Syllabic composition and use frequency: how do they affect stress assignment? A comparison between slow readers and fluent readers

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Abstract

Italian words can be stressed either on penultimate or antepenultimate syllables. In both cases, stress assignment is not predictable by rules, but requires a lexical check. Italian words with stress on the penultimate syllable are defined as regular because the proportion of these words is much larger than words with stress on the antepenultimate syllable, defined as irregular. We propose to investigate the influence (in terms of correct stress positioning) of different syllabic and stress structures during "decoding" by both slow readers and fluent readers. Forty-eight children, twenty-four slow and twenty-four fluent readers, decoded "target words" selected on the basis of frequency (high/low frequency) and different syllabic and stress structures: This included both irregular stress (on the third-last syllable) and structures of the open second-last syllables (ending with a vowel); Also regular stress (on the second-last syllable) and an open second-last syllable structure, including regular stress falling on a second-last syllable closed structure (ending with "A" consonant). Subjects' performances resulted worse in the case of open second-last syllables with irregular and regular stress. Instead, closed, second-last syllable stress created improbable errors. In particular, slow readers are influenced by stress and syllabic structure also in the case of high frequency use lists of words, contrary to the results from fluent readers.

Keywords: Slow readers; Stress assignment; Syllables; Decoding; Use frequency.

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1. Introduction

Several studies have focused on how children understand the correspondence that exists between orthography and segmental phonology when decoding monosyllabic and polysyllabic words or non-words (Bishop & Snowling, 2004; Fratantonio, Rappo, & Pepi, 2011). Similarly, there is a growing interest on how to apply stress assignment during the reading of polysyllabic words in languages (as English) that have not always the same stress pattern, or languages that do not have a common stress pattern (Soto-Faraco, Sebastián-Galles, & Cutler, 2001; Seva, Monaghan, & Arciuli, 2009; Arciuli, Monaghan, & Seva, 2010).

On the other hand, stress assignment in longer words of two syllables is considered the only characteristic of the Italian language that is not predictably based on specific rules, but rather requires access to "A" lexicon for a correct reading aloud.

In Italian there are two main stress types: stress on the penultimate syllable (*cantàre*) and stress on the antepenultimate syllable (*lògico*). The proportion of Italian words with stress on the penultimate syllable is higher (about 80%), compared to the words with stress on the antepenultimate syllable (about 18%) and, for this reason, the first type is defined with regular or dominant stress, while the latter is defined with irregular or not-dominant stress (Burani & Arduino, 2004). In both cases, stress is not indicated by a graphic sign and, therefore, can not be derived from grapheme-to-phoneme conversion rules, but rather through a process involving the whole word.

If we then refer to low frequency use words, stress assignment becomes a function of the dominant stress type, as well as the so-called "stress neighborhood". Paizi, Zoccolotti and Burani (2011) evaluated stress assignment in the sixth grade subjects, dyslexics and fluent readers. Fluent readers were not affected by dominant stress, while dyslexic children, though influenced by use frequency, committed more errors (stress regularization) in case of low frequency use words. On the other hand the so-called "stress neighborhood" would affect reading of low frequency use words, regardless of dominance stress, for both groups of subjects: words with many "stress neighborhoods" (with the same final sequence and the same stress), were read more accurately than words with few "stress neighborhoods". According to the authors, therefore, in cases of both a typical child's development and also those with dyslexia, readers of Italian background result particularly sensitive to the distributive properties of the language.

It is without doubt, therefore, that the "stress neighborhood" variable can influence the stress assignment process, both for speed and accuracy. In this

paper, however, we did not consider the "stress neighborhood" variable, but rather the syllabic structure of the penultimate position.

The correct stress "reading", in fact, may depend not only by its regularity, but also by the relationship between the stress position and the structure of the penultimate syllable; in fact, this relationship may influence accuracy (correct stress assignment) and decoding speed of fluent readers and developmental dyslexics (Pepi, Fratantonio, Lo Cascio, & Maltese, 2010).

