THE INFLUENCE OF ENVIRONMENTAL PRINT ON PRESCHOOLERS' LITERACY DEVELOPMENT IN A TWO-ALPHABET SOCIETY

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Abstract Children in Greece are exposed to a unique literary situation as they live in a monolingual society which uses two different alphabetical systems: the Greek alphabet and the Roman alphabet. Since the school curriculum of preschool education does not include the teaching of Greek or non-Greek letters, environmental print is mainly responsible for primitive hypotheses about letters. In this research 504 preschoolers were tested regarding their ability to differentiate between the two alphabets which circulate widely in the Greek urban print environment. It was revealed that preschoolers, although unable to read, were able to differentiate between texts written with Greek or Roman letters. This gives strong evidence for the conclusion that, apart from the major role that visual language plays in the reading of environmental print, information about actual letters is also absorbed by preschoolers.

French En Grèce, les enfants sont exposés à un contexte linguistique unique puisqu'ils vivent dans une société monolingue qui emploie deux systèmes alphabétiques différents : l'alphabet grec et l'alphabet romain. Comme le programme de l'école maternelle n'inclut pas l'enseignement des lettres, grecques ou non-grecques, l'exposition à l'écrit environnant détermine les premières hypothèses que font les enfants sur les lettres. Cette recherche menée auprès de 504 élèves de maternelle examine dans quelle mesure ils parviennent à différencier ces deux alphabets, largement présents dans l'environnement urbain grec. Les résultats montrent que les élèves de maternelle, bien qu'incapable de lire, distinguent les textes écrits avec des lettres grecques de ceux en lettres romaines. Ceci conduit à conclure que, indépendamment du rôle essentiel des indices extra-linguistiques dans la lecture de l'écrit environnant, des informations sur les lettres sont également prélevées par les jeunes apprenants.

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Chinese 希腊儿童面对一种独特的情况 — 一种语言、两种字母系统。这两种字母系统，分别是希腊字母和罗马字母。由于幼儿教育课程之中，并没有包括教授希腊及非希腊字母，生活上接触到的文字，成为幼儿对文字的主要基本假设。是次研究测试了 504 位学前幼儿，探索他们分辨两种在希腊城市流通的字母的能力。研究结果发现，学前幼儿虽然未能阅读，却能分辨希腊字母和罗马字母两种书写文字。这结论证明了除视觉语言在阅读环境文字中，担当重要的角色外，书写文字的讯息，亦同时被学前幼儿所吸收。

Περίληψη Τα παιδιά στην Ελλάδα αντιμετωπίζουν μια ιδιαίτερη γλωσσική πραγματικότητα, αφού, ενώ ζουν σε μια μονογλωσσική κοινωνία, έρχονται σε επαφή με δύο αλφάβητα, το Ελληνικό και το Λατινικό. Επειδή η διδασκαλία των γραμμάτων, Ελληνικών και μη, δεν εντάσσεται στους στόχους του αναλυτικού προγράμματος της προσχολικής εκπαίδευσης, ο περιβάλλων γραπτός λόγος φαίνεται να είναι ο μόνος ή ο κύριος υπεύθυνος για τις γνώσεις των παιδιών αναφορικά με τα γράμματα του ελληνικού αλλά κυρίως του λατινικού αλφαβήτου. Στη συγκεκριμένη έρευνα ζητήθηκε από 504 παιδιά προσχολικής ηλικίας να διακρίνουν ανάμεσα σε γραπτά μηνύματα κωδικοποιημένα και στα δύο αλφάβητα. Η ανάλυση των αποτελεσμάτων έδειξε ότι τα παιδιά προσχολικής ηλικίας, αν και δεν γνωρίζουν ακόμη να διαβάζουν, είναι σε θέση να διακρίνουν ανάμεσα στο Ελληνικό και το Λατινικό αλφάβητο. Το συγκεκριμένο εύρημα μπορεί να ενταχθεί στο γενικότερο διάλογο για τη συμβολή του περιβάλλοντος γραπτού λόγου στην κατάκτηση του γραμματισμού, την οποία και φαίνεται να υποστηρίζει.

