Recent findings on dyslexics’ language learning

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Introduction

Cross-cultural communication is important and especially for those who speak minor languages to be able to communicate in one or two of the major languages in the world. However, there are groups of people such as dyslexics, who display difficulties in accessing multilingualism and they either lag behind their peers or do not learn and sometimes do not even try to learn a foreign language at all. This presentation attempts to show: a) the profile of the dyslexic child across languages (with a focus on Greek, English, French) b) the role of morphological and syntactical awareness in dyslexia c) the relationship between native (L1) and foreign (L2) language competence skills d) research findings concerning the Greek language e) our research findings in dyslexics’ writing in Greek (L1) and English (L2)  f) research findings concerning the French language g) our recent research on the difficulties in the morphology and syntax that Greek dyslexic 5th and 6th grade students have in learning French as a foreign language as compared to non dyslexic students of the same age.
Why French as an L2? Why morphology and syntax?

- Most research findings concerning learning difficulties/dyslexia concern the English language either as native (L1) or foreign (L2)
- Most research studies examine phonological skills
- French is mostly studied as a native language in dyslexics
- No study has examined French as a foreign language by dyslexics with Greek as an L1
Research on dyslexia/learning-reading difficulties in French and English during the last three years (2012, 13, 14)


• Does dyslexia appear in all languages?
• Is the profile of the dyslexic student the same across languages?
• If not, why?
• Why most research is on the English language (either as an L1 or L2)?
Paulesu et al. (2001) used the technique of brain imaging and revealed that the brain dysfunctions associated with dyslexia are similar in dyslexics whose mother tongue was English, French and Italian, even if the problems are manifested in different ways depending on the language.

It is concluded that developmental dyslexia generally occurs in all languages, it is a neurological disorder and may vary according to the spelling system and the typology of each language.
Points of activation in the left temporal region of the brain in readers of typical development (TD) and in dyslexics (3 languages: French, Italian, English) [(A=TD, B=Dyslexics, C=difference between A and B), Paulesu et al., 2001]
The degree of phonemic-grapheme correspondence of each language influences the way that a student with dyslexia develops his/her reading and spelling abilities.

There are languages that the grapheme-phonemic relationship is simple and they are characterized as phonologically 'transparent' languages (transparent languages), such as the Greek (49 graphemes - 25 phonemes, Chatzisavidis & Chatzisavidou, 2011), the Italian and Spanish (45 graphemes – 32 phonemes, Sprenger-Charolles & Cole, 2006). Other languages are characterized as phonologically non-transparent languages, such as English (1120 graphemes - 40 phonemes, Coulmas, 1996 in Sprenger-Charolles, 2003). French (130 graphemes – 35 phonemes) and German (85 graphemes – 40 phonemes) are characterized by an intermediate level of transparency (Ziegler & Goswami, 2005).
They are not many, mainly because of the historical orthography (it is based on etymology, e.g. εκρήγνυμαι, /ekriγnime/=burst, οικογένεια, /iκoγeνeia/=family).

It is transparent as far as the grapheme-phonemic reading consistency (95.1%), semi-transparent in orthographic writing (80.3%, Protopapas & Vlachou, 2009). Each letter represents the same sound but the same sound can be represented by different letters or letter pairs, e.g. /i/: ι,η,υ,ει,οι,υι /e/: ε,αι, /o/: ο,ω (Mavrommati & Miles, 2002).

Difficulties because of the rich morphology (rich inflectional system, multiple endings mainly in the verb conjugation).
Generally English has fewer consistent relationships between sounds and letters than many other languages (e.g. the letter sequence *ough* can be pronounced in 10 different ways) making English spelling not a reliable indicator of pronunciation and vice versa. As a consequence, it takes longer for students to become completely fluent readers than in many other languages, including French, Greek, Spanish (Ziegler & Goswami, 2005) and it has been found they take up to two years longer to learn to read than their counterparts in 12 other European countries (Seymour, 2001)

- Consonants are combined in two producing a sound (th, ch, sh) or they can be read individually as well (t and h in penthouse).

