

# Manifestations of Dyslexia in Bilingual Moroccan Children: A Psycholinguistic Perspective

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**Abstract:** This article explores the specific manifestations of dyslexia in Moroccan children, a subject little studied in the scientific literature. In Morocco, the multilingual and non-formal linguistic context poses unique challenges for the identification and management of dyslexia, given the coexistence of standard Arabic, dialectal Arabic, Berber, as well as the use of foreign languages such as French and English in the education system. This study aims to fill an important gap in research on dyslexia in multilingual contexts by focusing on the phonological, orthographic, and linguistic characteristics that influence the learning of reading in Moroccan children. Additionally, it emphasizes a newly recognized and studied disorder within the framework of the inclusive Moroccan school. To outline the manifestations of dyslexia, we conducted a series of observations and qualitative analyses on a sample of 45 bilingual students, aged 7 to 12, from different social categories and various types of schools. The manifestations of dyslexia differ from one language to another.

**Keywords:** Dyslexia; Morocco; inclusive school; manifestations; reading; disorder.

## I. Introduction

Dyslexia, a specific developmental learning disorder affecting reading ability, is a universal issue impacting students regardless of their native language or cultural background. However, the manifestations of dyslexia can significantly vary across different linguistic contexts due to the orthographic and phonological specificities of languages. In the Moroccan context, the issue of dyslexia manifestations is characterized by the variable of linguistic diversity, including Modern Standard Arabic, dialectal Arabic, Berber, and the increasing use of French and English in the educational system. Consequently, dyslexia manifestations in students present unique challenges for Moroccan researchers and practitioners.

The objective of this article is to examine in detail the manifestations of dyslexia in bilingual Moroccan students. This is based on observations from inclusive classrooms, a review of existing scientific literature, and case studies conducted in various educational contexts in Morocco. This article aims to contribute to a better understanding of the issues related to dyslexia in Morocco, offering an enriching perspective for researchers, teachers, and inclusive medical and paramedical professionals involved in the support and rehabilitation of dyslexic students.

## II. From Ignorance to Understanding: Confessions of a Teacher Facing the Disorder

This section presents a real account of a teacher who was unaware of the disorder but experienced its manifestations after a particular experience in his classes.

He states: "Like a scholarly traveler, I have navigated the winding paths of teaching the French language, from primary levels to the higher echelons of higher education, for over two decades. At each stage of this journey, I had the privilege of accompanying students from diverse backgrounds, from their first steps in learning to the heights of university studies. However, at the heart of this educational journey, a dark reality emerged, overshadowing the path of some: dyslexia.

"How many times have I seen these learners, valiantly struggling against words, sentences, paragraphs, like souls lost in the middle of an oceanic storm," I recalled, confronted with this insidious challenge. Despite the efforts deployed and the sustained pedagogical attention I offered them, their reading difficulties persisted, like impenetrable enigmas. Dyslexia, this elusive reading disorder, often lurked in the shadows, like an invisible entity undermining the confidence of these students and confronting them with insurmountable obstacles. Poorly diagnosed, it sapped their aspirations, thirst for knowledge, and desire to succeed, hindering their educational journey like a treacherous reef on their path to knowledge.

I remember with emotion a particular student I encountered at the beginning of my career. "His eyes shone with a bright spark of curiosity, his mind eager for knowledge, but his efforts were hindered by this invisible dyslexia," I recalled with a touch of sadness. Despite our joint attempts, this reading challenge seemed insurmountable for him. His face, marked by frustration and discouragement, haunted my thoughts. I then understood that we were facing a deeper challenge, requiring an unconventional approach.

It was in 2004, at the start of my educational career. My path led me to a remote school, nestled in southern Morocco. There, I met a group of students with sparkling eyes and minds eager for knowledge. Among them, this particular child caught my attention.

