Universal Restrictions on Syllable Structure: Evidence from Sindhi

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ABSTRACT: Across the world, natural languages prefer onset with large sonority distances to those with smaller distances (e.g., bw-bd--lb). And certain preferences are extended even to those languages which lack initial CC clusters. Are Sindhi speakers sensitive to onset sonority hierarchy? Does voicing difference play any role in perception and production of speakers? To approach these questions, here, we move to Sindhi, a cluster poor language. The reason was given by us that, in case, Sindhi native speakers were found sensitive to onset sonority hierarchy, then ill-formed onsets should be repaired into well-formed ones (e.g., lbif →lebif), the worse-formed the onset, the more likely its repair, henceforth, its misidentification. To scrutinize these questions, the current study presents a corpus of data from Sindhi language illustrating the universal restrictions or language universals and typological range of variation among certain kinds of consonant clusters in syllable- initial position for instance, "bl" in block. The case study consists of two experiments: first experiment short or long judgment task (participants were directed to notify each stimulus as 'short' or 'long') and second experiment identity judgment task (participators were directed to judge the item whether it is "identical" or "non-identical") are followed. Auditory stimuli were recorded by a Pashto speaker. In Pashto language all types of onset clusters are attested. Participants were 20 native-Sindhi speakers and 20 Pashto students from Lasbela University in Pakistan. Results were coherent with the hypothesis, the current study displays universally dispreferred onset clusters are more frequently misperceived than universally preferred ones. The current findings suggest that the Sindhi speakers were found sensitive to onset sonority hierarchy and voicing remained significant in perception but insignificant in production.

Keywords: *ill-formed, clusters, misperception, onset, sonority, dispreferred*

1. Introduction

World languages have inclination to follow their mechanism naturally, for instance syllables like blif are more regular as compare to lbif (Berent et al. 2017; Greenberg 1978). In this scenario, a group of global restraints is shared on syllables structure by all languages (Prince and Smolensky, 2004). Syllables like blif are illicit-formed, therefore; they are disliked by people and underrepresented across languages. In contrast, the restraints on syllable structure arise merely from the sources other than linguistics. In fact, syllables such as blif are considered more common or effortless to utter and comprehend (Blevins 2004). Might be persons' priorities not mirrored by global linguistic restraints but rather their shared experience, acoustic and articulatory pressures (Liberman et al. 1967). Sonority is illustrated by linguistic account as a speculative phonological characteristic of segments that relate with acoustic intensity (Clements 1990). Universal preference of sonority is as: Stops (Δs = 1), fricatives (Δs = 2), nasals (Δs = 3), liquids (Δs = 4) and glides finally (Δs = 5). Syllables like blif are given priorities across languages over illicit syllables lbif is because of the emanation from global linguistic restraints on sonority distance (Δs) (Greenberg, 1978; for farther relevant investigation view). It is

predicted by the study that there should be activeness of restraints in all persons regardless of syllables' presence or absence in their language (Prince and Smolensky, 2004). Similarly, our former finding shares that sensitivity has been found among the speakers of distinctive languages on initial clusters that are never ever have been heard by them previously.

1.2. Misidentification of Ill-Formed Clusters: Phonological or Phonetic

It is a matter of worth value that what are the possible reasons that certain clusters are hierarchically under-represented and perceived inaccurately by the speakers of language? One of the very common possibilities is that it is because of grammatical ill-formedness. However, a contrary illustration, merely acoustic characteristics are mirrored by the certain clusters. For instance, onsets like*lbif* may be ambiguous with *lebif* for the reason that the acoustic clues for the sonorous l (in lbif) are ambiguous with those of the pretonic vowel *e* in *lebif*. A completely contrary argument on a plainly auditory illustration for this anomaly has been given by the Berent et al. (2017). According to their views, speech words are encoded in two forms: a phonological form and a phonetic form. The misidentification of illicit onsets is not because of a failure to encode their phonetic characteristics from the auditory clues but misidentification of illicit formed onsets gives the reflection of their phonological repairing by the grammar. This opinion is supported by the two arguments. First, when task requires boost participators to appear to phonetic detail (especially, to the existence of the pretonic vowel in the auditory input), persons have an ability to recognize extremely illicit-formed *lbif* sort of clusters exactly- as exactly as they recognized their well-formed *bdif*sort of counterparts. In accordance with, the typical misidentification of illicit-formed onsets could not be merely because of a failure to encode their phonetic characteristics from the auditory clues but misidentification of illicit formed onsets gives the reflection of their phonological repairing by the grammar such as the repairing of *lbif* into *lebif*). Illicit-formed onsets are generally recognized inaccurately by the persons because phonological representations are typically based by their reposes. Whereas, phonetic encoding is boosted by the conditions could impact a switch from the fault dependence on phonological representation to the examination of the phonetic format. By discovering that certain conditions support alike correctness in the process of better-formed and illicit-formed clusters proposes that it is not inevitably that the illicit-formed onsets have wrong phonetic representation. However, a second argument totally contrary on a plainly phonetic failure is offered by studies proposing that the processing of disyllabic counterparts is affected by hatred to