Key words: Environmental print, letter-knowledge, preschoolers, two-alphabets society, literacy

1. INTRODUCTION

Children in Greece encounter a unique situation as they live in a literate society which uses two different alphabetical systems: the Greek and Roman alphabets. Whereas the Greek alphabet is used mainly to encode the Greek messages, the Roman is prolific in all kinds of environmental print, from well-known logotypes and shop names to popular children's film heroes and well loved toys. A vast number of texts written in English (e.g. *Rooms to let*), French (e.g. *Clochard, Decoratrice*), Italian (e.g. *Spaghetteria, Gelateria*) or German (e.g. *Lili Marlen*) introduce the parallel use of the Roman alphabet and create an interesting communicational mosaic of languages, texts, letters. The use of the Roman alphabet reaches its peak in tourist areas such as the Greek islands, where virtually all the messages of the urban print are non-Greek and printed in Roman letters.

Since Greece is a westernized country that never became part of the Communist bloc, it differs from Eastern European countries that also do not use the Roman alphabet. The imitation of the 'American' lifestyle and its consumer products brought about the increasing use of the non-Greek alphabet. Increasingly, messages written in Roman letters become the norm; some Greek companies even give them preference in their trading names (e.g. EPAVLIS instead of ΕΠΑΥΛΙΣ which means *villa*). The recently invented *greeklish* (Greek texts written in Roman letters instead of Greek e.g. *ine* instead of *είναι* which means *is*) has invaded the electronic communication, mobile telephones and chat rooms, especially among the young.

In decoding street signs, shop names, print advertisements, two alphabets, corresponding vaguely to different languages, compel readers to switch alternatively into Greek and non-Greek depending on the text they are reading. Thus, readers are exposed to a unique situation not shared with other linguistic societies such as Serbo-Croatian readers who read their own language in two phonemically precise and partially overlapping alphabets; the Cyrillic and the Roman (see Lukatela & Turvey, 1998, Lukatela et. al, 1996). The Greek society remains monolingual and formal

education is limited to Greek language and the Greek alphabet, at least until third-grade when pupils begin to learn English as a foreign language. Despite this monolingualism, Greek people are being obliged to grapple with two different alphabets, the traditional and national Greek and the Roman used mainly in the environmental print.

2. GREEK/ ROMAN LETTERS AND PRESCHOOLERS

Internationally the first words preschoolers 'read', even before they know how to read, are *McDonald's* and *Coca Cola* (Cronin, Farell, Dalanay, 2000; Goodall, 1984; Wepner, 1985). In Greece young children seem to recognize popular logos referring to their favourite food, drinks, or toys, such as *Coca Cola*, *Goody's* (a Greek fast-food company) and *Pokemon* (Sfiroera & Haralambidou, 2003; Yannicopoulou, 2004). It is worth noting that not only those most recognizable logos but many of the preschoolers' 'readable' words (e.g. *Barbie, Spiderman*) are written in the Roman alphabet.

Furthermore, many of those recognizable words happen to start with a letter, which either does not exist in the Greek alphabet (e.g. the phoneme /k/ corresponds only to K, while the Greek alphabet lacks the letter C of *Coca Cola*) or, even if it exists, is linked with a different phoneme violating the grapho-phonic correspondence of the Roman alphabet (P does not stand for /p/ but for /r/; the Greek letter for /p/ is Ππ). In other cases, children are confronted with two versions of the same letter, one Greek and another Roman (e.g. /l/ corresponds to the Roman Ll and the Greek Λλ). In this instance, they are faced with an awkward situation which forces them to trace the reasons why *Λεωνίδας* (Leonidas) and *Λίνα* (Lina) start with *Λ* - they share the same first phoneme /l/- when *Lacta* and *Lion (King)* ask for another sign, L.

All the letters can be classified into three categories:

- The common letters that vaguely correspond to the same phonemes in Greek and Roman alphabets (e.g. T, K, Z, N, M)
- The letters that exist only in one alphabet, either in Roman (e.g. C, D, F, G, J, L, Q, R, W) or in Greek (e.g. Γ, Δ, Θ, Λ, Ξ, Σ, Φ)
- The common letters that correspond to different phonemes (e.g. B, /b/ for English, /v/ for Greek; P, /p/ for English, /r/ for Greek; X, /x/ for English, /h/ in Greek).

On the other hand, many Greek kindergarten teachers can affirm that very often preschoolers connect specific phonemes with English logotypes (e.g. "/k/ as in Coca Cola") even in those cases where the starting Roman letter differs from the Greek one ("/p/ as in Pokemon", although Pokemon starts with the letter P, which in Greek alphabet corresponds to the phoneme /r/; e.g. PAKETA is pronounced as /raketa/ and means racket). In addition, when children, who do not know how to write produce their own writings, a series of Roman letters intrude into them, even though the young writers are unable to name them (e.g. for F "That is /f/") or, at least, recognize their foreign origin (for R "This is a Greek letter, but I do not remember which one"). On the contrary, the same children, when observing the environmental print,

become occasionally aware of the presence of Roman letters considered 'English', 'French' or 'German'.

