ten different words within the passage, and the spelling session was carried out after completing every unit of the textbook; in this way each text served as a recycled teaching of certain inflexional and derivational morphemic patterns. The target morphemic patterns were: the -s plural, the -ed ending for regular verbs, adjective suffixes, comparative degree suffixes, noun suffixes (-or, -er, and -tion, -sion) and the final –ing morpheme that causes a change to the root word, for example the doubling of the end consonant (see Appendix B).

The issues of major concern were: (a) systematic recycling of morphological patterns in a range of meaningful spelling contexts, (b) student engagement in problem-solving spelling activities that allow them to employ morphological processing strategies and (c) the scaffolding of students' morphological processing strategies.

Each session included a complete spelling activity performed in five basic steps, each focusing on a certain subprocess with a specific objective. During the *first, pre-dictation step*, the teaching emphasis was on *morphological awareness training*. The students were taught oral identification and segmentation of the morphemic components of the words; they were taught to identify the common part of words, to analyze words into their morphemes, to check for affixes and roots, and to realize that the spelling of bases and the spelling of inflexions typically remain unchanged regardless of the lexical context. The focus of the *second step*, the main step of teacher dictation, was on highlighting *morpho-semantics and morpho-orthographic relations*. The teacher dictated the text in phrases with pauses between phrases; then she questioned and prompted the students to spell the target words and justify their answers in a guided participatory context. In this way, they had some opportunities to find the semantic relationships between base word and suffixes. In case the students did not feel certain about writing any target words, they were encouraged to leave a blank by 'drawing a bubble'. The focal point of the *third step* was stimulating the students to *reflect on the spelling patterns corresponding to analyzed morphemes*. While the teacher was rereading the text for a second time, the students had the chance to restore any missing parts in their work with either inflections or derivations. The *fourth step* aimed at providing students with the opportunity for *self correction*, with the teacher paying special attention to the students with spelling difficulties. At the *final step*, the students were encouraged to *verbalize metamorphological strategies explicitly*, to report on the specific difficulties they encountered during the whole procedure and to evaluate themselves in a rather enjoyable environment releasing them from 'failure fear'. It was in such a context, that spelling was treated as a problem solving activity and was carried out in the above five steps.

2.2 The Program of the traditional spelling instruction

The students in the non-treatment group did not receive any special instruction; Nevertheless, they were taught English orthography in the conventional way (visual

memory based teaching), based on the national curriculum. The basic teaching procedures were the following:

a) The dictation of individual words, which the students should have already memorized. Typically, children were given lists of irrelevant words and had to memorise their spellings, as learning to spell is considered to be a matter of storing sequences of letters in their correct order in visual memory.

b) The dictation of a text. The teacher recited a text extracted from the textbook and students phonetically transcribed it. These dictation texts, which were delivered at the beginning of every session, are simple paragraphs selected from the student-book texts. The teacher dictated the text and the students began transcribing. Occasionally, a student asked for a word or phrase to be repeated; the teacher generally repeated any word or phrase once, if requested. Afterwards, she read the dictation through a second time at normal speaking speed. After the completion of the dictation, the students were allowed a minute or two for final corrections; then the teacher either collected the notebooks to correct the errors in the classroom with a focus on checking for a set of frequent mistakes or, in some cases, she followed the peer-correction technique.

In such an instructional context, a 'process-oriented' approach was not followed, as student reflection on the structure of the words was not the focal point of this conventional instruction method. Emphasis was placed on the final written 'product', so the basic goal was how to make students create orthographically correct texts.

3. The effectiveness of the morphological strategies training

The assessment of the effectiveness of the Morphological Processing Spelling Approach was the main purpose of the project. The first goal of the project, examined in study 1, was to determine the effects of morphological strategies training on the spelling abilities of a whole primary-school class, and additionally of certain group of poor spellers. The second goal of the project, which was examined in the following two studies, was to examine the feasibility of implementing metamorphological teaching in the classroom context.

The objective of the Study 2 was to observe the students' participation and teacher-students interaction during the metamorphological intervention, and the objective of the Study 3 was to explore students' satisfaction and teachers' attitudes to MPSA. The primary means of data collection consisted of: a) a pre-test, which was administered in the classroom before the project started, and a post-test after the completion of the intervention (Study 1), b) six sessions of classroom non-participant observations carried out by two assistant researchers (Study 2), and c) a post-questionnaire administered to the students and interviews conducted with the teacher and the two assistant researchers after the completion of the intervention (Study 3).

3.1 Experimental design

In this quasi-experimental design, one of the two classes at the same school was randomly assigned to intervention group and the other was assigned to control group. The 48 students comprising both the treatment and control groups were assessed by being administered the same spelling test, before the initiation of the intervention ($t1$, in November 2007) and after the intervention was completed ($t2$, in May 2008). The pre-intervention test was administered to determine students' abilities on specific morphemic patterns before the intervention, and exactly the same test was administered after terminating the intervention (post-intervention test).