- Pairs of vowels which can be read as one phoneme (meat) or separately (each letter individually e.g create).

- Combinations of letters can be read in several ways according to the word (bear, hear, heart).

- In syllable not stressed, especially at the end of a word, the vowel may lose its value in terms of the corresponding sound and is pronounced in the central oral cavity as a neutral vowel sound (‘schwa’) even though it is represented by different phonemes or combinations of phonemes in writing (madam, evolution) or a combination of consonant – vowel may be read as one consonant or a combination of consonants (patient, soldier, nature).

- Letters not read (climb, cough, sigh, gnaw, knight).
Inconsistencies of the French orthographic system

Generally French pronunciation follows strict rules based on spelling but spelling is often based more on history than phonology. It can be difficult to predict the spelling of a word based on the sound, on the other hand a given spelling usually leads to a predictable sound.

Quantity:

- Two or more graphemes correspond to one sound: ([o] → o, ô, au, eau, eaux)
- One grapheme does not correspond to only one sound:
  - Grapheme ‘h’ is not pronounced when used on its own. It is pronounced with grapheme ‘c’ [ʃ] or [k] (chanson, chœur).
  - The final consonants are not pronounced:
    - -s, -x → symbols of plural number
    - -r → infinitive suffix
    - -t → verb form suffix
    - -b, -c, -d, -f, -g, -l, -p, -s, -t, -x, -ct, -ls, -rc, -rs → consonant suffixes

Quality:

- A grapheme can be pronounced in several ways:
  - E → [ɛ], [a], [œ]
  - U → [y], [w], [ɥ]
  - I → [i], [j]
  - C → [k], [s], [g]
  - G → [g], [z]
  - T → [t], [s]
  - X → [s], [z], [gz], [ks]
  - Ch → [ʃ], [k]
  - Ill → [ij], [il]
  - Eu → [œ], [ø], [y]
Does dyslexia appear in all languages? Yes, it does (both in alphabetic and logographic writing systems, Ho & Fong, 2005)

Is the profile of the dyslexic student the same across languages? No, it isn’t

If not, why? Languages are different in terms of transparency (grapheme to phoneme correspondences) as well as concerning morphosyntax

Why most research is on the English language (either as an L1 or L2)? Because of its great inconsistency between phoneme-grapheme and of the great number of people who have it as an L1 (about 450 million) and as an L2 (about 900-1500 million) as it is the global lingua franca (http://en.wikipedia.org/wiki/English_language)

Why most research examines phonological skills? Because it is on the English language………..
• Research to date has repeatedly shown the significant role of phonological awareness in the reading acquisition (Kuo & Anderson, 2006; Ziegler & Goswami, 2006).

• There is also evidence supporting that morphological and syntactic awareness has a significant influence on word reading achievement in alphabetic languages as well as in languages with characters (Carlisle, 1995; Casalis & Luis-Alexandre, 2000; Kirby, Deacon, Bowers, Izenberg, Wade-Woolley & Parrila, 2012; Kuo & Anderson, 2006; Rispens, McBride-Chang, & Reitsma, 2008).
Dyslexic students with reading disabilities are weaker than their normal achieving counterparts on a variety of skills—phonological/orthographic, morphological, syntactic, and verbal memory—in their first language (Scanlon & Vellutino, 1997; Siegel & Ryan, 1984) and also in a foreign language (FL) (Geva et al., 1997; Sparks et al., 1998b). These skills were found to be the components of a general language ability that best predicted oral and written proficiency in a FL (Andreou & Baseki, 2010, 2012; Sparks et al., 1998b).
Sparks and Ganschow (1993a,b), in their Linguistic Coding Differences Hypothesis (LCDH) claimed that both L1 and L2 learning depend on basic language learning mechanisms that are similar in both languages and indicated that weak L2 learners have difficulties in specific aspects of their L1, namely the phonological /orthographic (sound and sound–symbol) and syntactic (grammatical) components of language learning. In other words, native language phonological and syntactic skills are closely related to FL learning (Sparks et al., 1998a).
Research in Greek