This young boy, different from his peers, faced enormous difficulties in reading and writing, in both French and Arabic. The words seemed to dance before his eyes in an indescribable confusion, and his writing, akin to an unsolvable mystery, reflected the depth of his obstacles. Despite his apparent shortcomings, I perceived in him a bright intelligence in all other subjects. However, the invisible obstacles of his learning difficulties erected insurmountable barriers on his daily school path.

Scrutinizing the intricacies of his educational record, I discovered he had experienced three repetitions throughout his schooling. These problems, although hidden from the outside world, had made him vulnerable to his peers' mockery. Despite the despair that engulfed him, I refused to believe his fate was sealed.

Convinced of his exceptional intelligence, I endeavored to find the key that would unlock his eager mind.

Faced with this unprecedented situation, I sought the advice of more experienced teachers, but their responses were tinged with resignation. I then decided to take charge of his learning in a personalized manner, convinced that another path needed to be explored to offer him a chance at success.

I observed that this student quickly forgot what he learned and read very slowly, with visual confusion between similar letters and words, such as "b, p," "m, n," "t, f," and "ج،خ،ح," "ن،ت،ب," and homophones "allocation, allocation," "لمح، لمح." Despite many efforts, he struggled to recognize a few letters and decode common words. Nevertheless, he continued to omit syllables, words, and sometimes even lines. At times, he added letters, while at others, he neglected punctuation. He seemed to read what he understood rather than what he saw.

Despite individualized and daily support of 1.5 hours, his progress remained very slow and tiring. As for his writing, it hardly improved.

It was not until 2012, during my transition to higher studies in linguistics, that I understood he was not an ordinary student but indeed a child with dyslexia."

### **III. Theoretical Context and Literature Review**

Dyslexia, a specific reading learning disorder, is a significant subject of study in the fields of psychology, education, and psycholinguistics. However, in the Moroccan context, research on dyslexia faces several challenges, notably the scarcity of studies and the absence of an exhaustive literature review written in French on this subject.

Given this situation, we will rely on existing international studies. Indeed, dyslexia is a disorder whose exact etiology remains unknown (Habib, 2018). The term "dyslexia" was first used in 1887 by the German ophthalmologist Dr. Rudolf to describe a learning disorder that manifests in written language. These "Dys" disorders make teaching/learning tasks heavy, difficult, and sometimes even impossible. Among these disorders, dyslexia is characterized, in particular, by a persistent and notable impairment in reading acquisition, without intellectual, psychiatric, neurological, sensory deficiency, or inadequate schooling (Coquet et al., 2011). The most frequent manifestations of this disorder are numerous, summarizing in slow, laborious, and hesitant reading, confusions, substitutions, additions, and omissions of letters, syllables, or words (Bosse et al., 2007). Dyslexic students can present the same symptom, but to varying degrees, ranging from mild to advanced. Finally, I understood that dyslexia negatively impacts learning, speed, accuracy, and reading automatism and greatly hinders comprehension of written text.

Without the persistence of the disorder, it is difficult to distinguish between students with simple reading delays or difficulties and those with dyslexia. Thus, practically, we can only speak of dyslexia after observing an 18-month reading delay compared to statistical norms (Lecocq, 1991). Concerning the Moroccan system, we cannot speak of dyslexia until the end of CE1, that is, the second year of primary school.

However, certain signs should attract attention in preschool or before the student learns to read. These include language delay, difficulty learning the alphabet, poor spatial and temporal representation, clumsiness when tying shoes (Brazeau-Ward, 2003).

Shaywitz (2017) advances other revealing signs:

- Difficulty learning common rhymes or song lyrics.
- Difficulty learning the alphabet and its order.
- The student seems unable to recognize the letters of his own name.
- He mispronounces familiar words.
- He continues to talk like a baby.
- He does not recognize rhymes like pass, break, face... He does not memorize numbers.
- He has difficulty naming familiar objects and uses more general words like "this," "that."
- He has trouble remembering things in the right order.
- He has trouble distinguishing right from left.

