

A Socio-phonetic Study of English Vowel Backness Awareness

and Production among EFL University Students

دراسة اجتماعية-صوتية لوعي وإنتاج خاصية خلفية حروف العلة الإنجليزية لدى
طلبة الجامعات من متعلمي اللغة الإنجليزية كلغة أجنبية

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1. Introduction

English sound system is constructed from the phonemes that represented the vowel space; however, vowel backness remains one of the most distinctive features of vowel production. Native dialects have covered ground in the changing of back vowels, but here using such tact with non-natives raises abstract inputs the only defense against such a lone outsider act double frame. Pretty sure /u:/, /ʊ/ and /əʊ/ function in a different way socially but they do seem to operate under influence of separate dialects. Though they may be theoretically aware of the difference between these two sounds, learners might still find it difficult to produce them correctly in reality. This problem is further compounded by a phenomenon known as the “production–perception gap” observed in advanced learners.. They are trained in the International Phonetic Alphabet (IPA) and can distinguish between different vowel contrasts on a perceptual level but learners tend to have a problem in producing them consistently. For instance, learners may feel confident in their ability to pronounce, but actual performance, such as the pronunciation of common words such as “good” (/ɡʊd/), shows relatively low rates of accuracy. Also, natural phonological processes such as vowel centralization in fast speech often take precedence over rules for pronunciation acquired formally. Sociophonetic empirical work has demonstrated that vowel backness is a fluid and socially conditioned property. Acoustic research shows that vowels such as /u:/ are often subject to fronting, influenced by factors such as age, gender and speech style. Articulatory research also demonstrates that variation in vowels results from interactions between physiological constraints and dialect norms. Perceptual work has also shown that listeners associate subtle differences in vowel quality with social meanings, such as identity, prestige and regionality, confirming the sociophonetic importance of vowel backness .

Despite the growing interest in this area, there are many critical research gaps. Only a few studies have combined metalinguistic awareness, perceptual ability and actual production in one framework. Existing studies often separate acoustic or perceptual analysis and tend to ignore the role of socio-phonetic factors such as gender, social background and media exposure. Furthermore, the impact of learners’ beliefs about these factors on their actual pronunciation accuracy has received little attention, particularly in relation to the perceptual distinction of back vowel contrasts.



The

present

study aims at addressing these gaps by investigating the relation between awareness, perception and production in the sociophonetic variation of backness of vowels by English learners. Employing data from questionnaires and controlled production tasks, the project explores awareness of various social variables, perceptions, self-reported behavior, and perceptual sensitivity. In this study we compare the ability predicted competence vs. the actual performance where there is a stark contrast between what we know and the disparity in action taken. It situates in the sociophonetic literature, as it relates vowel backness to both a phonological and socially-embedded characteristic of the language.

2. Literature Review

1. Sociophonetics: Definition and Scope

Sociophonetics is an interdisciplinary field that studies the interactions between phonetic variables and sociolinguistics (most often linguistic variation due to social factors such as gender, socioeconomic class, regional heritage) wherein these interactions are investigated utilizing demographic information about speakers and statistical analyses. In this way sociophoneticians deviate from traditional phonetics as they must at least sample an ethnic population e.g. From a perspective of Foulkes and Docherty (2006), The field has evolved from viewing phonetic variation as mere random variability to recognizing it as a systematic marker of social identity.

Sociophonetics has emerged as one of the largest interdisciplinary fields, combining phonetics and sociolinguistics, by studying the social structuring of variation in speech production and perception. Sociophonetics makes variation central to linguistic analysis. Traditional phonetics has often treated variation as incidental or peripheral, but sociophonetics argues that phonetic detail is inherently socially conditioned (by age, gender, ethnicity, social class, etc.). The identification of early building blocks for the field can be traced to the variationist paradigm that Labov (1966) was one of its pioneers, for instance, he demonstrated systematic relationships between linguistic variables and social stratification. According to this tradition, sociophonetics incorporates the use of tools for instrumental phonetic analysis, enabling a level of detailed investigation into acoustic and articulatory variation that was not available before.

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sociophonetics emerged in the second half of the 20th century, when Foulkes and Docherty (2006) introduced phonetic variation as an integrated component in the discussion of language as part of its “social life”. They suggested that phonetic features are not just mechanical by-products of the speech apparatus, but have social meanings, and speakers can actively manipulate those features in their speech. This perspective reflects more general theoretical changes in sociolinguistics, which see language as a resource for identity construction rather than a simple reflection of social categories. Consequently, sociophonetics has increasingly moved from correlational studies to interpretive frameworks that explain the indexical relationship between linguistic forms and social meanings (Eckert, 2008).