The seven sessions of intervention were conducted in the students' classes. These sessions were spread over a 6-month period from mid –November 2007 till the end of May 2008. The classroom English teacher participated in implementing the experimental spelling approach, after being trained. She was thoroughly introduced to the MPSA and its applications in three two-hour contact sessions with the two researchers. The same teacher delivered the conventional instruction, following the methodological principles of the national curriculum, in the control class at different session hours.

3.2 Method

In the first study, the effectiveness of the morphological strategies training was examined. This naturalistic quasi-experimental study had a twofold purpose fulfilled in two parts. In the first part, we examined the effectiveness of the morphological strategies training on the students of the whole class, and in the second part we examined the effectiveness of the morphological strategies training on a sub-group of students with spelling difficulties.

4. Study 1: The effectiveness of the MPSA

4.1 First part of Study 1

The first part of Study 1 aimed at examining the following research question: "Could the training in morphological processing strategies result in better student spelling performance compared with the performance of students who received the conventional classroom instruction?"

4.1.1 Participants

Forty eight (48) sixth-grade Greek–speaking students between the ages of 11 and 12 participated in the project. All students attended the same state primary school in the town of Florina, Northern Greece. 23 students (Mean age 11.48, SD=.31, 15 boys and 8 girls), who attended one of two sixth-grade classes, were randomly assigned to the treatment group. The remaining 25 students (Mean age 11.44, SD=.24, 13 boys and 12 girls), who attended the other sixth-grade class were assigned to the control group.

Since students comprising entire classes were involved in the study, both groups included children with varying degrees of spelling abilities, ranging from good to poor. Forty-four (44) students came from Greek-speaking families and 4 students (two in each group/class) came from Albanian-speaking families, but they were born in Greece and had been attending Greek schools for six years. All 48 students had been learning English as a foreign language for four years in state primary schools.

4.1.2 Procedure

Pretest and post-test. All participants were tested before and after the completion of the intervention on spelling performance. The same test was administered as a group test by one trained research assistant one week before the beginning of the training period, and again a week after the training period had terminated. It was a single word spelling test consisted of 21 words encountered by the students for the first time (see Appendix A). Fifteen (15) of the total number of the words were selected, because they include the specific morphemic patterns (inflectional and derivational morphemic patterns) that were the focus of the MPSA program. The other 6 words were selected because of their irrelevance to the intervention program. All the words of the spelling test were orally presented in a sentential context to ensure non-ambiguous understanding. Firstly, the teacher read each word in the list, one at a time. Then, a sentence, including the word, was presented orally and finally the word was presented once again. The students were asked to write down the word on a sheet of paper. The time available for each item (including the sentence and repetition) was about 40 seconds; the total time for the 21 items was about 14 minutes. There was sufficient time for slow handwriters to spell the word. Since, the test was group-administered, precautions against copying needed to be taken. The following errors were considered for scoring: a) the number of spelling errors in the 'inflectional and derivational morphemic patterns' (see Appendix A), and b) the number of spelling errors in the 'non target morphemic patterns', including the roots of the words.

4.1.3 Results

Two independent t-tests were carried out to examine possible pretest differences in inflectional and derivational spelling skills and non-target spelling skills between treatment and control group on any test at the pre-test level. The pre-intervention scores are depicted in Table 1. The results of these preliminary independent t-tests were not statistically significant. As for the inflectional and derivational orthography, there were no significant differences on spelling performance in the pretest measure ($t(46)$=-.1.84, p>.05). In addition, no significant differences on spelling performance in the non-target orthography were found in the pretest measure ($t(46)$=-.1.66, p>.05). Therefore, the treatment and control group appeared to be equivalent on pre-test spelling variables.

Two mixed analyses of variance (ANOVAs) with a repeated measures factor were conducted separately for target and non-target spelling to determine if there were significant differences between the treatment and control group on the spelling scores.

As shown on the Table 1, the effects of the MPSA intervention for the target spelling were statistically significant. More specifically, a 2 (time of testing: pre-test vs. post-test) X 2 (spelling group: intervention vs. control group) analysis of variance with repeated measures on the first factor yielded a significant main effect of time of testing ($F(1, 46)$ = 36.47, $p< .001$, partial η^2 =.442), indicating that overall there is a decrease in spelling mistakes between pre- and post-testing. However, the interaction between time of testing and spelling group was statistically significant ($F(1, 46)$ = 9.51, $p<.01$, partial η^2 =.166), indicating that the intervention group performed significantly better than the control group on inflectional and derivational target teaching spelling skills. The strength of this association, evaluating by partial η^2, was a small one.