• In Greek, during the last few years there has been an increasing interest in the role of morphological awareness skills in early literacy, namely decoding and reading comprehension (Manolitsis, 2006; Manolitsis & Kandilidou, 2011; Rothou & Padeliadu, 2011) and in spelling/writing (Andreou & Baseki, 2010, 2012; 2014; Chliounaki & Bryant, 2002; Tsesmeli, 2007).
Andreou & Baseki (2010, 2012) examined the ability to write (to compose) a story on the computer based on pictures, in dyslexic and non-dyslexic students by the use of the program ScriptLog. The languages examined were Greek (L1) and English (L2). Results showed that dyslexics generally made more mistakes than non-dyslexics in both languages but both dyslexics and non-dyslexics made more phonological mistakes (pix-picks, solgers-soldiers) in English than in Greek, in which most mistakes were orthographical (γιτονας, πιραζαν, αγνοι). Phonological mistakes are more serious than orthographical ones since they can completely change the meaning of a word or produce non-words. The above finding proves that the type of mistakes in writing is completely depended on the orthographical system of a language (Greek: shallow, English: deep) as well as on the morphology of each language (Greek: rich derivational and inflectional morphology, English: poor inflectional morphology).
Andreou & Baseki (2014, submitted) examined spelling performance in picture elicited narratives of dyslexic and non dyslexic students in Greek (L1) and English (L2). Phonological, orthographical and morphological errors were assessed and the revising and pausing behavior of the students was also examined, as essential parts of the writing process and closely linked to spelling performance. The results showed: a) Dyslexics made more morphological errors in Greek and more phonological errors in English b) In both groups, dyslexics and non dyslexics, phonological errors were the least frequent type of spelling errors in Greek c) Dyslexics paused and revised as much as non dyslexics but at the end their texts were not successfully revised and exhibited a deficient error detection mechanism.
• Manolitsis (2006) examined the Greek-speaking kindergartners’ sensitivity to morphological structure of words in relation to their early reading skills at year 1. Results indicated that the development of kindergartners’ morphological awareness had a significant contribution to reading accuracy skills at year 1 and that this contribution was not independent of their phonological awareness.

• Pandeliadou & Rothou (2011) explored the development of morphological awareness in Greek. The purpose was to explore the possible differences in the formation of derived suffixed words and in the segmentation of compounds among young children. The general ability to segment compounds developed through the three first grades and there was a developmental trend in the ability to decompose adjective compounds into their constituents. The ability to produce derived words seemed to be a difficult task and even third grade students had a moderate performance.
In a recent Phd thesis (Anastasiou, 2014) on L3 speech production (with Greek or Albanian either as an L1 or L2 and English as an L3) it was found that even in heavily inflected languages, like Greek and Albanian, children prefer using more content (verbs, nouns etc.) than function words (articles, pronouns etc.). Content words have rich morphology but they are absolutely necessary for the formation of a sentence.
Ratio of content to function words in the sentences produced as a total per language

Content - Function words

% of words in each language

- **EN**: 54% Content words, 46% Function words
- **AL**: 68% Content words, 33% Function words
- **GR**: 59% Content words, 41% Function words
- **TOTAL**: 55% Content words, 45% Function words

Legend:
- **Content words**
- **Function words**
### Content - Function words in code mixed sentences

<table>
<thead>
<tr>
<th>Language</th>
<th>% of Content words</th>
<th>% of Function words</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGLISH mix</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td>ALBANIAN mix</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>GREEK mix</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>TOTAL_mix</td>
<td>56</td>
<td>44</td>
</tr>
</tbody>
</table>
- Greek language has a shallow orthography with morphophonemic structure (Porpodas, 2006) and a rich morphology including derivational morphology, inflections as well as compounding (Ralli, 2005).

