A CASE STUDY OF ATTRITION OF SARAIKI IN DELHI

Nasir A. Syed (nasirabbassla@gmail.com)

Rajkumar Malik (rajkumarmalik@sifi.com)

ABSTRACT: A large scale mass migration to and from Pakistan occurred as a result of division of the Subcontinent into two Independent dominions, Pakistan and India. Saraiki speakers who migrated from Pakistan became a linguistic minority on arrival in India. The current study analyzes the speech of 61 such migrants and 57 of their progeny who were born in Delhi after the migration. Half of the participants of both groups were female. The current study identifies the role of markedness, gender, attitude, incomplete acquisition and frequency of use in language attrition. The participants were asked to produce words carrying breathy voiced sonorants [m^h n^h l^h $ɲ^h$ $ɳ^h$], plan alveo-palatal nasal [ɲ], fricatives [z x ɣ] and implosives [ɓ ʃ ɗ ɠ] of Saraiki. The recordings were evaluated by 3 native speakers of Saraiki of the area from where the participants' families had migrated. The findings show that those participants who were more affiliated to Hindi were losing their L1 (Saraiki) consonants faster than those who were less affiliated to it. Those migrants who were young at the time of migration, were faster in losing Saraiki phonemes than those who were adults at the time of migration. The role of phonetic factors was evident in that the participants were losing coronal implosives more rapidly than labial implosives. It is because labial implosives are perceptually more prominent than coronal ones. The participants were not losing retroflex nasal because it is not only used frequently in Saraiki but it also frequently occurs in Hindi. The participants were more accurate in producing coronal fricatives compared to producing velar fricatives. This shows the role of markedness in language loss. The female participants were found to be less accurate in Saraiki consonants than male participants. However, frequency of speaking the L1 (Saraiki) does not seem to have any correlation with language attrition/maintenance.

Keywords: Attrition, Consonant, Hindi, Saraiki

1. Introduction

The British East India Company managed to occupy the Subcontinent of India and Pakistan in 1857. For the next 90 years, the Subcontinent remained under the British control as its colony. In 1947, the Subcontinent got freedom and two independent states of Pakistan and India appeared on the map of the world. The Sub-continent was divided on the basis of religion. Therefore, at the time of the division, there was a large scale transfer of population to and from Pakistan. Lots of Saraiki speaking Hindu families moved from Pakistan to India in 1947. Thus, Saraiki originally a language of the central Pakistan emerged as a minority language in India. The Saraiki speaking migrants who settled in Delhi and their sons and daughters slowly started shifting from Saraiki to the dominant language Hindi. This paper studies the direction of language loss among the Saraiki speaking migrants settled in Delhi. It is relevant to point out that in this paper, the terms attrition, loss, convergence and obsolescence will be used synonymously although experts have pointed out subtle differences between these terms. Since the study was conducted with a view to understand the nature of convergence of Saraiki into Hindi, this paper focuses on only those Saraiki sounds that do not exist in Hindi.

By comparing the phonemic inventory of Saraiki and Hindi, it becomes clear that the consonants of Hindi are subset of Saraiki consonants. Saraiki has in its phonemic inventory all consonants of Hindi. (Consonant phonemic inventories of both languages are given in appendix). Besides, Saraiki has breathy voiced lateral and nasals [m^h n^h l^h $ɲ^h$ $ɳ^h$], plan alveo-palatal nasal [ɲ] and implosives [ɓ ʄ ɗ ɠ] which Hindi lacks. The Saraiki fricatives [z, x, ɣ] although present in the phonemic inventory of classical Hindi, are substituted respectively with [ɟ k^h g] in the daily informal conversation of Delhiite speakers of Hindi (Shapiro, 2007, p. 259). In the words of Iverson and Salmons (2008), Hindi is a stop-rich but fricative-poor language. Therefore, substitution of stops with fricatives is common in Hindi (Hock, 1991).The retroflex nasal [ɳ] and velar nasal [ŋ] have special status in both Saraiki and Hindi in that, [ɳ] is very frequently occurring phoneme and [ŋ], in contrast, is a rarely occurring phoneme in both languages. The current project aims to study the nature and direction of language loss in the phonemic inventory of Saraiki speakers of Delhi with a focus on plan [ɲ ɳ ŋ] nasals, breathy voiced [m^h n^h l^h $ɲ^h$ $ɳ^h$] sonorants and fricatives [z x ɣ].

In the process of attrition of a dominated language, the role of factors such as markedness (Seliger, 1996) and dominant languages (Ecke, 2004) has already been identified. Primarily, the current study tries to tease apart the effect of these two factors. A study of contribution of the following factors in L1 attrition is also one of the major objectives of this study:

a. gender,

b. L2 learning environment,

c. frequency of speaking L1 and

d. functional load of a phoneme

Hindi and Saraiki languages belong to Indo-Aryan family. In both languages, the retroflex nasal is used as a morpheme, a suffix to derive a noun from a verb. (e,g, Saraiki *a+ɳ > aɳ ~ aʊʌɳ 'arrival'*; Hindi *kʌr+ ɳ > karʌɳ 'doing'*).[1] According to the universal markedness scale, coronal sounds are less marked than velar sounds (de Lacy, 2007). On account of complexity, a retroflex nasal is more marked than alveo-

[1] Let us remember that both Saraiki and Hindi are from the same family of languages i.e. Indo-Aryan; therefore, they have common in their morphological features.

palatal (non-retroflex) nasal because retroflexion involves complex articulatory gesture. On account of previously existing vast literature on the subject, we assume that markedness, influence of dominant language and frequency of use may be significant factors which contribute to language convergence. Therefore, we can develop the following hypotheses about this study.

If language loss is exclusively triggered by only universal markedness, the velar nasal of Saraiki should be lost prior to the coronal nasals, and among the coronal nasals, retroflex nasal on account of being more complex, is expected to attrite before the alveo-palatal nasal. Similarly, among other sounds including implosives, coronals should attrite after velar sounds. Alternatively, if only a dominant language is the cause of language loss, the Saraiki speakers of Delhi should be equally faithful to retroflex nasal and velar nasal because these sounds exist in the dominant language i.e. Hindi; in that case, among nasals, they may lose only alveo-palatal nasal which does not exist in Hindi. And if the effect of frequency of occurrence (functional load) also contributes to language loss, the alveo-palatal on account of being non-existent in Hindi should die first, and velar nasal on account of being a less frequently occurring phoneme, should disappear before retroflex nasal (a frequently occurring phoneme) from the phonemic inventory of the Saraiki speakers of Delhi. The implosives on account of being non-existent in the phonemic inventory of Hindi should also disappear from the phonemic inventory of the participants and the fricatives should attrite or substitute with the corresponding stops of Hindi.

