

# Articulatory challenges in the perception and production of French vowels by Jordanian learners: A cross-linguistic phonetic analysis

Nouman Malkawi <sup>a</sup>, Emad Al-Saidat <sup>a, \*</sup>

<sup>a</sup> *Al-Hussein Bin Talal University, Jordan*

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**Abstract.** This study aims to identify and examine persistent articulatory challenges relating to French oral vowels among adult Jordanian learners of French, who are native speakers of Jordanian Arabic. The authors explore the problems in pronouncing the vowels by six male and six female participants of 20-22 years old with B1-B2 French proficiency level at Al-Hussein Bin Talal University, Jordan. The study employed a quantitative and qualitative analyses to examine the learners' phonetic recordings. The results suggest that the front rounded vowels (/y/, /ø/, /œ/) are the hardest to learn because they don't exist in Arabic and require labio-lingual articulation. The average success rate is only 27.7 %. The back rounded vowels (/u/, /o/, /ɔ/, /ɑ/) and the front unrounded vowels (/i/, /e/, /ɛ/, /a/) are easier to learn (90 % and 79 %, respectively) since they are present or similar to those in Arabic. The persistent presence of errors, despite extensive training, signifies that students necessitate explicit teaching, encompassing perceptual training, visual feedback, and articulatory coordination exercises. The findings emphasise the significance of the L1 and corroborate the notions stated by Flege and Bohn (2021) and Best (1995).

**Keywords:** Jordanian learners, L1 transfer, rounded front vowels, pronunciation pedagogy, L2 phonetic acquisition.

**Малкаві Ноуман, Аль-Сайдат Емад. Артикуляційні труднощі у сприйнятті та вимові французьких голосних у йорданських студентів: міжмовний фонетичний аналіз.**

**Анотація.** Стаття має за мету встановити та проаналізувати повторювані проблеми вимови французьких голосних звуків у дорослих йорданських університетських студентів – носіїв йорданської арабської. Автори аналізують проблему вимови цих голосних шістьма учасниками жіночої та шістьма учасниками чоловічої статі віком 20-22 роки, які мають рівень володіння французькою мовою B1-B2, і навчаються в Університеті імені Хусейна бін Талала, Йорданія. Результати засвідчили, що огублені голосні переднього ряду (/y/, /ø/, /œ/) є найскладнішими для вивчення, оскільки вони не існують в арабській мові і вимагають губно-язикової артикуляції. Середній рівень

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\* Corresponding author. Emad Al-Saidat,  0000-0002-0674-038,  emad.m.saidat@ahu.edu.jo

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успішності становить лише 27,7 %. Огублені голосні заднього ряду (/u/, /o/, /ɔ/, /ɑ/) та неогублені переднього ряду (/i/, /e/, /ɛ/, /a/) легше засвоїти (відповідно 90 % та 79 %), оскільки вони існують або є подібними до тих, що є в арабській мові. Постійна наявність помилок, незважаючи на інтенсивне навчання, свідчить про те, що студенти потребують чіткого навчання, що включає тренування сприйняття, візуальний зворотний зв'язок та вправи на координацію артикуляції. Дослідження підкреслює значення L1 і підтверджує ідеї, висловлені в працях Flege та Bohn (2021) і Best (1995).

**Ключові слова:** йорданські студенти, перенесення рідної мови, огублені голосні переднього ряду, педагогіка вимови, фонетичне засвоєння іноземної мови.

## Introduction

Adults must learn a whole new way of speaking when they learn a new language. However, certain L2 aspects pose obstacles for learners; they may hinder or at least reduce their L2 gains. One of the hardest areas is pronunciation (Al-Saidat et al., 2024). This issue can persist, hinder communication, and result in a discernible foreign accent (Derwing & Munro, 2015). When it comes to languages that are very different from each other, like Arabic and French or English, this problem is even worse. The grammatical structure, phonetic system, and modes of expression of these two languages can make the conversion highly hard and time-consuming.

This research falls within the field of second language didactics and applied phonetics. It seeks to study the acquisition of French vowel sounds by adult Jordanian learners whose native language is Arabic, specifically Jordanian Arabic (JA, henceforth). Our objective is to identify and describe the persistent articulatory challenges faced by these learners after several years of formal study in the French department. To this end, we conducted a case study with twelve third- and fourth-year students, recording their speech to ensure data reliability and stability. This study will enable us to compile a list of difficulties specific to the acquisition of the French vocalic system and, consequently, propose pedagogical strategies.