More specifically, to read correctly a word of three or more syllables (with reference to stress assignment) that contains a closed syllable (CVC - propòrre) in the penultimate position, would not require lexical information, because stress can only be positioned on that syllable (with rare exceptions). This type of linguistic structure makes a stress assignment error unlikely in both developmental dyslexics and fluent readers. On the other hand, for assignment stress correctly to trisyllabic or polysyllabic words with penultimate open syllable (CV or CCV – aggiustàre o cantàre) instead lexical information is needed from which to infer stress position. Obviously this is possible if the subject "re-knows" the word to be decoded (Miceli & Caramazza, 1993; Fratantonio, Rappo, Maltese, & Pepi 2009; Fratantonio, 2010; Pepi et al., 2010). In this regard, high use frequency words, activating a specific lexical information, suggest the correct stress type (through the processing of the whole word) and, for this reason, are pronounced more quickly. This would be done independently of the stress regularity. The reader, recognizing the word, can assign the stress using lexical information. On the other hand, the sub-lexical correspondence, or the grapheme-phoneme conversion, would be used for pronunciation of low frequency use words (Colombo, 1992). In the pronunciation of low frequency use words with irregular stress, therefore, the subjects would be less accurate and would take more time than reading low frequency use words with regular stress. This would be caused by what is called a *misali*gnment between the regular and "dominant" stress (on the penultimate syllable), temporarily assigned and with contrast created by lexical information, so that the correct not "dominant" stress is activated (Monsell, Doyle, & Haggard, 1989; Colombo, 1992; Colombo & Tabossi, 1992; Burani & Arduino, 2004).

The influence of the syllabic-stress composition has already been evaluated in previous work research (Pepi *et al.*, 2010), in which we have analyzed, in addition, the variable relating to contextual information (word dislocated at the beginning and at the end of the sentence), considering accuracy (correct stress assignment) and speed (reading speed of the whole sentence). Just to eliminate any influence of sentence context, it was decided to present verbal material out of context and to evaluate stress assignment both by making available lexical information (high frequency use words) and eliminating this availability (low frequency use words).

Therefore it is interesting to deepen the relationship between stress type and syllabic composition considering not only reading of known words for subject (high frequency use), but also of unknown words (low frequency use) that "force" the adoption of a phonological reading strategy (c-a-n-t-a-to) or utilization of groups of letters (cant-ato) and syllables (can-ta-to).

It should be specified that there is a "regularity" understood as a "distributional trend" that could lead to assigning more common stress Indicators only in relation to their distributional frequency and a "regularity" understood in relation to a relevant linguistic rule. Therefore, it would be starting from the assumption that, in particular for low frequency use words, it is assumed there exists a tendency to assign more common stress (therefore, in relation to its frequency distributional), and at the same time, it is assumed there is a syllabic composition influence on decoding of the words and therefore on stress assignment. In the latter case, as evidenced by Miceli and Caramazza (1993), the open penultimate syllable would lead to errors regarding stress assignment), both in case of irregular stress (with relative regularization), and in the case of regular stress (with possible transformation of regular stress to irregular stress). On the other hand, when the penultimate syllable ends in a consonant (CVC), with rare exceptions (màndorla [almond]), stress can only be positioned on that syllable, minimizing stress assignment errors even in case of low frequency use words. This is a necessary specification because, in case of high frequency use words, the lexical information can be recovered and stress can be correctly assigned regardless of the syllabic composition.

The specific difficulty on decoding written text and, therefore, the failure in the automation of the reading process, can lead to slow and inaccurate decoding, and to a non-recognition of the whole word that, in some cases, does not allow a correct stress assignment. As is known, in fact, for a correct stress assignment (as supra-segmental characteristic), it is not sufficient to operate a grapheme-phoneme conversion (although correct), but it is necessary to recognize the word.