To test these hypotheses, an experiment was conducted with 120 Delhiite speakers of Saraiki with focus on the above Saraiki consonants. In a way, it is a case study of convergence of L1 in the Saraiki speaking community of Delhi to L2 (Hindi). The data were collected in an interview and a word production task. In the interview, the participants were asked to provide information about their personal and linguistic background.

2. Literature Review

In this section some linguistic and non-linguistic factors have been highlighted which contribute to language attrition. In the existing literature, exposure to the L2 and frequency of use of L1 and L2, universal markedness, role of dominant language, age of acquisition and attitude of speakers to L1 and L2 have been found to have a

significant role in language attrition. The following section presents a brief description of these factors.

2.1. Exposure and frequency of use

The opinion of linguists is divided about the role of frequency of use in language attrition. The findings of some studies could not establish any link between these factors with language loss (Opitz, 2011; Varga, 2012, etc.) but some linguists give a lot of importance to frequency of use and recency on language attrition. For example, Activation threshold theory lays stress on the frequency and recency of use in language loss (Paradis, 1993). Schmid (2007) and Schmid and Dusseldorp (2010) found some link between the use of the attriting language in a professional setting and language attrition.

In the opinion of Schmid (2013), the frequency of speech may have negative impact on language maintenance in a vicious circle where speakers feel less confident in their own proficiency and start converging towards a dominant second language. In the current study we conducted a study of language loss to see its relation with language acquisition. The main proposition is that language acquisition is a mirror image of language attrition. In line with this argument, the factors which influence language acquisition may also inversely affect language loss. Previous studies also confirm a close relationship between language use and acquisition (Ellis, 2002; Garlock, Walley, & Metsala, 2001; Goodman, Dale, & Li, 2008; Tyler & Edwards, 1993). Usage-based phonology (Bybee, 2001) also highlights the importance of usage in language acquisition. These studies indirectly imply that language loss also has a correlation with language use.

2.2. Markedness

Markedness is a much used but less understood term in the world of linguistics. There is little agreement among linguists about the real nature of markedness. In the words of Hume (2003), the term markedness dates back to the linguists of Prague school, particularly Nikolai Trubatzkoy and Roman Jacobson. One view about markedness is that more complex sounds are relatively more marked than less complex sounds (de Lacy, 2007). Let us remember that markedness is a relative concept. As an example, compare retroflex consonants with non-retroflex ones. Retroflex sounds are produced with more complex articulatory gestures than non-retroflex ones. Thus, other things

being equal, a retroflex sound will be more marked than a non-retroflex phoneme. Another view is that if consonants are classified on the basis of major places of articulation, normally coronal sounds are least marked and dorsal sounds are most marked with labials in between (de Lacy, 2007).

Another criterion to determine markedness is the frequency of occurrence of sounds in the world languages. A commonly accepted view is that the most frequently occurring sounds are the least marked and vice versa. According to the implicational scale of markedness, if sound X implies sound Y also but not vice versa, then Y is more marked than X (Archibald, 1998). This may be illustrated with examples from phonemic inventories of the world languages. Oral plosives exist in all languages of the world but nasals are not necessarily part of phonemic inventories of all languages of the world (Ladefoged & Maddieson, 1996). There are languages which have only oral stops and there are languages which have both oral and nasal stops. But there are no known languages which have only nasal stops without having oral stops in their consonant phonemic inventories. Thus, the presence of nasal stops implies that of oral stops but not vice versa. Therefore, nasals are more marked than oral stops.

Another important way to determine markedness is the direction of acquisition of sounds in L1. Normally, the unmarked or less marked sounds are acquired before the more marked ones. A similar pattern is followed in L2 acquisition (Eckman, 1991). It is also claimed that the reverse is direction of loss of consonants in language attrition. The claim that language loss is a mirror image of language acquisition implies that in language loss, the more marked sounds are lost before the less marked ones (Hansen & Chen, 2001). One of the objectives of this study is to test this claim in the current context. Another important thing related to this is that the direction of language acquisition and frequency of occurrence of implosive sounds indicates that there is a markedness hierarchy different from that observed in explosive sounds. From the viewpoint of language acquisition (Cissé, Demolin, & Vallée, 2011), articulation (Clements, 2002), and frequency of occurrence (Ladefoged & Maddieson, 1996; Maddieson, 1984), bilabial implosives are found to be the least marked and velar implosives are the most marked with coronal implosives in between. In this regard, if language loss is a mirror image of language acquisition, the direction of loss of implosives among the Delhiite Saraiki speakers should be from dorsal to coronal to

labial implosives i.e. velar implosives should disappear first and labial implosives finally in a language loss case.

2.3. Dominant language

One of the major causes of language attrition is that speakers cannot inhibit L2 influence in an environment where the L2 is dominant (Schmid, 2013). In the current study, we notice that Saraiki speakers are in a very small number in the sea of a people who are native or non-native speakers of Hindi language. Their language is quite unknown and of low profile in India. On the other hand, the dominant language of the society is Hindi which is also the first language of a very large number of speakers in India. There is strong probability of convergence towards Hindi in the Saraiki of the migrants and their progeny.

2.4. Age of L1 acquisition and attrition

It is a long debate on whether an acquired L1 can be lost. In the words of Opitz (2011, p. 20) "In cases other than language pathology, we do not expect an established L1 to deteriorate or diverge from the grammar that has been fully acquired". Some researchers have suggested a 'threshold of frequency of use' and/or proficiency level beyond which knowledge becomes immune to loss (de Bot, 1998). On the other hand, some claim that 'neither first languages nor second languages may lose. With non-use they fade, and though they keep their place in our memory system, they become less accessible up to the point where the knowledge has sunk beyond reach and is for practical purposes lost. In the view of Herdina and Jessner (2002, p. 94) it is possible for someone to lose first language if it is neglected for a long period of time. A compromising view is that of reduced accessibility of knowledge which claims that nothing is totally forgotten (Penfield, 1965; Penfield & Roberts, 1959).