Sociophonetic research has long been concerned with the nature of the relationship between variation in speech and social structure. Phonetic variables have been shown in many studies to pattern in systematic ways with respect to macro-social categories such as region, class and gender (Labov, 2001). For example , vowel shifts and consonantal variation are often markers of regional identity . Subtle phonetic differences may be markers of membership of particular social groups . But this traditional focus on fixed social categories has been criticized. According to Eckert (2000), such categories are too static and do not account for the dynamism of social identity, and instead argues for a “community of practice” approach, in which linguistic variation is seen as part of ongoing social interaction. This development has led to a more complex analysis in sociophonetics, which takes into account local meanings and speaker agency.

Sociophonetics has also taught us about speech perception as well as production showing that listeners are highly sensitive to socially meaningful phonetic variation. There is a large body of research that demonstrates that very tiny phonetic cues can allow people to infer a speaker’s region, gender, and even personality traits (Hay & Drager, 2007). This bi-directional interaction between production and perception is identified by Grabe (1998) as a key characteristic of sociophonetics, where social information is stored in mental representations of speech. Most importantly, exemplar theory has also contributed in this regard (Pierrehumbert, 2001) proposing that speakers use detailed memories of particular tokens, including both phonetic information and social information associated with individual exemplars. As its name suggests, sociophonetics is methodologically wide, mixing quantitative and qualitative methods.

advances in acoustic analysis have enabled researchers to make very precise measurements of phonetic variables, employing techniques such as spectrographic analysis and formant tracking. At the same time, there has been an increasing use of ethnographic methods to provide context for these measurements in specific social settings (Eckert, 2000). The combination of methods leads to a more complete understanding of how linguistic variation works across the various levels of analysis. Yet, the methodological complexity of sociophonetics brings its challenges, especially in the interpretation of data and in the integration of different analytical frameworks.

2.2 English Vowel System

The English vowel system has been a major focus of phonetics and phonology for a long time, due to its structural complexity, variation across dialects, and relevance to intelligibility in both native and second-language contexts. Many languages have relatively stable vowel system. English, on the other hand, has a complex and dynamic system of vowel contrasts based on height, backness, length and tenseness, and the distinction between monophthongs and diphthongs. Traditional accounts, such as those proposed by Jones (1962).

Later Gimson (1989) improved on this, classifying English vowels according to their articulatory characteristics, and placing them in the vowel space according to the height and advancement of the tongue. However, recent work has increasingly emphasized the phonological, sociolinguistic and cognitive aspects of the English vowel system that are essential for its full understanding.

One of the features of the English vowel system is the number of vowel phonemes, which is high, especially in standard dialects such as Received Pronunciation (RP) and General American (GA). On average, these systems make use of 12 monophthongs and 8 diphthongs, but this depends on the analytical criteria used (Roach, 2004). The tense vs. lax vowel contrast, usually correlated with duration and quality differences, has been the subject of much discussion, but is still a theoretical problem. Some scholars argue that tenseness is a phonetic correlate, not a phonological feature. Some claim it is irrelevant for distinguishing vowel categories (Ladefoged & Johnson, 2015). This therefore points to an ongoing tension between phonetic and phonological approaches to vowels.

By far

the most

obvious of course from dialect to dialect in simply its richness of structure and so, indeed for instance the English vowel interaction. (Labov 1994). These divergences contend that instead of a single, monolithic set of vowels patrolled by the watchful eye of the standard form, English is made up of as many systems of vowel pronunciation as there are English speakers and those systems overlap in historic geographic and social pressure. Sociophonetically, this variation is not random but patterned in a systematic way, with vowels functioning as markers of regional identity and social affiliation.

Another important property of the English vowel system is its vulnerability to phonological processes such as reduction and centralization. [vowels in unstressed syllables are often changed to schwa /ə/.] This is an important aspect of rhythm and prosody of English (Roach, 2004). The phenomenon is a sign of the interaction of the segmental and suprasegmental features. One cannot analyze vowel quality, that is, without considering the stress patterns and intonation. Furthermore, vowel reduction can be considered as a very difficult task for second language learners since they might have difficulty perceiving and reproducing the reduced vowels accurately that might affect intelligibility (Celce-Murcia et al., 2010).

