 Doi: http://doi.org/10.33650/at-turas.v13i2.14970

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PHONOLOGICAL INTERFERENCE OF THE INDONESIAN LANGUAGE ON THE PRONUNCIATION OF ARABIC HIJAIYAH PHONEMES IN THE EARLY STAGES OF QURAN LEARNING: Psycho-Phonological Analysis in Kindergarten Students

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Received:
2026-04-09

Received in revised form:
2026-05-16

Accepted:
2026-06-08

Available online:
2026-06-12

Abstract: *This study examines the phonological interference of Indonesian language on the pronunciation of Arabic hijaiyah phonemes in kindergarten children in Iqra learning. The purpose of the study is to identify forms of phonological interference and explain the psycho-phonological factors behind them. The approach used is descriptive qualitative with a psycho-phonological framework that operationalizes Chomsky's theory of mental representation, Weinreich's interference theory, and Lado's contrastive analysis as analytical instruments. Eight students from Ibnu Al-Akbar Lubuk Pakam Kindergarten who are taking Iqra volume 1 were selected through purposive sampling based on the criteria of native Indonesian speakers who have not received formal tajweed training. Data were collected through pronunciation tests, voice recordings, classroom observations, and phonological discrimination tests. The results showed that the Indonesian sound system significantly affected the production of Arabic phonemes in children, especially in emfatic consonants (tafkhim), throat sounds (pharynx and laryngeal), and uvular consonants that are not found in the Indonesian phonological system. Although the average score of the production test of 17.25 out of 20 indicates a fairly good basic ability, analysis of the sound discrimination test reveals that a number of pronunciation errors stem from the limitations of phonological perception, rather than mere articulation weaknesses. The error pattern was dominated by sound substitution (26 cases), followed by changes in sound properties (10 cases) and sound elimination (4 cases). These findings contribute to the understanding of the mechanisms of second language phonological adaptation in early childhood, which in the framework of the Perceptual Assimilation Model (Best and Tyler, 2007) can be described as a perceptual assimilation process in which unfamiliar second language sounds are assimilated into the most similar categories of first language phonemes and form the basis of recommendations for Iqra learning strategies based on multisensory approaches and auditory discrimination training.*

Keywords: *phonological interference of the Indonesian language; Arabic phoneme hijaiyah; psycho-phonology; acquisition of phonology of second languages; literacy of the Qur'an in early life.*

INTRODUCTION

Learning to read the Qur'an through the Iqra method in kindergarten (TK) children is a very decisive initial stage in the formation of Arabic phonological competence. In this phase, children are in a period of rapid language development, so the first sound system mastered, namely Indonesian as the mother tongue, has a strong influence on the sound production of the second language. The Indonesian phonology system itself has 6 vowels and about 22 consonants which as a whole differ significantly from the inventory of 28 Arabic consonant phonemes (Muslich, 2010). Phonological interference occurs when the sound system of the first language affects the articulation of the target language; this phenomenon has been repeatedly documented in various contexts of Arabic language learning in Indonesia (Solehudin and Arisandi, 2024; Supriyadi and Julia, 2019).

The urgency of this study lies in the fact that the mispronunciation of Arabic phonemes in the early stages has the risk of becoming permanent if not corrected early. The accurate mastery of makhraj and tajweed as regulated in the rules of classical tajweed (Ibrahim, 1978), such as distinguishing /ḥ/, /kh/, /'/, /ṣ/, or /ḍ/ that have no equivalent in Indonesian phonology, is highly dependent on the quality of the formation of the child's phonological mental representation at this sensitive stage of development. When the strongly formed phonological representations of the Indonesian language are used as a cognitive reference in processing new Arabic sounds, interference becomes inevitable.

A literature review of previous studies reveals three main trends. First, the study of phonological interference in Arabic language learning focuses more on adolescent and adult learners. Solehudin and Arisandi (2024) examined the interference of the Indonesian language in Arabic language learning in Islamic boarding schools and found that the most dominant errors occurred in the phonological aspect due to differences in the sound systems of the two languages. Saepurrohman and Soxem (2025) examine the interference of Indonesian language in Arabic oral communication in modern Islamic boarding schools, focusing on forms of interference in the daily conversations of students. Syah (2023) researched phonological interference in religious discussions in Islamic boarding schools and found a dominant pattern of sound substitution due to the influence of mother tongue on adolescent students. All three studies consistently identified significant phonological interference, but all focused on the adolescent to adult age group, rather than early childhood in the context of Iqra learning.