We evaluated, in particular, stress assignment regardless of the help that can be derived from the understanding of a text reference. The intent is to show that it is closely linked to the recognition of the letters string and then, to the proper functioning of the visual-lexical strategy and, consequently, also use frequency of the word can affect stress assignment. On the other hand, syllabic composition can influence stress assignment and, therefore, is particularly interesting to assess the relationship between decoding difficult, word recognition and stress assignment. We expect a more significant difficulty, in stress assignment, in subjects who demonstrate difficulty in decoding/processing of the word.

2. Aim and Hypothesis

In this regard, our research objective is to analyze the effects (in terms of stress assignment) of different stress-syllabic patterns on reading high and low frequency use target words, considering dyslexic children and fluent readers performance. In particular, we have considered three stress-syllabic types (Pepi *et al.*, 2010): irregular stress and open structure of the penultimate syllable (type A); regular stress and open structure of the penultimate syllable (type B); regular stress and closed structure of the penultimate syllable (type C).

In previous research (Pepi *et al.*, 2010), the target words with stress-syllabic types just mentioned, were inserted in sentences with the intention of evaluating the influence of the relative semantic context. The present, on-going research, however, specifically aims to analyze the influence of stress-syllabic composition, eliminating the influence of a semantic context that, in previous research, was given through the content of the sentence in which the target word was inserted. In addition, to analyze the influence of stress-syllabic composition, limiting the help given by recognition of the word, we inserted a use frequency variable. This study's goal is to analyze more fully previous research, including some of the variables and isolating these variables (list of words not included in sentences), in order to identify the real influences of the stress-syllabic composition.

As demonstrated by Pepi *et al.* (2010), error in stress assignment would be more likely if the penultimate syllable is open and less likely if the penultimate syllable is closed while considering also that, contrary to low frequency use words, high frequency use words activate a specific lexical information (Colombo, 1992). What we expect, in the comparison between the same stresssyllabic composition and the different frequency of use, is an influence of the latter, with lower performance (in terms of correct stress assignment) if the list contains low frequency use words, only for open penultimate syllables (types A and B). However, no significant differences are appeared in the comparison of type C (closed syllable) high frequency of use and type C low frequency of use. This occurs for both groups of subjects.

We also plan to evaluate the two groups performance (in terms of correct stress assignment) in the comparison between the different stress-syllabic composition and the same use frequency and in the comparison between the different stress-syllabic composition and the different use frequency. We assume significantly lower performance in case of open penultimate syllables and in the case of low frequency use lists of words.

Concerning the differences between stress type A and stress type B, the latter type is constituted by regular stress words (the dominant mode) and with penultimate syllable open (syllabic composition that makes "possible" error in stress assignment), while stress type A has the same characteristics but with irregular stress (non-dominant mode). It is assumed there will be a greater number of errors in case of stress type A (and therefore a greater number of regularizations).

3. Method

a. Participants

Forty eight children participated to the study (24 males and 24 females). Of these, 24 were slow readers (12 males and 12 females) and 24 fluent readers (12 males and 12 females), attending the third grade of two state-run elementary schools in Palermo. The participants were aged between 7 years and 8 months (92 months) and 8 years and 5 months (101 months), average = 96.3, SD = 2.81. Children were selected from a sample of 198 children (see below).

a. Materials and Procedure

Screening procedures

First, each child was given a sociological evaluation form to exclude that the socio-cultural disadvantage factor might interfere with reading ability and only involving children whose both parents had completed at least a high school educational level.

Children were tested with a battery including the Non-Verbal Intelligence Test (TINV; Hammill, Pearson, & Wiederholt, 1998), the MT Comprehension and Decoding Test (Cornoldi & Colpo, 2001) and the Dyslexic and Dysorthographic Evaluation Test (Sartori, Job, & Tressoldi, 1995).