Table 1. Means, standard deviations and mixed ANOVAs summaries for pre- and post-test spelling variables

Spelling variables	Treatment group (n=23)		Control group (n=25)				Partial η^2
	M	SD	M	SD	F	p	
Inflectional & derivational target orthography							
Pretest	9.35	4.02	7.08	4.44			
Posttest	5.48	3.52	6.04	4.09	9.51	.004	.17
Non-target orthography							
Pretest	19.78	8.12	15.40	10.02			
Posttest	17.35	9.77	12.88	8.59	.00	.983	

For the non-target spelling, the effects of intervention were not statistically significant. More specifically, a 2 (time of testing: pre-test vs. post-test) X 2 (spelling group: intervention group vs. control group) analysis of variance with repeated measures on the first factor yielded a significant main effect of time of testing ($F(1, 46)$ = 14.27, $p< .001$, partial η^2 =.237), indicating that overall there is a growth in spelling scores between pre- and post-testing. However, the interaction between time of testing and spelling group was not statistically significant ($F(1, 46)$ = .00, $p>.05$), showing that the intervention group had not performed significantly better than the control group on non-target teaching spelling skills.

4.2 Second part of Study 1

Furthermore, the second part of the study 1 aimed at examining the following research question: "Could the poor spellers' training on morphological strategies have resulted into better spelling performance compared to other poor spellers who received the conventional classroom instruction?"

4.2.1.   Participants and Procedure

Fifteen students (4 boys and 11 girls) were drawn from both initial groups (treatment and control) of students with the lowest ortho-morphological processing scores during spelling. These students fell into the category 'poor spellers'. The student performance at the 75th percentile or above on the number of inflectional and derivational spelling mistakes in the above mentioned test was the criterion for this designation. Nine students (Mean age 11.49, *SD*=.34, 7 boys and 2 girls), part of the initial experimental group, who met this criterion, were placed in the 'morphological strategies training' group, and 6 students (Mean age 11.40, *SD*=.25, 3 boys and 3 girls), part of the initial control group, were placed in the control group. The 8 students in the treatment group were Greek-speaking and one student was of Albanian origin, while all 6 students in the control group were Greek-speaking.

4.2.2.   Results

Two independent t-tests were carried out on inflectional and derivational, and non-target spelling measures to investigate whether there was any significant difference between the treatment group of poor spellers and the control group of poor spellers on any test at the pre-test level. The results of these preliminary independent t-tests were not statistically significant. As for the inflectional and derivational orthography, no significant differences on spelling performance were found in pretest measures ($t(13)$ =-.36, p>.05). Also, in the non-target orthography, no significant differences on spelling performance were found in pretest measures ($t(13)$ =-.91, p>.05). Therefore, the groups appeared to be equivalent on pre-test spelling variables.

Two mixed analyses of variance with a repeated measures factor was conducted separately for target and non-target spelling to determine if there were significant differences between the two groups on the spelling scores.

The effects of intervention for the target spelling were statistically significant (see table 2). More specifically, a 2 (time of testing: pre-test vs. post-test) X 2 (spelling group: intervention group vs. control group) analysis of variance with repeated measures on the first factor yielded a significant main effect of time of testing ($F(1, 13) = 27.20$, p<.001, partial η^2 =.677), indicating that overall there is a growth in spelling scores between pre- and post-testing. But the interaction between time of testing and spelling group was statistically significant ($F(1, 13) = 6.23$, p<.05, partial η^2 =.324), showing that the intervention group performed significantly better than the control group on inflectional and derivational target teaching spelling skills. The strength of this association, evaluating by partial η^2, was small.

Table 2. Means and standard deviations and mixed ANOVAs summaries for pre- and posttest spelling variables

Spelling variables	Poor spellers in treatment condition (n=9)		Poor spellers in control condition (n=6)				Partial η^2
	M	SD	M	SD	F	p	
Inflectional & derivational target orthography							
Pretest	13.11	3.69	13.67	3.01			
Posttest	7.11	4.11	11.17	2.79	6.23	.027	.32
Non-target orthography							
Pretest	23.56	11.19	28.83	11.51			
Posttest	21.11	14.13	23.33	10.67	.26	.336	

For the non-target spelling, the effects of intervention were not statistically significant. More specifically, a 2 (time of testing: pre-test vs. post-test) X 2 (spelling group: intervention group vs. control group) analysis of variance with repeated measures on the first factor yielded a significant main effect of time of testing ($F(1, 13) = 6.27$, $p<$ .05, partial $\eta^2 =.325$), indicating that overall there is a growth in spelling scores between pre- and post-testing. But the interaction between time of testing and spelling group was not statistically significant ($F(1, 13) = .26$, $p>.05$), showing that the intervention group had not performed significantly better than the control group on non-target teaching spelling skills.