illicit-formed onsets. When it was enquired to judge whether input have two or one syllable, the participators were found considerably more accurate with *lebif* as compare to *benif*.

1.3. Sindhi language

‘‘Sindhi is an Indo-Aryan language with its roots in the Lower Indus River Valley. It is widely communicated in Pakistan, particularly in Sindh.

Many researchers such as Grierson (1919: 01) classified Sindhi as belonging to a northwestern sub-group of Indo-Aryan, under the Indo-Iranian branch of Indo-European family.

Indo-European
\
Indo-Iranian
\
Indo-Aryan
\
Northwestern group
\
Sindhi

It was an estimated that roundabout 30-40 million people (projected from 1981 census data) communicate Sindhi worldwide (http://www.outreach.uiuc.edu).Moreover, a great number of Balochistan. Even, a considerable population of Sindhi-speaking people in Iranian Balochistan adjoining to the northwestern border of Pakistan with Iran.

1.4. Dialects of Sindhi Language

There are total six dialects of Sindhi language. The Vicholi (middlemost) a standard dialect of Sindh, Thareli, Lasi, Lari, Kachchi and Siraiki.

1.5. Research Questions

1. Are Sindhi speakers sensitive to onset sonority hierarchy?
2. Do Sindhi speakers misperceive generally infrequent onset clusters as compare to universally more-frequent ones?
3. Does voicing difference play any role in perception and production of speakers?

2. Literature Review

2.1. Syllable Structure

A syllable maximally consists of three parts: onset, nucleus and coda. The syllable holds two branches attached by Onset (O) and Rhyme (R). Further, Rhyme (R) branches into Nucleus (N) and Coda (Co). The onset (O) and coda (Co) are consonants, which are occupied at the starting and final position of the syllable. The core of the syllable is formed by the nucleus. Let us have a look at ‘‘cat ’’, rhymed is formed by [at].The example of syllable structure has been demonstrated through tree diagram below:

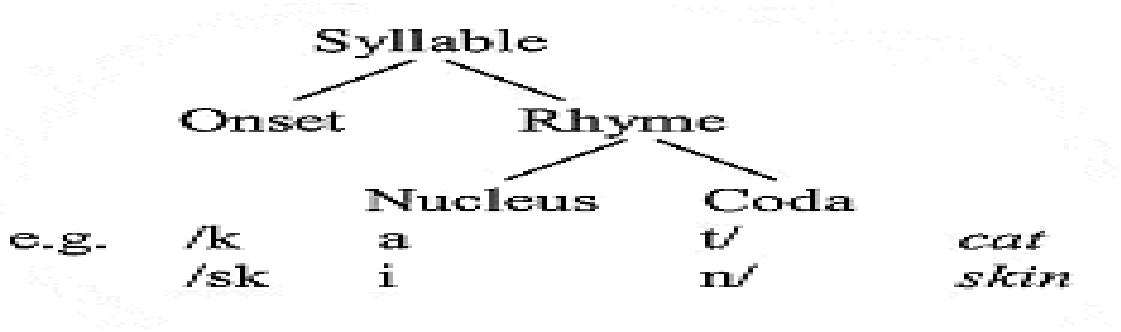

Figure 2.1: Syllable Structure via tree diagram

For instance, in the word ‘‘cat’’ [c] is the syllable onset, [a] is the nucleus and [t] is the coda. It is not necessary that a syllable must have an onset or coda. It depends upon language; however, the presence of nucleus is necessary. If a coda is present in a syllable, then a single unit is formed by the nucleus and the coda which is known as a rhyme; otherwise the rhyme is made up by nucleus itself.