## Investigative Issues

Adults typically have a hard time learning to speak a second language (Al-Saidat et al., 2023), especially when the sounds of their first language (L1) and those of the target language (TL) are very different. Jordanian learners of French find it even harder because Arabic has only three basic vowels (a, i, u), whereas French has twelve oral vowels, nine of which do not exist in Arabic (Ghazali, 1979; Barakat, 2000).

To be more specific, Modern Standard Arabic (MSA) and its dialectal variants rely on a restricted vocalic triangle, whereas French benefits from a

sophisticated vocalic trapezoid that includes front rounded vowels ([y], [ø], [œ]), semi-open and semi-close vowels, as well as a central vowel ([ə]) (Meunier et al., 2004). This phonetic diversity necessitates that Jordanian learners adopt novel articulatory and perceptual methods, especially for the front rounded vowels, which demand labio-lingual coordination not present in Arabic (LeBel, 1990; Harmegnies et al., 2005).

Flege and Bohn's (2021) Revised Speech Learning Model (SLM-r) asserts that individuals learning a second language frequently combine the phonetic components of their first language (L1) with those of the second language (L2). In this regard, Flege et al. (2021) stated, "individuals who are exposed to an L2 map the sounds they hear in L2 words onto native language (L1) phonetic categories (p. 85). This can make it harder for them to learn new phonetic categories. Consequently, phonological interference, articulatory confusions, and unstable productions are likely, particularly for sounds lacking parallels in the source language (Best, 1994; Flege & Bohn, 2021). In this regard, the current study aims to examine the following research questions:

1. Which French vowels are the most difficult for Jordanian learners of French to pronounce?
2. Does continuous exposure to French promote an improvement in the production of the target vowels?
3. In what ways does the Arabic phonological system affect how people perceive and produce French vowels, especially the front rounded vowels?

This study investigates the oral competency of Jordanian learners of French across several years of education to find common challenges and suggest solutions for enhancing their pronunciation.

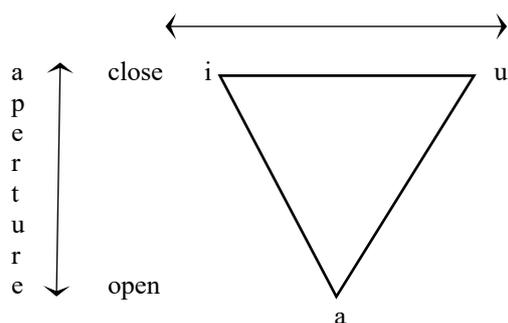
## The Arabic Vocalic System

The basic vocalic system of Modern Standard Arabic (MSA) is generally presented as a system with three contrastive vowels in timbre and aperture. It consists of two front vowels – a close [i] and an open [a] – and a back close vowel [u]. This triangle (see Fig. 1) is distinguished by an opposition of quantity (short vs. long vowels) rather than quality.

However, comparative analyses of Arabic dialects (Ghazali, 1979; Barakat, 2000) complicate this simplicity. Ghazali (1979), in an analysis of twelve speakers from six dialects (Algerian, Tunisian, Libyan, Egyptian, Jordanian, and Iraqi), investigated differences in vowel duration and their effects on formant qualities. His findings indicate that the vocalic system of Arabic dialects comprises not merely three phonemes characterised by a length distinction (Al-Ani, 1970), but rather two subsystems: one consisting of three long vowels ([a:], [u:], [i:]) and another of three short vowels ([a], [u], [i]), the latter

frequently exhibiting distinct qualities and sonorities compared to their long counterparts (Barakat, 2000). Arabic speakers need to be able to tell the difference between the two sounds in each pair in order to perceive and produce them.