The advantage of these signs is that they allow for early intervention to avoid any comorbidities or psychological complications.

In primary school, during the basic learning of reading, dyslexic children generally have difficulty understanding written text. They also have decoding with various errors in the same word, ignored punctuation, very difficult reading aloud, visual or auditory confusion, inversions, letter omissions, word or line jumps, and word replacement with synonyms (Brazeau-Ward, 2003).

Some signs are also revealing in writing. You can find the same word with different spellings, excessive phonetic transcription. The student writes as he speaks, drafts a text with very short sentences, uses inappropriate punctuation marks, and poorly uses the space on pages (Valdois, 2006), among many other signs that we will develop progressively.

In Great Britain, this checklist is used by the British Dyslexia Association: the instruction is: "If you have not been assessed but think you are dyslexic, check the list below. Read the following, but only answer yes if the problem occurs frequently" (Heaton & Mitchell, 2001: 24).

- I read very slowly and sometimes have to reread several times to understand.
- I lose my place or miss lines when I read.
- When I write, I confuse words that are similar.
- I make many spelling mistakes.
- Some days I write better than others.
- I cannot copy things accurately.
- I dread being given complicated instructions.
- I get confused with dates and times.
- I have trouble organizing myself.
- I confuse left and right.

Indeed, dyslexia as a sustained acquisition disorder of reading and its automatism, despite classroom learning, reflects an inability to acquire the linguistic skills that enable learning to read and write properly. This disorder can be translated into:

- Typical reading difficulties; laborious decoding, sound and word substitution, spelling difficulty in reading and writing comprehension, considerable slowness in all school activities

related to reading. But also attention difficulties; necessary for the decoding task. It is also altered by increased fatigue due to the attentional cost of reading tasks (Shaywitz, 2017). The essential thing is to add the element of persistence to distinguish the disorder from a difficulty.

Thus, dyslexic children also have a lot of trouble learning lessons. Especially if they do not understand or do not remember. They lose their efforts on simple tasks, which is why they get tired easily, dream, and are always late for school activities (Huau et al., 2017). Moreover, the space of the dyslexic student is poorly organized.

In mathematics, people with dyslexia have very good mathematical reasoning skills. Problems arise in understanding instructions to solve tasks. Like during memorization and mental calculation development, or multiplication tables or even using arithmetic (Shaywitz&Shaywitz, 2017).

Their school results are very irregular, which negatively impacts their psychological health and manifests abnormal behaviors, such as rebellion, aggression, indifference, withdrawal, and depression (Huc-Chabrolle et al., 2010). However, these normally intelligent children are active, enterprising, with a vivid imagination, great curiosity, artistic talent, a propensity for motor skills, and often stereoscopic visualization (Casalis et al., 2018).

#### **IV. Empirical Part of the Study**

Throughout our experimental part, we took into account all the ethical aspects of research. Thus, we obtained explicit consent from all participants; namely dyslexic students, their parents, inclusive teachers, respondents, interviewees, and observed ones. We also ensured the confidentiality and anonymity of the collected data.

#### 4.1 Participants

In this study, the selected population consists of primary school students from several educational levels, various school environments, and different socio-economic backgrounds. This is a non-random convenience sampling.

Thus, the study population is recruited from two environments; public and private primary schools, and from two environments, rural and private, and according to an affluent and less affluent social category.

It involves 45 students aged between 8 and 13 years, comprising 32 boys and 12 girls attending 23 schools in the province of El Jadida. We recruited some following an announcement made by the Al Amal association for children with learning disorders. Others were recruited in collaboration with the provincial education department in El Jadida. Others were recruited at the request of their teachers.

These students were all diagnosed with dyslexia following a formal dyslexia assessment based on a report established by speech therapists.

Some students already had their assessments, while others were diagnosed by a speech therapist working at the Health Center, Essada-El-Jadida Speech Therapy Service.