In a linguistic community where preschoolers do not receive any formal training on the alphabet, it is interesting to investigate issues concerning their ability to trace the difference between the two alphabetical systems. When certain foreign verbal utterances (e.g. *Superman*, *Action man*) are so incorporated into children's life that they consider them mainstream Greek, it is worth investigating their knowledge regarding the two alphabets, the results of children's engagement with environmental print. Among the questions which need deliberation are:

1) Do Greek preschoolers know that in their houses, in grocery stores, along streets and highways, messages circulate that are coded in two different alphabetical systems?
2) Are they aware of the Greek and the Roman letters?
3) Can they distinguish between texts printed in Greek and others in Roman alphabet?

3. ENVIRONMENTAL PRINT

Crucial to the acquisition of literacy is the issue of the influence of environmental print, the "roots of literacy" according to Yetta Goodman (Goodman, 1986). The presence of two alphabetical systems in the same monolingual society creates a suitable situation for studying the influence of environmental print on children's reading ability. If children perform successful letter identifications and are able to differentiate between Greek and non Greek texts, environmental print should then be recognized as an important aspect of their literacy development. Since, according to the school curriculum, preschoolers are not taught letters, Greek or non-Greek, the primitive hypotheses that they form about letters arise solely through their exposure to environmental print.

Although for nearly four decades children's ability to read environmental print has been investigated (Aldridge & Rust, 1987; Durkin, 1966; Goodman & Altwerger, 1981; Harste, Burke & Woodward, 1982; McGee & Jones, 1990; Orellana & Hernandez, 1999; Rule, 2001; Wepner, 1985, see also case studies which consist of observations on early literacy development of the researchers' own children, Baghban, 1984; Laminack, 1991; Lass, 1983; Miller, 1996; Payton, 1994;), the contribution of environmental print to early literacy remains a matter for debate and a focus for continuing research on early literacy.

A number of empirical studies seem to deny the environmental print's influence on literacy development. Researchers used selected environmental print items, which were systematically manipulated across a number of presentation conditions – e.g. gradually removing aspects of visual hints, such as colour, font, and so on - in order to examine if children's ability to read depends on letters/ words or on the extra-linguistic elements. In the extensive research of Masonheimer et al. (1984) the sample consisted of 102 preschoolers aged from three to five, who were able to recognize at least 8 out of 10 sample-items of environmental print. Those preschoolers were asked to read the same items in different conditions; either after the deletion of

contextual and visual information (e.g. colour, font) or after alterations of certain letters (e.g. instead of *Pepsi*, *Xepsi*). The results showed that children lacked the ability to read only when non-linguistic elements were altered (e.g. colour, font), while they continued to read easily the familiar logo even after letter alterations (e.g. *Xepsi* instead of *Pepsi*). Masonheimer et al. (1984) concluded that being experienced in environmental print reading does not, in itself, lead to word reading skills.

Masonheimer et al.'s (1984) views were also shared with others researchers (Stahl & Murray, 1993), who concluded that, due to children's dependency on visual hints, they learn little about the recognition of words through exposures to contextualized environmental print. In spite of the fact that preschoolers consider that the environmental print communicates messages, they make extensive use of the non-linguistic information in order to decode it. However, it seems probable that those researchers reached that conclusion due to the prominent role that visual elements, such as colour or distinctive font, play in the reading of familiar items of environmental print. The successful logo of a well-known refreshement has become an extremely familiar visual image that is conceived totally, and not analytically, making minor letter alterations 'invisible' (*Xepsi* instead of *Pepsi*).

Since young children's approach to environmental print is context dependent, the exposure to logotypes does not seem to facilitate the reading of words (Stahl & Murray, 1993). Once the visual and contextual cues are removed, preschoolers' performance in reading the logos declines, establishing a negative correlation between the decontextualizing of the logo and the ability of the students to read the print (Cloer, Aldridge & Dean, 1981/1982). Even in cases where some items of environmental print in the classroom have been discussed between children and a capable adult -a key factor for learning according to Neuman & Roskos (1993)- the results are the same (Kuby, Aldridge & Snyder, 1994).