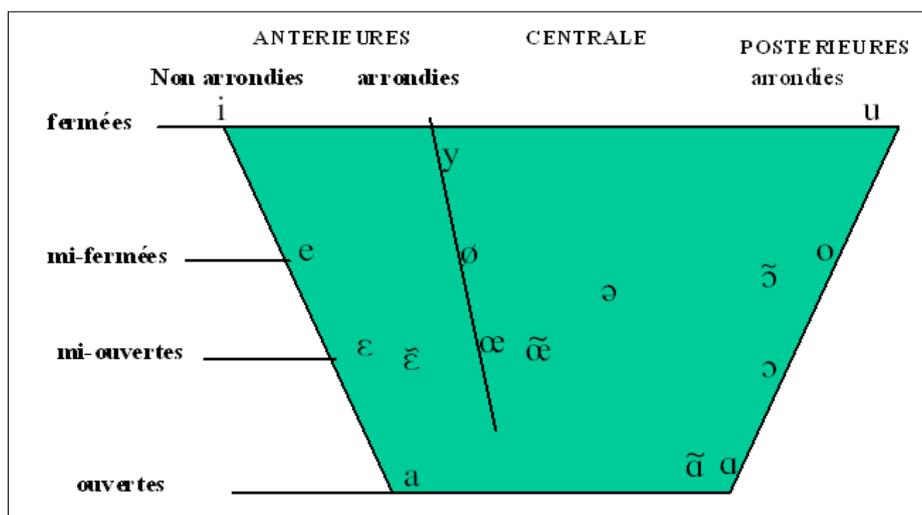
Figure 1  
*Vocalic Triangle of Arabic*



### The French Vocalic System

The French vocalic system, on the other hand, is far more complex. It has sixteen vowels in its inventory: twelve oral ([i, e, ε, a, u, o, ɔ, y, ø, œ, ə, ɑ]) and four nasals ([ã], [õ], [ɛ̃], [œ̃]). This wealth is depicted not by a triangle, but by a vocalic trapezoid (see Fig. 2), illustrating a broader range of articulatory positions.

Figure 2  
*The French Vowel Trapezium (Adapted from Fredet, 2006)*



The harmony of this system shows that the vowels that make it up are spoken in a similar way, as Meunier et al. (2004) showed in their study. In order for speech to be clear, native speakers need to maintain the different articulatory zones separate and avoid any confusion that could make communication less clear. French words are hard to say because you have to round your lips in a certain way. This procedure of articulation is different for front and back vowels, which is not the case in Arabic.

This hard situation is a huge difficulty for anyone who speaks Arabic. LeBel (1990) states that they have a lot of challenges, such as interference, confusion, and productions that aren't stable. This is notably true for the rounded vowels in the front ([y], [ø], and [œ]), which are not in Arabic. Targeted phonetic training and practice can help you get over these problems. Students can slowly get better at writing and talking in general by focusing on the particular lip movements they need to form French sounds. LeBel (1990) asserts that precise auditory detection, followed by visual and tactile perception of articulation, is crucial to correct the misarticulation of [y] and attain its accurate front articulation.

Listening to native speakers or watching French TV shows and films can also help you get better at these things. This strategy helps learners get better at speaking and makes them more confident in using the language in real life. Also, giving students a place where they feel secure making mistakes would help them learn the language a lot. Teachers can make their students' learning better by encouraging them to talk to each other and giving them helpful feedback (Al-Saidat et al., 2023). In the end, this will make it easier for learners to talk to each other. In this kind of setting, students are more likely to be excited and motivated, which lets them use their language abilities and try new things.

This increases the chances that students will get really interested in the language and culture, which could help them understand and enjoy their studies more deeply. It is fascinating to witness how learners shift from a phonemically inadequate vocalic system to a robust one, demanding the acquisition of new articulatory skills.

### **Theoretical Framework: Phonetic Acquisition of L2 by Adult Learners**

Adults have a difficult time learning the phonetics of a second language (L2) because their first language (L1) has altered how they perceive and produce L2 sounds. To address the specific challenges faced by Jordanian learners in mastering the French vocalic system, a plural theoretical framework is essential, integrating models of speech perception, articulatory restrictions, and L1 interference.

## **The Impact of the L1 Phonological System**

Lado (1957) posited that the fundamental idea of contrastive analysis indicates that learning challenges are invariably influenced by the predominant function of L1 in phonetic acquisition, a notion that remains evident despite the complexities arising from the differences between L1 and L2. According to Al-Ani (1970) and Ghazali (1979), the vocalic system of Jordanian Arabic is usually shown as a basic triangle system with three main vowel qualities: /i/, /a/, and /u/. There is also a quantity opposition between short and long vowels.

