Role of Acoustic phonetic cues in adult L2 acquisition: A study of learners of English in Balochistan

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Abstract

This study aims to test the prediction of Feature Model that a new L2 sound contrast can be acquired if the phonological feature required to differentiate between the new L2 phonemes is already active in feature geometry of adult L2 learners. Pashto and Balochi lack [p-f] contrast but Brahvi does have this pair in its phonemic inventory. However, Eastern Balochi has only [f] and Western Balochi has [p], thus lacking both consonants as a minimal pair. Four groups of participants from Eastern Balochi, Western Balochi, Brahvi and Pashto speakers in Balochistan were selected for a series of experiments which tested the participants' perception of [p-f] consonant pair. The results show that the participants are overall better in perception of [f] than [p], and their perception of [f] is better on coda and that of [p] on onset position. This is because of stronger acoustic signals of the target consonants. This indicates that phonetic acoustic cues are sometimes more effective factor in L2 perception than L1 phonological features. The findings seem to contradict the predictions of the Feature Model. Therefore, this paper forwards a suggestion that a phonetic-perception based model of L2 acquisition may better account for difficulties of adult learners of English in Balochistan.

Keywords: Adult L2 acquisition, Feature Model, L1, phonetic perception, phonology

1. Introduction

English being an international language is spoken as a second and official language of Pakistan. However, adult learners of English face difficulties in

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learning it. Effect of L1 on acquisition of an L2 is believed to be one of the most important influencing factors. Linguists think that such impact is due to resemblance among native L1 and second language (Flege, 1995, Best & Tyler, 2007, etc.). However, some researchers ascribe such errors to differences between native language (L1) and target language (L2) grammar (Eckman, 1977, 1991, Brown, 1998, 2000, Major, 1987, 2001, Lado, 1957, etc.). The previous literature on L2 acquisition has pointed out, at large, causes and nature of difficulties faced by adult L2 learners.

In this regard, Brown claims (1998, 2000) that the major source of difficulty in perception of particular sounds of an L2 is Feature Geometry of the L1 of learners. She suggests that if native language grammar of a learner does not carry the phonological feature which discriminates a new second language (non-native) contrast, the learner will not be able to perceive such contrast and, resultantly, will not acquire the target L2 segment(s). The model developed by Brown is called Feature Model (FM) of Second Language Acquisition. This paper aims to study perception of [f] and [p] by adult learners of English in Balochistan, who speak Balochi, Brahvi and Pashto as their L1s. The speakers of these languages cannot properly produce some phonemes. [f] is one such sound which Western Balochi and Pashto speakers cannot produce accurately. They substitute it with [p]. The current investigation aims to find out the motives for this substitution.

Balochi is one of the major languages of Balochistan province of Pakistan. It is, like Pashto and Persian, a Northwestern Iranian language. Eastern and Western Balochi are two of the major dialects of this language. Western Balochi speakers produce [p] sound where Eastern Balochi speakers produce [f] (Jahani & Korn, 2009) e.g. the commonly known Persian word '*aab*' (water) is produced as '*aap*' in Western Balochi and '*aaf*' in Eastern Balochi. Thus, [p] and [f] are allophones of a single phoneme in Balochi which are distributed on account of dialectal variation.

Brahvi is also one of the major languages of Balochistan. It is a Dravidian Language. It has both [p] and [f] phonemes in its consonant inventory (Bray, 1986). Pashto is the language of the Pashtoon who live in Afghanistan, Khyber Pakhton-Khawa (KPK) and Balochistan. Pashto is also a language of Iranian family of the Indo-European (MacKenzie, 2016). The monolingual speakers of Pashto in Balochistan cannot produce [f] sound because this consonant also does not exist in Pashto (David, 2013). This scenario indicates that, according to the predictions of Feature Model, Baloch learners of English may not be able to

successfully acquire [p-f] contrast while learning English as a second language in adult age. The current study aims to test the predictions of the Feature Model on speakers of these languages.

