


Phonological Awareness as a Predictive Indicator of Spelling Performance Difficulties Among Fourth-Year Primary School Students

الوعي الصوتي كمؤشر تنبؤي لصعوبات الأداء الإملائي لدى السنة الرابعة الابتدائي

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Abstract

This study investigates the relationship between phonological awareness and spelling difficulties among fourth-year primary school students. The study adopted a correlational methodology to examine the association between these two (02) variables. A sample of sixty (60) fourth-year primary school students was selected using an intentional sampling method. Two standardized instruments were employed: the Phonological Awareness Scale and the Spelling Difficulties Scale.

The key findings reveal a statistically significant negative correlation between phonological awareness and both types of spelling difficulties (visual and auditory). Precisely, the results indicate that: there is a statistically significant negative correlation between phonological awareness and visual spelling difficulties, furthermore, there is a statistically significant negative correlation between phonological awareness and auditory spelling difficulties and alternatively, there is a statistically significant negative correlation between phonological awareness and the overall dimensions of spelling difficulties (visual and auditory combined).

These results suggest that as students' phonological awareness increases, their spelling difficulties decrease. The study concludes that phonological awareness is a significant predictor

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of spelling proficiency and underscores the importance of developing phonological awareness skills as a foundational component of early literacy instruction. Several educational implications and recommendations are discussed.

Keywords

Phonological Awareness, Spelling, Spelling Difficulties, Visual Spelling, Auditory Spelling.

الملخص

تبحث هذه الدراسة العلاقة بين الوعي الصوتي وصعوبات التهجئة لدى طلاب الصف الرابع الابتدائي، حيث اعتمدت الدراسة منهجية الارتباط لدراسة العلاقة بين هذين المتغيرين، كما تم اختيار عينة مكونة من ستين (60) طالباً من طلاب الصف الرابع الابتدائي باستخدام أسلوب العينة المقصودة، وتم استخدام أداتين معياريتين: مقياس الوعي الصوتي ومقياس صعوبات التهجئة. تكشف النتائج الرئيسية عن وجود ارتباط سلبي ذي دلالة إحصائية بين الوعي الصوتي ونوعي صعوبات التهجئة (البصرية والسمعية)، وتشير النتائج إلى ما يلي: وجود ارتباط سلبي ذي دلالة إحصائية بين الوعي الصوتي وصعوبات التهجئة البصرية، ووجود ارتباط سلبي ذي دلالة إحصائية بين الوعي الصوتي وصعوبات التهجئة السمعية، ووجود ارتباط سلبي ذي دلالة إحصائية بين الوعي الصوتي والأبعاد الكلية لصعوبات التهجئة (البصرية والسمعية مجتمعة). تشير هذه النتائج إلى أنه كلما ازداد وعي الطلاب بالأصوات، انخفضت صعوباتهم في التهجئة. وتخلص الدراسة إلى أن الوعي الصوتي مؤشر هام على إتقان التهجئة، وتؤكد على أهمية تنمية مهارات الوعي الصوتي كعنصر أساسي في تعليم القراءة والكتابة في المراحل المبكرة، وتناقش الدراسة العديد من الآثار والتوصيات التربوية.

الكلمات المفتاحية

الوعي الصوتي، التهجئة، صعوبات التهجئة، التهجئة البصرية، التهجئة السمعية.

1. Introduction

The early school years represent one of the most vital stages in a child's educational journey, during which the foundational skills for language learning are established. Among these skills, reading and writing constitute fundamental pillars that significantly influence a student's academic trajectory. These skills require the integration of a complex set of cognitive and linguistic processes that involve multiple brain systems working in harmony.

Writing, in particular, demands mastery of the rules governing the visual-motor transfer of speech sounds into written symbols. It involves the precise encoding of language sounds and the accurate formation of letters according to the specific conventions of the writing system. A disturbance in any of these processes leads to spelling difficulties, which represent one of the most predominant learning disorders observed in school settings.

Phonological awareness has been identified as one of the most robust predictors of reading and spelling success. It refers to the ability to recognize and manipulate the

sound structure of spoken words, including skills such as segmenting words into phonemes, blending sounds to form words, and identifying rhyme and alliteration patterns. Research has consistently demonstrated that deficits in phonological awareness are strongly associated with difficulties in learning how to read and spell.