- In the Greek language, nouns, adjectives and articles are inflected by gender, number and case. Verbs are also marked for person and number. There are three genders: masculine, feminine and neuter and four cases. The nominative and the accusative cases have the same suffixes.
The Greek language has a relatively free word order. The same sentence may be expressed in several different word orders. For example, you can say /agorasame mila xthes/, which means we bought apples yesterday and serves as the most neutral structure, but the sentences /mila agorasame xthes/ and /xthes agorasame mila/ are also considered correct, although the emphasis is laid on the product bought and on the time of purchase respectively. The subject is completely omitted in the above mentioned sentences and this is usually the case in Greek because each person in either singular or plural of each tense is showed by a different morpheme in Greek. For this reason, Greek is labelled as a pro-drop (pronoun drop) language since the subject is not compulsory (Andreou, Karapetsas & Galantomos, 2008).
The French language has a deep orthography expressing morphological units as well as phonemes. In French spelling morphology is often represented at the cost of phonemic transcription. Thus there are some modifications of pronunciation from root to derived word (an example is ‘femme’ vs ‘feminin’, where the initial ‘e’ in the derived form receives a different pronunciation) (Casalis & Luis-Alexandre, 2000).
According to Quémart, Casalis, & Duncan (2012) the French derivational system is rich and morphemes are used as recognition units. As noted by Rey-Debove (1984), 75% of the French words are polymorphemic and can be analyzed in terms of their morphemic constituents. In addition, French derivatives are mostly phonologically transparent, even though the derivation often involves slight orthographic shifts at the end of the bases that do not obscure morphological relations between base and derived forms (e.g., plume – plumage). The prevalence of morphemes in words, along with phonological transparency, appears to facilitate the development of oral knowledge of morphology in French-speaking children (Duncan, Casalis, & Colé, 2009) and may also promote their use of written morphology.
The French language has a canonical word order SVO (subject - verb - object). This order, relatively strict, has some exceptions: the use of clitic pronouns object generates SOV structures (il la mange) and the interrogative sentence order VSO (“connais-tu ce garçon?” but “est-ce que tu connais ce garçon?”). Moreover, unlike other languages, the omission of the subject in French makes ungrammatical sentence. In addition, some lexical items (auxiliaries, pronouns, prepositions, determinants, the negation markers) serve an essential syntactic role and are present at a fixed position [at the beginning of a prepositional phrase for prepositions (e.g. *durant* le match), in preverbal position for auxiliary (e.g. *J’ai* vu le livre) etc.].
Purpose of the Study

Based on the above, the aim of the present study (Andreou & Tsela, 2014) was to compare performance in L1 (Greek) and L2 (French) measures of morphology and syntax among two groups of twenty-five learners each: dyslexic and non dyslexic elementary school children learning French as a foreign language. The study attempts to provide support for the LCDH in which Sparks and Ganschow (1993a,b) claim that a student’s efficiency in the morphosyntactic code of his L1 affects the degree of success or failure in the L2 classroom.
Participants

- Two groups of elementary schoolchildren who attended Grade 5 and Grade 6 and the research included schools of urban, rural and semi-urban areas.
  - The Dyslexia group (25 children) diagnosed at KEEDY (Centers for Diagnosis, Assessment and Support for people with Special Educational Needs), were within normal range of IQ, and attended regular classes (with the support offered at school by a special educator).
  - The Control group (25 children) matching the Dyslexia group by age, sex, grade, and level of nonverbal intelligence. According to their class teachers their reading and writing performances were normal.
Measures

• Raven’s Standard Progressive Matrices (Raven et al., 1993) assessing nonverbal ability.
• AMDE (Detecting learning disabilities from teachers) (Pandeliadou & Sideridis, 2007) valuating student progress by Teachers.

• Reading Test (Test-A, Pandeliadou & Antoniou, 2007): Subtests 5, 6, 7, 8 evaluating student performances in Greek language.
• A specific test battery was constructed aiming to evaluate students’ performance in French as a foreign language and included almost the same types of tasks with Test-A adapted accordingly for grades 5 and 6.
Morphological awareness: two measures required an oral response by the participants.