1.1 Feature Model

Feature Model (Brown, 1998, 2000) demonstrates that acquisition of new sounds of a second language (L2) depends on feature geometry of native language (L1) of adult learners. If the relevant feature required for differentiating between two new L2 sounds exists in the native language (L1) Feature Geometry, the new sounds will be accurately perceived and acquired by adult learners. But if the relevant phonological feature which is required to differentiate the target L2 contrast, does not exist in the L1, the new sound pair will not be acquired. According to the Feature Model, when infants listen new sounds, they develop L1 Feature Geometry because their mind is like a clean slate at that time. But adult learners filter L2 sounds through already existing Feature Geometry of their L1. If the feature involved in a new L2 sound contrast is not active in the native language, the learners cannot perceive accurately the target sounds and resultantly, cannot learn those sounds. The prediction of the FM is based on the view that access to the Universal Grammar (UG) does not terminate in adult age. (Although Lin (2017) has raised questions on the concept of UG, the idea is still valid and popular point of discussion among linguists). Brown conducted a series of experiments to confirm the above predictions. She developed her model after several experiments with speakers of the Far Eastern languages like Japanese, Chinese, Taiwanese and Koreans who were learning English as a second language. But the model has never been tested at large on speakers of languages of South Asia.

Following the predictions of Feature Model (FM), it is hypothesized that adult Brahvi and Pashto speakers may learn to differentiate between [p-f] contrast in an L2 more easily than Balochi speakers. Because the consonant [f] is fricative which is [+ continuant] while [p] is stop which is [- continuant], and Brahvi language has both consonants. Similarly, Pashto language has [ɣ] (غ) and [g] (ګ) phonemes; these velar consonants are also differentiated by the feature [continuant] in that [ɣ] (غ) is [+ continuant] and [g] (گ) is [-continuant]. Therefore, the feature [continuant] is active in Pashto on the basis of which it may be hypothesized that adult Pashto speakers can perceive these sounds as two different consonants and can acquire this contrast accurately; whereas the same feature is inactive in Balochi language because there is no such pair of sounds in Balochi which is differentiated solely on the basis of the feature [continuant]. Thus, the hypothesis is that this pair of consonants may be difficult to differentiate in perception for adult Balochi learners of English, making accurate learning of

these two phonemes very difficult for them. This study aims to test these hypotheses.

1.2 Research Questions

The current research aims to address the following research questions.

(a) Can adult Pashtoon and Baloch learners of English acquire a new phonemic contrast which does not exist in their L1?
(b) What is influence of L1 Feature Geometry on acquisition of L2 consonants?
(c) How far does Brown's feature model account for the difficulties of adult learners of Balochistan in acquisition of English as a second language?

2. Research Methodology

Four groups of learners who speak Eastern Balochi, Western Balochi (Makarani), Pashto and Brahvi were selected for this experiment. There were 10 students in each group. All students were selected from the same academic session in a university in Balochistan to control individual differences based on their level of study and age. They all had learnt Urdu but in adult age and were also learning English. English and Urdu both have [p-f] contrast. Thus their knowledge of L2 can only influence their results positively. No negative influence from Urdu is expected in this learning context. The selection was based on availability and convenience sampling. Participants' ages ranged from 18 to 22 years. The table below carries basic information related to the participants. These data were obtained using a questionnaire.

Table 1. Detail of Participants: Mean (Standard Deviation)

S.No	Particulars	Eastern Balochi	Western Balochi	Brahvi	Pashto
11	Age in years	20.10 (3.41)	21.30 (1.94)	22.70 (1.25)	22.00 (1.82)
22	Age when learners started Listening English	10.30 (3.36)	11.30 (2.26)	11.70 (2.83)	11.60 (5.05)
33	Age when learners started speaking English	13.20 (3.58)	14.50 (2.95)	14.20 (2.57)	14.40 (4.32)
44	Speaking English Hours/Day	3.30 (4.54)	1.70 (01.56)	1.50 (1.08)	3.30 (4.19)
55	Reading English Hours/ Day	3.40 (2.59)	2.80 (01.22)	3.70 (2.00)	4.60 (4.55)
66	Listening English Hours/ Day	5.10 (3.75)	3.00 (02.05)	2.60 (2.11)	3.70 (2.49)
77	Writing English Hours/ Day	3.40 (2.50)	2.50 (0.84)	2.60 (1.57)	5.00 (3.85)

This study is based on perception experiment, which had three tasks namely (a) Identification, (b) Forced Choice Picture Selection and (c) Discrimination Test. The tests were conducted in a quiet room at the Department of English in the university where the participants were studying. Before starting the tests, nature of the tests was explained to all participants in Urdu by the second author. The participants were allowed repetitions as many times as they wanted. They were also requested to use English as well as Urdu or their native languages to ask any question regarding methods of the experiment. A detail of the experiment is given in the section below.