In the Arab educational context, several researchers have pointed to the unique characteristics of the Arabic language that influence the nature and prevalence of spelling difficulties. Arabic orthography presents specific challenges due to its diglossic nature, the presence of diacritical marks, and the visual similarity of certain letter shapes. These linguistic features contribute to distinct patterns of spelling errors among Arabic-speaking students.

According to international statistics, learning disabilities affect approximately 30% of students worldwide (UNESCO, 2023). These disabilities are not limited to a single domain but encompass various dimensions, with two main types being most prominent: cognitive difficulties related to basic academic skills (such as reading and writing) and broader educational achievement deficits. Among these, spelling difficulties represent one of the most significant forms of learning challenges, requiring high levels of proficiency in auditory perception, visual discrimination, and motor coordination.

Based on the study by Al-Salaq and Al-Tannoub (2021), spelling difficulties in students emerge most prominent during the fourth and fifth years of primary education. At this developmental stage, writing demands increase considerably, affecting multiple aspects of the student's psychological and academic life, including academic achievement, self-esteem, and the overall learning experience.

Given that spelling involves the process of transferring heard sounds into written symbols according to the conventions of the writing system, effective intervention requires enhancing the student's skills and abilities to minimize spelling errors. Researchers such as Al-Mua and Naima Sahrah (2021) have emphasized that spelling is the means through which a learner achieves writing proficiency and elevates their educational level, as spelling errors lead to comprehension errors.

This study focuses on auditory spelling difficulties, which are linked to weaknesses in phonological awareness and the ability to distinguish between certain sounds during listening. This is particularly relevant for Arabic-speaking learners, as the visual and auditory characteristics of the Arabic language, including the presence of phonetically similar letters, complicate the spelling process.

2. Theoretical Background

2.1 Phonological Awareness: Definition and Conceptualization

Phonological awareness refers to the conscious ability to reflect on and manipulate the sound structure of spoken language. According to Jason and David (2005, p. 254), it encompasses a set of skills including the ability to identify speech sounds, segment words into their constituent phonemes, blend individual sounds to form words, and analyze the relationships between sounds and letters. This capacity is considered fundamental for both reading acquisition and spelling development.

The concept of phonological awareness, as highlighted by researchers such as Schankweiler and Libermann (1984), develops through a series of hierarchical levels. According to Gombert (1992), these levels include:

- The Epilinguistic Level: The child becomes aware of phonological units through implicit knowledge, without conscious reflection.
- The Metalinguistic Level: The child develops explicit awareness of phonological units and consciously manipulates them.

Phonological awareness also comprises several distinct but related components which include:

- Syllable Awareness: The ability to segment words into syllabic units.
- Onset-Rime Awareness: The ability to identify the initial consonant sound (onset) and the vowel-consonant sequence (rime) within a syllable.

2.2 Spelling: Definition and Components

Spelling is defined as the orthographic skill that involves writing words correctly according to the established rules of the writing system. It requires the accurate representation of language sounds through written symbols and the application of conventional spelling patterns. According to Al-Sahsh (cited in relevant literature), spelling involves the transfer of heard sounds into written symbols according to the conventions of the writing system.

Some classical sources have defined spelling as "the knowledge of the rules by which the learner can write words correctly. However, modern educational frameworks emphasize empirical validation over traditional attributions. Writing represents one of the most important language skills, as it serves as the primary means of communication and knowledge preservation.

2.3 Spelling Difficulties: Definition and Classification

Spelling difficulties refer to persistent problems in learning to spell words correctly, despite adequate instruction and normal intelligence. These difficulties manifest in various forms which include:

- Visual Spelling Difficulties: Errors related to the visual form of letters and words, such as confusion between visually similar letters (e.g., "d" and "b", or Arabic letters with similar shapes).
- Auditory Spelling Difficulties: Errors related to the sound structure of words, such as difficulty in distinguishing between phonetically similar sounds and correctly mapping sounds to their corresponding letters.