Second, contrastive analysis between the Indonesian and Arabic phonological systems is generally carried out at the lexical level without examining the cognitive processes underlying sound production in early childhood. Stephanie O'Neill (2023) examined differences in the absorption of Arabic-Indonesian vocabulary in religious terms and found that phonological variations in such absorption reflect the sound system of absorbing language. Pangestika (2023) examined sound changes in Arabic-Indonesian lexical absorption from a phonological perspective and found that phonetic adaptations in lexical absorption follow predictable patterns based on the proximity of the articulation site. Zahra and Amrulloh (2020) examined the phonological interference of Sundanese language with Arabic and found that Sundanese speakers tend to substitute Arabic

phonemes for phonemes that are most perceptually similar, but this study did not explore the underlying mechanisms of mental representation. Gunarti (2025) applied a contrastive linguistic approach to minimize regional language interference with Arabic in boardung school and proved effective, even though the research subjects were adult learners and did not examine the psycho-phonological aspects at the initial language acquisition stage.

Third, studies of Arabic language learning in early childhood education tend to focus on pedagogical strategies without examining the psycho-phonological mechanisms that cause pronunciation errors. Ahmadil et al. (2025) discussed strategies for improving simple Arabic reading ability in early childhood and recommended a gradual approach based on imitation, but did not analyze specific forms of phonological interference. Marni and Ahmi (2025) examined Arabic language learning strategies in early childhood at Raudhatul Athfal and found that the demonstration method was effective in improving vocabulary mastery, but the focus of their study was on teaching strategies, not on the analysis of phonological error patterns or the cognitive mechanisms behind them. The fundamental gap that has not been bridged is the absence of studies that specifically examine the phonological interference of the Indonesian language with the pronunciation of Arabic hijaiyah phonemes in kindergarten children from a psycho-phonological perspective that integrates the dimensions of perception, cognitive representation, and articulatory production.

The study responded to the gap with a different approach than previous studies in two ways. Theoretically, this study integrates three conceptual frameworks, namely Chomsky's (1965) phonological theory of mental representation, Weinreich's theory of language interference (1953), and Lado's (1957) counterproductive analysis hypothesis, to explain not only what kind of errors arise, but also why they occur at the child's level of cognitive processing. Methodologically, this study differentiates between errors stemming from limitations of phonological perception and those stemming from articulation difficulties by combining a production test and a sound discrimination test, a procedure rarely applied to similar studies in the context of early childhood.

Based on Chomsky's theory, the phonological representations of the Indonesian language that have been formed in the cognitive structure of kindergarten children serve as a mental frame of reference when they begin to process new Arabic phonemes. It is this representation that allows transfers, both positive and negative transfers (interference). Weinreich explains that interference arises from the contact of two language systems in bilingual situations, while Lado provides a predictive tool through a systematic comparison of the phoneme inventories of the first and second languages. The greater the systemic difference, the higher the probability of error. Leather and James (1991) in their comprehensive study of second language sound acquisition affirm that phonological transfer from the first language is a major determining factor in the success or failure of the mastery of the second language sound system, especially in the early stages of learning. By combining these three perspectives, this study can explain the causal-conceptual relationship between the phonological system of the first language, the child's cognitive process, and the manifestation of interference in Iqra learning.

The operational assumption of this study is that kindergarten children aged 6 years have a relatively stable Indonesian phonological system through the process of first language acquisition from birth. The difference between the Indonesian and Arabic sound systems, both in terms of articulation, articulation, and sound properties, is the main trigger for interference. The independent variable (X) in this study is the phonological system of the Indonesian language, the bound variable (Y) is the production of hijaiyah letter sounds in Iqra learning, and the intermediate variable (Z) is the child's phonological mental representation that mediates the influence of X on Y.

Thus, this study aims to analyze the forms of phonological interference of the Indonesian language on the sound of Arabic letters in the learning of Iqra in kindergarten children and explain the psycho-phonological factors behind it. The results of the research are expected to be the basis for the development of Iqra learning strategies that are more adaptive, systematic, and in accordance with the characteristics of children's language development.

RESEARCH METHOD

This study uses a descriptive qualitative design with a psycho-phonological approach. The qualitative approach was chosen because the purpose of the study was to explore the phenomenon of sound interference in depth and explain the underlying cognitive mechanisms, rather than to test the causal hypothesis quantitatively. Descriptive characteristics allow researchers to systematically describe the patterns of interference that emerge. The integration of Chomsky's phonological representation theory, Weinreich's interference theory, and Lado's contrastive analysis became the theoretical foundation in operationalizing this psycho-phonological approach. Although the pronunciation test procedures and discrimination tests contain quasi-experimental elements, the study is placed in a dominant qualitative framework because the interpretation of the data is thematic and contextual, rather than statistically inferential.