There is a large body of literature on the relationship between age and language acquisition. According to the Critical Period Hypothesis, a language can be acquired perfectly only in a natural environment during the critical period of language acquisition (Lenneberg, 1967; Patkowski, 1990; Scovel, 1988). A related point of view about language loss is that a language once acquired in a natural environment during the critical period cannot be totally lost after puberty (Schmid & Mehotcheva, Footnick, 2007; 2012). Contrary to this, linguists like Flege (1995), Best (1995) and Brown (2000) claim that a new language can also be acquired after the critical period.

If this view point is accepted, then the related viewpoint about language loss is that a language once acquired can also be lost in adult age. A compromised view between these two extremes is that a language can be acquired after the critical period of language acquisition is gone; however, the learning outcome which occurs in adult age is different from a language acquired during the critical period. The difference lies in pronunciation. A language acquired during the critical period is produced with native like accent and that a language learnt after the critical period is normally produced with accent. Similarly, the pattern of language loss which starts during the critical period is expected to be different from that of language loss which starts after that period (Bylund, 2009). According to Montrul (2008) and Schmid (2012b), a language loss which starts during the critical period is actually not a language loss but incomplete L1 acquisition. The assumption that 'language attrition is a mirror image process of language loss' was first expressed by Roman Jacobson. He suggested this idea in his regression hypothesis (Jakobson, 1968). The empirical support to this idea came from Jacobson's study of aphasiac children. Later on, many linguists worked on it and provided empirical support to this idea from their study of healthy normal subjects (Herdina & Jessner, 2002; Keijzer, 2008; Schmid, 2002; Schmid & Mehotcheva, 2012, etc.). The current research study also aims to study the relationship between age and language loss.

According to Schmid (2013), there is not much research on the issue of correlation between attitude and language attrition. She assumes that attriters with positive attitude towards their L1 may undergo slow attrition than those who have negative attitude towards their L1. Very few studies have established a correspondence between attitude and language attrition (e.g. Schmid, 2011) while some studies did not find any correspondence between language attitude and attrition (Cherciov, 2011). Schmid (2012a) reports some contexts in which the holocaust stricken attriters did not want to remember or speak their L1. Such detachment definitely contributed towards their L1 attrition. On the other hands, she (ibid) also talks about a possibility that some traumatic memories afflicted in the holocaust survivors might have pre-occupied their minds to remain there forever. This paper attempts to identify the role of such factors in the process of attrition of Saraiki in the Saraiki immigrants from Pakistan in Delhi.

3. Research Methodology

This section details the methodology used to collect and analyze the data for this study. In the first section, a description of the participants and their grouping factors is given. In the next sub-section, the method and tools of research used for data collection and analysis are described at large.

3.1. Participants of the study

Two groups of participants, one consisting of 57 native speakers of Saraiki and the other of 61 such speakers were selected for this study. A detail of the participants' age and their speaking hours is given in the following table.

Table 1: Detail of the participants

	Group	Minimum	Maximum	Mean	Std. Deviation
Age (years)	Immigrant	66.00	87.00	75.25	6.26
	1st Generation	27.00	64.00	52.53	8.90
Speaking Saraiki (hours/day)	Immigrant	.50	10.00	02.97	2.92
	1st Generation	.50	10.00	02.53	2.76

In the first group were those participants who were born before the division of the Subcontinent into Pakistan and India in 1947 in the areas which are now part of Pakistan. These participants moved to India on the eve of emergence of Pakistan in 1947. The second group comprised of progeny of these migrants. They are called 'first generation of Delhi-born Saraiki speakers' in this study. The number of male and female was nearly equal in both groups. The average age of Delhi-born first generation of Saraiki speakers was 52.53 years. Aged participants for this group were selected with a view that they must be born soon (i.e. only 13 years in average) after their parents migrated to India in 1947. It is expected (and the participants of this group also later on confirmed) that the parents of these participants were speaking Saraiki when these participants (their progeny) were born because it is quite unexpected that the Saraiki migrants must have stopped speaking their mother tongue

(Saraiki) only 13 years after their arrival in a new city i.e. Delhi. In other words, both the migrants and the Delhi-born first generation got input from native speakers of the same dialect of Saraiki and learnt it as their L1. The only difference is that the migrants were born in a monolingual Saraiki speaking area (now in Pakistan) while the Delhi-born participants were born in a multilingual environment of Delhi.

The above table shows that the migrant participants were 75.25 (st. dev. 6.26) years of average age and the Delhi-born first generation of participants were of 52.53 (8.90) years of age at the time of experiment. According to their own statements, the migrant group speaks Saraiki for 2.97 (std. dev. 2.92) hours daily and the 1st generation group speak Saraiki for an average of 2.53 (2.76) hours daily. The following table shows number of male and female participants in both groups.

Table 2: Gender-based detail of the participants

Grouping		Gender		Total
		Male	Female	
Group	Migrant	30	27	57
	1 Generation	30	31	61
Total		60	58	118

The above table shows that there is not a big difference between the numbers of male and female participants in each group. Details regarding data collection and analysis are given in the following sub-section.

3.2. Tools of research

Interview and word- production task were used as tools for data collection. The background information provided in the previous sub-section was taken from the participants in the interview. The second author of this paper conducted the interview in Delhi with the participants at places that were convenient for the participants. The interviews were recorded. The interview was conducted in Saraiki. Both first and second author are native speakers of Saraiki. The second author is also a son of a

Saraiki migrant family and speaks the same dialect which Saraiki speakers of Dehli speak.

Afterwards, a set of stimuli was presented to the participants one by one by the second author and the participants were asked to produce the same words in the best pronunciation of their L1. The productions were recorded. Twelve sounds were the focus of this study. There was a long list of stimuli which were produced by the participants including the target sounds to conceal the target consonants. Some of the words in the list of stimuli were also used as distracters.

In most of the cases wherever possible, words that were selected as stimuli had the target sounds on word-initial position. The word-initial position was selected for study because it is considered relatively more unmarked compared with coda position (Archibald, 1998). However, some of the target sounds do not occur word-initially or syllable initially. The retroflex and alveo-palatal nasal [ɳ ɲ] do not occur word-initially. Thus, the words with the retroflex and alveo-palatal nasal on word-final position were selected as stimuli for only these two sounds. Some other sounds namely [ŋ n^h l^h $ɳ^h$] occurred word-medially in the stimuli. For these sounds, words which had these consonants on word-medial position were carefully selected. (See a list of stimuli in the appendix).