According to Anwar Farah (2012, p. 326), spelling difficulty is "an error in spelling words that involves the omission or addition of a letter within a word.

3. Operational Concepts

3.1 Phonological Awareness

This refers to the total score obtained by a fourth-grade student on the phonological awareness test developed for this study.

3.2 Spelling:

This refers to the total score obtained by a fourth-grade student on the written and listening spelling tests.

4. Previous Studies

Several empirical studies have investigated the correlation between phonological awareness and spelling abilities. For instance, Sahsah (2022) examined the effect of a phonological awareness intervention program on spelling skills among dyslexic students in the third and fourth grades. The study employed a therapeutic program targeting phonological and phonemic unit analysis and demonstrated significant improvements in spelling performance following the intervention. In a similar clinical context, a field study of four fourth-year primary school pupils with phonological dyslexia revealed that affected students exhibit specific phonemic errors—including omission, substitution, addition, and distortion of sounds—which are precisely the processes that underlie spelling difficulties (Arabi & Ouled Mehand, 2024, p. 424). Al-Gharbi and Hamouda (2020) investigated the manifestations of spelling difficulties among primary school students in the city of Ténès. Their findings revealed seven primary manifestations of spelling difficulties, including confusion between uppercase and lowercase letters, letter omissions and additions, and errors in writing long and short vowels.

Additionally, Hamouda and Yahya (2022) confirmed that deficits in phonological awareness among students with early educational difficulties lead to persistent spelling errors, writing problems, and poor academic achievement. Their study highlighted the causal relationship between phonological awareness deficits and spelling difficulties, providing further evidence for the importance of phonological training in early education.

5. study Problem

According to global statistics compiled by Mohammed Zeidan in 2023, learning difficulties affect 30% of males and females alike. Students face ongoing challenges in the educational process, and these difficulties are not limited to one area but encompass several diverse aspects of learning. Learning difficulties are divided into two main types: developmental difficulties, which relate to an individual's basic abilities such as attention and perception, and academic difficulties, which are related to academic achievement.

Writing difficulties have emerged as one of the most prominent academic challenges, becoming increasingly prevalent among students. This is due to the high levels of motor coordination, auditory perception, and the ability to distinguish between letters and words that sound similar. According to a study by Ilham Sultania and Basma Al-Aqoun (2021), writing difficulties significantly impact several aspects of the lives of students in the second cycle (fourth and fifth grades), including psychological disturbances that hinder learning and academic achievement. Among the difficulties students encounter in writing is spelling, as spelling is the process of translating spoken sounds into written symbols, provided they are placed correctly within a word. A

study by Aya Saidi and Amina Sayeh (2021) concluded that spelling is a means of achieving practical knowledge and skills, enabling learners to improve their academic performance. Spelling errors lead to a decline in the learner's writing ability and, consequently, to misunderstandings. Thus, some students suffer from spelling difficulties. Auditory dictation difficulties may stem from a deficiency in phonological awareness, manifesting as an inability to break down words into their basic sounds. This leads to errors in phonetic cross-writing. Learners in auditory dictation often suffer from weak auditory discrimination and struggle to differentiate between certain sounds, especially those that sound similar. This results in confusion when writing words correctly, as demonstrated by Zahira Boulahia's study (2022), which concluded that primary school students exhibit high performance in both visual discrimination of written words and auditory discrimination of spoken words. (Zahia Boulahia, 2022, p. 363). The process of spelling relies on students' ability to perceive the phonemes of words. A deficiency in auditory awareness during early educational stages can cause significant problems in learning spelling correctly, particularly in later stages of education. Based on theoretical analysis and previous field studies, the fundamental relationship between phonological awareness and spelling skills becomes clear, especially among primary school students. Spelling... Listening, as a linguistic activity requiring the analysis of spoken words into their basic phonemes, is closely linked to the learner's ability to discriminate auditory sounds, process similar sounds, and convert phonetic representations into accurate written symbols. The results of the aforementioned studies, and others, have shown that any deficiency in phonological awareness during the early educational stages leads to frequent spelling errors, writing difficulties, and misunderstandings of spoken material. Based on this operational link between weak phonological awareness and the emergence of listening spelling difficulties, the main question can be formulated as follows:

- Is there a statistically significant correlation between phonological awareness and **visual spelling difficulties** among fourth-year primary school students?
- Is there a statistically significant correlation between phonological awareness and **auditory spelling difficulties** among fourth-year primary school students?
- Is there a statistically significant correlation between phonological awareness and the combined dimensions of spelling difficulties (visual and auditory) among fourth-year primary school students?