5. Study 2: The evaluation of the MPSA guided-participatory context

The purpose of study 2 was to evaluate the guided-participatory context of spelling instruction, based on morphological strategies training. More precisely, it addressed the following research questions:

1. What was the poor spellers' involvement in the morphological strategies training during the spelling sessions?
2. What was the instructional context and spellers' participation during the English spelling sessions?

5.1 Method

Non participant observations were conducted, as it was thought to be central to gaining an in-depth understanding of the implementation and monitoring of the intervention in the treatment classrooms. During a screening session both the students and the assistant researchers were prepared for the observational procedure. Six observation sessions were conducted to record the instructional context and spellers' response and participation in the morphological strategies training during the English spelling lessons.

5.2 Context and procedure

These observations took place in the sixth grade class consisting of 23 students that received the MPSA training. The two assistant researchers (non-participant observers) and one researcher sat on a chair at the back of the classroom either behind or next to the three poor spellers and recorded their observations on an observational checklist. They tried to be unobtrusive, minimizing their interactions with teacher and students. There were occasional questions posed to the teacher at the end of the lesson when the observers needed some clarification.

Moreover, the assistant researchers observed all students' spelling behaviours, during every intervention, focusing especially on the spelling behaviour of poor spellers with very low results in inflectional and derivational patterns, who were also selected to think aloud the spelling processes they followed and the difficulties they encountered at the end of each session. In order to obtain a representative picture of the responses of poor spellers, a random sample of three students out of nine poor spellers were selected and included in the study. The 3 poor spellers in the treatment group were Greek-speaking.

5.3 Instrumentation

An observational coding system was developed to record certain aspects of poor spellers' involvement in the morphological strategies training (see table 3) and spellers' responses to the spelling intervention (see Table 4). Observational data was recorded by putting a tick next to the code(s) observed (coding categories).

The ten target-spelling words of every session were used to study particular aspects of teacher's, class and poor spellers' behaviour.

Regarding the poor spellers' self-correction behaviour, each item was recorded on the checklist for each of the three poor spellers. Each poor speller was observed on 6 separate sessions during the first and second opportunities for self correcting. During the dictation of the sentences, the usual time interval, ranging from 10 to 30 seconds, facilitated the recording procedure in collecting observational data. Poor spellers' involvement in the morphological strategies was defined functionally as the number of observed self-correcting attempts, per session, concerning the target misspelled words.

Since self-correcting behaviour possibly depends on the number of misspellings, a self correcting index (SCorI) was constructed. The researchers formed the SCorI through dividing the mean number of observed 'self-correction' attempts by the number of target misspellings, and then multiplying the result by 100. Thus, a SCorI of 100 indicates 100% attempts of self-correcting every spelling error, while a SCorI of 0 indicates a complete lack of self-correction. The greater the poor spellers' involvement in the process of self-correcting, the higher is the SCori expected to be.

Regarding the teacher's behaviour and the class's participation for each target-word, the observations focused on a) the teacher's behaviour in the classroom, such as cues for the morphological pattern, prompts for the gaps, repetition of the sentence

containing the target-word, motivational prompts, and b) the whole class's participation, such as the number of students raising their hands per target-spelling word, and the spontaneous justification of a correct answer. These were recorded by the two observers. The frequency of the aforementioned behaviours was also recorded on the observation checklist per each item.

5.4 Inter-observer reliability

Reliability data was collected for all training sessions. Two assistant researchers independently observed and recorded data. Inter-observer reliability was calculated for each observation with a formula representing the number of agreements divided by the number of agreements plus disagreements, and multiplied by 100. Inter-observer reliability ranged from 75.0% to 100.0 % for self correction behaviours of poor spellers per session, from 50.0% to 100.0% for teachers' hints per session, from 87.5% to 100.0% for teachers' encouragements per session, from 82.9% to 100.0% for students' raising hands per session, and from 71.4% to 100.0% for students' justifications per session.

5.5 Results

Descriptive statistics were employed to analyze the observational data, as sample size does not allow of using inferential statistics. Results for the 'scaffolding' technique in the guided participation context and learners' responses to spelling instruction were organized according to the observational categories (see tables 3 and 4).

The data on table 3 indicated that the three poor spellers profited from the scaffolding technique. There seemed to be a gradual increase in 'correcting' their own mistakes in the specific morphological patterns during their first attempt (step 3 of the training process). Moreover, the fact that students were provided with the opportunity to reflect on their own work (spelling) and to restore any missing parts (step 4 of the training process) had a positive effect on poor spellers' 'self-correcting' ability.