2.1 Identification Test

In Identification Test, common words of English and Urdu were played while the learners were asked to identify those words. They wrote down their answers on a given sheet. The stimuli had [p] and [f] making minimal pairs. Some distractors were also added in the list of stimuli written below (The target words are highlighted bold).

English: Chair, Board, **Pull**, Book, Ball, **Depend,** Cat, Bat **Leap**, Rat, Camel, **Full,** Television, Computer, **Defend,** Table, Rose, **Leaf,** Radio, Cup.
Urdu: Kitab (Book), Anda (Egg), **Falto** (Useless), Gai (Cow), Hirran (Deer), **Naff** (Umbilicus), Billi (Cat), Murghi (Hen), **Nap** (Measure)**,** Kalam (Pen), Bakri (Goat), **Palto** (Pet), Kutta (Dog), Shair (Lion).

This set of stimuli helped us to confirm if the participants can differentiate between [p] and [f] on word initial (English: pull-full; Urdu: palto-falto), -medial (English: depend-defend) and -final position (English: leap-leaf; Urdu: nap-naff). The target contrast on word-medial position in Urdu could not be tested because we could not find any suitable minimal pair in Urdu language of daily use. Primary focus of this experiment was to test participants' perception in English. Urdu stimuli were only added in the test to further confirm the results obtained from English stimuli.

2.2 Forced Choice Picture Selection

In this segment of the experiment two pictures were shown to the subjects along with a verbal cue that corresponded to one of the pictures. For example, they saw a picture of '**leap'** on one side of the page and that of **'leaf'** on the other, and at the same time, they heard one of these words. They were asked to specify by selecting one of the two pictures which object the verbal utterance named. The same list of stimuli was used in all three tasks/tests.

The picture naming task is slightly tricky and needs some training. Therefore, before experiment, the experimenter (second author) showed each of the pictures to the subjects and elaborated their names to the participants. When the researcher felt satisfied that the participants had understood the nature of the task, the test was performed. The participants were also given a third option 'not sure' if they thought they did not understand any item in the set of stimuli.

2.3 Discrimination Test

In this test, the same pair of Urdu (Falto-Palto, Naff-Nap) and English (Full-Pull, Defend-Depend, Leaf-Leap) words were presented to the participants in a recording. They were asked to write down if they were listening to two different words, or one word repeated twice. Some distractors were also added in this test. Each target sound pair was played three times. Thus, the same list of stimuli was repeated in all three tasks. The stimuli were randomized on each repetition. In all, we obtained three responses for each target stimulus from each of the participants.

3. Presentation and analysis of data

The current study was based on three experiments. The results of all these are described below separately.

3.1 English Identification Test

In this experiment, meaningful words were included as stimuli. Six target words in English and four in Urdu were chosen besides distractors. The distractors were included for concealing target words and for testing the tools and research method. In 90% of the distractors, accuracy of participants' perception was between 90% and 100% which indicates accuracy of the research methods used in this experiment. The items included in this experiment were regular tokens of the UK English words recorded from Oxford Advanced Learner's Dictionary using the Audacity Software. The result of target words is in table 2. There were three repetitions of each stimulus. On each correct identification, one mark was awarded. The marks show means of a group out of a total three with standard deviation in parentheses.

Table 2. English Identification Test Result

S. No	Stimuli	Eastern Balochi	Western Balochi	Brahvi	Pashto
11	Pull	.00 (.00)	.10 (.31)	.00 (.00)	.00 (.00)
22	Depend	1.00 (1.33)	1.20 (1.13)	.80 (1.13)	.50 (.84)
33	Leap	1.10 (1.19)	.90 (1.28)	1.50 (1.35)	.80 (1.13)
44	Full	.40 (.84)	2.30 (1.05)	1.30 (1.49)	.20 (.63)
55	Defend	2.00 (1.41)	1.80 (1.54)	2.70 (.67)	1.20 (1.39)
66	Leaf	1.30 (1.33)	.80 (1.22)	1.90 (1.28)	.50 (.70)

A one-way ANOVA applied on these results shows that over-all group variance is significant for the target word 'Full' ($F=8.269$, $p=.0001$). All other differences are non-significant ($p>.05$). A further Post-hoc pair-wise comparison shows that the mean difference between Eastern and Western Balochi ($p=.004$) and Pashto and Western Balochi ($p=.001$) are significant; other differences are non-significant ($p>.1$).