6. study Hypotheses

- H1: There is a statistically significant negative correlation between phonological awareness and visual spelling difficulties among fourth-year primary school students.
- H2: There is a statistically significant negative correlation between phonological awareness and auditory spelling difficulties among fourth-year primary school students.
- H3: There is a statistically significant negative correlation between phonological

awareness and the combined dimensions of spelling difficulties (visual and auditory) among fourth-year primary school students.

7. study Objectives

The study aims to achieve the following objectives:

- To reveal the level of visual spelling difficulties among fourth-year primary school students.
- To reveal the level of auditory spelling difficulties among fourth-year primary school students.
- To reveal the level of phonological awareness among fourth-year primary school students.
- To investigate the relationship between phonological awareness and spelling difficulties (visual and auditory) among fourth-year primary school students.

8. Importance of the study

- This course highlights the pivotal role of phonological competencies in students' spelling. It focuses on one of the most prominent learning difficulties—spelling—by introducing approaches to phonological awareness.
- This awareness helps children understand the relationship between sounds and letters, thus facilitating their learning to read and write. It also enables them to distinguish between phonetically similar words, which enhances their writing accuracy and reduces spelling errors.
- Furthermore, developing phonological awareness in early childhood effectively prevents future spelling difficulties, thereby promoting students' language acquisition and improving their academic performance.

9. Study Methodology

9.1 Research Design

The study employs a correlational descriptive research design. This approach is appropriate for investigating the nature and strength of relationships between variables without manipulating them experimentally. The study describes the existing relationships between phonological awareness and spelling difficulties as they naturally occur in the target population.

9.2 Population and Sample

The study population consists of all fourth-year primary school students in selected elementary schools within the Bouira Governorate, Algeria. The research sample comprises of sixty (60) fourth-year primary school students, selected through intentional sampling to ensure representativeness and accessibility.

A table N 01 showing the distribution of the number of students with spelling difficulties in each primary school.

School	Number of Students
El-Hadjen P. S	10

El-Amel P. S	10
Ibn Sina P. S	10
El-Feth P. S	10
El-Ikhlās P. S	10
Al-Nour P. S	10
Total	60

9.3 Research Variables

- Independent Variable: Phonological awareness (measured as a continuous variable across multiple sub-dimensions).
- Dependent Variable: Spelling difficulties, encompassing two sub-dimensions: visual spelling difficulties and auditory spelling difficulties.

9.4 Data Collection Instruments

The study utilized two standardised research instruments:

- ✓ The Phonological Awareness Scale: This measure assessed students' phonological awareness across multiple dimensions, including phonological identification, phonological discrimination, phonological analysis, phonological blending, phonological memory, and phonological manipulation. The scale demonstrated high internal consistency with a Cronbach's Alpha coefficient of 0.824 for the first dimension and 0.775 for the second dimension.
- ✓ The Spelling Difficulties Scale: This measure assessed spelling difficulties across two main dimensions: visual spelling difficulties and auditory spelling difficulties. The scale demonstrated satisfactory psychometric properties with a Cronbach's Alpha coefficient of 0.780 for visual spelling difficulties and 0.814 for auditory spelling difficulties.

10. Results and Discussion

10.1 Results Related to the First study Question

The first research question asked: Is there a statistically significant correlation between phonological awareness and visual spelling difficulties among fourth-year primary school students?

The Pearson correlation analysis revealed a statistically significant negative correlation between phonological awareness and visual spelling difficulties ($r = -0.678$, $p < 0.01$). This indicates that as students' phonological awareness increases, their visual spelling difficulties decrease. The strength of this correlation is moderate to strong, suggesting that phonological awareness plays an important role in predicting visual spelling proficiency.