The English vowel system is further complicated by the division of vowels into monophthongs and diphthongs. Diphthongs are changes from one vowel quality to another within a single syllable . They involve close co-ordination of articulatory gestures. Traditionally, diphthongs have been described as individual phonemes, but some scholars have suggested that they should be analyzed as sequences of vowel targets in a continuous phonetic space (Ladefoged & Johnson, 2015). This perspective aligns with more gradient models of phonology that stress the fluidity of speech production.

Cognitively, the representation of vowels in the mental lexicon has been explored in terms of models such as exemplar theory, which argues that speakers store detailed phonetic information about individual tokens of speech (Pierrehumbert, 2001). This approach takes into account the variation in vowel production and perception and the effect of frequency and context on vowel realization. It also offers a framework for understanding how listeners categorize vowels in the presence of considerable acoustic overlap between categories. Sjerps, Mitterer, & McQueen, 2011.



It is

important to note that the English vowel system has been of much interest in second language acquisition, especially in the context of English as a Foreign Language (EFL). The acquisition of English vowels is difficult for learners because of the differences between the native vowel systems and the English vowel system. Studies have shown that vowel contrasts not present in the learner's first language are particularly difficult, resulting in persistent pronunciation errors (Flege, 1995). Furthermore, the variation of English vowels from one dialect to another can make the process of learning the language more difficult since learners may be exposed to a number of different and sometimes conflicting models of pronunciation.

A great deal of research has been done on the English vowel system but there are still a few challenges. One of the outstanding problems is the disagreement on the phonological status of certain vowel distinctions, e.g. length vs quality. Moreover, the field is still struggling to incorporate phonetic detail into phonological theory in light of evidence from sociophonetics and cognitive linguistics. Another limitation is the predominance of studies focusing on standard varieties of English, which may not be representative of the diversity of global Englishes.

The recent improvements in both acoustic phonetics and computational model has never made the study of the English vowel system easier. Such traditional approaches to the study of vowel formants, combined with large-scale corpus investigations that allow for access to patterns of variation across speakers previously unavailable to us, are likely to provide other potential sources of individual stability. Concurrently, social and contextual factors involved in vowel production have come under scrutiny. The trend is a reflection of the broader shift toward holistic language models. I contend that what these changes entail is not that the English vowel system is just a fixed set of categories, but rather a dynamic, evolving subsystem shaped by multiple constantly-interacting forces.

However, the course has plenty of critics. An important caveat is that it is based in large part on data collected from primarily English-speaking participants, which hampers the generalisability of its conclusions. That difference between the literature and actual sound systems, he observes, means we are badly in need of more cross-linguistic work on the ways sociophonetic patterns express themselves across a language/culture divide. Some have also criticized it for being

confused in theory. It While this breadth of orientation provides considerable stamina, it also has the potential to create incoherence among theoretical models. (Kendall et al., 2023).

These difficulties where a smooth approach falls short are by no means novel, but some potential work-arounds have been recently proposed following the rise of sociophonetics (and as well know all those that do computational linguistics and cognitive science). With large corpora of speech available and techniques from machine learning, it is possible to analyze intricate patterns or variation. Sociophonetic phenomena are embedded in perception and cognition, and experimental methods have revealed the underlying processes. Moreover, sociophonetics should give much more space to aspects of identity, ideology and power increasingly prevalent with the rise of globalization and digital communication .

A powerful method of modern linguistic theory and analysis, sociophonetics reveals the systematic and socially meaningful structure of phonetic variation. It questions essential conceptual dichotomies like competence vs performance (by definition context-independent) and linguistic description of the spoken word, advocating for viewing language as a dynamic system situated in social contexts. Phonetic detail and social meaning will be central to contemporary linguistics as the field continues to develop its interest in the relation between these dimensions .

2.3 Vowel Backness

Vowel backness is a basic articulatory and acoustic vowel quality referring to the horizontal position of the tongue in the production of a vowel, from front to central to back. Apart from height and rounding, the other main parameter in the description of vowels is the backness of the vowel. The vowel backness parameter is the one that phonemic distinction in languages such as English depends on. Vowel backness has traditionally been described in phonetic terms, beginning with Jones (1962) and further elaborated by Ladefoged and Johnson (2015), as the relative advancement or retraction of the tongue body in the oral cavity. Front vowels such as /i:/ and /e/ are articulated with the tongue at the front of the mouth and back vowels such as /u:/ and /ɔ:/ are articulated with tongue retracted. Central vowels are somewhere in the middle . The most common central vowel in English is schwa /ə/ .