For the evaluation of the target sounds, the recordings were presented to four native speakers of Saraiki. In some of the cases there were repetitions of the stimuli. Among the repetitions, the best productions were selected by the first author for evaluation. The evaluators were asked to evaluate only the target consonants in words on a given criterion. The evaluators were asked to strictly control themselves so that their judgements are not biased by the (in)correct pronunciations of the sounds other than the target sounds in the stimuli. Thus the evaluators marked the target sounds only, without getting influenced by the overall productions of the participants. The evaluators were also requested to determine by writing on a piece of paper, if the target sounds were produced incorrect, with which sound the participants had substituted it. The following Likert scale was used for evaluation by the evaluators.

Table 3: Likert scale used for evaluation

Score	Definition
5	Native-like
4	Near-native-like
3	Different from natives but understandable
2	Hard to understand
1	Unintelligible

There were four judges who evaluated the productions on the given scale. The opinions of the judges were different in productions. The four opinions for each of the productions were averaged for use in further analysis. The reliability of evaluation was determined by applying a Cronbach's alpha reliability test. The results of the test are given in table 4.

As table 4 shows, in all but one cases, the reliability coefficient is above 0.7. 0.7 is considered ideal reliability coefficient which indicates 70% agreement among judges (Larson-Hall, 2010). The column three in the table shows percentage of agreement among the judges. The overall high percentage of agreement among judges confirms reliability of the data. In the following section only averaged results are presented. The findings of this study have been discussed elsewhere but in separate sets of consonants which do not present comprehensive picture of the case of attrition of Saraiki in Delhi. The current study is an attempt to draw a thorough and complete picture of convergence of Saraiki towards Hindi in Delhi.

Table 4: Reliability of the evaluation

Sounds	Cronbach's alpha	Reliability (%)
[ɳʰ]	0.785	79
[lʰ]	0.607	61

[n^{h}]	0.769	77
[ɲ]	0.787	79
[ŋ]	0.765	77
[ɳ]	0.746	75
[x]	0.890	89
[ɣ]	0.843	84
[z]	0.739	74
[ɓ]	0.821	82
[ɗ]	0.910	91
[ɠ]	0.854	85

4. Results

A comparative look at the phonemic inventories of Saraiki and Hindi (see the inventories in appendix) reveals that there are twelve sounds of Saraiki which do not exist in Hindi. Initially, the twelve different sounds of Saraiki and two common sounds between Hindi and Saraiki namely retroflex [ɳ] and velar nasal [ŋ] were included in the list of stimuli for this experiment. However, two sounds namely labial breathy voiced nasal [m^{h}] and alveo-palatal implosive [ʃ] were later excluded from analysis due to technical reasons. Therefore, the current discussion focuses only on twelve consonants, ten consonants of Saraiki which do not exist in Hindi phonemic inventory and two nasal sounds which are common in Saraiki and Hindi. Out of the ten sounds which (we assume) do not exist in Hindi, are three fricatives namely [z], [x] and [ɣ] which although exist in written Hindi and in classical formal Hindi t have virtually disappeared from the colloquial Hindi spoken in Delhi (Shapiro, 2007). The purpose of adding only two nasal sounds which are common in both language is that the retroflex nasal [ɳ] is one of the mostly used sound in Saraiki and Hindi and that of including velar nasal [ŋ] in the study is that it is one of the less frequently used sounds of Hindi and Saraiki. Besides, the velar nasal does not have its representation in Hindi orthography (ibid). Like English, it is a consonant which only exists in the spoken repertoire of Hindi speakers but it does not have its representative letter in Hindi

alphabet. Studying these sounds may highlight the role of orthography and frequency of occurrence of sounds in this study.

The results are presented in this section in sets of sounds. The scores of each of the sets are presented separately initially. In the analysis section, generalizations will be developed on the basis of these results.

Table 5: Overall results for breathy-voiced sounds

Sound	Minimum	Maximum	Mean	Std. Deviation
[ɳ͡ʰ]	1.00	5.00	1.78	1.05
[l^{h}]	1.00	4.50	1.81	0.88
[n^{h}]	1.00	5.00	2.01	1.18

The difference between the scores of the breathy voiced consonants is marginally (in)significant (F=2.859, p=.06). There is no big difference between the mean scores of the three sounds. This shows that the participants are poor in producing these three Saraiki breathy voiced consonants. Overall, the mean scores are between 1 and 2. According to the scale used for evaluation, a score of 1 was awarded for a thoroughly inaccurate production. In other words, a score of 1 indicates total loss of a sound. In the evaluation, a score of 2 stands for 'different from natives but understandable'. The results show that except for alveolar breathy voiced nasal [n^{h}] other two sounds are *almost* extinct from the phonemic inventory of the participants. The alveolar nasal is also getting lost. The results of the plain (non-breathy voiced) nasals are given in the following table.

Table 5: Overall results for plain (non-breathy-voiced) nasal consonants

Sound	Minimum	Maximum	Mean	Std. Deviation
[ɲ]	1.00	5.00	2.52	1.33
[ŋ]	1.00	5.00	3.48	1.19

Sound	Minimum	Maximum	Mean	Std. Deviation
[ɲ]	1.00	5.00	2.52	1.33
[ŋ]	1.00	5.00	3.48	1.19
[ɳ]	1.00	5.00	3.92	1.30

The difference of mean scores for these consonants is strongly significant (F=51.509, p.<0001). The mean values show that the participants have scored the highest in production of retroflex nasal [ɳ] and the lowest in production of alveo-palatal nasal [ɲ]. A score of 4 indicates 'near native-like' production. The average production of the participants is 3.92 for retroflex nasal [ɳ] which indicates that overall the participants are closer to the near-native level in production of the retroflex nasal. The following table shows results for fricatives.