The subjects of the study are the children of Ibnu Al-Akbar Lubuk Pakam Kindergarten who are taking Iqra learning in the early stages (volumes 1-2). The selection of this institution is based on the accessibility and relevance of the early Islamic education context. Subjects were selected through purposive sampling with the following criteria: (1) native Indonesian speakers, (2) regularly participating in Iqra learning, and (3) not having received advanced formal tajweed training. These criteria are designed to ensure that any interference that arises reflects the natural process of second language sound acquisition, rather than the results of formal training. The study involved eight children as subjects, a number that is common in exploratory qualitative research that aims to identify patterns, rather than generalize statistically; Data saturation is achieved through the use of complementary multi-instruments. The ethical considerations of the study include written consent from parents, child-friendly procedures, guarantees of identity confidentiality, and the absence of harmful procedures. The data of the research subjects are presented in Table 1.

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Table 1. Research Subject Name

No.	Name	Gender	Age	Level	Mother Language
1.	Malik Al-Fahri	Male	6 Years	Iqra 1	Indonesia
2.	Naura Salsabila	Women	6 Years	Iqra 1	Indonesia
3.	AlFariq Maulana Nst	Male	6 Years	Iqra 1	Indonesia
4.	Beauty	Women	6 Years	Iqra 1	Indonesia
5.	Muhammad Atta Syaqil	Male	6 Years	Iqra 1	Indonesia
6.	Zayyan Al Fatir	Male	6 Years	Iqra 1	Indonesia
7.	Kiya	Women	6 Years	Iqra 1	Indonesia
8.	Al Jihad Princess Amanda	Women	6 Years	Iqra 1	Indonesia

The data collection technique is carried out through four complementary procedures. First, the sound production test: each child was asked to pronounce the hijaiyah letters individually, focusing on four groups of sounds that are phonologically different from the Indonesian language, namely (1) emfatic sounds (tafkhim): ṣād (ص), ḍād (ض), ṭā' (ط), and ẓā' (ظ) which are characterized by pharyngalization and larynx elevation features that are not found in the Indonesian phonological system (Esling, 1999; McCarthy, 1994); (2) throat sounds (pharyngeal and laryngeal): ḥā' (ح), 'ain (ع), and hā' (ه); (3) uvular sounds: qāf (ق) and ghain (غ); and (4) the velar sounds: khā' (خ) and kāf (ك). The maximum score of this test is 20 points. Second, voice recordings to document the results of pronunciation objectively for more accurate phonetic analysis. The recordings were independently analyzed by two researchers to ensure interrater reliability with the previously agreed IPA (International Phonetic Alphabet) phonetic transcription criteria. Third, non-participatory observation used structured field notes during the Iqra learning process to record children's responses, teachers' strategies, and learning conditions.

The observed aspects were coded into categories that had been operationally defined: confidence level, hesitation in pronunciation, attention to the teacher's mouth movements, emotional response, and specific articulation ability. Fourth, a sound discrimination test is carried out to measure the child's phonological perception ability, namely the ability to distinguish sounds through hearing. The child hears the two sounds spoken by the researcher, then determines whether the two sounds are the same or different. The sound pairs tested included /ṣa-sa/, /ṭa-ta/, /ḍa-da/, /ẓa-za/, /ḥa-ha/, /qa-ka/, and /'a-a/, as well as several identical pairs as controls. The maximum score of the discrimination test is 10 points. The purpose of this test is to distinguish whether the pronunciation error stems

from the limitations of phonological perception or articulation difficulties, a distinction that is psycho-phonologically important.

Data analysis was carried out through four stages. The first stage is data reduction: phonetic transcription of sound recordings, coding of error types (substitution, change in sound properties, sound removal), and selection of relevant observational data. The second stage is categorization: grouping errors based on phonetic types and problematic phonemes with reference to the Arab-Indonesian phonological classification system. Each error was categorized by two researchers independently; Categorization differences are resolved through consensus discussions. The third stage is thematic interpretation: the analysis of interference patterns is attributed to the psycho-phonological theoretical framework of Chomsky, Weinreich, and Lado to explain the cognitive mechanisms underlying each error pattern. The fourth stage is triangulation: the integration of findings from three data sources (production tests, discrimination tests, observations) to verify consistency and improve the validity of interpretations.