Early

descriptions of vowel backness were based largely on articulatory observation, but advances in acoustic phonetics have allowed a more precise and quantifiable analysis. Specifically, the second formant frequency (F2) has been extensively established as the main acoustic correlate of vowel backness, with higher F2 values associated with front vowels and lower F2 values associated with back vowels (Ladefoged & Johnson, 2015). This acoustic view has enabled researchers to study subtle differences in vowel quality that might not be so easily detected by auditory analysis alone. However, the relation between articulation and acoustics is not always straightforward, as the formant values can be influenced by lip rounding and coarticulation, thus making the interpretation of backness as a single, discrete dimension more complex.

The backness of vowels is a major organizing principle of the English vowel system, and contributes to the phonemic contrasts on which lexical contrasts are based. Examples include /i:/ vs. /u:/ or /ae/ vs. /ɑ:/ which are partially distinguished by the extent of forward movement of the tongue. However, the factors that influence how vowel backness is realized in English are quite variable, both phonologically and sociophonetically. Research has shown that backness of vowels can change systematically within speech communities as demonstrated by large scale chain shifts such as the Northern Cities Shift where front vowels become centralized or backed and back vowels can move forward in the vowel space (Labov, 1994). These patterns indicate that backness of vowels is not a static property but a dynamic feature that develops over time and social contexts.

In sociophonetics, backness variation is often linked to social identity and group membership . Speakers can vary the degree to which vowels are fronted or backed to indicate regional membership, social class, or stylistic stance. For example, fronting of back vowels such as /u:/ and /ou/ has been well documented in a large number of varieties of English (Foulkes & Docherty, 2006) and could be seen as a case of sound change and social differentiation. This variation complicates traditional phonological models that treat vowel categories as discrete and invariant, and lends support to more gradient and usage-based approaches that are able to account for continuous variability in phonetic implementation.

Such data make vowel backness an important dimension in speech perception . as well as production . Studies have shown that listeners rely on formant frequencies, especially F2 for the



front-

back

dimension of vowel contrasts (Johnson, 2012). In contrast, perceptual categorization is driven by acoustic cues and linguistic experience and other contextual factors. For example perceptual boundaries for dialects or ways of talking can be context-dependent (Kraljic & Samuel, 2007). This indicates that the perceptual system is quite adaptable and flexible being consistent with exemplar-based models of speech perception which argue that listeners store detailed phonetic information in their memory even keeping information regarding variation on vowel backness within those representations of words . (Pierrehumbert, 2001).

That aspect can be the most challenging in second language acquisition namely, a vowel backness for persons coming from one first language to another. vowel system or no similar front–back contrasts. In the context of English as a Foreign Language (EFL), learners often have problems perceiving and producing accurately contrasts involving backness, which often results in pronunciation errors that might affect intelligibility (Flege, 1995). The variation in the pronunciation of English vowels between dialects and the influence of orthography, which does not consistently represent the quality of the vowels, further aggravate these problems. Thus the teaching of vowel backness calls for explicit focus on both articulatory and acoustic cues, as well as exposure to a range of authentic speech models.

While vowel backness has been a central topic in phonetic theory , it has also been the subject of critical re-evaluation in recent research . Some scholars have claimed that the traditional front-central-back classification is an oversimplification of the multidimensional nature of vowel space and does not take into account the continuous and context-dependent nature of vowel production. Furthermore, the interaction of backness with other features, e.g., roundness and height, indicates that the quality of vowels is better described as a complex of articulatory and acoustic parameters than as a set of independent dimensions. This view is supported by advances in phonetic modeling and visualization techniques showing the highly dynamic nature of vowel articulation .

Vowel backness is a fundamental but complex dimension of vowel description, which is central to phonemic contrast, speech perception and sociolinguistic variation. Recent work suggests that we may also want to be more neurophonetic than the traditional models ever allow, in particular, when it comes to variability and interaction with other phonetic features or social and cognitive factors, but like the classical models approaches are pretty helpful for our understanding this

dimension as well. Hence, the study of vowel backness is an important part of research in theoretical and even applied linguistics (esp. with regard to language variation, change as well as acquisition).