Table 6: Over-all results for fricatives

Sounds	N	Minimum	Maximum	Mean	Std. Deviation
[x]	118	1.00	5.00	2.21	1.41
[ɣ]	118	1.00	5.00	2.62	1.47
[z]	118	1.00	5.00	3.65	1.42

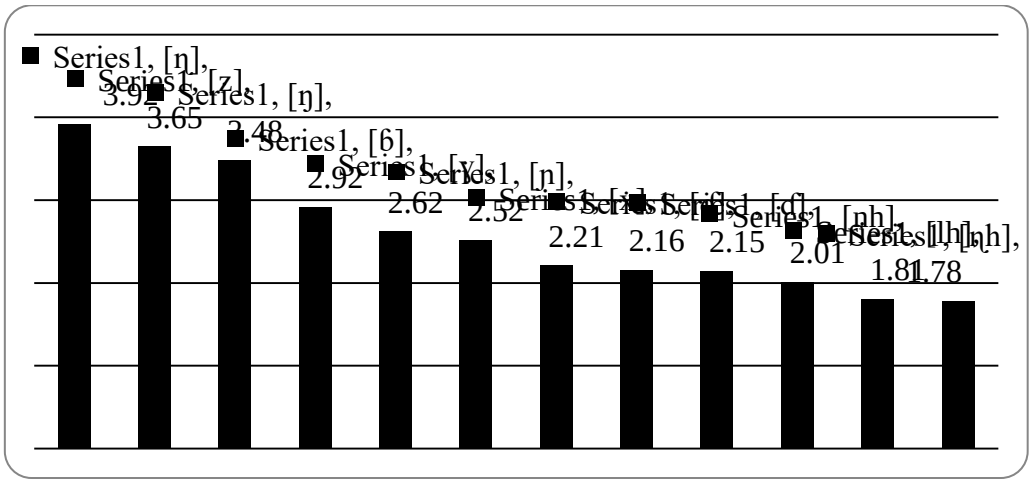
The above table shows the scores of the participants for [x] are lesser than for [ɣ] and those for [z] are more than for [ɣ]. A pair-wise parametric analysis confirms that the scores for voiced [ɣ] and voiceless velar [x] (t=-3.107, p=.002) and those for coronal [z] and velar [ɣ] (t=7.431, p>.0001) are significantly different from each other. The results confirm that the participants are losing voiceless [x] before voiced [ɣ], and velar [ɣ] before coronal [z]. The following table shows overall results of implosive sounds.

Table 7: Overall results for implosives

Sounds	Minimum	Maximum	Mean	Std. Deviation
[ɓ]	1.00	5.00	2.92	1.31
[ɗ]	1.00	5.00	2.15	1.20
[ɠ]	1.00	5.00	2.16	1.18

Table 7 shows the scores obtained by the participants in production of implosive sounds. A maximum possible score was 5 which was given on ideally accurate productions and the minimum possible score was 1 which was given on a thoroughly inaccurate production. These results show that the participants are worse on coronal and dorsal implosives than on the labial implosive. A parametric test confirms that the overall difference between the scores at different places of articulation is highly significant ($F=45.64$, $p<.0001$), however further post hoc pair-wise comparisons show that the difference between the mean scores obtained by the participants in coronal and velar implosives is non-significant ($p>.1$). Thus, the results indicate that the participants are going to lose labials lastly and dorsal and coronal implosives before labial implosive. This shows that the performance of the participants is relatively significantly less poor on bilabial implosive. The cumulative results for all consonants studied in the experiment are given in the following figure.

Figure 1: Overall performance of the participants



The figure 1 reveals that overall only three sounds could obtain a score between 3 and 4 and none of the sounds could obtain more than 4. A score of 4 was awarded to a

'near native-like' production and 3 to a production which was rated as *'different from natives but understandable*'. Thus only three sounds in the L1 phonemic inventory of the participants are rated as closer to or near native-like category. The figure confirms that all target sounds are attriting. However, they are not attriting from the phonemic inventory of the participants simultaneously at the same speed. There is a specific direction of loss. The two sounds which are common in Hindi and Saraiki namely retroflex and velar nasal are among those (along with [z] which have won the highest scores in this evaluation. The reasons will be discussed in the following sections in detail.

The figure 1 presented an overall picture of direction of language loss. For a detailed analysis we counted the frequencies of the participants lying in different categories. Let us recall that the evaluation was based on a five point Likert scale given above. The table 8 presents a detailed view of how many participants lie in each category in production of the sounds.

Table 8: Number of participants in each category

consonant	1	2	3	4	5	Missing
[ɳʰ]	63	27	14	09	2	3
[lʰ]	49	34	29	5	1	0
[nʰ]	49	22	18	10	4	15
[ɲ]	31	28	22	23	13	1
[ŋ]	13	10	20	56	18	1
[ɳ]	11	7	10	36	53	1
[x]	51	10	19	11	27	0
[ɣ]	41	20	21	17	19	0
[z]	17	11	20	20	50	0

[ɓ]	26	19	21	39	13	0
[ɗ]	48	22	27	16	5	0
[ɠ]	47	24	22	21	4	0

For further clarity, we summed up the number of participants who got 1-2 scores and those who got 3-4 scores together. On the scale used for evaluation, 1 denotes absolute loss and 2 means 'hard to understand' as the target sound. Those participants who earned 1-2 scores have *almost* lost the target sounds from their L1 phonemic inventory. Similarly, 3 denotes 'different from natives but understandable' and 4 denotes 'near native-like' which also means different from natives. Thus the candidates who obtained 3-4 scores show that they are on the way to lose their L1 sounds. And those who have scored greater than 4 points in the evaluation are those who have retained the target sounds. The summary of cumulative scores according to this classification is given in the following table. As the table 8 shows, there were missing values in some of the cases, so we converted the numbers into percentage.

Table 9: Participants who have lost/retained/or are losing the target consonants

Consonant	**Lost**	**Losing**	**Retained**
[ɳ^{h}]	78.26	20	1.74
[l^{h}]	70.34	28.81	0.85
[n^{h}]	68.93	27.18	3.88
[ɲ]	50.43	38.46	11.11
[ŋ]	19.66	64.96	15.38
[ɳ]	15.38	39.32	45.3
[x]	51.69	25.42	22.88
[ɣ]	51.69	32.2	16.1
[z]	23.73	33.9	42.37
[ɓ]	38.14	50.85	11.02
[ɗ]	59.32	36.44	4.24
[ɠ]	60.17	36.44	3.39

The table shows that more than 40% of the participants have retained Saraiki [z] and [ɳ] with native-like accuracy and 22.88% of them have [x] with native-like accuracy. Besides, more than 10% (but less than 17%) of the participants have also retained palatal nasal [ɲ], labial implosive [ɓ] and velar fricative [ɣ] with native-like accuracy. The remaining participants have either lost or are losing the target sounds. The four evaluators were also asked to determine the direction of change of the target Saraiki consonants. The following table shows the direction of convergence as unanimously determined by the evaluators.