This simplified system is different from the complex vocalic system of French, which comprises sixteen oral and nasal vowels (Carton, 1974). The lack of front rounded vowels /y, ø, œ/ and nasal vowels in Jordanian Arabic presents a foreseeable challenge, resulting in phonetic interference as novel sounds are interpreted and manifested via the lens of L1 categories (Weinberger, 1987).

## **Perceptual Models: Transitioning from Assimilation to Categorisation**

To account for the cognitive processes involved in this interference, two major theoretical models complement each other. Best's (1995) Perceptual Assimilation Model (PAM) posits that learners process L2 sounds by categorising them within the phonological frameworks of their L1. Jordanian learners are likely to see the French vowel /y/ as an unusual variant of the Arabic vowel /u/, given that both possess a distinctive feature of rounding. This erroneous categorisation elucidates the ongoing production errors.

The Revised Speech Learning Model (SLM-r) of Flege and Bohn (2021), as mentioned earlier, goes further by proposing the permanent flexibility of the phonetic system. It proposes that new phonetic categories for L2 sounds can be established if the learner perceives a sufficient difference from L1 sounds. But this capacity weakens with age, and the perceived equivalence between an L2 sound (e.g., /y/) and an L1 sound (e.g., /u/) prevents the creation of a new category and leads to an "accented" production. This model is interesting for understanding why, even after long exposure to French, Jordanian learners struggle to distinguish and produce the front rounded vowels.

## **Difficulties with Articulation and Coordination Between the Lips and Tongue**

Correctly pronouncing French vowels takes more than just hearing them. For an Arabic speaker, the front rounded vowels /y, ø, and œ/ need an uncommon coordination of tongue advancement (like for /i/) and lip rounding (like for

/u/). This labio-lingual arrangement is absent in the articulatory repertoire of Jordanian Arabic, where rounding is exclusively applied to back vowels.

Catford (1977) and Ladefoged and Maddieson (1996) have observed that the acquisition of these sounds requires explicit motor learning, which entails adjustments in oral usage and the development of novel muscle coordination strategies. If no help is given, the articulatory method that is most comparable to the learner's L1 will be chosen. For example, they may pull their tongue back for /y/ to keep it round, which would make a sound like /u/.

### **What This Entails for Fixing Problems and Teaching**

These perceptual and articulatory components collectively illustrate the significance of an active and holistic methodology in teaching pronunciation. Derwing and Munro (2005) and Thomson (2017) both found that explicit instruction that includes differential perceptual training (to increase auditory discrimination) and conscious articulatory practice (with visual and kinesthetic feedback) makes it easier for adults to understand what they are learning.

For Jordanian learners, this entails engaging in activities that emphasise the distinctions between minimal pairs such as "lu" /ly/ and "loup" /lu/, and utilising video or speech visualisation software (e.g., Praat) to see the positioning of the tongue and lips.

## **Method**

This section describes in detail the experimental protocol used to collect and analyze the data. It presents the characteristics of the study population, the composition of the corpus, and the procedure of the tasks, as well as the quantitative and qualitative analysis approaches used to examine the learners' phonetic recordings.

### **Participants**

The research included twelve (N=12) university students from Jordan, whose first language is Jordanian Arabic. During the trial, all participants were third- or fourth-year students in the French Language Department at Al-Hussein Bin Talal University in Jordan. They were taking a higher-level class on how the French sound system works. The table below shows a summary of the participants' age, gender, and language skills.

Table 1  
*Participant Profile*

Participant ID	Age	Gender	Year of Study	French Level	Other languages
P01	22	M	3rd	B1.2	English
P02	21	F	4th	B2.1	English
P03	20	F	3rd	B1.1	English
P04	22	M	4th	B2.1	English
P05	22	F	3rd	B1.2	English
P06	21	M	4th	B2.2	English
P07	20	M	3rd	B1.1	English
P08	22	F	4th	B2.1	English
P09	22	M	4th	B2.1	English
P10	21	F	3rd	B1.2	English
P11	21	F	4th	B2.2	English
P12	20	M	3rd	B1.1	English

Notes: Participant ID: Anonymised identification number.