With reference to the teacher's behaviour for each target-word in the classroom, table 4 shows that the teacher's hints for morphological patterns, her prompts for the gaps and the repetition of the sentence involving the target-word were on a gradual 'decrease', as the sessions proceeded. This means that gains were made by the whole 'morphological strategies training' group of students, who assumed more initiative gradually and seemed to manage better on their own from session to session.

Table 3. Self Correcting Index per session: Attempts of the three poor spellers related to their errors observed by two observers (A & B)

Session	First attempt of self-correction			Second attempt of self-correction			Total		Self correcting Index
	A	B	Errors	A	B	Errors	A	B	
2	14	15	20	2	2	16	16	17	42.5
3	11	12	20	6	7	11	17	19	58.3
4	25	22	25	2	2	8	27	24	59.5
5	16	15	22	9	10	20	25	25	59.0
6	9	9	13	3	2	4	12	11	65.9
7	13	13	18	5	5	8	18	18	67.4

As regards aspects of class' participation, the results matched with the abovementioned data relating to the teacher's behaviour. More precisely, there was a gradual 'increase', as the sessions proceeded, in students raising their hands per target-spelling words and their spontaneous justification for choosing the correct item. This indicates the students' positive response to the intervention, as well as their gradual morphological processing development and their spontaneous participation in the project.

Table 4. Means of observed teacher's behaviour (hints and encouragement) and students participation per session for two observers (A & B)

Session	Teacher's hints			Teacher's encouragement			Mean number of students' hands raising per word			Students' justification		
	A	B	Mean	A	B	Mean	A	B	Mean	A	B	Mean
2	4	4	4.00	18	16	17.50	3.20	3.20	3.20	3	3	3.00
3	3	3	3.00	7	8	7.50	3.40	4.10	3.75	3	4	3.50
4	2	3	2.50	8	8	8.00	3.30	3.50	3.40	5	7	6.50
5	2	2	2.00	5	5	5.00	4.50	4.50	4.50	7	8	7.50
6	1	2	1.50	3	3	3.00	4.90	4.70	4.80	10	11	10.50
7	1	1	1.00	2	2	2.00	5.50	5.70	5.60	12	12	12.00

6. Study 3: Students' attitudes towards the MPSA intervention and teacher's viewpoints

The purpose of the third study was twofold, aiming at:
1. Recording students' attitudes towards the MPSA intervention.
2. Exploring teacher's and assistant researchers' viewpoints on the MPSA intervention.

6.1 Participants

Twenty three (23) students who received the MPSA intervention and the teacher who was involved in the implementation of the intervention, as well as the two assistant researchers took part in this study.

6.2 Materials

Two means of data collection, student questionnaires and teacher interviews, were utilized to address the purpose of the third study.

Student Questionnaire. The students were asked to complete a questionnaire at the end of the intervention, and to express their attitudes to the spelling project. The questionnaire consisted of two basic sections. In the first section, students were invited to express their overall experience of the training project. They were asked to indicate the extent to which they liked or disliked and agreed or disagreed with certain statements on a four-point Likert-type scale. The second section of the questionnaire comprised items that were open response only, aiming at collecting spontaneous students' reactions.

Interviews. Follow-up teacher interviews were conducted to collect additional information about the teachers' and the observers' viewpoints on the intervention. The semi-structured interviews aimed at a) recording the teachers' experience and their views on the usefulness of the intervention, b) eliciting their accounts on difficulties faced, and c) recording their suggestions about possible improvements in the intervention project. Interviews were tape-recorded and transcribed verbatim.

6.3 Results

Due to the small sample size (22 out of the 23 students of the treatment group), the data derived from the questionnaires was analyzed by using descriptive statistical methods. Frequencies and percentages for all items of the questionnaires were obtained. The data analysis revealed the following categories with reference to students' viewpoints and attitudes to the intervention.

Students' attitudes towards Morphological Processing Spelling Approach. With regard to the students' attitudes towards MPSA, the questionnaire data indicated that the majority of the students preferred this intervention. More precisely, a significant percentage of the participants (59.1%) reported that it is a very easy way of learning spelling, while 34.4% of the students considered it to be fairly easy.

Concerning the degree to which the students were interested in the spelling intervention, it is noteworthy that the specific method excited students' interest to a significant degree (31.8%) and to a minor degree (36.4%) respectively. In addition, an important percentage of the sample (54.5%) seemed to agree fully on the usefulness of the intervention and 31.8% of the students considered it to be a fairly useful way of learning spelling. Only 4.5% found it a very difficult way of learning and 22.7% of the total sample claimed that it is a fairly difficult one.

Students' satisfaction with the intervention. From students' responses it appeared that they were very much satisfied with: a) the teacher's hints before dictating (40.9%), b) verbalising their difficulties and the sub-skills (22.7%), c) filling-in the gaps (9.1%) and d) checking out the errors (4.9%). Furthermore, a considerable number of the students

preferred the intervention, since they were helped to a large extent by classmates' oral spelling (90.9%), the teacher's second dictation (72.7%) and the process of reconsidering the gaps (31.8%) (see Table 5).