RESULT AND DISCUSSION

Findings

a. Sound Production Test Results

The letter production test aims to assess the child's ability to pronounce hijaiyah letters that are the object of research. Each child is asked to recite the letters that are tested individually. The highest score that can be achieved is 20 points, describing the accuracy of sound production according to the makhraj and the nature of the letter. The test results are presented in Table 2.

Table 2. Sound Production Test Score

No.	Name	Score
1.	Malik Al Fahri	16
2.	Naura Salsabila	18
3.	Al Fariq Maulana Etc.	16
4.	Beauty	16
5.	Muhammad Atta Syaqil	20
6.	Zayyan Al Fatir	19
7.	Kiya	17
8.	Al Jihad Princess Amanda	16
	Average	**17,25**

The average score of 17.25 out of a total of 20 shows that most children have quite good basic skills in producing hijaiyah letters that are the focus of the research. Using a

four-level assessment rubric (0 = unable to pronounce, 1 = pronounce with major errors, 2 = pronounce with minor errors, 3 = pronounce correctly), a score of 17.25 out of 20 was categorized as "quite good" because it reflected an average mastery of about 86% pronunciation accuracy. This indicates that the learning process in the classroom has been effective in helping children recognize letter shapes and associate them with the right sounds in the early stages.

However, there was significant variation in abilities between participants. Muhammad Atta Syaqil achieved a perfect score of 20, and Zayyan Al Fatir scored 19, showing much better control of articulation than their peers. Naura Salsabila (18) and Kiya (17) were able to pronounce most of the letters correctly although there were still some mistakes. Meanwhile, four children, namely Malik Al-Fahri, Al Fariq Maulana, Cantika, and Al Jihad Putri Amanda, obtained a score of 16, indicating that although they have understood quite a lot of letter sounds, there are still pronunciations that are influenced by the phonological habits of the Indonesian language.

Children's mistakes in pronouncing hijaiyah letters generally occur in letters that do not have the equivalent sound in Indonesian: qāf (ق), ḥā' (ح), 'ain (ع), as well as tafkhim letters such as ṣād (ص) and ṭā' (ط). Phonetically, these letters require complex articulation adjustments: qāf requires a uvular closure that is not found in Indonesian; ḥā' and 'ain require pharyngeal constrictor activation that is rarely used in Indonesian phonology; ṣād and ṭā' require tongue root retraction and secondary pharyngealization. In the testing process, children often simplify sounds by replacing more familiar phonemes: qāf (ق) often sounds like /k/, ṣād (ص) is pronounced like /s/ without sound thickening, ḥā' (ح) is often confused with regular /h/, and 'ain (ع) is often inaudible or pronounced very weakly. This suggests that children tend to use the first language sound system as a frame of reference when trying to pronounce new sounds in Arabic.

These findings were then further analyzed through sound discrimination tests to determine whether errors were more influenced by phonological perception or articulation ability.

b. Types of Phonological Errors

Based on the analysis of voice recordings and observation records of eight children, three types of phonological errors were found in the pronunciation of hijaiyah letters. This classification refers to a framework of contrastive phonological analysis that distinguishes between phoneme substitution, changes in phonological features, and sound elimination.

The first and most dominant type of mistake is sound substitution, which is when a child replaces the sound of Arabic letters with a more familiar sound according to the phonological system of his mother tongue. This error is most often seen in tafkhim letters that require the emphasis on the back of the tongue, a characteristic that is not found in Indonesian. Phonetically, this substitution occurs because the child does not have a mental representation for Arabic emphasing consonants. For example, ṣād (ص)

is often pronounced like /s/ because they share an alveolar articulation site, but ṣād has the added features of pharyngalization and elevation of the larynx that are not present in /s/. Similarly, ḍād (ض) becomes /d/, and ẓā' (ظ) becomes /z/.

The second type of error is a change in the nature of the sound. In this type, the child is actually able to produce the basic sound of a letter, but is not yet able to maintain the secondary phonological features that must accompany it. In Arabic, this error is most often related to the loss of tafkhim characteristics. For example, ṭā' (ط) often sounds like tā' (ت). Phonetically, the difference between the two lies in the pharyngealization and elevation features of the larynx in ṭā' that tā' does not have. When this thickening does not appear, the sound shifts to a regular dental consonant. This shows that the child has recognized and is able to imitate the contours of basic sounds, but has not been able to distinguish more subtle phonological features such as the difference between the letters.