3. Methodology

The present study follows the mixed-methodological sociophonetic approach that combines quantitative and quasi-experimental designs to investigate how metalinguistic awareness can be achieved as an automaticity in EFL learners with respect to perception and production at the level of vowel backness. The design is especially appropriate as it enables triangulation between self-reported knowledge, perceptual sensitivity and actual phonetic performance, a major shortcoming of previous work that separates these dimensions.

The participants were 30 (male/female) EFL learners who were studying English language programs. The participants were selected by a method called purposive sampling which means that they all had previous formal training in phonetics and had been exposed to the International Phonetic Alphabet (IPA) and English vowel systems. This ensures that the inconsistencies in performance are not due to some forms of instruction but rather to cognitive, sociophonetic and experiential differences.

The data were collected using two main instruments. The first was a questionnaire regarding four domains: (1) awareness of the backness of vowels, (2) production preference, (3) perception of the diversity of English accents, and (4) sociophonetic and attitudinal factors. The questionnaire is designed to test the learners' metalinguistic awareness, perceptual judgments and sociolinguistic attitudes through the Likert five-point scale. (4) Content validity: the instrument was developed on the logical decision based on previously established frameworks related to sociophonetics and second language acquisition (to name a few examples: Foulkes & Docherty, 2006; Flege, 1995).

The second means was a controlled production task where subjects had to select or produce accurate pronunciations of target words that contained critical backness contrasts (e.g. /u:/ versus /ʊ/, and/or /əʊ/ versus /aʊ/). The task included an objective measure of phonetic accuracy that

was

quantitatively compared with self-assessed competence. High frequency lexical items were selected to ensure ecological validity, i.e., specific words such as, good, snow and home (i.e., words frequently encountered in natural speech).

Analyses of concordance patterns for questionnaire items were performed using descriptive statistics (frequencies and percentages). To establish the existence of a production-perception gap, self-reported awareness scores were also compared with the accuracy percentages achieved in the respective production tasks. Through this analytical strategy, we can observe the gap between theoretical knowledge and phonetic realization that lies at the center of our research goals.

Separated as the Analysis of Sociophonetics, it considers the factor systems which emerge from individual pronunciation notions: Gender, social status and media usage are considered. Even if the analysis is quantitative in nature it ultimately places itself outside (yet relative to) larger theories of indexicality and identity formation (Eckert 2008).

The general methodological character is all-encompassing and multimodal: subjective perception together with cognitive awareness versus objective phonetic execution. Because fusing the two improves interpretability and reliability, this paper is an important step in EFL sociophonetics..

4. Results and Discussion

Section A: Awareness of English Vowel Backness (Items 1–10)

Item No.	Items	Measure	Strong disagree (1)	Disagree (2)	Natural (3)	Agree (4)	Strong Agree (5)
1	I am familiar with the concept of vowel frontness and Vowel backness	Frequency	0	4	10	12	4
		Percentage	0.0%	13.3%	33.3%	40.0%	13.3%
2	I can distinguish between front and back vowels when listening	Frequency	2	1	4	17	6
		Percentage	6.7%	3.3%	13.3%	56.7%	20.0%
3	I can feel my tongue moving	Frequency	1	3	6	6	14



Item No.	Items	Measure	Strong disagree (1)	Disagree (2)	Natural (3)	Agree (4)	Strong Agree (5)
	when producing English diphthongs	Percentage	3.3%	10.0%	20.0%	20.0%	46.7%
4	Teachers emphasize correct vowel articulation in class	Frequency	0	1	7	13	9
		Percentage	0.0%	3.3%	23.3%	43.3%	30.0%
5	I learned about vowel charts (IPA) at university	Frequency	1	1	3	12	13
		Percentage	3.3%	3.3%	10.0%	40.0%	43.3%
6	I find back-closing diphthongs (/aʊ/, /əʊ/) difficult to pronounce	Frequency	1	5	10	10	4
		Percentage	3.3%	16.7%	33.3%	33.3%	13.3%
7	I find front vowels easier than back vowels	Frequency	0	3	8	15	4
		Percentage	0.0%	10.0%	26.7%	50.0%	13.3%
8	I can distinguish between /aɪ/ and /aʊ/	Frequency	2	2	15	7	4
		Percentage	6.7%	6.7%	50.0%	23.3%	13.3%
9	I can identify the difference between /ɑ:/ and /æ/	Frequency	2	2	9	6	11
		Percentage	6.7%	6.7%	30.0%	20.0%	36.7%
10	Pronouncing back vowels accurately is important for clear communication	Frequency	1	5	8	9	7
		Percentage	3.3%	16.7%	26.7%	30.0%	23.3%

Interpretation:

Most of the respondents (a very big majority of them) stated that they were formally trained in the IPA (Item 5) and that their teachers constantly focus on proper pronunciation of vowels (Item 4). This good teaching background is seen through their self-reported capacity to differentiate front and back vowels on an auditory basis (Item 2). These findings indicate that the participants are highly metalinguistically aware, and this is necessary in further phonetic development.