**Greek language**

1. A sentence completion task assessing children’s ability to manipulate the morphological structure of verb inflections. A temporal adverb at the beginning of the sentence defined the alteration of the verb tense. In the verb inflection task, children were asked to change the tense of the verb (shown in parentheses) in 7 sentences. For example:

- Χθες ..................... δύο καταπληκτικές ταινίες (βλέπω)
- Yesterday I.................. two great movies (see)
2. A sentence completion task assessing children’s ability to produce compound words and manipulate the morphological elements of the language. In the compound-inflection task, children were asked to form words from two others (shown in parentheses) in the correct gender and number in 8 sentences. For example:

- Στο χωριό έμειναν μόνο ................................ (γυναίκες + παιδιά)
- In the village there were only .................................. (women + children) left
French language

1. A sentence completion task assessing children’s ability to manipulate the morphological structure of verb inflections. A temporal adverb at the beginning of the sentence defined the alteration of the verb tense. In the verb inflection task, children were asked to add an inflectional morpheme marking present and future tense of the verb (shown in parentheses) in 7 sentences. For example:

- Demain, il **va chanter** à l’école (chanter)
- Tomorrow, he **will sing** at school (sing)
2. A sentence completion task assessing children’s ability to produce derivative words and manipulate morphological elements of the language. In the morphemic synthesis task, children were asked to form words given root and suffix (shown in parentheses) (word forms obtained by derivation are far more numerous than those obtained by compounding in French, [Duncan, Casalis & Cole, 2009]) in 8 sentences (Carlisle, 1987; Casalis & Louis-Alexandre, 2000). For example:

- Mon petit chien est **adorable** (adorer + -able)
- My little dog is adorable (adore + -able)
Syntactic awareness: two measures required an oral response by the participants.

Greek language

1. Syntactic awareness is measured by using word order correction tasks in which children are asked to repeat the sentence putting the words into the correct order. The task contains a variety of different syntactic structures including prepositional phrases, coordination and subordination and a variety of tenses. There are pictures which help understand the meaning of the sentences (8 sentences). For example:

- βροχή / πολύ / είναι / Η / δυνατή
- rain / very / is / The / strong
2. Syntactic awareness measured by using word order correction tasks in which children are asked to repeat the sentence putting the words into the correct order without the help of pictures. The task contains a variety of different syntactic structures including prepositional phrases, coordination and subordination and a variety of tenses (4 sentences). For example:

- τη /Βρήκαμε / φωλιά / πουλιών / των
- the / We found / nest / birds / of/ the
1. Syntactic awareness is measured by using word order correction tasks in which children are asked to repeat the sentence putting the words into the correct order. The sentences contained easy or medium difficulty syntactic structures of gradually increasing difficulty and number of words maintained subject–verb–object order suitable for their level. There are pictures which help understand the meaning of the sentences (8 sentences). For example:

- aime / la / Il / musique.
- loves / music / He
2. Syntactic awareness is measured by using word order correction tasks in which children are asked to repeat the sentence putting the words into the correct order without the help of pictures. The sentences contained easy or medium difficulty syntactic structures of gradually increasing difficulty and number of words maintained subject–verb–object order suitable for their level (4 sentences). For example:

- frères / ai / deux / sympas / J’.
- have / friendly / two / I / brothers.
Procedure

The children were tested individually in a quiet room in their school. The series of standardized and experimental tasks were administered to the children in Greek and in French.

Statistical analysis: The data were analysed in accordance with their properties by Wilcoxon and Mann–Whitney U-test.
Results

• The statistical analysis of Wilcoxon revealed statistically significant differences (in the verb inflection task for the 5th grade, in the word compound task for the 6th grade, in the syntax sentences with images for both grades and the syntax sentences for the 5th grade) between the two languages and the two grades for the non dyslexics (Table 1).

• The statistical analysis of Wilcoxon revealed a statistically significant differences between the two languages and the two grades in all the morphological tasks and non statistically significant differences in the syntactic tasks (Table 2).