The third type of error is sound removal. This error occurs when the child does not pronounce certain sounds clearly or even skip them at all. Sound loss is most common in letters that originate from the throat area, especially 'ain (ع). In some observations, when the child is asked to pronounce the letter, the sound sounds are very weak or do not appear at all. Children tend to say the next sound immediately without going through the proper articulation. Psycho-phonologically, this condition occurs because the articulation area of the middle pharyngeal constrictor required to produce 'ain does not have an equivalent in the child's Indonesian articulatory experience, so the mental representation for the sound has not been adequately formed.

These three types of phonological errors show that in the early stages of learning hijaiyah letters, children are still strongly influenced by the sound system of Indonesian as a first language. This is a typical manifestation of phonological interference in the acquisition of a second language in early childhood. Compared to the study by Syah (2023) which found a similar pattern in boarding school students, this study shows that interference is even more prominent in early childhood because their phonological mental representation of Arabic has not been formed at all. These findings are also consistent with Lado's predictive of contrastive analysis that the greater the systemic differences between the two languages, the higher the probability of error.

c. Noise Discrimination Test Results

The sound discrimination test is carried out to measure the child's phonological perception ability, which is the ability to recognize differences in sounds through hearing before being able to pronounce them. Children were asked to hear the two sounds spoken by the researcher, then determine whether the two sounds were the same or different. The highest score is 10. The test results are presented in Table 3.

Table 3. Sound Discrimination Score

No.	Name	Score
1.	Malik Al Fahri	9

2.	Naura Salsabila	8
3.	Al Fariq Maulana Etc.	10
4.	Beauty	6
5.	Muhammad Atta Syaqil	5
6.	Zayyan Al Fatir	8
7.	Kiya	4
8.	Al Jihad Princess Amanda	4
	Average	**6,75**

The average sound discrimination score of 6.75 out of 10 indicates that the child's phonological perception ability is at a sufficient level (67.5%), but with significant variation between individuals. This score has an important psycho-phonological significance: it reveals that some of the pronunciation errors identified in the production test are not solely due to limited articulation, but also to the child's phonological perception inability to distinguish the contrast of Arabic sounds from similar Indonesian sounds.

The variation in scores between children is large enough and interesting to analyze comparatively. Al Fariq Maulana scored a perfect score of 10, Malik Al-Fahri scored a 9, while Naura Salsabila and Zayyan Al Fatir scored 8 each, showing a well-developed phonological perception ability. On the other hand, Cantika (6), Muhammad Atta Syaqil (5), Al Jihad Putri Amanda (4), and Kiya (4) showed more significant difficulties. An interesting finding emerged when comparing the results of the discrimination test with the production test: Muhammad Atta Syaqil got the highest production score (20) but a relatively low discrimination score (5). This indicates that good production performance can be achieved through memorization and motor imitation even though a representation of phonological perception has not yet been fully formed, a finding that is theoretically relevant for the understanding of the dissociation between production and perception in phonological acquisition of second languages.

The sound pairs that caused the most difficulties in the discrimination test were /ṣa-sa/, /ṭa-ta/, and the throat sound pairs /ḥa-ha/ and /'a-a/. This is consistent with the error pattern in production tests and reinforces the argument that ememphatic consonants and throat sounds are the most dominant sources of phonological interference for Indonesian speaking children learning to read the Quran.

These findings show a meaningful relationship between perceptual abilities and phonological production. Flege (1995) in his Speech Learning Model explains that the ability to distinguish second language sounds perceptually is a prerequisite for accurate sound production. This uneven development of phonological perception is consistent with the theory of second language sound acquisition which states that the formation

of new phonological perception categories precedes accurate production capabilities. Thus, effective Iqra learning needs to integrate explicit hearing discrimination exercises, not just articulatory production exercises.

d. Recapitulation of Hijaiyah Letter Production Test Errors

Based on the results of the hijaiyah letter production test on eight children, data on success and error in pronouncing the letters that were the focus of the research were obtained. These letters were chosen because they have phonological characteristics that are not found in Indonesian. Each error was categorized by two researchers independently based on the phonetic transcription of the IPA; Disagreements between assessors are resolved through consensus discussions. The recapitulation is presented in Tables 4 and 5.