10.2 Results Related to the Second study Question

The second research question asked: Is there a statistically significant correlation between phonological awareness and auditory spelling difficulties among fourth-year primary school students?

The analysis revealed a statistically significant negative correlation between phonological awareness and auditory spelling difficulties ($r = -0.712$, $p < 0.01$). This correlation is somewhat stronger than that observed for visual spelling difficulties, suggesting that phonological awareness is particularly important for auditory-based spelling skills, indicating that as students' phonological awareness increases, their auditory spelling difficulties decrease significantly. This finding is consistent with theoretical models that posit a direct link between phonological processing abilities and the encoding of sound-letter correspondences.

10.3 Results Related to the Third Research Question

The third research question asked: Is there a statistically significant correlation between phonological awareness and the overall dimensions of spelling difficulties (visual and auditory combined) among fourth-year primary school students?

The results confirmed the existence of statistically significant negative correlations between phonological awareness and both dimensions of spelling difficulties. The correlation coefficients ranged from -0.678 (visual spelling) to -0.712 (auditory spelling), both significant at the 0.01 level.

These results collectively demonstrate that phonological awareness is a significant predictor of spelling abilities, explaining approximately 50.7% of the variance in auditory spelling difficulties ($r = 0.712$, $r^2 = 0.507$) and approximately 46% of the variance in visual spelling difficulties ($r = 0.678$, $r^2 = 0.460$).

10.4 Discussion of Results

The findings of this study align with and extend previous research in several important ways. Firstly, the significant negative correlation between phonological awareness and spelling difficulties confirms the theoretical and empirical connections established in the broader literacy literature. Students with higher levels of phonological awareness demonstrated fewer spelling difficulties, which is consistent with the view that phonological processing skills provide the cognitive foundation for effective spelling.

The stronger correlation observed between phonological awareness and auditory spelling difficulties ($r = -0.712$) compared to visual spelling difficulties ($r = -0.678$) has important theoretical implications. This finding suggests that phonological awareness is more directly involved in the sound-based aspects of spelling, which require the accurate mapping of phonemes onto graphemes. However, the significant correlation with visual spelling difficulties also indicates that phonological awareness contributes to the visual recognition and retention of correct word forms.

From a school psychology perspective, these findings have several important implications:

- **Early Assessment:** School psychologists should prioritize the assessment of phonological awareness in early primary grades to identify students at risk for spelling difficulties.
- **Targeted Intervention:** The results support the implementation of phonological

awareness training programs as a preventive and remedial strategy for students with spelling difficulties.

- Instructional Design: Teachers and specialists should integrate phonological awareness activities into spelling instruction, particularly for students who struggle with sound-letter correspondences.

11. Conclusions and Recommendations

11.1 Conclusions

Based on the findings of this study, the following conclusions were drawn:

- ✓ There is a statistically significant negative correlation between phonological awareness and visual spelling difficulties among fourth-year primary school students.
- ✓ There is a statistically significant negative correlation between phonological awareness and auditory spelling difficulties among fourth-year primary school students.
- ✓ There is a statistically significant negative correlation between phonological awareness and the combined dimensions of spelling difficulties (visual and auditory) among fourth-year primary school students.
- ✓ Phonological awareness appears to be a stronger predictor of auditory spelling difficulties than visual spelling difficulties, though both relationships are significant.

11.2 Recommendations

In light of the study findings, the following recommendations are proposed:

- ✓ Educational programs should be developed to enhance phonological awareness skills among primary school students, particularly during the early grades when these skills are most malleable.
- ✓ School psychologists and educational specialists should incorporate phonological awareness assessments into routine screening procedures for identifying students at risk for spelling and reading difficulties.
- ✓ Teacher training programs should emphasize the importance of phonological awareness in literacy instruction and provide practical strategies for integrating phonological activities into the classroom curriculum.
- ✓ Future research should explore the effectiveness of specific phonological awareness intervention programs in reducing spelling difficulties among Arabic-speaking students.
- ✓ Longitudinal studies are needed to track the developmental trajectories of phonological awareness and spelling skills across the primary school years.

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