In the following table, the phonological features involved in the convergence are also noted in column 3. It is important to note that all the sounds listed in column 3 also exist in Hindi. But this must not prompt us to jump to a conclusion that the sole reason of the loss is the dominant language i.e. Hindi. There may be other reasons for this. The substitution of [x] to [k] was noted in only a few cases. In most of the cases, those participants who could not produce [x] accurately substituted it with aspirated velar [k^h].

Table 10: Direction of convergence of Saraiki consonants

S. No.	Saraiki sound	Convergence	Feature involved
1.	[ɳ^h]	[ɳ]	[breathy voiced]
2.	[l^h]	[l]	[breathy voiced]
3.	[n^h]	[n]	[breathy voiced]
4.	[ɲ]	[ɟ]	[nasal] [sonorant]
5.	[ŋ]	[g]	[nasal] [sonorant]
6.	[ɳ]	[n]	[retroflex]/[anterior]
7.	[x]	[k] [k^h]	[continuant]
8.	[ɣ]	[g]	[continuant]
9.	[z]	[ɟ]	[continuant], [ant, dist]

10	[ɓ]	[b]	[constricted glottis]
11.	[ɗ]	[d]	[constricted glottis]
12.	[ɠ]	[g]	[constricted glottis]

5. Analysis and discussion

To reach a refined conclusion of these results, we analyze the whole data keeping in view the research questions in the following sub-sections. This section is divided into six subsections. In these subsections, the above data have been analyzed with reference to the role of factors like dominant language, gender, frequency of use, linguistic environment, age, and attitude of speakers in language loss.

5.1. Dominant language and attrition

Dominant languages play a vital role in language death. In the current context, the participants are found to perform better in three consonants which exist in Hindi also. Besides, they performed better in the production of retroflex nasal which occurs in Hindi most of all. Thus the current study confirms the role of dominant language in attrition of a moribund language. The non-coronal alveo-palatal nasal is the most unmarked among all nasals under study in this experiment. But the participants were the worst in accurate production of this sound. On the other hand, retroflex nasal which is more complex was produced most accurately by them. Similarly, velar place of articulation is more marked but the participants were better in velar nasal than alveo-palatal nasal (coronal). These results indicate that the role of a dominant language is stronger than that of universal markedness in language attrition. The participants are better in those more marked sounds which exist in the phonemic inventory of the dominant language Hindi but they are weaker in relatively more unmarked sounds which do not exist in the consonant phonemic inventory of Hindi. The sounds which exists in the dominant language, regardless of the level of markedness, are either retained by speakers or seem to last longer than the other sounds.

5.2. Gender in language loss

Almost half of the participants of this study were male and half of them were female. To identify the role of gender in language attrition was also one of the objectives of this study. The following table shows scores obtained by male and female participants in the production of the target sounds. The scores which are significantly different from each other are highlighted bold. We had two generations of participants in this study and both had male and female participants. Therefore, two variables namely gender and generation are considered in the analysis.

The difference between the scores of male and female participants for implosives is highly significant ($F=24.10$, $p<.001$). This confirms that male participants are better than their female counterparts in retaining their L1 implosives.

The role of gender is non-significant in the production of all breathy voiced nasal sounds. The interaction between non-breathy voiced nasal consonants and gender is significant ($F=4.371$, $p=.014$) but all other two or three-way interactions are also non-significant. This means that there is no difference in breathy voiced sounds between the pronunciation of male and female participants. The difference between the mean scores of male and female participants for the retroflex nasal is significant ($t=2.353$, $p=.020$) statistically but non-significant for dorsal and palatal ($p>.1$) nasal. A repeated measures ANOVA shows gender ($F=.845$, $p=.360$) has no significant effect on the pronunciation of [z]. There is no two-way interaction ($p>.1$) between gender and generation in the production of [z]. This confirms that there is no difference between male and female speakers in their production of [z]. The effect of gender ($F=5.772$, $p=.018$) is significant for [ɣ] but there is no interaction between gender and generation ($p>.1$). Similarly, the effect of gender ($p>.1$) is also not significant on the production of [x] with no interaction between gender and generation ($p>.1$). This means that there is no difference in the performance of male and female participants for these sounds. During the native evaluation, it was also observed that the participants who did not produce the target sounds of Saraiki [z x ɣ] accurately converged to the Hindi sounds [ʤ k^h g], respectively.

Table 11: Gender-based results

Sounds	Male	Female
[ɳʰ]	1.75 (1.09)	1.66 (0.81)
[lʰ]	1.97 (0.92)	1.81 (1.02)
[nʰ]	2.04 (1.10)	1.98 (1.26)
[ɲ]	2.53 (1.21)	2.52 (1.45)
[ŋ]	3.57 (1.06)	3.39 (1.31)
[ɳ]	**4.28 (1.13)**	**3.56 (1.36)**
[x]	2.31(1.33)	2.09 (1.49)
[ɣ]	**3.03 (1.57)**	**2.13 (1.21)**
[z]	3.55 (1.47)	3.68 (1.37)
[ɓ]	**3.39 (1.11)**	**2.44 (1.34)**
[ɗ]	**2.57 (1.19)**	**1.71 (1.04)**
[ɠ]	**2.56 (1.26)**	**1.75 (0.94)**

Our main concern in this section is gender. Overall, the effect of gender is significant for voiced velar fricative [ɣ], three implosives and retroflex nasal [ɳ]. For all other sounds, the effect of gender is non-significant. A careful look at the results given in the above table shows that in the production of all these sounds, the male speakers have obtained better scores than female participants. It means the female participants are losing these sounds before their male counterparts. Apparently it seems strange because in the Asian society with male dominance as its prominent social norm, male speakers have more opportunities to come across speakers of other languages whereas females have to sit in homes for relatively longer time than their male counterparts. This unexpected trend in language loss is because females are more innovative than males. Therefore, they may be quicker than male counterparts to adopt Hindi language. Another reason for this is that females have to grow up their children. The

Delhiite Saraiki speakers realize that it is need of time that their sons and daughters acquire the dominant language Hindi as L1. Therefore, the female participants seem to be more responsive than their male counterparts to the demand of adopting Hindi as the L1 instead of Saraiki.