The TINV is aimed at children with reading and language disabilities, because, in the evaluation, the influence of linguistic aspects was eliminated

The consists of 150 items, subdivided into three areas of logical operations: analogies, categories and sequences. Each area includes object illustration and geometric picture tasks. For each item, evaluation was binary, with a mark of 1 attributed to each correct item, and 0 to incorrect items. The raw data obtained were transformed into a measure of mental age on the basis of conversion

tables. The average intelligence was 100 with standard deviation 15. The reliability coefficient of the test was $\alpha = .90$.

The MT test consists of *Comprehension Test and Decoding Test* (Speed and Accuracy) (Cornoldi & Colpo, 2001), the *Comprehension Test* consists of 10 multiple choice questions relating to the characters and events mentioned in a story. Scoring comprised 1 point for each correct response. Normal performance is five or more correct choices. The objective is to select students with normal reading comprehension abilities. The reliability coefficient of the test is $\alpha = .60$ (Cornoldi & Colpo, 2001). The Speed and Accuracy test (Cornoldi & Colpo, 2001) requires the subject to read aloud a text, evaluating reading time, the number and type of errors.

Separate scores were calculated for speed and accuracy. With regard to accuracy, a score of 1 was attributed for each long pause, or addition or omission of syllables, words, or lines. A score of .5 was attributed for each stress error, hesitation, or self-correction. Normal performance is 6 or less errors. With regard to speed (calculated in syll/sec), the total score was obtained by calculating the number of syllables of text read on the basis of timed seconds. Normal performance was a score of 1.55 syll/sec or more. This test was administered to identify participants with reading decoding difficulties (Cornoldi & Colpo, 2001).

Finally, the Battery for the Assessment of Developmental Reading and Spelling Disorders (Sartori *et al.*, 1995) consisted of 12 sub-tasks, but were not fully administered: task 4 (reading lists of words aloud) and task 5 (reading lists of non-words aloud) were administered only to subjects with decoding disabilities to ascertain specific types of difficulties (phonological or visual word recognition).

Performance under the 5th percentile indicated reading disability. The testretest reliability of the battery was r = .56 for accuracy and r = .77 for speed.

Slow readers had the following characteristics: we selected children who achieved scores in the middle range (between 85 and 115) on the TINV, made at least 7 errors in the correctness test (MT)⁴, read 1.54 syll/sec or less in the MT decoding test⁵ and responded to at least 7 correct responses out of 10 in the MT comprehension test⁶. Then, 2 tasks (4 and 5) of the Battery for the Assessment of Developmental Reading and Spelling Disorders (Sartori *et al.*, 1995) were administered to all children who had a defective performance in Correctness and Speed in the MT tests (7 errors or more for Accuracy Test and 1.54 syll/sec or

⁴ Inclusion criteria relating to the standard rules MT (Cornoldi & Colpo, 2001), according to which at least 7 errors corresponds to Request of Attention.

⁵ Inclusion criteria relating to the standard rules MT (Cornoldi & Colpo, 2001), according to which a score of at least 1.54 (obtained by dividing number of syllables of the text for seconds spent) corresponds to Request of Attention.

⁶ Inclusion criteria relating to the standard rules MT (Cornoldi & Colpo, 2001), according to which at least 7 correct answers corresponds to Sufficient performance compared to the criterion.

less for Speed test). Therefore we included in our sample only those children who, in these tasks (4 and 5) reported scores lower than the 5th percentile.

With regard to fluent readers, we selected children who achieved scores in the middle range (between 85 and 115) on the TINV, made less than 7 errors in the Accuracy Test (MT), read 1.55 syll/sec or more in the MT decoding test and responded correctly to at least 7 questions out of 10 in the Comprehension Test (MT).