The result of 'Pull' shows that the all participants are very poor in perception of [p]. However, no major variance among the results of 'Depend' and 'leap' is found. The results of all groups for these words are almost similar. The results for the stimulus 'Defend' show better perception of the participants. In identification of the word 'Full' Western Balochi participants are significantly better than Brahvi ones, however, Eastern Balochi and Pushto groups are poor. In the identification of 'Leaf' Eastern Balochi and Brahvi participants performed slightly better, but Western Balochi and Pushto speakers were poor.

3.2 English Picture Selection Test

In this phase of the experiment, the subjects were presented with two pictures placed on a file in front of them accompanied with a verbal cue which pronounced the name of one of the two pictures. The subjects' task was to point out one of the pictures which the verbal cue named. The verbal cue recorded from online Oxford English Dictionary was played from a recording device. There were three repetitions of each stimulus. On each correct selection, one mark was awarded. The marks in the table show means of a whole group out of three and the digits in the parentheses show standard deviations.

Table 3. English Picture Selection Test Result

S.No	Stimuli	Eastern Balochi	Western Balochi	Brahvi	Pashto
11	Defend	2.20 (1.31)	2.40 (.84)	1.70 (1.33)	2.40 (.96)
22	Depend	1.60 (1.26)	1.30 (1.33)	1.60 (1.26)	1.90 (1.10)
33	Leaf	2.70 (.94)	2.70 (.67)	2.80 (.42)	2.80 (.63)
44	Leap	1.10 (1.28)	.50 (.70)	.80 (1.13)	.30 (.67)
55	Full	.20 (.42)	1.50 (1.08)	1.20 (1.39)	.20 (.42)
66	Pull	2.50 (.84)	2.60 (.51)	2.10 (.99)	.90 (1.19)

A one-way ANOVA applied on these results shows that over-all group variance is significant for the target word 'Full' (F=5.234, p=.004) and 'Pull' (F=7.114, p=.001). All other group differences are non-significant (p>.05). Further Post-hoc pair-wise comparisons show that the mean value of Western Balochi (p=.033) is significantly different from Pashto and Eastern Balochi for 'Full'[5]. In perception of the word 'Pull' Pashto group is different from Eastern Balochi (p=.005), Western Balochi (p=.003) and it is also marginally (non)-significantly different from Brahvi (p=.053). All other group differences are non-significant (p>.1). The results for the words 'Defend' and 'Leaf' show better performance of all participants; however, the 'result for the word 'Depend' shows an average performance than 'Leap'. All participants were very poor in perception of the word 'Leap' in this task. For the English word 'Full' Western Balochi speakers are significantly better from Pashto and Eastern Balochi speakers. In perception of 'Pull' the Pushto speakers showed poor performance as compared to other groups.

3.3 English Discrimination Test

In this phase of experiment, a pair of words was played from a recorder. The task of the participants was to indicate whether they heard the same word produced twice or a pair of two different words. The main purpose of this experiment was to judge the participants' ability to discriminate the target consonants.

Table 4. English Discrimination Test Result

S.No	Stimuli	Eastern Balochi	Western Balochi	Brahvi	Pashto
11	Pull -Full	2.00 (1.05)	2.50 (.70)	2.20 (1.03)	2.80 (.42)
22	Defend -Depend	1.90 (.99)	2.00 (1.15)	2.10 (1.10)	1.10 (.99)
33	Leap -Leaf	2.10 (1.28)	1.90 (1.10)	2.30 (1.05)	1.60 (.96)

[5] P value for both comparisons is the same

A one-way ANOVA applied on these results shows all group differences are non-significant (p>.05). In the pair of words "Defend-Depend" Western Balochi and Brahvi groups performed better as compared to Pashto and Eastern Balochi, however, in "Leap-Leaf" Eastern Balochi and Brahvi groups showed better performance than Western Balochi and Pashto. In the pair of words "Pull-Full" all groups performed better.