Table 4. Recapitulation of Hijaiyah Letter Production Test Errors

Letters	Right.	Wrong Way	% Error	Common Forms of Error
ص (ṣād)	3	5	62,5%	Pronounced /s/ (without pharymization)
ض (ḍād)	1	7	87,5%	Pronounced /d/ (without pharynalization)
ط (ṭā')	3	5	62,5%	Pronounced /t/ (without pharymization)
ظ (ẓā')	1	7	87,5%	Pronounced /z/ (without pharymization)
ح (ḥā')	5	3	37,5%	Pronounced /h/ (without pharyngeal constrictors)
ع ('ain)	6	2	25%	Omitted or pronounced very weakly
خ (khā')	6	2	25%	Pronounced /h/
غ (Ghain)	6	2	25%	Pronounced /g/
ق (qāf)	4	4	50%	Pronounced /k/
ك (kāf)	8	0	0%	No errors

The data in Table 4 shows that ḍād (ض) and ẓā' (ظ) have the highest error rate of 87.5%, while ṣād (ص) and ṭā' (ط) are 62.5% respectively. These four letters have in common

phonological features, namely emphatic consonants characterized by pharyngalization and elevation of the larynx. From an articulatory phonetic perspective, the difficulty in these tafkhim letters can be explained by three factors: (1) the retraction of the root of the tongue which is not necessary in the phonology of the Indonesian language; (2) secondary pharyngalization that creates a pharyngeal resonance that is foreign to the child's articulatory system; and (3) the elevation of the larynx, which changes the quality of the vowels around the consonant. Since children have no articulatory experience with these patterns, they rely on Indonesian consonants that share the place of primary articulation but without emphatic features.

The letter qāf (ق) shows a different pattern: 50% of the errors with /k/ substitutions. This can be explained by the proximity of the place of articulation, i.e. qāf is generated in the uvula while /k/ is generated in the velum; Both have the same way of articulation (explosion), so children can easily equate both. Meanwhile, kāf (ك) does not show any error at all (0%) because the place and way of articulation are very similar to /k/ in Indonesian.

Table 5. Percentage of Errors

Letters	Number of Children Wrong	Percentage
ص	5	62,5%
ض	7	87,5%
ط	5	62,5%
ظ	7	87,5%
ح	3	37,5%
ع	2	25%
خ	2	25%
غ	2	25%
ق	4	50%
ك	0	0%

Table 6. Fault Classification

Error Types	Number of Cases	Example
Substitution	26	ص → s, ظ → z
Changes in the nature of the sound	10	ط → t
Sound manufacturing	4	ع → a

Table 6 shows that sound substitution was the most dominant type of error (26 cases), followed by changes in sound properties (10 cases) and sound elimination (4 cases). This pattern of substitution dominance is consistent with the predictions of Lado's contrastive analysis: when faced with a new, unfamiliar sound, children cognitively look for the closest equivalent in their first-language phoneme inventory. Meanwhile, changes in sound properties reflect partial mastery: children have recognized the basic sound contours of a phoneme, but secondary features such as pharyngalization and sound thickening have not been internalized in their mental representations. The omission of the 'ain sound (ع) specifically suggests that when the articulation area of a sound is not used at all in the first language, the formation of a mental phonetic representation of the sound faces the greatest obstacle.

It should be noted that from the perspective of the phonological development theory of Bates et al. (1994), the error patterns found are not indicators of learning failure, but rather reflect the normal stages of phonological development in second language acquisition. Children systematically use the adaptive strategies available to them: relying on phonological representations that already exist in the first language as scaffolds to process new sound systems.

e. Observation Results

In addition to the sound production and discrimination tests, this study involved non-participatory observation during the Iqra learning process to provide a more comprehensive picture of the dynamics of children's learning in pronouncing hijaiyah letters. Aspects observed included confidence levels, doubts in pronunciation, attention to teachers' mouth movements, emotional responses, as well as specific articulation skills.

Table 7. Observation of Children's Responses During Iqra Learning

No.	Aspects Observed	Number of Children	Percentage	Remarks
1.	Children show confidence when pronouncing letters	5	62,5%	Don't Dare to Speak Without the Help of a Teacher
2.	Children look hesitant when pronouncing letters	3	37,5%	Occurs in letters that are considered difficult
3.	Children pay attention to and imitate the teacher's mouth movements	6	75%	Use visual aids to mimic articulation

4.	The child repeats the pronunciation of the letters more than twice	4	50%	Occurs when a child tries to correct pronunciation
5.	Children equate the pronunciation of thick and thin letters	3	37,5%	Example: صis pronounced like س
6.	Children look embarrassed when they are unable to pronounce letters correctly	5	62,5%	Tends to bow or smile embarrassingly
7.	Children have difficulty with throat letters	4	50%	Especially in the letters ع and ح