Experimental task

Specifically, for the construction of the instrument, were selected 162 words (De Mauro, 2000; De Mauro & Moroni, 2000): 108 target and 54 distractors. In particular, half of the target words (54) are selected from high frequency use words, according to the DIB (a specific Italian dictionary for children from 8 to 11 years, De Mauro & Moroni, 2000); the other half of the target words (54) are selected from low frequency use word (specifically, according to the DIB, we refer to words that are not included in the "basic" words, "strategic" words and in high frequency use words). Regarding stress-syllabic component 36 words were selected (equally divided between the two frequency type) with irregular stress (stress placed on the vowel of the antepenultimate syllable) and a structure of the penultimate syllable open (ending in a vowel) with 36 words (equally divided between the two frequency type) with regular stress (stress placed on the vowel of the penultimate syllable) and finally a structure of the open penultimate syllable with 36 words (equally divided between the two frequency type) with regular stress and a closed structure of the penultimate syllable closed (ending in a consonant). The target words were also balanced considering the number of syllables (54 of three syllables and 54 of four syllables) and the grammatical class (36 nouns, 36 verbs and 36 adjectives).

Therefore, we have created a total of 6 words lists:

- List 1 – 18 target words, high frequency of use, divided into 6 verbs (3 of three syllables and 3 of four syllables) 6 nouns (3 of three syllables and 3 of four syllables) and 6 adjectives (3 of three syllables and 3 of four syllables). The target word is characterized by an open syllabic structure (ending in a vowel - CCV or CV) in the penultimate position and irregular stress (stress on the antepenultimate syllable).

Es: spè-gne-re [to switch off]

In the list 1 there are also nine distractors, consisting of words with the same frequency of use, but different stress-syllabic component (es. re-gà-lo – [gift])

- List 2 – 18 target words, high frequency of use, divided into 6 verbs (3 of three syllables and 3 of four syllables) 6 nouns (3 of three syllables and 3 of four syllables) and 6 adjectives (3 of three syllables and 3 of four syllables). The target word is characterized by an open syllabic structure (ending in a vowel - CCV or CV) in the penultimate position and regular stress (stress on the antepenultimate syllable).

Es.: *bal-là-re* [to dance]

In the list 2 there are also nine distractors, consisting of words with the same frequency of use, but different stress-syllabic component (es.: ròm -pe-re [to break]).

- List 3 – 18 target words, high frequency of use, divided into 6 verbs (3 of three syllables and 3 of four syllables) 6 nouns (3 of three syllables and 3 of four syllables) and 6 adjectives (3 of three syllables and 3 of four syllables). The target word is characterized by a close syllabic structure (ending in a consonant - CVC) in the penultimate position and regular stress (stress on the antepenultimate syllable).

Es.: *bril-làn-te* [brilliant]

In the list 3 there are also nine distractors, consisting of words with the same frequency of use, but different stress-syllabic component (es.: mà-gi-co [magic])

List 4 – 18 target words, low frequency of use, divided into 6 verbs (3 of three syllables and 3 of four syllables) 6 nouns (3 of three syllables and 3 of four syllables) and 6 adjectives (3 of three syllables and 3 of four syllables). The target word is characterized by an open syllabic structure (ending in a vowel - CCV or CV) in the penultimate position and irregular stress (stress on the antepenultimate syllable).

Es.: fòn-de-re [to melt]

In the list 4 there are also nine distractors, consisting of words with the same frequency of use, but different stress-syllabic component (es.: pla-cà-re) – [to appease].

List 5 – 18 target words, low frequency of use, divided into 6 verbs (3 of three syllables and 3 of four syllables) 6 nouns (3 of three syllables and 3 of four syllables) and 6 adjectives (3 of three syllables and 3 of four syllables). The target word is characterized by an open syllabic structure (ending in a vowel - CCV or CV) in the penultimate position and regular stress (stress on the antepenultimate syllable).

Es.: nu-trì-re [to feed]

In the list 5 there are also nine distractors, consisting of words with the same frequency of use, but different stress-syllabic component (es.: volge-re [to turn]).