3.4 Urdu Identification Test

The items included in this experiment as stimuli were common words of Urdu language produced by a native Urdu speaker. The same experiments were replicated with the same participants using Urdu words as stimuli to re-confirm the results obtained in the previous tests.

Table 5. Urdu Identification Test Result

S.No	Words	Eastern Balochi	Western Balochi	Brahvi	Pashto
1	Falto (Useless)	.20(.63)	.60(1.07)	.20(.42)	1.90(1.44)
2	Naff (Umbilicus)	2.70(.94)	1.90(1.19)	3.00(.00)	1.40(1.50)
3	Nap (Measure)	2.50(.70)	.30(.94)	1.90(1.37)	.00(.00)
4	Palto (Pet)	2.00(1.41)	.90(1.28)	2.20(1.22)	1.10(1.44)

A one-way ANOVA applied on these results shows that over-all group variance is significant for the target words 'Falto' (F=6.774, p=.001), 'Naff' (F=4.667, p=.007) and 'Nap' (F=18.010, p=.0001.). The other group differences are non-significant (p>.05). Further Post-hoc pair-wise comparisons show that the mean value of Pashto group is significantly different from Western Balochi (p= .046), Eastern Balochi (p=.005), and Brahvi (p=.005.). In identification of the word 'Naff' mean scores of Pashto and Brahvi are significantly different from each other (p=.020). In identification of 'Nap' Eastern Balochi group was significantly different from Western Balochi (p=.0001) and Pashto group (p=.0001), Western Baloch group is significantly different from Brahvi (p=.004) and Brahvi is significantly different from Pashto (p=.001). All other group differences are non-significant (p.>1). Apparently, in the identification of the word 'Palto' Eastern Balochi and Brahvi group performed better than Pashto and Western Balochi group although the group variance is marginally non-significant (F=2.294, p=.094). In the word 'Falto' all groups performed poorly except the Pashto speakers whose performance is only average. In identification of the word 'Nap'

Eastern Balochi speakers showed better performance than Brahvi speakers, however, Western Balochi and Pashto speakers remained poor in identifying it. In identification of the word 'Naff' participants of Brahvi and Eastern Balochi groups showed better performance.

3.5 Urdu Picture Selection Test

There were three repetitions of each stimulus and one mark was awarded on each correct response. The scores in the table show below mean marks of a whole group out of three and the digits in parentheses show standard deviations.

Table 6.: Urdu Picture Selection Test Results

S.No	Words	Eastern Balochi	Western Balochi	Brahvi	Pashto
11	Naff (Umbilicus)	3.00(.00)	1.00(1.24)	3.00(.00)	2.80(.63)
22	Nap (Measure)	1.90(1.28)	1.70(1.33)	2.80(.42)	1.30(1.33)
33	Falto (Useless)	.00(.00)	1.30(1.41)	.40(.69)	.60(.96)
44	Palto (Pet)	2.90(.31)	2.00(1.41)	2.60(.69)	2.40(.96)

A one-way ANOVA applied on these results shows that over-all group variance is significant for the target words 'Falto' ($F=3.447$, $p=.027$), 'Palto' (3.447, $P=.027$) 'Naff' ($F=19.295$, $p=.0001$) and 'Nap' ($F=2.975$, $p=.044$.). Further Post-hoc pair-wise comparisons show that the mean value of Pashto group is (non)-significantly different from Brahvi ($p= .055$) for the target "Nap'. For the target word 'Naff' the participants of Western Balochi are significantly different from Pashto ($p<.0001$), Eastern Balochi ($p<.0001$), and Brahvi ($p<.0001$). For the stimulus 'Falto' only Eastern Balochi and Western Balochi speakers are significantly different from each other ($p=.032$). All other group differences are non-significant ($p<.1$). In perception of 'Falto' Western Balochi speakers performed average compared to others, however in perception of the word 'Nap,' Brahvi speakers showed better performance as compared to average performance of other speakers. On the word 'Palto' all speakers showed better performance, and in perception of the word 'Naff' all groups performed better except Western Balochi who showed poor performance in perceiving this token.

3.6 Urdu Discrimination Test Result

Urdu Discrimination Test contained recordings of two pair of target Urdu words. The task of the participants was to determine whether they heard the same words twice or two different words each produced once.