There were a very few respondents who did not agree with these statements. The insignificant conflict with Items 4 and 5 supports the view that vowel teaching is there and appreciated in their school setting. The low negative score on the 2-item shows that nearly all the learners are confident in their auditory discrimination ability of front/back vowel differences, which is a prerequisite skill in production.



Section B: Production Preferences (Backness in Speech) (Items 11–20)

Item No.	Items	Measure	Strong disagree (1)	Disagree (2)	Natural (3)	Agree (4)	Strong Agree (5)
11	When speaking fast, my back vowels become more central	Frequency	0	1	10	15	4
		Percentage	0.0%	3.3%	33.3%	50.0%	13.3%
12	I sometimes replace /u:/ with /o:/ or /ʊ/	Frequency	1	4	7	10	8
		Percentage	3.3%	13.3%	23.3%	33.3%	26.7%
13	I sometimes pronounce /ɑ:/ closer to /a/	Frequency	0	8	11	8	3
		Percentage	0.0%	26.7%	36.7%	26.7%	10.0%
14	Arabic influences my pronunciation of English back vowels	Frequency	3	2	12	8	5
		Percentage	10.0%	6.7%	40.0%	26.7%	16.7%
15	I try to imitate native speaker pronunciation	Frequency	1	1	7	9	12
		Percentage	3.3%	3.3%	23.3%	30.0%	40.0%

16.Snow ☐ /saʊ/ ☐ /səʊ/

17.Good ☐ /ɡʊd/ ☐ /ɡu:d/

18.Home ☐ /həʊm/ ☐ /haʊm/

19.Call ☐ /kɔ:l/ ☐ /kɑ:l/

20.Now ☐ /naʊ/ ☐ /nəʊ/

Interpretation:

The high consensus with Item 15 indicates the proactive approach to the accent acquisition. There are a large number of learners who also recognise natural phonological processes like centralisation of back vowels when using rapid speech (Item 11) and replacing /u:/ sometimes (Item 12), and this shows some level of self awareness regarding their own production patterns.



The lack of agreement with Item 11 is very minimal, which indicates that centralisation of the back vowels in less formal conversation is a very common experience among this group. The negative rate of the item 15 is low, showing that the majority of learners are keen on acquiring the native like pronunciation. Even though the negative proportion of the Item 12 is somewhat more high, most people still confirm that they made the given substitution.

No.	Correct Answers	Wrong Answers	Total Answers	Correct %	Wrong %
16	20	10	30	66.67%	33.33%
17	17	13	30	56.67%	43.33%
18	20	10	30	66.67%	33.33%
19	25	5	30	83.33%	16.67%
20	20	10	30	66.67%	33.33%

In this section, the actual accuracy of production of five words that have vowels sensitive to the backness distinction (e.g., əʊ/ vs. /aʊ/, /u:/ vs. /ʊ/, /o:/ vs. /a:/) was measured.

The largest accuracy (83.33%) was with the word call, which indicates that the vowel contrast in this lexical object is thoroughly developed in the production of the participants. The rest of the words (snow, home, now) were moderate in accuracy (66.67%), whereas good was the least accurate (56.67%). This disparity between self reported awareness (Section B) and actual production draws attention to the fact that even high metalinguistic knowledge learners might have some difficulties with certain back vowel contrasts, especially with the /ʊ:-/u:/ contrast.