List 6 – 18 target words, low frequency of use, divided into 6 verbs (3 of three syllables and 3 of four syllables) 6 nouns (3 of three syllables and 3 of four syllables) and 6 adjectives (3 of three syllables and 3 of four syllables). The target word is characterized by a close syllabic structure (ending in a consonant - CVC) in the penultimate position and regular stress (stress on the antepenultimate syllable).

Es.: ro-vèn-te [red-hot]

In the list 6 there are also nine distractors, consisting of words with the same frequency of use, but different stress-syllabic component (es.: grà-ci-le [frail]).

The subjects were then led out of class and taken to a suitable environment for the testing phase (away from other activities within the school). During this period, the children read the 6 lists of words for a total of 162 words. The administration of the lists was balanced in order to appropriately vary the order of presentation: the first subject read the 1st, the 2nd, the 3rd, the 4th, the 5th and the 6th list, the second subject read the 2nd, the 3rd the 4th, the 5th the 6th and the 1st list, the third subject read the 3rd, the 4th, the 5th the 6th, the 1st and the 2nd list, the fourth person read the 4th, the 5th the 6th, the 1st, the 2nd and the 3rd list, the fifth subject read the 5th the 6th, the 1st, the 2nd and the 4th list and sixth subject read the 6th, the 1st, the 2nd, the 3rd and 5th list, continuing until the 24th subject of the first group and following the same procedure with the second group.

4. Results

We conducted ANOVA tests to assess the differences between the two groups of subjects. The results show significant differences between the two groups, as regards: type A high frequency use ($F_{(1,46)} = 52,676; p < .001$) and low frequency use ($F_{(1,46)} = 53,929; p < .001$) and type B high frequency use ($F_{(1,46)} = 5,813; p = .020$), with lower performance of slow readers in all cases. Instead, there were no significant differences, in case of type B low frequency of use and in case of type C high frequency of use and low frequency of use (see Table 1).

We conducted the t-test to evaluate differences within each group. First, we compared the same stress-syllabic component with different use frequency: for children with slow readers, significant differences were found in relation to the type A high frequency of use *vs*. type A low frequency of use $(t_{(23)} = -8.760, p < .001)$, with lower performance for low frequency of use type; and type B high frequency of use *vs*. type B low frequency of use $(t_{(23)} = -3.330, p = .003)$, with lower performance for low frequency of use type; with exception for type C high frequency of use *vs*. type C low frequency of use.

 Table 1 - Effects of stress-syllabic composition and use frequency on correct decoding (only errors in stress assignment): average numbers of errors and standard deviations.

	Type A use freq	high uency	Type use fre	A low quency	Type use fre	B high equency	Type use fre	B low equency	Type use fr	C high equency	Type use fr	C low equency
-	Av	SD	Av	SD	Av	SD	Av	SD	Av	SD	Av	SD
Slow readers	2.21	1.28	7.83	3.28	.29	.46	1.21	1.32	.13	.38	.04	.20
Fluent readers	.21	.41	2.38	1.58	.04	.20	1.25	.94	0	0	0	0

Also fluent readers have reported similar results: significant differences with regard to type A high frequency of use vs. type A low frequency of use $(t_{(23)} = -7.561, p < .001)$, with lower performance as regards low frequency of use type; type B high frequency of use vs. type B low frequency of use $(t_{(23)} = -6.355, p < .001)$, with lower performance as regards low frequency of use type; with exception for type C high frequency of use vs. type C low frequency of use (in both conditions the subjects do not commit errors), also for fluent readers.

Then we compared the different stress-syllabic components with the same use frequency. In this regard, an interesting result is the comparison between type A high frequency of use and type C high frequency of use: in fact, slow readers, showed significant differences ($t_{(23)} = 7.755$, p < .001) with lower performance for type A; on the other hand, fluent reader showed no significant differences between the two types.