The speech therapy assessments used, according to personalized adaptations and translations, were mainly based on two diagnostic batteries: BELO1 and BREV2.

Groupe expérimental																									
Types d'écoles	Écoles publiques										Écoles privées										Types de dyslexie	Moyenne d'âge			
	Rurales		Urbaines																						
Nr d'école	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	11	12	Phonologique et de surface	Entre 8 ans et 13 ans	
Filles	1	1	1	0	0	0	0	0	0	1	1	1	0	2	1	0	1	1	1	0	1	0			0
Garçons	1	1	1	1	1	1	1	1	2	2	3	1	2	1	1	3	0	4	2	1	0	1			1
Total	2	2	2	1	1	1	1	1	2	3	4	2	2	3	2	3	1	5	3	1	1	1			1

**Table 1: Distribution of the Experimental Group of the BRD-BH**

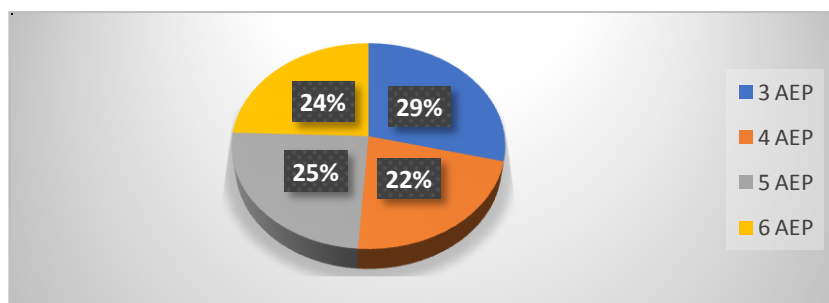
#### 4.2 Descriptive Statistics of the Experimental Group

The experimental group's students continue their education in public and private schools, in urban and rural environments. They are divided as follows:

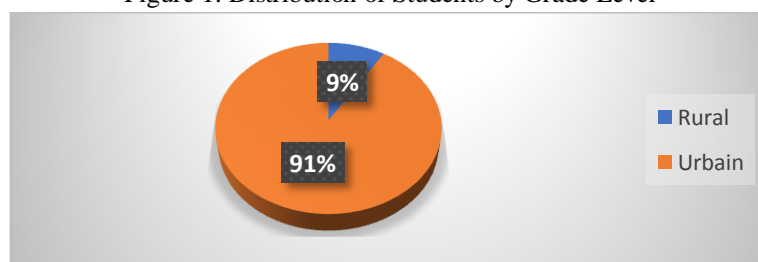
	Levels	Environment	Type of School
<b>N</b>			
Valid	45	45	45
Missing	0	0	0
<b>Mean</b>	2.44	1.91	1.64
<b>Median</b>	2.00	2.00	2.00
<b>Mode</b>	1	2	2
<b>Standard Deviation</b>	1.159	0.288	0.484
<b>Variance</b>	1.343	0.083	0.234
<b>Range</b>	3	1	1
<b>Minimum</b>	1	1	1
<b>Maximum</b>	4	2	2
<b>Percentiles</b>			
25th Percentile	1.00	2.00	1.00
50th Percentile	2.00	2.00	2.00
75th Percentile	3.50	2.00	2.00

**Table 2: Distribution of the Experimental Group of the BRD-BH**

Multiple signs can coexist, depending on the nature of the disorders present in the student, and each observed symptom can vary from one student to another, ranging from mild to severe. The most common symptoms are cited by Bosse et al. (2007), and we have added those specific to Standard Arabic.