• The statistical analysis of Mann-Whitney revealed statistically significant differences between dyslexics and non dyslexics of both grades in all morphological and syntactical tasks in both the Greek and the French language (Tables 3 and 4).
**Table 1: Mean proportion performance of non-dyslexic students of fifth and sixth grade in morphosyntactic tasks in Greek and French languages**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Median [50\textsuperscript{th} Percentile (25\textsuperscript{th} – 75\textsuperscript{th})]</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greek</td>
<td>French</td>
<td></td>
</tr>
<tr>
<td>T1: Verb inflection task*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7 (6 - 7)</td>
<td>6 (5.25 – 6)</td>
<td>-2.333</td>
</tr>
<tr>
<td>6</td>
<td>7 (6 - 7)</td>
<td>7 (6 - 7)</td>
<td>0.000</td>
</tr>
<tr>
<td>T2: Word derivation/compound task***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7 (7 – 7.75)</td>
<td>7 (7 – 8)</td>
<td>-0.743</td>
</tr>
<tr>
<td>6</td>
<td>7 (6 – 7.75)</td>
<td>7 (7 – 8)</td>
<td>-2.646</td>
</tr>
<tr>
<td>T3: Syntax (sentences with pictures)****</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>7 (6 – 7)</td>
<td>7 (7 – 8)</td>
<td>-2.111</td>
</tr>
<tr>
<td>6</td>
<td>7 (6 – 7)</td>
<td>7 (7 – 8)</td>
<td>-2.271</td>
</tr>
<tr>
<td>T4: Syntax (sentences without pictures)*****</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3 (3 - 3)</td>
<td>4 (3 – 4)</td>
<td>-2.449</td>
</tr>
<tr>
<td>6</td>
<td>4 (3 – 4)</td>
<td>4 (3 – 4)</td>
<td>-1.000</td>
</tr>
</tbody>
</table>

*Maximum score =7  
**Statistically significant scores  
***Maximum score =8  
****Maximum score =8  
*****Maximum score =4
Table 2: Mean proportion performance of dyslexic students of fifth and sixth grade in morphosyntactic tasks in Greek and French languages

<table>
<thead>
<tr>
<th>Grade</th>
<th>Median[50\textsuperscript{th} Percentile (25\textsuperscript{th} – 75\textsuperscript{th})]</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greek</td>
<td>French</td>
<td></td>
</tr>
<tr>
<td>T1: Verb inflection task*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3 (2 – 3)</td>
<td>2 (2 - 2)</td>
<td>-2,271</td>
</tr>
<tr>
<td>6</td>
<td>3 (2 – 3,5)</td>
<td>2 (2 - 2)</td>
<td>-2,414</td>
</tr>
<tr>
<td>T2: Word derivation/compound task***</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3 (3 – 3,75)</td>
<td>2 (2 – 2,75)</td>
<td>-2,810</td>
</tr>
<tr>
<td>6</td>
<td>3 (3 – 3,75)</td>
<td>2 (2 – 2,75)</td>
<td>-2,810</td>
</tr>
<tr>
<td>T3: Syntax (sentences with pictures)****</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3 (3 – 3)</td>
<td>3 (2 – 3)</td>
<td>-1,000</td>
</tr>
<tr>
<td>6</td>
<td>3 (2,5 – 3)</td>
<td>3 (2 – 3)</td>
<td>-0,333</td>
</tr>
<tr>
<td>T4: Syntax (sentences without pictures)*****</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1 (1 – 2)</td>
<td>1 (1 – 1,75)</td>
<td>-0,816</td>
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<tr>
<td>6</td>
<td>2 (1 – 2)</td>
<td>1 (1 – 2)</td>
<td>-1,890</td>
</tr>
</tbody>
</table>

*Maximum score =7  
**Statistically significant scores  
***Maximum score =8  
****Maximum score =8  
*****Maximum score =4
Table 3: Mean percentage performance of dyslexic and non dyslexic students of fifth and sixth grade in morphosyntactic tasks in Greek language