The scores of the male participants for all (except one i.e. retroflex nasal) sounds are also below 4 which means that they are also losing these sounds but their female counterparts are faster in convergence towards Hindi. Only in the production of retroflex nasal, the male participants have acquired more than 4 score which shows that they are between *native* and *near native* stage in the production of this sound. According to Schmid (email communication), in such situations as is the current scenario, it is very difficult to tease apart the effect of gender and sex. Therefore, there are not many studies on the role of gender and language loss. This issue also needs further investigation.

5.3. Effect of linguistic environment on language loss

The following table provides mean scores of those who migrated from Pakistan to India and their progeny who were born in New Delhi[2]. The migrants were born in pure Saraiki speaking monolingual environment but their progeny were born in a multi-lingual Hindi dominant linguistic environment of Delhi. A comparison of the performances of the two groups will help in identifying the effect of dominant linguistic environment on language loss.

The difference of scores between the two groups is strongly significant ($F=4.771$, $p=.031$) for breathy voiced nasals. The interaction between the breathy voiced consonants and grouping is also significant ($F=3.613$, $p=.029$). The group difference is significant ($t=2.093$, $p=.039$) for retroflex nasals. For the other two nasal sounds namely alveo-palatal [ɲ] and velar nasals [ŋ], the difference is non-significant ($p>.1$). The interactions are also non-significant. These results confirm that the pronunciation of the migrants is better than their sons and daughters for breathy voiced nasal sounds. A repeated measures ANOVA shows that generation has a very significant effect for [z] ($F=8.732$, $p=.004$), [ɣ] ($F=21.807$, $p>.0001$) and [x] ($F=4.913$, $p=.038$). During the

[2] Since there are many consonants under study, a cumulative quantitative test may show the differences significant. Therefore, significant tests are applied on small sets of consonants which belong to the same class.

native-evaluation it was also observed that the participants who did not produce the target sounds of Saraiki [z x ɣ] accurately were inclined to converge to the Hindi sounds [ʤ k^h g], respectively. The difference between the scores of the migrants and their progeny is also strongly significant (F=16.89, p<.0001) for implosives. The following table shows the mean scores of the two groups for the target consonants. Those data for which the group difference is significant, are highlighted bold.

Table 12: Generation-based results

Sounds	Migrant	Delhi-born
[ɳ^h]	**1.76 (1.01)**	**1.57 (0.76)**
[l^h]	**2.08 (0.92)**	**1.78 (1.11)**
[n^h]	**2.31(1.22)**	**1.80 (1.09)**
[ɲ]	2.76 (1.26)	2.30 (1.36)
[ŋ]	3.63 (1.69)	3.34 (1.20)
[ɳ]	**4.06 (1.30)**	**3.80 (1.29)**
[x]	**2.83 (1.43)**	**1.62 (1.12)**
[ɣ]	**3.15 (1.48)**	**2.06 (1.25)**
[z]	**3.94 (1.35)**	**3.31 (1.43)**
[ɓ]	**3.31 (1.21)**	**2.55 (1.31)**
[ɗ]	**2.59 (1.28)**	**1.73 (0.95)**
[ɠ]	**2.47 (1.18)**	**1.87 (1.11)**

In summary, the effect of generation is significant on implosives, fricatives and retroflex nasal [ɳ]. The above table shows that in all these sounds, the scores of the migrants are higher than their sons and daughters. However, except for retroflex nasal, in all other sounds, the scores of the migrants is also less than 4. This confirms

that the migrants are slower in losing their L1 than their sons and daughters. However, both the migrants and their progeny *are* losing their L1 consonants.

5.4. Critical period for language acquisition and loss

The age of migrants was between 4 and 21 years at the time of migration. Thus, some of these were in the critical period for language acquisition and others were beyond that period at that time. Normally, it is assumed that the critical period ends at the age of 13 (Lenneberg, 1967; Patkowski, 1990; Penfield & Roberts, 1959; Scovel, 1988). The participants who migrated to New Delhi were divided into two groups. In one group were those who were above the age of 13 at the time of migration and the other group comprised of the participants who were below the age of 13 at that time. It is assumed that those who were of 13 years of age or below were in the critical period of language acquisition and those who were above that age, were beyond critical period of language acquisition. In all, 18 participants of the migrant group were beyond their critical period of life and the remaining 39 were below the critical period at the time of migration. The mean scores of both groups for all target sounds are given in the following table. Those mean values which are significantly different from each other are highlighted bold.[3]

Analyses show that there is no significant effect of age on the performance of the migrants for dorsal implosive [ɠ], voiced coronal fricative [z], all breathy voiced consonants and plan nasals. The effect of age on attrition of labial [ɓ] (t=-2.86, p=.004) and coronal implosive [ɗ] (t=-2.44, p=.015) and for fricatives [x] (t=-2.270, p=.028) and [ɣ] (t=-2.792, p=.008) is significant. Most of these are the sounds in which the participants have shown better performance. In other words, the participants are still in the process of language loss for these sounds. Whereas most of the other consonants have either already been deleted are still quite alive in the phonemic inventory of both groups of participants. The results confirm that critical period of language acquisition has some effect on language loss. It has been called incomplete maturation. Those participants who were in the critical period of their life were immature in that they had not fully acquired their L1. Thus they converged to another language with relatively more ease than those who had acquired their L1

[3] Standard deviations are given in parentheses.

thoroughly. But since both groups are losing their L1, we may infer that an L1 once acquired may be lost due to certain reasons.