- Niveau (CADRE): Evaluation based on the department's internal evaluation and the course.

- Years of study: They all began studying French at the university at the age of 17 or 18.

The selection of upper-level students (3rd and 4th year) offers the possibility of examining persistent phonetic problems despite prolonged exposure to the target language, thus excluding errors exclusively attributed to a lack of knowledge.

### Corpus and Material

The phonetic catalogue had 34 examples of French words, both monosyllabic and polysyllabic. The 12 French oral vowels (/i, y, u, e, ø, o, ə, ε, œ, ɔ, a, α/) are represented by these nouns. The terms were chosen based on the following criteria:

1. Frequency: Preference for frequent words to avoid vocabulary problems.
2. Positioning of the target vowel: Each vowel was examined in initial, medial, and final word positions as much as possible in order to analyze the impact of the phonetic context. This parameter was restricted by specific French phonetic constraints, such as the fact that the sound /ə/ is infrequent in the word-final position and is not present at the very beginning of a word.

3. Consonantal context: A diversity of contexts (open/closed syllable, simple/complex onset) was chosen to ensure the reliability of observations.

## Steps and Tasks

Data collection took place over one month, occurring in two well-defined stages:

1. Listening and Repetition Stage (from perception to production): The participants first listened to how each word in the corpus was pronounced by a native speaker, recorded from the Petit Robert CD. The goal of this stage was to give everyone the same input so that mistakes caused by bad graphic representation would be less likely to happen.

2. Recording Stage: After listening, each participant had to read all the words from the list out loud. Using a high-quality external microphone and a Sony digital recorder in a quiet environment, the sound was precisely replicated.

Everyone sat down in front of the microphone. The reading speed was just right: a word was spoken every three seconds, as directed by the researchers, to keep the speech from going too fast and making it hard to understand.

## How to Look at Data

The recordings were looked at in the following way:

### 1. *Transcription and Review*

The productions were transcribed using phonetic symbols. It was noted if each time a target vowel was said, it was right (✓) or wrong (X). It was considered correct if a realisation was seen and written down as making the right sound without too much influence from Arabic (for example, saying [u] instead of /y/ was seen as wrong).

### 2. *Classifying Vowels*

Vowels were placed into three main categories depending on how they sound, using the French vocalic trapezium: back rounded vowels (/u, o, ɔ, ɑ/), front unrounded (spread) vowels (/i, e, ε, a/), and front rounded vowels (/y, ø, œ/). The core vowel /ə/ was analysed distinctly and independently from the other vowels.

### 3. *Quantitative Analysis*

The number and percentage of correct productions for each vowel and category were counted for all participants, no matter where in the word they were (beginning, middle, or end). In addition, summary tables were created to illustrate the results in a form that made it easy to compare success rates based

on the different vowels and categories (see Tables 2, 3, 4, and 5 in the Results section).

## Results

This part shows the results of looking at recordings of the twelve Jordanian students. According to our method, the findings are sorted into the three sound groups set up by the French vocalic diagram, with a special focus on the central vowel. The success rates shown below display, on average, the number of times all participants correctly identified the vowels, regardless of their position in words.

### Back Rounded Vowels (/u/, /o/, /ɔ/, /ɑ/)

Jordanian learners have an excellent grasp of the back-rounded vowels in French. These vowels, even though they do not look the same in Arabic, are all rounded like the Arabic /u/, which seems to make them easier to learn. Table 2 gives a summary of the performances.

Table 2  
*Success Rate for Back Rounded Vowels*

Vowel	Number of Correct Articulations	Number of Incorrect Articulations	Success Rate
/u/	11/12	1/12	91.5 %
/o/	10/12	2/12	84 %
/ɔ/	10/12	2/12	84 %
/ɑ/	12/12	0/12	100 %
Average	11/12	1/12	90 %

Everyone in the group pronounces the sound /ɑ/ (as in 'pâte') correctly, and people probably hear it as a contextual version of Arabic /a/. The sounds /o/ (as in 'bateau') and /ɔ/ (as in 'porte') both have a high success rate of 84%. The continual challenge for /u/ ('fou') and /o/ may be attributed to the accuracy of aperture or rounding in particular phonetic contexts.