And more, in the comparison between the regular mode with the penultimate syllable open (type B) and the easiest mode (type C), no significant differences were found for both groups in case of high frequency use lists. On the other hand, in case of low frequency use words, have emerged lower performance in case of penultimate syllable open (type B) for both slow readers ($t_{(23)} = 4.263$, p < .001) and fluent readers ($t_{(23)} = 6.486$, p < .001).

Finally, we compared the different stress-syllabic components with different use frequency: in the comparison between type A high frequency of use and type B low frequency of use, slow readers showed lower performance in case of type A high frequency of use ($t_{(23)} = 2.849$, p = .009), while for fluent readers, lower performance in case of type B low frequency of use ($t^{(23)} = -4.899$, p < .001).

In the comparison between type B high frequency of use and type C low frequency of use, significant differences were found only for children with slow readers, with lower performance in case of type B high frequency use ($t_{(23)} = 2.769, p = .011$). For fluent readers no significant differences were found.

5. Discussion

Although our language is characterized by transparent spelling (regular spelling), it is only on a segmental level. This means that you can get the pronunciation of most words through the application of grapheme-phoneme conversion rules but, on a supra-segmental level, it turns out to be opaque (irregular spelling). In this regard, stress is one of the supra-segmental elements of our language and, for this reason, a correct stress assignment does not depend on the grapheme-phoneme decoding process (albeit correct), but by global recognition of the word (Colombo, 1992; Colombo & Tabossi, 1992; Denes & Pizzamiglio, 2000). In addition, most Italian words assign stress on the vowel of the penultimate syllable and if there isn't the identification of the whole word (for example in the case of unknown words), subjects would tend to assign stress, anyway, on the penultimate position. However, the present study emphasizes the importance of the word syllable composition, considered as an element that can affect the correct stress assignment, beyond regular stress assignment.

Confirming the results of Pepi *et al.* (2010), it has been highlighted that the open structure of the penultimate syllable minimizes stress assignment errors with respect to closed penultimate syllables. In particular, in the present study, unlike high frequency use words (that need lexical information to be read correctly), it is more probable that the pronunciation of low frequency use words is formed through the activation of alternative procedures. Undoubtedly one of these is the grapheme-to-phoneme conversion technique that, on the basis of the Italian language's regularity, allows one to decode any string of letters. However, the sublexical mode does not prevent stress errors and, consequently, as evidenced by Colombo (1992), in the pronunciation of words with irregular stress and low frequency of use, the subjects would be less accurate with respect to reading words with regular stress and low frequency of use.

In particular, with regard to the correct stress assignment, comparing the same stress-syllabic component and the different use frequency, research has actually shown an influence of use frequency (with lower performance if the list of words is low frequency of use) only for the penultimate open syllable, for both groups of subjects and an absence of significant differences in the comparison of the type C high frequency of use and type C low frequency of use. This result highlights the improbability of making errors in case of type C, regardless of the frequency of use (Pepi *et al.*, 2010).

In addition, comparing the more complex type (type A: irregular stress and penultimate open syllable) and the easiest (type C: regular stress and penultimate syllable closed), in case of low frequency use lists, performances were

significantly different, with lower results in case of type A, for both groups of subjects. If lists were high frequency of use performances resulted significantly different (lower performance in case of type A) only for children who were slow readers. This result showed that slow readers may be influenced by stresssyllabic component also in case of high frequency of use lists. On the other hand, in the comparison between the regular mode with penultimate syllable open (B) and the easiest mode (type C: with regular stress and penultimate syllable closed) there were no significant differences between both groups, if the lists were high frequency of use. Probably, high frequency of use combined with dominant stress mode (characteristic of types B and C), did commit fewer errors, resulting in no significant differences between the two performances (reading lists of type B words and reading lists of type C words). On the contrary, in the case of low frequency use lists, there was significantly lower performance in case of penultimate open syllable (type B) for both slow readers and fluent readers. This result highlights that in the case of less known words, despite the dominant stress mode (type B), the subjects commit still a significant number of errors (that is, they tend to make irregular also regular stress).