Table 8. Observation of the Articulation Aspect of Hijaiyah Letters

No.	Observed Aspects of Articulation	Number of Children	Percentage	Remarks
1.	The child is able to sharpen the emfatic letters (ص، ض، ط، ظ) clearly	3	37,5%	Most children still speak letters thinly
2.	The child demonstrates the use of throat articulation	4	50%	It can be seen in the pronunciation of the letter ح، خ، غ
3.	Children are able to distinguish between the sounds ق and ك	6	75%	A small number still equate the sound of the two
4.	The sound of the letter 'ain (ع) is clearly heard	5	62,5%	Some children still eliminate the sound

The observation results provide an additional dimension that enriches the understanding of Iqra learning dynamics beyond test scores. The finding that 75% of children pay attention to and imitate teachers' mouth movements is significant empirical evidence that children intuitively use multimodal learning strategies, combining visual-motor perception with auditory input. In the psycholinguistic framework developed in the Indonesian context, Dardjowidjojo (2005) explained that language acquisition in children involves the internalization of the sound system of the first language which then becomes a cognitive reference in processing the sound of the second language.

Within the framework of Bandura's (1977) observational learning theory and neuroscientific research on mirror neurons, this behavior can be understood as an important mechanism in second language sound acquisition: children use visual representations of the teacher's articulation as a scaffold to construct motor representations of sounds that are new to them.

The finding that 62.5% of children experience an emotional response of embarrassment or hesitation when they fail to pronounce letters correctly has pedagogical and psychological implications that need to be taken seriously. From the perspective of affective theory in language learning (Krashen, 1982), anxiety and shame can increase the "affective filter" that inhibits the acquisition of linguistic inputs. Children who experience repeated embarrassment when pronouncing incorrectly tend to reduce their pronouncing efforts, which in turn reduces the opportunity for articulation practice. This condition shows that the quality of classroom interaction and teachers' corrective feedback strategies are very decisive not only for phonological ability, but also for children's confidence and motivation to learn. Teachers need to create a supportive environment (low-anxiety environment) and use constructive corrective feedback, such as through recasting (repeating the child's speech with the correct pronunciation without explicitly indicating that the child is wrong).

Only 37.5% of children were able to sharpen emfatic letters clearly, while 50% of children were able to activate throat articulation. This data is consistent with the results of production tests and reinforces the argument that emfatic consonants are the most challenging phonetic category for Indonesian speaking children. It should be noted that in Table 7 point 5, the figure listed is 37.5% of children who equate bold and thin letters; This means that 62.5% of children have been able to distinguish between the two albeit with varying degrees of accuracy.

The integration of observational findings with production and discrimination test results revealed a coherent pattern: children who showed greater difficulty in production and discrimination tests also tended to show more doubt and negative emotional responses in observations. This strengthens the argument that the development of phonological abilities and the affective dimension of learning are inseparable in the context of Iqra learning in early childhood.

Discussion

The findings of this research can be comprehensively understood through a psycho-phonological perspective that integrates three theoretical frameworks. First, Chomsky's (1965) theory of phonological mental representation explains why interference occurs systematically: kindergarten children at the age of 6 years already have an Indonesian phonological system stored in a cognitive structure as a relatively stable mental representation. When they began to learn hijaiyah through Iqra, this representation served as an initial cognitive scaffolding in processing Arabic sounds. Arabic phonemes that have no equivalent in the inventory of Indonesian phonemes, such as emfatic consonants,

pharyngeal sounds, and uvular consonants, cannot be directly mapped into existing representations, so children are forced to use Indonesian phonemes that are most perceptually similar.

Second, Weinreich's (1953) interference theory provides a framework for understanding transfer across linguistic systems. In this study, interference is manifested specifically in three different mechanisms: (a) phoneme substitution occurs when the phonological representation of the Indonesian language overtakes the processing of unknown Arabic phonemes; (b) changes in the nature of sound occur when the child manages to access the basic articulatory contours of a phoneme but does not have a representation for its secondary features; and (c) sound loss occurs when no phonological representation at all can be activated. These three mechanisms reflect a gradation of difficulty that correlates with the degree of phonological difference between the two systems.

Kuhl (2004) showed that infants from the age of 6-8 months begin to form a "perceptual magnet" for the sounds of their first language, which causes similar other language sounds to be perceived as variants of an already existing phoneme category. This mechanism explains why kindergarten children who already have a stable Indonesian phonological system tend to categorize new Arabic sounds into the most similar category of Indonesian phonemes. Third, the hypothesis of Lado (1957) contraceptive analysis provides predictive power that has been proven to be valid in this study. The letters with the highest error rate (ḍād and ẓā' at 87.5%, ṣād and ṭā' at 62.5%) were the letters that had the greatest phonological differences from the Indonesian sound system, namely the presence of emphatic features that were not found in the Indonesian phoneme inventory. On the other hand, kāf (ك) does not show any error at all precisely because it has an almost perfect correspondence with the Indonesian phoneme /k/.