It seems that the complex visual and contextual cues associated with logos are responsible for children's ability to read environmental print. When stylized print is found in a misleading context (e.g. *Crest* label on a *Coca Cola* can), the latter takes predominance over the word, because young children trust more the image of the text than the actual letters of it **(**Dewitz & Stammer, 1980). These results are duplicated with adults, who also tend to 'read' more the contextual and visual information than the actual print, by ignoring striking letter swapping, e.g. *Caco-Calo* instead of *Coca-Cola* (Delano, 2001).

Children's propensity to notice the print found in their environment does not encourage them to use the entire contents of their print and phoneme knowledge network, because the reading of environmental print calls on different strategies that rely mainly on visual components (Reuthzel & Fawson, 2003). Preschoolers are more interested in "reading the world than the words" (Orellana & Hernandez, 1999) and in the case of environmental print the aesthetic and contextual cues of the writing results in effortless comprehension.

However, another body of research reaches different conclusions about the significance of environmental print for early literacy development. Since preschoolers actively use and experiment with language and form concepts about it (Ferreiro & Teberosky, 1982), they explore the details of environmental print before they start their formal education (Clark, 1976; Clay, 1993). In a society full of print, non read-

ers attempt more to read environmental (e.g. a *Ruffles* potato chip bag) than functional print items (e.g. McGee, Lomax & Head, 1988). In addition, although preschoolers tend to identify the labels as either categories (toothpaste) or functions (to clean teeth) (Goodman & Altwerger, 1981; Morgan, 1987), they gradually move from gross approximations about print to conventional reading looking for individual words and letters.

Their continuing encounters with print allow children to test out the viability of their assumptions concerning its meaning, and preschoolers thereby have a meaningful basis to make sense of the written language around them. The reading of environmental print improves with age, as older preschoolers recognize more items than the younger ones (Hiebert, 1978). In addition, it has been shown, that preschoolers who exhibit reading supremacy over their fellow students, contribute more logical and profound answers regarding the reading of the environmental print than their peers (Shaffer & McNinch, 1995).

Young children seem to concentrate on the print and many times they observe and comment on individual letters (McGee, Lomax & Head, 1988). Even in cases of wrong readings, due to misleading visual hints, children seem to take notice of the actual print. Thus, for example, a one-to-one correspondance between the printed words and those counted in the children's own wrong 'readings' was observed (Hiebert, 1978; Goodall, 1984). Moreover, in a more recent study (Cronin, Farell & Delaney, 1999) it was found that recognizing words in environmental print created an advantage for learning words in isolation and written in the same neutral way (e.g. *Stop* from the well known sign) as compared with learning new words (e.g. *Sock*). The children who could identify environmental labels exactly learned to read these words, even when they were not identical in font and style, more quickly than the words from logos they could not identify (Cronin, Farell & Delaney, 1999).

4. THE CURRENT RESEARCH

In Greece, children, even before they know how to read, encounter two alphabetical systems; Greek (mainly in books and Greek texts) and Roman (mainly in the environmental print). Since preschoolers are not taught reading and writing either in Greek or English, they absorb knowledge about letters and print from their environment. This research aimed to examine young children's knowledge of Greek and Roman alphabets which both circulate widely in the urban print environment. If children were able to differentiate between those two alphabets, it can be claimed that preschoolers read not only the environmental extra-linguistic cues, in context and out, but also pay attention to the print itself. The unique situation of Greek children provides a useful vehicle for determining the nature of print knowledge that children develop through the environmental print.

The participants in the study were 504 non-readers, aged between five and six years old, 246 boys and 258 girls, 412 monolingual and 92 bilingual, who studied in the kindergardens of the city of Rhodes in Rhodes Island. (See Table 1).

Table -1. The sample: Frequencies (percentages in brackets)

	Boys		Girls		Total	
Monolingual	200	(39,7)	212	(42,1)	412	(81,8)
Bilingual	46	(9,1)	46	(9,1)	92	(18,2)
Total	246	(48,8)	258	(51,2)	504	(100)

Every preschooler was provided with: a) a leaflet containing five sheets of paper with the pictures of five well-known video films, one on each page and b) Ten extra pieces of paper with the titles of the video films, one in Greek and the other in English. Thus, for each video film two different pieces were provided containing the title of the film, one in Greek letters and the other in Roman. Both Greek and English titles were printed in capital letters, since young children are more familiar with them than with the lowercase one (Smythe, Stennett, Hardy, & Wilson, 1970-1971). The two titles were printed identically on a white background, lacked extra-lingustic cues and were given to children at the same time in a random order.