<table>
<thead>
<tr>
<th>Grade</th>
<th>Median [50th Percentile (25th – 75th)]</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non dyslexic</td>
<td>Dyslexic</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>T1: Verb inflection task*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7 (6 – 7)</td>
<td>3 (2 - 3)</td>
<td>-4,257</td>
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<tr>
<td>6</td>
<td>7 (6 – 7)</td>
<td>3 (2 - 3)</td>
<td>-4,401</td>
</tr>
<tr>
<td>T2: Word derivation/compound task***</td>
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<td></td>
</tr>
<tr>
<td>5</td>
<td>7 (7 – 7,75)</td>
<td>3 (3 – 3,75)</td>
<td>-4,298</td>
</tr>
<tr>
<td>6</td>
<td>7 (6 – 7,5)</td>
<td>3 (2,5 – 3)</td>
<td>-4,439</td>
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<tr>
<td>T3: Syntax (sentences with pictures)****</td>
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<td></td>
</tr>
<tr>
<td>5</td>
<td>7 (6 – 7)</td>
<td>3 (3 - 3)</td>
<td>-4,316</td>
</tr>
<tr>
<td>6</td>
<td>7 (6 – 7)</td>
<td>4 (3 – 4)</td>
<td>-4,482</td>
</tr>
<tr>
<td>T4: Syntax (sentences without pictures)*****</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3 (3 - 3)</td>
<td>1 (1 – 2)</td>
<td>-4,211</td>
</tr>
<tr>
<td>6</td>
<td>3 (2,5 – 3)</td>
<td>2 (1 – 2)</td>
<td>-4,291</td>
</tr>
</tbody>
</table>

*Maximum score =7
**Statistically significant scores
***Maximum score =8
****Maximum score =8
*****Maximum score =4
Table 4: Mean percentage performance of dyslexic and non dyslexic students of fifth and sixth grade in morphosyntactic tasks in French language

<table>
<thead>
<tr>
<th>Grade</th>
<th>Median[50th Percentile (25th – 75th)]</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non dyslexic</td>
<td>Dyslexic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1: Verb inflection task*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6 (5,25 – 6)</td>
<td>2 (2 – 2)</td>
<td>-4,437</td>
</tr>
<tr>
<td>6</td>
<td>7 (6 – 7)</td>
<td>2 (2 – 2)</td>
<td>-4,572</td>
</tr>
<tr>
<td>T2: Word derivation/compound task***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7 (7 – 8)</td>
<td>2 (2 – 2,75)</td>
<td>-4,340</td>
</tr>
<tr>
<td>6</td>
<td>7 (7 – 8)</td>
<td>2 (2 – 2,5)</td>
<td>-4,540</td>
</tr>
<tr>
<td>T3: Syntax (sentences with pictures)****</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7 (7 – 8)</td>
<td>3 (2 – 3)</td>
<td>-4,262</td>
</tr>
<tr>
<td>6</td>
<td>7 (7 – 8)</td>
<td>3 (2 – 3)</td>
<td>-4,477</td>
</tr>
<tr>
<td>T4: Syntax (sentences without pictures)*****</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4 (3 – 4)</td>
<td>1 (1 – 1,75)</td>
<td>-4,350</td>
</tr>
<tr>
<td>6</td>
<td>4 (3 – 4)</td>
<td>1 (1 – 2)</td>
<td>-4,518</td>
</tr>
</tbody>
</table>

*Maximum score =7  
**Statistically significant scores  
***Maximum score =8  
****Maximum score =8  
*****Maximum score =4
Differences between dyslexics and non dyslexics in Greek and French sentence syntax test (6th grade)
Discussion