Table 7. Urdu Discrimination Test Result

S.No	Words	Eastern Balochi	Western Balochi	Brahvi	Pashto
11	Falto-Palto	1.00(.66)	2.00(1.15)	1.70(.67)	1.40(1.42)
22	Naff-Nap	3.00(.00)	2.50(.84)	2.70(.94)	2.90(.31)

A one-way ANOVA applied on these results shows that all group differences are non-significant (p>.05). In the pair "Falto-Palto" Western Balochi speakers performed better as compared to Eastern Balochi speakers, however, in the pair "Naff-Nap" all groups performed better.

4. Analysis and Discussion

The main idea of Feature Model is that acquiring a new sound contrast of a second language (L2) rests on Feature Geometry of the L1 of adult learners. If the feature differentiating between two new L2 sounds is active in the L1 Feature Geometry, the new sounds will be perceived as different from each other and will be learnt accurately, but if the relevant L2 feature is lacking from the L1 feature geometry, the new contrast will not be acquired. The FM claims that acquisition of a new L2 sound is possible but that of new feature is not possible in adult age.

/f/ is fricative and fricatives are [+ continuant] while /p/ is a stop and stops are [- continuant]. Brahvi language has both consonants /f/ and /p/ and the relevant feature [continuant] is active in the language. Pashto has fricative [ɣ] (غ) and a stop [g] (گ) at velar place of articulation which are differentiated by the feature [continuant]. On the basis of this contrast in Pashto, it may be claimed that the feature [continuant] is active in this language while the same feature is inactive in Balochi language because there is no such pair of sounds in Balochi which is exclusively differentiated by the feature [continuant]. Following the predictions of Feature Model, it was hypothesized that adult Brahvi and Pashto speakers may learn to differentiate between /p-f/ contrasts in their perception more easily than Balochi speakers. In the following table, we present in a summarized form all results of identification and picture selection test combined together. The reason for taking only identification and picture selection task is that both identification and picture selection task judge real perception of participants more accurately than a discrimination test. As Boersma and Hamann (2009, p.31) argue, in a discrimination test, participants have to provide only yes/no type of responses. Therefore, a correct response in such a test may be an artefact of a guesswork. Thus, a correct response in a discrimination test does not always mean that respondents have real understanding of the target sound pair. On the other hand, in an identification task, subjects retrieve from their L2 phonemic inventory, the

relevant sound to match with the sound stimulus. Thus, only an identification test can determine real perception of learners. Discrimination tests are run in such experimentation for counter verification of results obtained in identification tests. Both picture selection and identification tests in this experiment actually involve identification. Therefore, results of these two tests are reproduced below in cumulative form as a ready reference for further comment. The terms used in the table such as "Poor, Average, Good" carry the information about responses given by the participants. The participants who obtained equal to or less than 1 out of a total of 3 scores, are considered "Poor" and those who obtained between 1 and 2 marks are considered "Average" and those who received 2 and above are considered "Good".

Table 8. Cumulative Results of Perception Tests in English

Tests	Stimuli	Eastern Balochi	Western Balochi	Brahvi	Pashto
Identification	Pull	Poor	Poor	Poor	Poor
	Full	Average	Average	Average	Average
	Depend	Average	Average	Average	Poor
	Defend	Good	Good	Good	Good
	Leap	Average	Average	Average	Average
	Leaf	Good	Average	Good	**Poor**
Picture Selection	Defend	Good	Good	Good	Good
	Depend	Average	Average	Average	Average
	Leaf	Good	Good	Good	Good
	Leap	Average	Poor	Average	Poor
	Full	**Poor**	Good	Average	**Poor**
	Pull	Good	Good	Good	Average

In the above table, 48 results (2 tests* 6 tokens*4 groups) have been presented. The target consonants have been tested on word-initial, -medial and -final position. Excluding only the three results which are highlighted bold, if we compare the performance of participants on [p] with [f], it shows that either they performed better on [f] than [p] or equal on both sounds. The FM predicts better performance of Pashto and Brahvi speakers than Balochi learners but this prediction does not establish in this test. The interesting thing is that speakers of Western Balochi and Pashto, (languages which do not have [f] in their phonemic inventories), also perform overall better on perception of [f] than [p] or at least they performed equally good (or bad) on both these sounds. It means that the participants' perception is not strongly influenced by their L1 phonemic inventory in this study. Had it been under the influence of their L1, Pashto and Western

Balochi speakers would have performed better on perception of [p] and Eastern Balochi speakers on that of [f]. But unexpectedly, they all perceived [f] relatively more accurately. It simply means that [f] consonant itself has something special in itself which makes its perception easier for L2 learners regardless of L1 phonemic inventory. We need to know the reason for this unexpected result.