Table 5. Students' satisfaction with the intervention process

Statements	Satisfaction							
	Very much		Fairly		Little		No	
	N	%	N	%	N	%	N	%
1. Satisfaction with the hints before dictating	9	40.9	10	45.5	3	13.6	0	0
2. Satisfaction with the fill-in the gaps process	2	9.1	10	45.5	3	13.6	7	31.8
3. Satisfaction with checking out the errors	9	40.9	9	40.9	2	9.1	2	9.1
4. Satisfaction with verbalising the difficulties	5	22.7	6	27.3	6	27.3	5	22.7
5. Being helped by classmates' spelling	20	90.9	1	4.5	1	4.5	0	0
6. Being helped by teacher's sec. dictating	16	72.7	3	13.6	1	4.5	2	9.1
7. Being helped by reconsidering the gaps	7	31.8	8	36.4	3	13.6	4	18.2

Reasons for getting satisfaction from the MPSA. The students gave reasons for being content with the specific intervention that was marked as an alternative way of spelling (18.8%). The participants liked most the fact that they could think aloud their difficulties and sub-processes while writing the dictation (31.3%); as well as that they could listen to their classmates spelling the target words (31.3%). Furthermore, they were satisfied with the 'filling in the gaps' process (6.3%) and the teacher's second dictation (6.3%).

Students' willingness to be taught spelling in the MPSA way. Two basic categories resulted from the analysis of students' responses to the open-ended question concerning their willingness to be taught spelling in this specific way: a) students' willingness and b) readiness to learn. More precisely, the great majority of the students (96.4%) would like to be trained in the morphological awareness program, because they found it an interesting and enjoyable way (22.7%), a helpful (13.6%) and an easy way (22.7%). In addition, certain students believed that this method provided them with the opportunity to learn new vocabulary (13.6%) and to learn spelling more easily compared to conventional instruction (13.6%).

Students' judgments on the effect of the MPSA on their learning. The students' responses to the open-ended question with reference to the effect of the MPSA, highlighted the following advantages: acquisition of new words (31.8%), development

of spelling skills (22.7%), learning to write correct orthography (13.6%), possibility of redrafting their text (9.1%), learning correct pronunciation (4.5%) and self correction (4.5%) (see Table 6).

As regards the difficulties the students experienced with spelling instruction, the majority of the respondents (68.4%) emphasized the impediments with 'unknown words'. A smaller number of students refer to the impediments caused by the 'morphological patterns' (21.1%) and to the difficulties they faced with the polymorphemic words (10.5%).

Table 6. Categories of the students' responses to open-ended question related to the effect of the MPSA on their learning

Categories	Frequency	%
1. Correct orthography	3	13.6
2. Correct pronunciation	1	4.5
3. Spelling skills	5	22.7
4. New vocabulary	7	31.8
5. Redrafting	2	9.1
6. Error correction	1	4.5
Total	19	100

Teacher's and assistant researchers' viewpoints. The verbal data of the teacher interviews was analyzed qualitatively; they underwent the procedures of first and second level coding as well as pattern coding (Miles & Huberman, 1994) and resulted into forty (40) codes that were grouped into eight (8) categories classified into three basic themes: a) Evaluation of the intervention, b) Integration of the MPSA into syllabus c) Suggestions (see Appendix C).

The interviews with the three teachers revealed more similarities than differences. As their responses to the questions related to the basic aspects of the MPSA training they showed a fair amount of similarity.

The picture resulting from teachers commenting on their experience was satisfactory, since all of them highlighted the usefulness of intervention. More precisely, the interviewees considered five basic sub-processes to be very useful to the treatment group: a) teacher's highlighting of the target morphemic patterns before dictating the passage, b) teacher's hints on the words including the target pattern, c) students' spelling the morphological patterns, d) self-correction and e) 'think-aloud process' at the end of every session.

The teachers stressed the importance of the intervention listing a number of positive aspects of the treatment. Firstly, all of them seemed to enjoy and get satisfaction from the whole training process, as it was a completely different way of spelling from the one the students were taught. Furthermore, they underlined the positive effects of scaffolding, teacher-student interaction and students' active participation in the learning process. It was stated that 'leaving the gaps' and rethinking

to 'fill in the gaps' resulted into a process-oriented approach, where students' awareness of their difficulties and self-correction attempts could 'contribute' to the development of metacognitive skills.

However, under these circumstances, they pinpointed certain problems and regarded students' difficulties in correcting specific morphological patterns as the basic factor that constrained them from monitoring the intervention effectively to some extent. In addition, any further implementation of the treatment has to consider time constraints since that was reported to be the main problem for the teacher.