Our findings generally reveal significant differences between the two groups on morphosyntactic tasks in both L1 and L2. Greek dyslexic students encounter difficulties in learning French as a foreign language and their morphosyntactic abilities in both languages are generally weaker than those of non dyslexic students.
More specifically, when the two groups were examined separately in both their L1 and L2, concerning morphology, non dyslexics showed statistically significant differences in the verb inflection task in the 5th grade (in favour of Greek) and in the word compound/derivation task in the 6th grade (in favour of French, Table 1). Concerning syntax, they displayed statistically significant differences in the sentences with pictures in both grades (in favour of French) and in sentences without pictures in the 5th grade (in favour of French, Table 1). It seems that learning a foreign language is an easy task for non dyslexics, at least at the very beginning, at the low level of L2 learning the students of our sample were. They did not encounter difficulties in the morphology and esp. the syntax of L2 (French) probably owed to the fact that morphological and syntactical skills are the components of a general language ability and once acquired successfully in L1 they are transferred to L2 (Sparks et al., 1998).
Dyslexics on the other hand, displayed statistically significant differences in all morphological tasks in both grades while in the syntactical tasks no statistically significant differences were found between Greek and French in both grades (Table 2). Morphology seems to be heavily affected in dyslexics esp. when learning a foreign language. Their scores were very low in both morphological tasks in both languages but they were lower in L2. Our study showed a particular difficulty on the part of dyslexics in both the verb inflection task and the word compound task esp. in their L2.
Their scores were also very low in both syntactical tasks but they were equally low in both Greek and French. The strict word order of the French language (S-V-O) taught explicitly [explicit teaching seems to facilitate language learning in dyslexics (Kormos, 2013; Schneider & Crombie, 2003; Sparks, 2012)] in a formal setting (foreign language classroom) seems to be an advantage for them who although they scored extremely low, their score was not statistically significant different from that of their L1 which was equally low.
When we compared the performance of the dyslexics in their L1 and L2 we generally found that students' native language skills appear to affect their ability to meet the demands of learning an L2. The dyslexic group performed very low on both their languages (L1 and L2) (Table 2) indicating that, according to the Linguistic Coding Differences Hypothesis (LCDH), difficulties expressed in L1 linguistic coding will resurface in FL acquisition (Sparks, & Ganschow, 1993a, b). Their difficulties in the morphology and syntax in L1 had an immediate and severe impact on their L2 learning and the level of proficiency in the morphosyntactic code of the Greek language seems to determine the degree of their success in the French language classroom.
When dyslexics compared to non dyslexics, our results indicate that dyslexic students performed more poorly than non dyslexics in both languages and in all morphosyntactic tasks (Tables 3, 4). These differences give support to the studies reviewed above indicating that inflectional morphology (Egan and Pring, 2004; Joanisse et al., 2000), derivational morphology (Siegel, 2008) and syntax (Abu-Rabia, Share & Mansour, 2003; Scarborough, 1990) are deficient in dyslexics.
This is also supported by the study of Casalis, Deacon and Pacton [2011, (in Verhoeven & Perfetti, 2011)] who studied the relationship between morphological awareness and spelling. They found that the relationship between spelling and morphological awareness in French seems to be affected by both the developmental level of the child and the phonological structure of the items in the morphological awareness task.
Furthermore, Casalis et al. (2004), who examined the morphological awareness skills of dyslexic children, found that the development of morphological knowledge in dyslexics might depend on their age and reading experience rather than on their phonological abilities.
Taking into account that the dyslexic children in our sample were beginners with little reading experience in French can also provide an explanation for their low performance esp. in morphological tasks.
The study provides implications for alternative methodologies which might be helpful in dyslexic L2 learning. The difficulties encountered by the dyslexics in our study in morphosyntactic tasks delineates the need for carefully designed instructional programs including exercises which will strengthen their syntactical as well as their inflectional and productive morphological skills, given the fact that morphology is strongly connected to spelling (Casalis et al., 2011) and morphosyntactic skills can predict reading ability (Cottardo et al., 1996). Therefore, early detection and intervention could help these students keep in pace with their classmates in L2 learning or at least not lag extremely behind them. Well-trained and experienced L2 teachers who will apply programs designed for dyslexic L2 learning is also a need.
However, our results should be treated cautiously due to the small sample size and to the limited number of language tasks. More studies are needed on dyslexic L2 learning with larger samples and a variety of language tasks in different languages which will give us the opportunity to recognize the linguistic profile of the dyslexic student in different languages so as to design and apply an instructional program suitable for his needs in L2 learning. Dyslexics **CAN** learn foreign languages provided they are taught with an **appropriate** method by an **appropriate** teacher.
References


Any questions?