Section C: Perception of English Variations (Items 21–30)

Item No.	Items	Measure	Strong disagree (1)	Disagree (2)	Natural (3)	Agree (4)	Strong Agree (5)
21	I can perceptually distinguish Vowel backness difference across English accent	Frequency	1	2	14	8	5
		Percentage	3.3%	6.7%	46.7%	26.7%	16.7%
22	American English uses more back vowel quality than British English	Frequency	2	5	11	8	4
		Percentage	6.7%	16.7%	36.7%	26.7%	13.3%
23	British pronunciation sounds clearer to me	Frequency	1	5	3	12	9
		Percentage	3.3%	16.7%	10.0%	40.0%	30.0%
24	American pronunciation is easier to imitate	Frequency	4	1	9	7	9
		Percentage	13.3%	3.3%	30.0%	23.3%	30.0%
25	I notice differences	Frequency	1	1	5	14	9



	in words like lot, hot, dog across accents	Percentage	3.3%	3.3%	16.7%	46.7%	30.0%
26	I prefer listening to British English	Frequency	3	4	6	8	9
		Percentage	10.0%	13.3%	20.0%	26.7%	30.0%
27	Exposure to movies has influenced my vowel pronunciation	Frequency	1	3	12	7	7
		Percentage	3.3%	10.0%	40.0%	23.3%	23.3%
28	I can recognize back vowel differences in native speech	Frequency	0	2	12	12	4
		Percentage	0.0%	6.7%	40.0%	40.0%	13.3%
29	Different English accents affect my pronunciation	Frequency	0	3	12	5	10
		Percentage	0.0%	10.0%	40.0%	16.7%	33.3%
30	I change my pronunciation depending on the accent I listen to	Frequency	1	4	3	8	14
		Percentage	3.3%	13.3%	10.0%	26.7%	46.7%

Interpretation:

The fact that the Agree level in response to Item 25 is high is an indication that the learners are sensitive to the familiar variations of vowels (e.g., the lot cloth- split across the accents). What is more impressive is the consensus with the Item 30: a very high proportion of the individuals readjust their pronunciation to the accent they are subjected to, which shows a great level of sociophonetic adjustability. This is disclosed in item 23 that shows that there is a preference on the part of the perceiver regarding British English clarity but this does not translate into a production preference.

There were very limited respondents who differed with these perception related statements. The negative scores of Items 25 and 28 are extremely low, which means that the majority of the learners believe that they are able to recognize variation of back vowels in natural native speech. The fact that the negative of Item 21 is also low supports the assertion that this perceptual ability is the same among the varieties of accent.

Section D: Socio-phonetic and Attitudinal Factors (Items 31–40)



Item No.	Items	Measure	Strong disagree (1)	Disagree (2)	Natural (3)	Agree (4)	Strong Agree (5)
31	Female students tend to pronounce vowels more accurately than males	Frequency	1	3	9	8	9
		Percentage	3.3%	10.0%	30.0%	26.7%	30.0%
32	Students from urban areas tend to produce English back vowels more accurately than those from rural areas	Frequency	2	3	13	9	3
		Percentage	6.7%	10.0%	43.3%	30.0%	10.0%
33	Social background affects English pronunciation	Frequency	0	1	8	15	6
		Percentage	0.0%	3.3%	26.7%	50.0%	20.0%
34	Students who watch English media frequently produce more native-like vowels.	Frequency	1	2	5	10	12
		Percentage	3.3%	6.7%	16.7%	33.3%	40.0%
35	Pronouncing vowels accurately reflects a higher education level	Frequency	0	3	15	7	5
		Percentage	0.0%	10.0%	50.0%	23.3%	16.7%
36	I feel confident about my pronunciation of back vowels	Frequency	3	3	10	11	3
		Percentage	10.0%	10.0%	33.3%	36.7%	10.0%
37	I feel embarrassed when ispronouncing vowels	Frequency	3	8	7	8	4
		Percentage	10.0%	26.7%	23.3%	26.7%	13.3%
38	I consciously adjust my pronunciation in formal situations	Frequency	1	1	13	7	8
		Percentage	3.3%	3.3%	43.3%	23.3%	26.7%
39	Improving vowel backness should be emphasized in phonetics courses	Frequency	0	1	11	15	3
		Percentage	0.0%	3.3%	36.7%	50.0%	10.0%
40	I am interested in receiving additional training on English vowel pronunciation.	Frequency	0	5	12	8	5
		Percentage	0.0%	16.7%	40.0%	26.7%	16.7%

Interpretation:

The high response to the Items 34 is an indicator of the common notion that media exposure has a beneficial effect on pronunciation. This is indicated in the sociolinguistic awareness as the learners are aware that social background is a determinant of accent (item 33). The fact that item 39, though a pedagogical statement, had a high positive response, indicates that the participants have a positive attitude towards specific teaching of vowel backness.