All three teachers welcomed the idea of a) re-implementing MPSA in the classroom, and b) integrating this method into the 6th grade English language syllabus, because it was a motivating and fruitful technique for students to develop morphological strategies. Moreover, they highlighted the fact that the students experienced no uncertainty and anxiety when they attempted to compose a task, due to the supportive classroom climate.

From the total number of answers given, the necessity for reimplementating the 'morphological strategies training' project, as a recycling way for teaching certain morphological patterns and the importance of adapting this spelling process to meet the needs of the poor spellers was valued highly by all teachers. Nevertheless, the three participants stressed the necessity for improving some aspects of the project. One teacher highlighted the need to design simpler texts. However another one thought that the morphemic patterns were easy enough and as a result more complicated patterns should be included.

7. General Discussion

The main issue for the present study was to evaluate the effectiveness of a spelling instruction project, based on morphological strategies training, as well as its feasibility in a classroom context. The basic questions to be answered were: did the training of a group of students with spelling difficulties, as well as the students of an entire class, lead to significant gains in the specific performance? How did the participants (both students and teachers) experience the Morphological Processing Spelling Approach (MPSA)? What kind of problems occurred in the implementation of the MPSA?

The results from the first part of the effectiveness study indicated that the students of the treatment class scored significantly better than the control group. Besides, the metamorphological intervention was proved to be effective in improving significantly the spelling performance of poor spellers in certain inflectional and derivational morphemes. Thus, explicit teaching of inflectional and derivational morphology, through the MPSA, seemed to work well both with poor spellers and the total of class. These results are compatible with findings of previous studies, which found that morphological awareness plays an important role in learning to spell (Egan & Pring, 2004; Mann, 2000; Nunes, Bryant, & Bindman, 2006; Tsesmeli & Seymour, 2007).

Nevertheless, our results suggest a significant but specific treatment effect on "morphological strategies training" groups. The students of the treatment groups (whole class and poor spellers) improved their spelling performance with regard to inflectional and derivational morpheme patterns similar to those that they had taught, but did not perform significantly better on non trained spellings of other morpheme patterns. There was no evidence of transfer from the inflectional and derivational spelling treatment to non-target spelling skills. This is not surprising given the relatively small number of training sessions (7) of 45 minutes.

Because of this limitation to the present study, it would be too risky to come to conclusions about the domain-specificity vs. generality of metamorphological skills that EFL students bring into new spelling-problem situations. A detailed intervention plan with the spread of the intervention over a full academic year would be a necessary condition for both the effect size of the MPSA and the topic of domain-specificity vs. generality of metamorphological skills of EFL poor and typical spellers.

Furthermore, the data, which was elicited from the observation sessions: a) revealed that the MPSA contributed to the teacher and the student interaction, b) indicated that there was an increase in students' involvement in correcting morphological patterns as well as in taking risks in the problem solving spelling activity. Simultaneously, there was a decrease in teacher's guidance and monitoring, indicating a kind guided-participatory context (Rogoff, 1990) of the MPSA, which is rather unusual in a typical Greek classroom.

The questionnaire data revealed that the students were pleased with the MPSA project. They got satisfaction from the 'hands-on', 'filling in the gaps' as well as the 'thinking aloud' process after the completion of each session. However, they referred to some difficulties that they faced; they emphasized the impediments caused by the 'morphological patterns' and by some 'unknown words'.

In the teacher interviews, it was shown that the teachers were eager to incorporate such a project in the English language upper primary classroom, since it seemed to be workable. Considering it as an alternative way of teaching spelling, they identified some of positive aspects for implementing the specific intervention, such as student motivation, self-correction, positive classroom atmosphere, active participation, development of metamorphological skills, teacher-student interaction and reflection on the task.

In conclusion, the three studies suggested that intervention was successful in improving spelling performance. Since special attention should be given to the importance of morphological strategies for the spelling development of poor and typical EFL students, the MPSA project could be implemented simultaneously in several primary school classrooms throughout a longer period of time. Thus, its effectiveness could be examined across different classrooms in order to depict a broader and more complete picture in the future.

It is noteworthy that, besides the small number of sessions and its limited implementation in terms of sample size, the effectiveness study has several other limits

in interpretability, as it didn't include a separate test of morphological awareness in order to examine the specific path leading to the improvement of metamorphological skills during the spelling process. However, this study addressed mainly the question of external validity compared to other more sophisticated intervention studies (Arnbak & Elbro, 2000; Henry, 1989, 1993; Tsesmeli & Seymour, 2007). Specifically, it examined whether the results of the previous intervention studies, showing the beneficial effects of morphological strategies on spelling skills, could be generalized to authentic school settings. The picture, derived from the results of the study, appears to be promising.