Fluent readers did not present significant differences comparing type B high frequency of use and type C low frequency of use and this is to be related to characteristics of type C (which reduces the possibility of making errors) and to the regular mode with the penultimate syllable open (type B) high frequency of use (which favors the recognition of the word).

Another interesting result is the comparison between type A high frequency of use and type B low frequency of use, because children with dyslexia showed lower performance in case of type A high frequency of use, while fluent readers, in case of type B low frequency of use. And yet, in the comparison between type B high frequency of use and type C low frequency of use, significant differences were found only in case of slow readers, with a lower performance in case of type B high frequency of use. Therefore, these data reveal that, in some cases, children with dyslexia are influenced by stress-syllabic composition also in the case of high frequency of use lists. Also fluent readers are influenced by stresssyllabic components but, unlike children with dyslexia, when differences have emerged between the various types, the performance was always lower in case of low frequency use lists. Slow readers, then, unlike fluent readers, show greater difficulties in word recognition, even in the case of high frequency of use terms, with a tendency to misplace stress assignment significantly more often than do fluent readers, also regarding the high-frequency lists (particularly in case of non-dominant stress with a tendency to regularize).

It is proper to specify that, because most of the items administered are mor-

phologically complex, containing a derivational suffix or inflected, there is undoubtedly a possible interaction between the morphological structure of the words and their stress pattern. In this regard, several studies have shown that reading of slow readers, as well as of fluent readers, can benefit from presence of morphological constituents. In other words, the possibility to decompose the stimulus in morpholexical elements (eg. roots and suffixes), would reduce some difficulties in decoding attributed, for example, to the length and/or to the complexity of the stimulus. Therefore, morpholexical reading, would allow the child with developmental dyslexia (especially in case of known words) to decode strings of letters that would help him in the processing of the whole lexical unit (Burani & Laudanna, 2003; Marcolini & Burani, 2003; Traficante, Barca, & Burani, 2004; Marcolini, Donato, Stella, & Burani, 2006; Barca, Burani, Di Filippo, & Zoccolotti, 2007; Barca, Ellis, & Burani, 2007; Burani, Marcolini, De Luca, & Zoccolotti, 2008; Zoccolotti, De Luca, Judica, & Spinelli, 2008).

The specific linguistic analysis, which emerges in this paper offers interesting ideas, highlighting some innovative features in an area that increasingly emphasizes the importance of the division of the word not only in individual graphemes but also in groups of letters and syllables. According to the recent CDP + + model (Perry, Ziegler, & Zorzi, 2010), the reading system would use a graphemic buffer in which orthographic information would be structured in a graphic-syllabic model. In a orthographic level, rather than individual letters, there would be utilized groups of graphemes (eg: th and ea). Instead, a phonological level, the phonemes, wouldn't be represented in a linear series, but would be structured into syllables.

With regard to the syllabic structures, particularly important is the demonstration of the importance they may have for the correct stress assignment in the composition of the penultimate syllable position as well as use frequency and stress regularity for both groups of subjects.

Undoubtedly, in this research paper there are critical points which focused on the administration mode. In fact, in a recent research development, we propose administrating stimuli in randomized sequences with the aid of a computer and we would like to evaluate also the reading speed of the stimuli.

Therefore, in applicative terms, some words have specific orthographic and lexical characteristics that make them more accessible than others (for both subjects with decoding disorders and fluent readers) and this highlights the importance of differentiating appropriately linguistic material used in assessment and rehabilitation. For example, in our previous research (Pepi, Alesi, & Rappo, 2008), we used the TIRD (Rappo & Pepi, 2011), a software whit a specific computerized treatment for the rehabilitation of dyslexia, useful to improve decoding skills, both in visual and phonological strategies, in dyslexic children. The words used in this software have been validated in previously studies.

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