**Figure 1: Distribution of Students by Grade Level**



**Figure 2: Educational Environments**

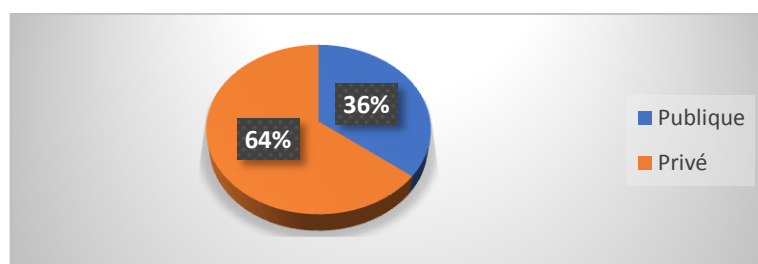


Figure 3: Types of Schools

### **3.3 Exclusion and Inclusion Criteria**

We excluded any student without a speech therapy diagnosis, or who does not show a persistent reading delay, or who has not completed their first or second year of primary school (CP, CE1, CE2).

### **4.4 Location of the Experiment**

The children continue their education in public and private schools, between rural and urban environments in the province of El Jadida.

### **4.5 Duration of the Study**

One school year, from September 1, 2021, to June 30, 2022.

### **4.6 Measurement Instruments**

Two observation grids throughout the reading sessions in Arabic and French.

## **V. Results of the Experimentation**

Following observations of inclusive classrooms to outline the manifestations of dyslexia in standard Arabic and French, the results obtained confirm the conclusions of the literature review presented in French.

In both languages, several typical manifestations of dyslexia were observed in students, such as difficulties identifying letters and sounds, recognizing common words, and understanding the meaning of the text read.

In Arabic, dyslexic students often encountered challenges in recognizing Arabic letters and segmenting words.

In contrast, in French, the difficulties observed were mainly related to the correspondence between letters and sounds, as well as fluent reading.

These results highlight the similarity of the disorder and the difficulties encountered by dyslexic students, regardless of the linguistic context, while emphasizing the specificities of each language. Regardless of the language, the student is unable to read easily, causing cognitive fatigue and hindering comprehension of what is read.

The following table summarizes the manifestations of the disorder with examples in both languages:

Dyslexia Manifestations in Students	French Language Examples	Standard Arabic Language Examples
Slow, tiring, hesitant, and choppy reading		
Visual confusion of letters and syllables that look alike	p/ q, b/d, au-ou, m-n, a-o, n-u, t-f, h-l - n/r	ب/ت/ث؛ ج/ح/خ؛ م/ش؛ ص/ض؛ ط/ظ؛ ش/س؛ ف/ق
Auditory and/or phonetic confusion of similar sounds and words	"PC" for "baiser", pain/bain	؛ ت/س/ص؛ ك/(ط،ت) (توت، دود) ق؛ خ/غ؛ ض/ظ/ذ
Confusion of similar words	"poule"/"boule", "Faut"/"vaut"	(بط، قط)
Inversion of points that change the place and number		بحر - < نحر
Difficult syllabic decoding in reading, impacting comprehension		حديقة - < ح دي قة
Aberrant or meaningless words	"Calmer", "camler"	صيا لدية (صيدلية)



Difficulty memorizing graphemes and corresponding phonemes		Confusion of points and the letter's position at the beginning, middle, or end of the word (ب/ب/ب/ب)
Difficulty writing letters in order or disorder	Difficulty mastering letters in cursive and uppercase	
Difficulty matching heard sounds with corresponding letters	The sound ch, on, oi	
Letter or syllable inversions within a word	"Deviner", "deniver", "toggoban" for "toboggan"	بحر/حبر
Omission or addition of graphemes	"camel", "caramel", "tabe" for "table", "pote" for "porte"	بحر -> بحرن , نحلة -> نحلاة بر / بحر . كتب/كتاب
Substitution or fusion of words	"por" for "pro", "bla" for "bal", "fitre" for "frite", "quarantan" for "quarante ans"	بات/بان
Addition of letters	"Arbustre", "arbuste"	
Replacements	"escapade", "cascapade"	
Word confusion	"voir", "boire"	
Reading one word for another	"auto" for "voiture"	
Disregard for punctuation	! ? : ,	! ? : ,
Difficulty reading a set of consonants	arbre	استنساخ
Grammatical transformations	The child reads what they understood, not what is written. "baladeur" for "radio"	
Confusing grammatical categories	Noun/adjective	
Confusing gender and number	Singular/plural, feminine/masculine	
Confusing nature and function	Subject/verb	
Conjugation problems	Past and future tense	
Confusion of grammatical and lexical homophones	a/à, vert/vers	