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Appendix A

The single word spelling test and the target morphemic pattern

	The words	The sentential context of spelling words	Morpheme Target
1	improved	Paul's score improved after hard training.	-ed
2	authorities	People complained to the local authorities about the polluted water.	-ies
3	healthiest	Kate is the healthiest child I know.	-iest
4	draining	Draining the vegetables is a very easy task.	-ing
5	intention	Tom had no intention of hurting her.	-tion
6	prettier	Alice is prettier than Susan.	-ier
7	laughed	They all laughed at Peter's joke.	-ed
8	submarine	A submarine can travel many meters under water.	-
9	swimmer	My brother is a great swimmer.	-er
10	chopping	The chef is chopping the onions in small pieces to serve the salad.	-ing
11	traveler	An experienced traveler sees a lot of different and interesting places.	-er
12	hospitable	A hospitable person has a lot of friends.	-able
13	backyard	Your basketball is in the backyard.	-
14	powerful	She is a very powerful athlete.	-ful
15	stroke	Julia stroke a match to light the fire.	-
16	loaves	The bakery is full with fresh warm loaves.	-s
17	lying	John's books are lying on the table.	-ing
18	magnificent	The film was magnificent, I loved it!	-
19	decomposed	After one month in the open air, the fruit completely decomposed.	-ed
20	ripe	Ripe tomatoes are tastier than green ones.	-
21	homogeneous	These two plants are homogeneous, they belong to the same kind.	-

Appendix B

Morpheme patterns, words of training sessions, and total number of words in dictation text per session

Session & Morpheme patterns	Words of training sessions	Number of words in dictation text
1. **Present Continuous Inflexion (-ing)**	surfing, searching, preparing, composing, mewing, crying, baking, telling, stopping, eating	128
2. **Plural Inflexions (–s, -es, -ies)**	lobbies, pianos, melodies, memories, bunches, lilies, bunnies, loaves, mangoes, peaches, knives	59
3. **Comparative and superlative suffixes (–er, -ier, -iest)**	naughtier, perkiest, cutter, prettier, quicker, louder, heavier, kindlier, loveliest, friendliest	45
4. **Regular Inflexion in simple past (-ed)**	appeared, topped, flitted, grubbed, trotted, touched, liked, ended, talked, disappeared	80
5. **Noun suffixes (-tion, -sion)**	mansion, attention, direction, pension, occasion, description, division, decision, institution, confusion	68
6. **Adjective suffixes (-y, -ful, -able)**	breezy, cozy, comfortable, colorful, cheerful, playful, naughty, miserable, beautiful, lovable	84
7. **Noun suffixes (-er, –or)**	writer, counselor, runner, actor, signer manager, butler, helper, aviator, painter	74

Appendix C

Themes, categories and pattern coding

Themes/Categories	Pattern Coding
1. Profile	**Primary school teachers**
A. Evaluation of the Intervention	
2. Usefulness of the intervention	SPATWO=Spelling the patterns/words SECORR=Self-correction THALPRO=Think-aloud process HIGHPAT=Highlighting the patterns FILGAPR=Using the fill in the gaps process FWOSPAT=Focus on the words including the specific pattern
3. Positive effects on students	STUSAT=Student satisfaction DIWAYSP=Different way of spelling STACTPA=Student active participation AWADIF=Awareness of their difficulties CONERCO=Control of error correction ACPRIKN=Activating prior knowledge
4. Positive aspects	SSINTER=Student-student interaction TSINTER=Teacher-student interaction REFIGAP=Rethink and fill-in the gaps PLEAGAP=Process of leaving a gap REWRCOR=Reflect on writing and correct PRORAPR=Process-oriented approach REJUANS=Reasoning-justification of the answers METCPRO= Metacognitive process
5. Difficulties / problems	TIMCOPR=Time-consuming process COMORPA=Correction of the morphological pattern UNKWOR=Unknown words
B. Integration of MPSA into syllabus	
6. Reasons for integrating	MOSTINT=Motivating student interest USESTU=Useful for students SELCOPR=Self-correcting process ALMEASS=Alternative method of assessment NOANXCO=Causing no anxiety about being corrected PLAENCL=Playful-enjoying climate POCLATM=Positive classroom atmosphere CHATORT=Changing student attitude towards orthography NOMETSP=Novel method of teaching spelling MECOGSK=Student metacognitive skills
C. Suggestions	
7. Reimplementation of the project	RECPRO=Recycling purposes CRCOMPR=Creative and communicative process STRSPNE=Meet the poor spellers' needs
8. Improvement of the project	DESHPAS=Design of simpler passages MDIFPAT=More difficult patterns LEMOPAT=lexical/morphemic pattern GAMBAPR=Game -based process