The inconsistency of social background (Item 33) is low, meaning that this is an accepted concept. The near unanimity of the support of including vowel backness in phonetics curricula is reflected in the correspondingly low negative of Item 39. The low negative score of the Item 33 means that the majority of learners do stylistic adjustment, which is consistent with the high level of agreement about accent based adaptation in the part of Section D.

The present study provides evidence for a complex, yet theoretically important relationship between metalinguistic awareness, perceptual ability and phonetic production as well as the clear production–perception gap existing among EFL learners. All participants reported a high awareness of vowel backness, with almost all participants reporting “strongly agree” that they were “familiar with the IPA” and could tell front from back vowels; however, knowledge did not always lead to accurate production. This divergence is in accordance with the Speech Learning Model (Flege, 1995) which states that perceptual knowledge does not necessarily lead to successful phonetic learning.

Importantly, the learners are perceptually sensitive to variation in English vowels at the word level, as indicated by their ability to discriminate examples from the pairs lot–lot and hot–hot/ʌt (where /ʌ/ represents another variant of the vowel), dog–dog, and so on and their confidence reports that have proved they can make adjustments in their own pronunciation after exposure. This is in line with sociophonetic claims that listeners are highly attuned to fine phonetic detail (Hay & Drager, 2007). In this respect, the production data portray only moderate to low accuracy for some of these vowel contrasts; among others, the /ʊ/–/u:/-contrast (as in good) revealed the lowest level of accuracy (56.67%). This indicates that phonologically similar (or absent) categories in the L1 remain hard to produce, even if categorically identified.

The

other

significant finding has to do with how natural phonological processes are engaged, especially the centralization of the vowel in fast speech. A lot of it has to do with the fact that many of them stated, when they talk fast, their back vowels were more centralized — evincing that automatic phonetic processes trump formal instruction. This accords with usage-based and exemplar models (Pierrehumbert, 2001) that see speech production as being constrained not merely by rules learned, over time (Skousen, 1989), but also based on frequency of forms used in a given context and real-time processing demands.

Sociophonetic Results The results from this study showed a prominent effect of social and attitudinal factors acting together. Most of the students indicate that they imitate native speakers to a considerable degree and feel that media exposure aids their pronunciation. This coincides with input frequency as well as identity orientation encoding phonetic behavior. Furthermore, pronunciation changes in other accent contact situations suggest social phonetic flexibility and support Eckert's (2008) claim that language is a resource for identity construction.

But in fact, the words that achieved from mirror-symmetric appearance are even made learners view that the social variables of background and gender were not all equally important but too overboard [16] than the actual production accuracy. This indicates that learners are sociolinguistically aware, but this awareness of form cannot change phonetic performance in itself unless it is reinforced by more consistent practice and exposure.

Results suggest that the multidimensionality of vowel backness, rather than a phonetic feature (Gee et al. 2022), is susceptible to cognitive, linguistic and social influences. The widespread acknowledgment of these production problems suggests that the appropriate response is that this type of phonetic instruction is not about procedural skill development at all, but rather declarative knowledge.

5. Conclusion

The present study examined the sociophonetic realization of vowel backness by EFL learners in terms of the interaction of awareness, perception and production. The results show that, despite a high degree of metalinguistic awareness and perceptual sensitivity, the learners' skills do not

necessarily lead to accurate phonetic production. This supports a persistent production-perception gap, one of the key barriers to second language pronunciation (Azevedo et al, 2021).

Apart from formal education, it also shows that much affects the backness of the vowels. Natural phonological processes, real input and sociolinguistic consciousness. The capacity for such variation across accents speaks to the current sociophonetic theories about social situatedness and dynamism of phonetic variation.

The results thus demonstrate that from a pedagogical perspective the area of pronunciation needs to change paradigm away from theory in vowel systems towards practice, with focused auditory calibration and live production. Real listening exposure combined with highlighting a problematic contrast, such as /ʊ/ versus /u:/, can provide a stop-gap solution before students deploy that knowledge into their speaking. In summary, this individualized study presents novel experimental findings in the area of sociophonetics from a previously under-researched EFL context, and highlights the need for models which encompass both incidental L2 learning derived from indirect instruction as well as cognitive-phonetic and social factors. Future studies to investigate the interaction of these factors in both phases of learning through longitudinal and experimental approaches across time periods and learner types are highly encouraged.

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