### Front Unrounded Vowels (/i/, /e/, /ɛ/, /a/)

Most people are familiar with this group, which includes Arabic vowels (/i/, /a/) or sounds that are similar to them. The data in Table 3 reveal that learners can do a good job of moving their tongues forward and expanding their lips.

Table 3  
*Success Rate for Front Unrounded Vowels*

<b>Vowel</b>	<b>Number of Correct Articulations</b>	<b>Number of Incorrect Articulations</b>	<b>Success Rate</b>
/i/	8/12	4/12	66.6 %
/e/	9/12	3/12	75 %
/ɛ/	9/12	3/12	75 %
/a/	12/12	0/12	100 %
Average	9.5/12	2.5/12	79 %

The sound /a/ (as in 'plat') is reproduced perfectly, as expected. The sounds /e/ (as in 'été') and /ɛ/ (as in 'mère') are well pronounced in 75% of instances. The sound /i/ (as in 'vie') is in Arabic, although this sound has the lowest success percentage (66.6%). This could be because of difficulties with how consonants are uttered or because it sounds a little different than its Arabic equivalent.

### **The Schwa (/ə/) Sound: The Central Vowel**

People who are learning French may have trouble with the central vowel /ə/ (as in le' or regarde'). These results are partly due to the fact that it is not very stable in French and does not exist in the Arabic phonological system.

Table 4  
*Success Rate for the Central Vowel /ə/*

<b>Vowel</b>	<b>Number of Correct Articulations</b>	<b>Number of Incorrect Articulations</b>	<b>Success Rate</b>
/ə/	9/12	3/12	75 %

A success rate of 75% indicates that the majority of learners can achieve the neutral tongue position required to generate the schwa, despite its pronunciation being affected by speech rate or context.

### **Front Rounded Vowels (/y/, /ø/, /œ/)**

The problem description suggests that this is the main problem for Jordanian learners. In Arabic, it is not feasible to enunciate these vowels since the lips

and tongue have to work together (labio-lingual). The lips are rounded; therefore, the speaker needs to push the tongue forward. There is no question regarding the results in Table 5.

Table 5  
*The Percentage of Success for Front Rounded Vowels*

Vowel	Number of Correct Articulations	Number of Incorrect Articulations	Success Rate
/y/	3/12	9/12	25 %
/ø/	5/12	7/12	41.6 %
/œ/	2/12	10/12	16.6 %
Average	3.3/12	8.7/12	27.7 %

The sound /œ/ (as in ‘peur’ or ‘œuvre’) is the most difficult, with a success rate of only 16.6%. The Arabic sound /u/ often replaces the sound /y/ (as in tu’ or ‘tunnel’). For example, [tynɛl] becomes [tunɛl]. The sound /ø/ (as in ‘deux’ or ‘veux’) has a somewhat greater success rate, but it is still quite low (41.6%). People often say [ø] instead of [o] or [e].

### Putting Together and Ranking Problems

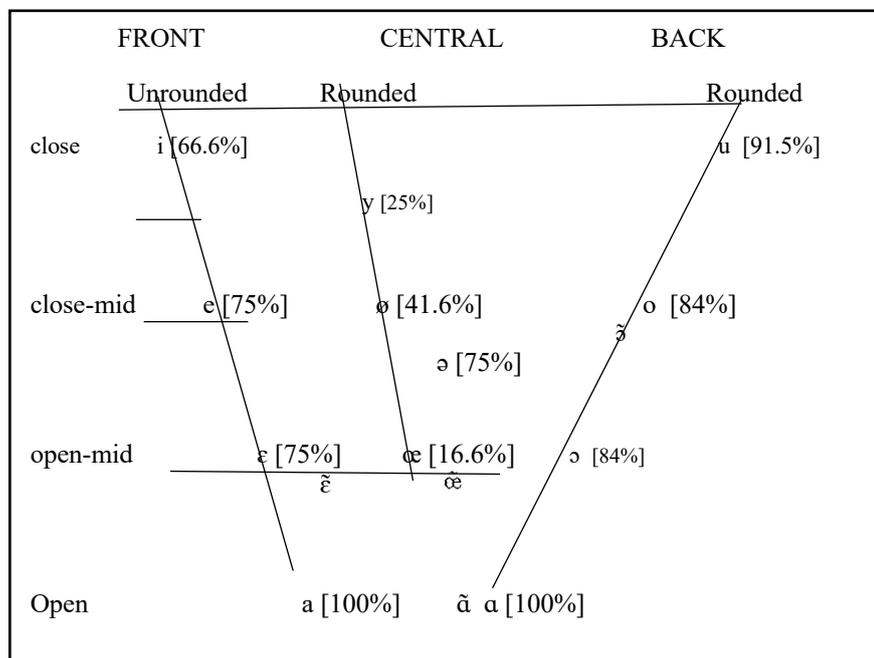
We can build a clear list of articulation problems by putting the results together and looking at the average success rate for each group:

1. Back rounded vowels: success rate of 90%
2. Front unrounded vowels: success rate of 79%
3. Central vowel (/ə/): success rate of 75%
4. Front rounded vowels: success rate of 27.7%.

This pattern can be observed in Figure 3, which represents a diagram of the French vocalic triangle with indications of the success rates. This diagram highlights the most complicated area, located in the upper left corner (the front rounded sounds), for Arab learners.

In short, the results support the major point of the study: speech issues are directly related to the fact that Arabic (L1) and French (L2) sound different. Vowels that are absent in the L1 system, particularly those necessitating novel articulatory coordination (front + rounded), induce enduring and consistent challenges, even subsequent to extensive formal education.

Figure 3  
*French Vocalic Diagram with the Success Percentages of Jordanian Learners Annotated*



## Discussion

The findings of this study distinctly and methodically underline the specific challenges encountered by Jordanian adults in acquiring the French vocalic system. Now we will share our thoughts on these outcomes by connecting them to our theoretical framework and the original query. We shall compare what we saw with what other studies have found to figure out what it means for teaching.

### Validation of the Core Hypothesis and L1 Effect

Our findings unequivocally validate the basic hypothesis: articulatory challenges are intricately associated with the phonological disparity between Arabic (L1) and French (L2). Arabic has a simple vocalic system that is frequently shown as a triangle with three main vowels (/i/, /a/, /u/). This is very different from the French system, which is more complex and has a trapezoidal shape.

This research underscores that possessing a phoneme in Arabic significantly enhances its acquisition in French, as seen by the high success rates for the vowels /a/ (100%) and /u/ (91.5%), and, to a lesser extent, /i/ (66.6%).

Conversely, the complete absence of front rounded vowels (/y/, /ø/, /œ/) in the Arabic phonological system accounts for their notably challenging acquisition, shown in a low average success rate of 27.7%.

This interpretation is grounded upon the aforementioned theoretical theories. The Revised Speech Learning Model (SLM-r) of Flege and Bohn (2021) is nicely exemplified here: learners tend to identify new sounds from their second language with categories already existent in their L1. As a result, the French vowel /y/ is not seen as a separate phoneme; instead, it is seen as a variant of the Arabic vowel /u/, which has the same rounding property. This ‘perceived equivalence’ makes it harder to form a new phonetic category and leads to mistakes in production, which usually sound like [u]. Consequently, Best’s (1995) Perceptual Assimilation Model (PAM) posits that the differentiation between /y/ and /u/ will be especially intricate for an Arabic speaker, which anticipates and elucidates the issues in production.

### **Difficulty Degree Scale: More Than Just a Simple Presence/Absence Distinction**

Our findings indicate the presence of an implicit hierarchy within the categories, despite the absence of a phoneme in L1 serving as a significant indicator of complexity. You can move these vowels from one word to another. Arabic doesn't include the back rounded vowels (/o/, /ɔ/) or the schwa (/ə/), but the accuracy percentages are still very high (84% and 75%). This means that learners can try to reproduce the sounds they hear in their speech by using articulatory properties that they only partially mastered in their L1, including rounding for /o/ and /ɔ/ and a neutral tongue position for /ə/. Surprisingly, despite having an equivalent in Arabic, the accuracy percentage of /i/ is 66.6%. This could be attributed to the interference from allophonic variation in Arabic, where the quality or context of /i/ may change significantly, or because of the French consonantal context, which makes it harder to produce.