Table 13: Critical Period Effect

Sounds	Within CP[4]	Above CP
[ɳʰ]	1.79 (1.04)	1.61 (0.92)
[lʰ]	1.97 (0.95)	2.30 (0.88)
[nʰ]	2.38 (1.30)	2.00 (0.91)
[ɲ]	2.63 (1.26)	3.00 (1.18)
[ŋ]	3.51 (1.17)	3.95 (1.22)
[ɳ]	3.96 (1.31)	4.24 (1.27)
[x]	**2.41(1.40)**	**3.32 (1.22)**
[ɣ]	**2.91(1.41)**	**4.06(1.29)**
[z]	3.80(1.51)	4.23(1.03)
[ɓ]	**2.99 (1.19)**	**3.92 (1.02)**
[ɗ]	**2.29 (1.23)**	**3.15 (1.22)**
[ɠ]	2.34 (1.22)	2.73 (1.08)

5.5. Frequency of use

One of the questions asked in the interview from the respondents was 'how many hours do you speak Saraiki?' A Spearman's correlation test was applied to determine correlation between number of hours they speak Saraiki and accuracy in their pronunciation. The results show that there was no correlation between frequency of use and pronunciation of the participants for all target sounds. Another correlation test

[4] CP stands for critical period. In the second column are the mean scores of those emigrants who were within critical period of their life and in the third column are the means scores of those who were beyond the critical period in 1947 at the time of migration.

was applied on the scores of migrants only, with a view that they had acquired Saraiki in a monolingual setting so there is a probability of correlation between the number of hours they speak Saraiki and accuracy in their pronunciation. The results show that there is medium to small size positive correlation between frequency of use and four of the target sounds. The results are given below in table 15.

Table 15: Correlation between frequency of use of a language and accuracy

S. No.	Sound	Spearman's rho	p (two-tailed)
1	[ɣ]	.293	.028
2	[ɓ]	.271	.044
3	[ɳ]	.311	.021
4	[ŋ]	.308	.022

These results show that in most of the cases, there is no correlation between language use and language loss. It is also important to note that the correlation is significant for only those consonants which the participants have not yet lost thoroughly. For those consonants which have been lost or which are closer to total loss, frequency of use does not seem to have any strong effect. These results confirm a very minor influence of frequency of use of a language on attrition of that language.

6. Summary of findings and conclusion

First of all, we summarize the findings of this study one by one in the following paragraph.

1. There was no significant correlation between the number of hours the participants speak Saraiki and their accuracy in pronunciation of the Saraiki nasal consonants. An important factor in this regard is that they speak Saraiki among themselves because there are no other communities of native speakers of Saraiki in Delhi. They are cut off from their origin (Pakistan) where standard Saraiki is spoken. It is also a language which does not have media channels in India. Thus the participants themselves are the only source of listening Saraiki for themselves. Since they themselves are converging to Hindi, their input is not accurate. Thus an inaccurate input of L1 does not help in

protecting one's L1. This supports the view that the L1 spoken in the L2 environment does not accrue any benefit to the L1 speakers (Schmidt, 2012).

2. The results also confirm that contribution of a dominant language rather than universal markedness, is more effective in attrition of an L1. The participants are losing only those sounds which do not exist in the dominant language. They performed their best in the production of retroflex nasal which is a part of phonemic inventory of Hindi. The findings also indicate that more frequent occurrence (i.e. functional load) of the target sounds in the L1 and L2 is an effective resistant to language obsolescence. Although retroflex nasal is more complex, the performance of the participants is better in its production than velar nasal (despite the fact that velar nasal exists in all three languages (Saraiki, Hindi and English) which the participants speak). Since the performance of the participants is better in velar nasal (a non-coronal nasal) than alveo-palatal nasal (a coronal sound), the better performance of the participants in production of retroflex nasal (another coronal) may not be ascribed to the universal un-markedness of coronal sounds. Actually, the participants performed better in retroflex nasal because retroflex nasal occurs more frequently than velar nasal in Saraiki and Hindi. This supports the idea that a high functional load also resists L1 attrition (Babel, 2008).

3. The way the participants of this study pronounced the target words and the direction of loss shows a drift of phonetic categories of L1 consonants towards those of the corresponding L2 Hindi sounds. In other words, Saraiki vocabulary exists in the minds of the Saraiki speakers of Delhi but they have lost the phonemes from their phonemic inventory. The attriters may be slow in naming low frequency words but Schmid (2013) ascribes this to the system load on bilinguals and not particularly to language attrition.

4. Incomplete acquisition of L1, context of learning L1 and critical period have a very effective role in language loss. Those participants who were in the critical period of their first language acquisition or had not completely acquired their mother tongue at the time of migration have retained/lost their consonants as compared to those who were beyond the critical period of language acquisition at the time of migration and had already acquired their mother tongue. Similarly, sons and daughters of the migrants who were born in natural bilingual environment were better in replacing

Saraiki with Hindi as compared to their parents who started listening/learning Hindi in adult age after they had acquired Saraiki as their mother tongue.

5. The results of this study also indicate that females are more inclined to adopt a dominant language and lose a dominated L1 as compared to their male counterparts.

Appendices

Consonant phonemic inventory of Hindi (Shapiro, 2007)[5]

	Laryngeal	**Labial**	**Dental**	**Retroflex**	**Palatal**	**Velar**	**Uvular**	**Glottal**
Plosive	voiceless aspirated voiced breathy voiced	p p^h b b^h	t̪ $t̪^h$ d̪ $d̪^h$	ʈ $ʈ^h$ ɖ $ɖ^h$	c c^h ɟ $ɟ^h$	k k^h g g^h	q	
Fricative	voiceless voiced	(f)	s (z)	ʂ	ʃ	(x) (ɣ)		h (ɦ)
Nasal		m	n	ɳ	ɲ	ŋ		
Flaps	plain voiced breathy voiced			ɽ $ɽ^h$				
Tap				r				
Lateral			l					
Approx.		v			j			

[5] The inventory is adapted from Shapiro (2007) who has inserted a footnote that the loan phonemes have been given in parentheses.

Consonant Phonemic Inventory of Saraiki (Syed, 2013)

	Laryngeal	**Lab**	**Dental**	**Alveolar**	**Retroflex**	**Alveo-platal**	**Velar**	**Glottal**
Plosive	Voiceless Aspirated Voiced Breathy voiced	p p^h b b^h	t̪ $t̪^h$ d̪ $d̪^h$		ʈ $ʈ^h$ ɖ $ɖ^h$	c c^h ɟ $ɟ^h$	k k^h g g^h	
Implosive		ɓ		ɗ		ʄ	ɠ	
Fricative	voiceless voiced	f		s z		ʃ	x ɣ	ɦ
Nasal	plain voiced breathy voiced	m m^h		n n^h	ɳ $ɳ^h$	ɲ $ɲ^h$	ŋ	
Flaps	plain voiced breathy voiced			r r^h	ɽ $ɽ^h$			
Lateral	plain voiced breathy voiced			l l^h				
Semi-Vowel	plain voiced breathy voiced	ʋ $ʋ^h$				j		

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