[f] being a fricative has strong acoustic signals than [p] which is a stop. Strong acoustic signals are easier to perceive for listeners whereas [p] being a stop does not have such strong signals. It is rather a pause or silence phase which takes its acoustic signals from the following vowels after burst. That is why the participants of this study perceived [f] better than [p] regardless of their L1 phonemic inventory. This result also answers the traditional question of whether phonetics or phonology is more effective in L2 acquisition. At least current results tilt in favor of a stronger and more effective role of phonetics in perception of L2 consonants. We now analyze results of participants on Urdu consonants which are summarized below.

Table 9. Cumulative Results of Perception Tests in Urdu

Tests	Stimuli	Eastern Balochi	Western Balochi	Brahvi	Pashto
Identification	Naff	Good	Poor	Good	Poor
	Nap	Good	Poor	Average	Poor
	Palto	Good	Average	Good	Average
	Falto	Poor	Poor	Poor	Average
Picture Selection	Naff	Good	Average	Good	Good
	Nap	Average	Average	Good	Average
	Falto	Poor	Average	Poor	Average
	Palto	Good	Good	Good	Good

This result shows another interesting picture. The perception of participants is either same on both sounds or in cases of variance in results, they are better on perception of [p] on onset position and that of [f] on coda position. Their perception of [p] is relatively poorer on coda position. Again, this is because of acoustic cues. A stop has relatively more prominent cues on onset, because of burst stops have a ground for release in the immediately following vowel on word-initial position which is missing on coda position thus making stops perceptually weak on this position. On coda position, stops do not have any following vowel, so they end on silence there. Therefore, listeners feel difficulty in perceiving a stop on coda. On the other hand, a fricative has turbulent fricative noise which remains continued on coda position (hence the name 'continuant').

Thus, fricatives are easier to perceive on coda. The same is apparent in the result obtained in this experiment.

The results show that the claims of Feature Model do not seem to establish at least in this study in the context of Balochistan, therefore, it may be claimed that acquisition of a new sound pair of a second language (L2) does not totally depend on only Feature Geometry of native language (L1) of learners. The results of the current study rather show completely inverse picture. It seems that acoustic signals are more effective than L1 feature geometry in L2 perception. Acoustic prominence, by some means or other, has already been found to have strong impact on perception of listeners (Leemann et al, 2016; Kohler, 2008; Kochanski, Coleman and Rosner, 2005). In this scenario, a model which is based on phonetic perception and has been widely tested, like SLM (Flege, 1995; Flege & Wayland, 2019) can be applied in Pakistan. Finally, this study shows that L2 learners can acquire a new phonological contrast which does not exist in their L1. However, those target sounds which have strong acoustic signals are easier to acquire than those which have weak acoustic signals. Another important finding of this study is that context of occurrence of a target L2 sound also plays effective role in its accurate perception of L2 sounds.

5. Conclusion

The current study could not confirm the predictions of the FM. The results rather show that L2 learners regardless of whether the relevant feature is active or inactive in their L1s, perceive a new contrast on the basis of acoustic phonetic signals. Secondly, position of occurrence of a target consonant seems more important than feature geometry of the L1 of learners in L2 perception. Thus, the study concludes that phonetic cues and context of occurrence of a sound have more effective role than phonological features in perception as well as acquisition of L2 sounds. The study confirms that a new L2 sound can be acquired in adult learning if the acoustic cues of the target sound are stronger enough to be perceived by learners. This leads us to further conclude that Feature model does not account for challenges of adult learners of English in Balochistan. A model based on phonetic perception can better fit in this learning context. This study was carried out with a small sample and has a very small data for running statistical tests. It deals only with perception. The same experiment can be further carried out focusing on production along with perception and with large samples, and it could be further extended to the other Models of adult second language acquisition which focus on phonetic perception such as Perceptual Assimilation

Model (PAM: Best, 1995), PAM-L2 (Best and Tyler, 2007) and Speech Learning Model (Flege, 1995) in the current context.

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