Lack of motivation	These students are not motivated to read	
Spelling/dictation problems	Possible comorbidity with dysorthography	
Mirror writing and sometimes illegible	Possible comorbidity with dysgraphia	
Delay in spatial or temporal orientation, confusion between left and right, top and bottom, before and after		
Clumsiness		
Slowness in overall school activities		
Occasional attention difficulties		
Specific troubles to the Arabic language	Confusion between diacritical marks	
Confusion of points that distinguish some graphemes	نون - N instead of Tanwin - نون واو - Waw instead of Damma - مكان التنوين ياء - Y instead of Kasra - مكان الضمة, ميقتاح/مفتاح - ياء مكان الكسرة	

**Table 3: Typical Errors Made by Dyslexic Children**

## VI. Limitations and Perspectives

Faced with these challenges, it is essential to promote research on dyslexia in Morocco by increasing available resources, encouraging national and international collaborations, and raising awareness among the Moroccan public and policymakers about the importance of this disorder. Developing an exhaustive literature review in French on dyslexia in the Moroccan context would significantly contribute to understanding this disorder and improving intervention and support strategies for Moroccan dyslexic learners.

Among the limitations of this research, we note the difficulty of isolating specific linguistic factors influencing dyslexia in a bilingual context, where interference between the two languages can complicate the identification and assessment of specific learning disorders.

Moreover, the generalization of results may be hindered by the diversity of educational contexts and the linguistic profiles of students.

However, this research opens promising perspectives, particularly in the development of diagnostic and pedagogical tools adapted to bilingualism, beyond the BRD-BH developed by researchers from Chouaib Doukkali University (Bouya, Hbabou, 2023).

It also highlights the importance of considering linguistic and cultural specificities in the approach to dyslexia, offering a path toward more inclusive and effective teaching strategies for dyslexic learners.

Finally, this study emphasizes the need for targeted training for inclusive teachers, enabling them to better recognize and support dyslexic students in a bilingual context. This is concretized in the Inclusive Pedagogical Guides (Les GPI) developed by the same researchers (Bouya, Hbabou, 2024).

### **Conclusion**

In summary, this study has shed light on the specific manifestations of dyslexia in Moroccan students, enriching our understanding of this complex condition in a less studied context. Our observations indicate that, as in other contexts, dyslexia in Moroccan students mainly manifests as difficulties in reading, writing, and reduced information processing speed. However, our study also reveals particularities, such as the significant impact of bilingualism (Arabic and French) on the manifestations of dyslexia and the way educational and cultural systems influence the identification and management of this condition.

These findings underscore the importance of screening approaches adapted to the linguistic and cultural context of students. They invite reflection on existing educational practices and the necessity to integrate inclusive and specific pedagogical strategies for dyslexic students. The involvement of teachers, speech therapists, and parents in creating a supportive environment is crucial for fostering the educational and personal development of dyslexic students.

This study also opens up interesting future research perspectives. It would be pertinent to further explore the impact of different reading teaching methods on the learning of dyslexic students and examine the long-term effects of early interventions. Additionally, a comparative analysis with other linguistic populations could enrich our understanding of the manifestations of dyslexia across different cultures and educational systems.

In conclusion, although significant progress has been made in recognizing and managing dyslexia in Morocco, this study highlights the need for a more individualized and contextualized approach. By adopting adapted inclusive educational strategies and promoting better awareness of dyslexia, we can aspire to a more inclusive and equitable environment for all students, enabling each to realize their full potential.

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