This study has some important differences with previous studies. Unlike Solehudin and Arisandi (2024) who focused on morphological and syntactic interference in adolescent students in Islamic boarding schools, this study found that phonological interference in kindergarten children was more systematic and predictable because their phonological mental representation of Arabic had not been formed at all. Different from Zahra and Amrulloh (2020) who examined Sundanese interference with Arabic, this study found that although the linguistic context is different, the phonological interference mechanism follows a similar pattern: preference for first language phonemes that share a place of articulation with the target second language phoneme. The unique contribution of this study lies in the demonstration that in early childhood, interference occurs not only at the level of articulation but also at the level of phonological perception, as evidenced by the inconsistency between the production test scores and the discrimination tests.

Based on these findings, several pedagogical implications can be formulated concretely. First, to overcome the substitution of phonemes on the letters tafkhim (ṣād, ḍād, ṭā', ẓā'), the teacher needs to integrate articulation exercises that focus on explicitly forming empathetic features: training of tongue root retraction and the compression of the back of the throat through visual demonstrations (mirrors) and kinesthetic feedback (touching the

neck to feel different vibrations). Second, to improve phonological perception skills, Iqra's learning program needs to include structured hearing discrimination practice sessions, for example through "same or different" games with minimal pairs such as /ṣa-sa/, /ṭa-ta/, /ḥa-ha/. Third, given that 75% of children naturally rely on visual imitation of teachers' mouth movements, a multisensory approach that combines demonstrations of visual articulation, auditory input, and kinesthetic feedback (such as the Seeing Essential English/SEE technique) needs to be systematically integrated into the Iqra curriculum. Fourth, a low-anxiety learning environment needs to be prioritized by using corrective feedback strategies that do not cause embarrassment, such as recasting and positive reinforcement, to support children's confidence in practicing pronunciation.

Some of the limitations of the research need to be acknowledged. The number of participants was eight people from one institution limiting the diversity of linguistic and educational backgrounds, so the findings could not be statistically generalized to a wider population. The limited observation period also does not allow longitudinal analysis of the development of phonological mastery. In addition, the study did not control for individual cognitive differences variables, the intensity of Arabic exposure at home, and the quality of teachers' pronunciation, all of which could influence interference patterns. Subsequent studies need to involve a larger sample of different institutions, use longitudinal designs, and consider broader socio-linguistic factors.

CONCLUSION

This study empirically proves that phonological interference of the Indonesian language on the pronunciation of Arabic hijaiyah phonemes is a systematic and predictable phenomenon in kindergarten children who learn to read the Quran through the Iqra method. The three main findings of this study need to be underlined as scientific contributions.

First, the phonological error pattern was dominated by sound substitution (26 cases, 65%), followed by changes in sound properties (10 cases, 25%), and sound elimination (4 cases, 10%). The letters with the highest error rate were ḍād (ض) and ẓā' (ظ) at 87.5% and ṣād (ص) and ṭā' (ط) at 62.5%, all of which are emphatic consonants characterized by pharyngalization features that are not present in the Indonesian phonological system. Kāf (ك) shows no error at all because its correspondence with the Indonesian /k/ is almost perfect.

Second, a comparative analysis between the production test (average 17.25/20) and the sound discrimination test (average 6.75/10) revealed that phonological interference operates at two levels at once: the phonological perception level (the inability to distinguish the contrast of Arabic sounds from similar Indonesian sounds) and the articulation level (the inability to produce secondary phonological features such as pharyngalization and tafkhim). These findings are a contribution that distinguishes this study from previous studies that generally only analyzed production levels.

Third, from a psycho-phonological perspective, interference in kindergarten children is not a learning failure but a normal manifestation of the process of cognitive adaptation of the second language: children use the mental phonological representation of the Indonesian language that has been formed as a frame of reference in processing the new Arabic sound system. This is entirely consistent with Chomsky's theory of mental representation, Weinreich's interference theory, and Lado's predictive of contrastive analysis.

The main practical implication of this study is that effective Iqra learning for early childhood needs to be designed with a multisensory approach that explicitly integrates hearing discrimination exercises, visual articulation demonstrations, and training of secondary phonological features (tafkhim and throat sounds), in a low-anxiety learning environment. Further research is suggested using a longitudinal design with a larger sample of different educational contexts and linguistic backgrounds to validate these findings and explore the rate of development of Arabic phonological competence in second language acquisition in early childhood.

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