The five films were: Η Πεντάμορφη και το Τέρας – Beauty and the Beast, Ο Βασιλιάς των λιονταριών – The Lion King, Το Βιβλίο της Ζούγκλας – The Jungle Book, Η Μικρή Γοργόνα – The Little Mermaid, Η Ωραία Κοιμωμένη –Sleeping Beauty.

The selection of the videos, from the whole range of the environmental print items, was due to the following factors:

- Among the environmental print items, video films are the only ones which actually circulate in the Greek market in two versions: a) Greek titles on their package when they are translated into Greek, b) English titles on their package when the English speaking film has Greek subtitles.
- Children are familiar with both title versions, the English and the Greek, due to the proliferation of consumer products, e.g. t-shirts, toys, pencils, schoolbags etc.
- In the results of a pilot study, those five video films were the most popular among preschoolers.

Children were asked to help the researcher to prepare an advertising leaflet for the Greek market by selecting and pasting under each video film-picture the Greek title. The same task was repeated five times regarding the five video films. Each time preschoolers dealt with only one picture and had to choose between the two pieces of paper with the corresponding titles, in Greek and in English. After finishing with one video film, they proceeded to the next one, without any evaluating comment, until they completed them all. The order of the video films was left to chance. In addition, preschoolers worked silently and were not asked to explain or comment on their choices.

The preschoolers were tested individually in their schools by the same researcher for approximately ten minutes.

Every child was scored according to the right answers s/he had accomplished. The highest score was 5/5 (5 right attempts out of 5 tries) and the lowest 0/5 (all his/her attempts were wrong). They also scored 4/5 (for 4 right anwers), 3/5 (for 3 right answers) and so on. Children were credited even if they had glued the right title upside down or vertically. On the other hand, their attempt was considered wrong if none or both titles, the Greek and the English, were attached to the same film-picture.

The children's answers were examined according to their ability to differentiate between the two alphabetical systems. Since the preschoolers could not refer to any non-linguistic cues in order to resolve their dilemma, they had either to focus on the actual letters of the two texts or to answer by chance. However, in the case of chance responses, the children had the same probability to select either the right or the wrong answer. Therefore, all the scores, 5/5, 4/5 etc, would be likely to appear in equal proportions. In other words, if the children chose between the two titles, the Greek and the English by chance, the curve of their answers should be presented as the normal curve of Gauss.

In contrast, the distribution of the proportions between the wrong and right responses showed that the majority of children concentrate on the right answers. As the relevant table (Table 2) and the diagram (Diagram 1) demonstrate, more than the 50% of the children who were asked, managed to select the Greek alphabet in all the five tasks or at least four of them. The distribution of their answers forms a rightly skewed distribution.

Table -2. Preschoolers' responses: number of correct selections (out of five) and cumulative percentages

Score	Nr. of students	Cumulative percentage
5 out of 5	118	23,4
4 out of 5	144	28,6
3 out of 5	127	25,2
2 out of 5	73	14,5
1 out of 5	38	7,5
0 out of five	4	0,8
Total	504	100

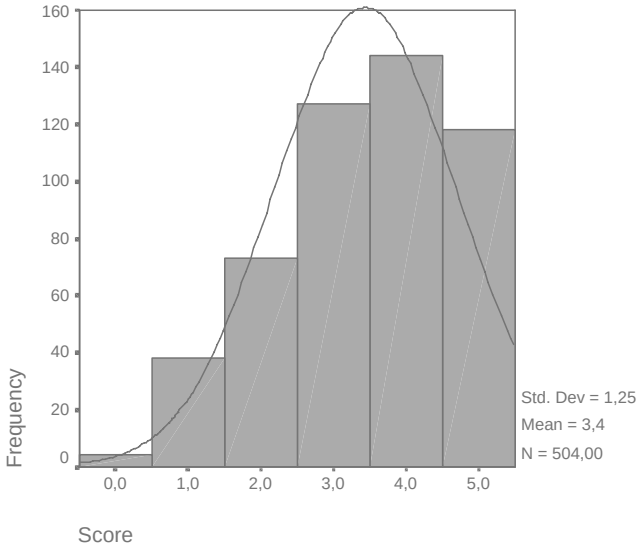

Figure -1. Preschoolers' responses.