A major problem is found in the production of the front rounded vowels (/y/, /ø/, and /œ/), which require double articulation. These vowels are found to be the hardest to pronounce because they demand a coordination of the lips and tongue that doesn't exist in Arabic. For example, to say /i/, you have to move your tongue forward, and to say /u/, you have to round your lips. The challenge now encompasses not only perception but also movement and articulation. The vowel /oe/, which is the most open in this group and needs an additional opening to maintain this unusual coordination, is naturally most difficult (16.6 % success).

## **The Continuation of Challenges Despite Exposure**

It is frequently seen that even after three or four years of university education, advanced learners (B1-B2) persist in making the same mistakes. This is really surprising. It shows that adults cannot change their phonological system just by passively hearing a language and picking it up without realising it. According to Flege and Bohn (2021) idea, beyond a certain age, non-contrastive aspects in L1 (such as frontness associated with rounding) are filtered out and disregarded, making acquisition exceedingly unlikely without explicit instruction.

## **Pedagogical Implications**

These findings suggest that the instruction of French phonetics to Arab learners requires modification.

1. **Priority and Explicit Instruction:** It is crucial to discover and focus on the front rounded vowels from the very start of the learning process. Instead of just repeating the same information, they need to be clear in their instructions.

2. **Distinctive Perceptual Training:** Before creation, learners must engage in substantial practice discriminating between minimal pairings (e.g., 'lu/loup', 'peu/poux', and 'veut/voté') to cultivate new phonological categories.

3. **Visual and Kinesthetic Feedback:** Things like articulatory diagrams, movies, mirrors, or speech visualisation software (like Praat) can be quite useful. When someone is talking, it is usually hard to see how their tongue is positioned and how their lips are curved.

4. **Articulatory Coordination Activities:** Systematic exercises that entail transitioning from an unrounded front vowel to a rounded back vowel (for example, moving from [i] to [u] while maintaining rounding, and subsequently from [i] to [y] by integrating rounding at that moment) can promote the cultivation of necessary coordination.

This study shows that the main thing that affects how people learn the phonetics of L2 is their L1. It is beneficial to create an exhaustive list of the challenges encountered by Jordanian learners, with front rounded vowels posing the most difficulty for clear and accent-free pronunciation. These results support a more dynamic, integrated, and scientifically based approach to pronunciation, making sure that learning these basic sounds is not left to chance.

## **Conclusion**

The objective of this study was to identify and examine the persistent articulatory challenges related to French oral vowels among Jordanian adult learners. The findings unequivocally support the primary hypothesis that the

typological disparity between the phonological systems of L<sub>1</sub> (Arabic) and L<sub>2</sub> (French) serves as the principal predictive factor for the encountered issues.

In conclusion, our data reveal a clear order of difficulties. The back rounded vowels (/u, o, ɔ, a/), which are comparable to Arabic in that they round, and the front unrounded vowels (/i, e, ε, a/), which are similar to or correspond to those of L<sub>1</sub>, are learnt with amazing success (90 % and 79 %, respectively). The front rounded vowels (/y, ø, œ/) are the most difficult to produce (27.7 % success), which suggests that the lack of these sounds in Arabic and the necessity for new labial and lingual coordination (tongue frontness + lip rounding) lead to mistakes that keep happening. The ongoing difficulties faced by advanced learners (B<sub>1</sub>-B<sub>2</sub>) across multiple years of formal education demonstrate the constraints of implicit learning and the imperative for intentional and focused instruction.

These findings corroborate the proposed theoretical frameworks, specifically the Revised Speech Learning Model (Flege & Bohn, 2021) and the Perceptual Assimilation Model (Best, 1995), which predict the challenges faced in forming new phonetic categories during the assimilation of L<sub>2</sub> sounds to L<sub>1</sub> sounds.

This study thus suggests a revision of French instructional methods tailored for Arab learners. It helps people learn by giving them structured lessons that cover a lot of ground right away.

1. Fine audio discrimination utilising minimum pairings to create novel perceptual categories.

2. Knowing how to employ visual aids like movies, software like Praat, and mirrors to make the phonetic gesture evident.

3. Targeted coordination exercises that enable the tongue and lips to move on their own. This study clarifies the phonetic similarities between Arabic and French, providing valuable insights for pronunciation teaching. It makes it simpler to ask more questions, especially over time.

## Disclosure Statement

The authors reported no potential conflicts of interest.

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