In addition, after using the Chi^2 for goodness of fit test, it becomes clear that the children's answers are correct beyond chance factors [X^2 (5) = 181,45, p = 0,000]. Since all the visual and non-linguistic clues were removed, the children reached the right answers and differentiated between messages printed in Greek or Roman letters by looking at the written text (Table 3).

Table -3. *Right expected preschoolers' responses*

Correct out of 5	Actual	Expected	Variation
5 out of 5	118	84	34
4 out of 5	144	84	60
3 out of 5	127	84	43
2 out of 5	73	84	-11
1 out of 5	38	84	-46
0 out of five	4	84	-80
Total	504		

We also examined if the children's responses were correlated with their gender. The statistical analysis showed that the preschoolers' responses were not influenced by their gender, since boys and girls scored similarly [t (502) = 1, 80, *ns*].

Furthermore, children's responses concerning the differentiation between the two alphabets seemed to be independent of the parameter of bilingualism. Monolingual and bilingual preschoolers do not appear to have statistically significant differences regarding their responses [t (502) = 0, 37, *ns*].

In addition, in order to investigate whether the interaction of the two variables (monolinguals/bilinguals and male/female), was statistically significant we ran a factorial ANOVA (2X2). The results showed no statistical significance not only for the two main effects, sex [F_A(1, 500) = 1,74, *ns*] and language [F_B (1, 500) = 0,15, *ns*] but also for their interaction [F_{AxB} (1, 500) = 0,01, *ns*].

5. DISCUSSION

The analysis of the collected data indicate that preschoolers, although unable to read, are not only aware of the existence, in the same linguistic community of two different alphabets, but they can differentiate between texts written in Greek or Roman letters. Since preschoolers are not taught even the Greek alphabet at kindergarden, their knowledge of the two alphabetical systems originates from their literacy environment. Whereas Greek letters are used in the majority of texts and the Roman alphabet dominates environmental print, children are exposed to both alphabets and learn about them even before formal schooling just by living in a two-alphabets society.

In contrast with researchers (Masonheimer et al, 1984) who concluded that children make sense of the environmental print only by decoding the extralinguistic cues, this research indicated that when children aged between five and six years were asked about specific letters, they observed the actual letters and answered accordingly. It seems that if all the extralinguistic elements are removed, children convey their knowledge about the written texts and express their literary experiences revealing that when the visual modality becomes inadequate to 'solve the problem' they turn to the written code.

Although the readable rudimentary environmental print words, like *McDonald's, Coca Cola, Lego*, are accessed directly and are not read through assembled phonology as they tend to occur before children can identify any letters (Louden & Hunter, 1999), this research shows that preschoolers, when they encounter the surrounding print, notice the letters and are able to make judgements regarding them, including the alphabet they belong to. It seems that youngsters do not use their knowledge of letters as they read the envrironmental print, but they approach it as a whole relying on graphic and visual cues. Since children are more keen to "read the world than the words" (Orellana & Hernandez, 1999), they do not resort to the use of letters to analyze the print. Only when a child's comprehension through visual extralinguistic elements is not sufficient, do they turn to other modalities and employ their knowledge of letters, words and alphabets.

The results of this research agreed with that of earlier work (McGee, Lomax, & Head, 1988) which stated that children, even if they are not able to read the environmental print conventionally, observe and comment on specific letters. The fact that Greek preschoolers seem able to discern successfully between the two alpabetical systems which proliferate in their literary environment, gives strong evidence to assume that environmental print contributes to their literary development. It is also noteworthy that preschoolers' ability to differentiate between the two alphabetical systems does not depend on their sex or the monolinguistic/ biligual parameter, since both monolingual and bilingual children are not taught to read or write either in Greek or in their 'other' language.

A linguistic environment where the vast majority of environmental print (e.g., popular logos of food and drinking products, superheroes, favourite toys, restaurants' and toy stores' logos) is written in Roman letters, whereas all the other forms of written communication is confined to the Greek alphabet, becomes an ideal setting for studying the influence of environmental print on the acquisition of literacy. If preschoolers, while not formally taught at kindergarten, exhibit some knowledge concerning the different alphabetical systems, as this research has showed, this may lead to the conclusion that apart from the major role that visual language plays in the reading of environmental print, information about letters and word recognition is also absorbed by preschoolers.

Further research should examine the degree to which preschoolers learn from the environmental print and define the instructional implications of living in a country of a two-alphabets literary environment, where children associate specific phonemes with letters of both alphabets announcing: "/m/ such in μαμά (mama=mummy) and M'Donald's".

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