2.2. Sonority

Sonority and the syllable are interconnected to each other. A syllable is a phonological unit of sonority. Phonetically, a strong disagreement has been observed among the researchers’ opinions whether sonority should be defined through a single phonetic parameter such as loudness of a specific sound or perceptual salience (Ladefoged, 1993); or the volume of airflow resonance chamber (Bloch et.al.1942, Goldsmith 1995); or whether its interpretation should be made through multiple phonetic parameters (Ohala et.al.1984; Ohala 1990). Phonologically, issue rotates, instead, upon whether sonority should be a phonological primitive in the form of a multi-

valued feature (Foley 1972; Selkirk 1984), or whether it should be derivable from the more fundamental binary features of phonological theory (Clements 1990). Furthermore, scales are formed on the basis of the observed typology of syllable scheme in a language particular way (Steriade1982; Davis, 1990).

2.3. Sonority scale

Most sonorous	5 Vowels			*	
	4 Approximants		*		
	3 Nasals				
	2 Fricatives				*
Least sonorous	1 Stops	*			*
k	l	a	s	p	

Figure: 2.2: Sonority scale

Sonority is the loudness of a sound having relation to other sounds. Sonority of a sound is shown in relation to other sounds by a sonority scale. Broadly, there is only a single universal sonority scale which is general to all world languages(Selkirk 1984; Clements 1990); or world languages individually have their particular sonority scales and certain degrees of freedom are possessed by the languages in the task of sonority values to their segments (Steriade 1982). Very interesting differences are taken among segments through sonority-independent frameworks, i.e. voicing, coronality etc. A universal sonority scale has been given by Clements, here non-syllabic segments solely comprised on the four major natural classes of sounds which are: obstruents, nasals, liquids and glides) ranged from minimum sonority to maximum sonority, as mentioned below:

1. O < N < L < G

However, Butt also gave sonority scale which is distinctive from Clements's sonority scale. In Butt's sonority scale distinctive values have been assigned to the voiced and voiceless obstruents. Here is a Butt's universal sonority scale:

2. Voiceless O < Voiced O < N < L < G < V

Moreover, some differences were also observed among the obstruents by and a different universal sonority scale for non-syllabic segments was given by him.

3. p, t, k < b, d, g < f, 7 < v, z, ' < s < m, n < l < r

It is observed by Steriade (1982), that the issue with Selkirk's opinion is that distinctive language appear to exhibit conflicting values to the identical entries on the scale.

2.4. Sonority Sequencing Principle

Briefly, Sonority Sequencing Principle (SSP) is a kind of rule that forms sounds within a syllable in accordance with a set order. The order is led by the sonority, a phonological as well as phonotactical term meaning loudness of sound. Few sounds are less sonorous than others, and the series of sounds are ordered by the sequence of sonority in a syllable. For instance, let us consider the syllable /**pla**/, an ordinary, not only in English but also in several world languages. It is well known that /**a**/ is a vowel, obviously highly sonorous, and it is informed by the SSP that as /**l**/ is closer towards the vowel/**a**/ as compare to consonant /**p**/, hence, /**l**/ is more sonorous as compare to /**p**/; as a matter of fact, it is an obvious case. However, an alternative syllable /**lpa**/ is neither occupied in English nor in most (or even any) languages, here SSP is violated by ill-formed syllable/**lpa**/. It is not just as that /**p**/ should have to come prior to /**l**/, but instead of /**l**/ should be closer to the vowel. The syllable /**alp**/ is very regular, whereas, /**apl**/ is less regular, due to SSP. Sonority rises towards vowel peak and later declines far, as it has been shown below:

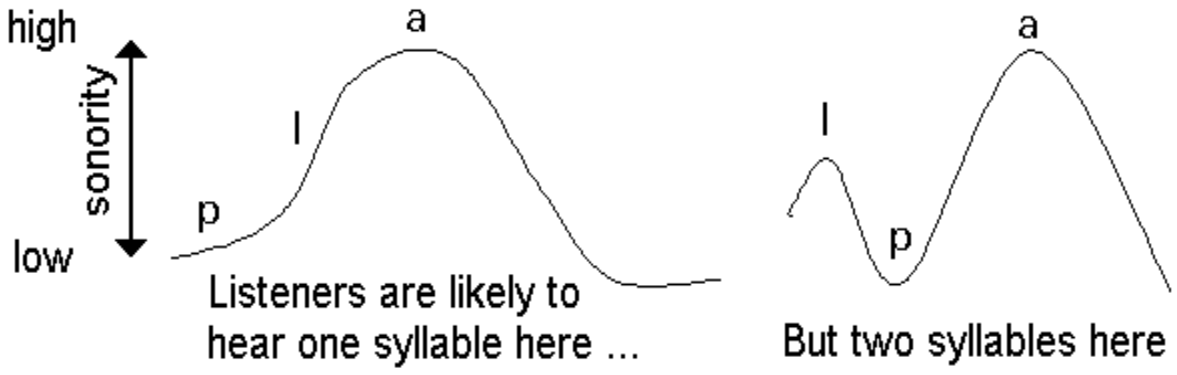

Figure: 2.3: Sonority Sequencing Principle

2.6. Previous studies on Universal Restrictions on Syllable Structure

Generally, why do persons pronounce and perceive successfully the initial consonant clusters such as *'drink'* and *'drive'* as compare to *'rdink'* and *'rdrive'*? It is stated by the present study that certain typologies could mirrored abstract phonological framework that is actively present in the brains of all communicators. This assumption is further strengthen by the statement that very similar convergence of phonological priority *(e.g., dra over rda)* has been observed among the human race in spite of the absence of certain clusters *(e.g., dra, rda)* in their natural languages, moreover, certain behavior is unexplainable merely on the basis of familiarity with the identical syllables and the system of sensorimotor. Apart from these supporting statements and hypothesis, even more supporting claim is there, on the first, the difference between the sensorimotor system and phonology is demonstrated by their dissociation in dyslexia, and, on the second, the transformation of phonological information from aural to vision. The functional framework of typical mind, genuine cause of speech and pattern less language, and phonological system can be explained by a comprehensive interpretation. (Berent, 2017).

Furthermore, another comprehensive study has wonderful findings regarding the hierarchy of universal restraints on the syllable structure from Mandarin Chinese by Xu Zhao and Iris Berent. It is ascertained by the current study that whether sensitivity to the initial syllables is available among Mandarin speakers? Or in other words, are Mandarin Speakers Sensitive to the Onset Hierarchy? Next, is sensitivity of complex onset present among Mandarin speakers? The 16 native Mandarin, college students, participated in both experiments. 16 English-speaking students of Northeastern University served as controls. In the nut shell, the findings were remained stable with the hypothesis of the study. It is recommended by the current study's findings that a vast phonological restraint might be shared by the speakers; however, phonetic factors play a key role in their detection. Now, it is a question of worth attempt that whether the linguistic restraints are the primary cause of the onset hierarchy; or those restraints are really universal, pending for farther studies (Zhao, Berentet al. 2015).

3.5. Conclusion: Hypothesis for the Current Research Paper

Several studies have been conducted on the sonority hierarchy and universal restraints among the speakers of different languages. Our case study will be a worth attempt to ascertain, demonstrate and analyze scientifically similar kind of language phenomena among Sindhi speakers whose language deficits beginning CC clusters from stops to nasals altogether. This study is unique of

its type based on fundamentally sonority distance on initial consonant sequences, onset clusters. The findings of the study will assist linguists in the world of search and research. The main hypothetical questions of the current study are following:

1. Are Sindhi speakers sensitive to the entire sonority hierarchy?
2. Do Sindhi speakers misperceive generally infrequent onset clusters as compare to universally more-frequent ones?
3. Does voicing difference play any role in perception and production of speakers?

3. Research Methodology

The study used Praat (Boersma &Weeninck, 2017) and Prosodypro (Xu, 2017) softwares to achieve Degree of freedom, and syllable duration in the participants' speech. The present research is statistical and analytical in its type that deals its analysis and findings in a quantitative manner. For the accurate research methodology, assistance has been taken from the previous related research methodologies which were adopted by various researchers in their research such as Berent et al. (2007) and Berent et al. (2008). The targeted languages are Sindhi and Pashto. However, there were total forty native speakers in study who were (twenty) native speakers of Sindhi and (twenty) Pashto languages. Two different experiments:

3.1. Data collection

The experiment 1 examined the linguistic priorities of Sindhi and Pashto speakers using a syllable judgment task. First of all, it was found out by the researcher that the illegitimate onset consonant clusters (*bl, sw, ʃw, zw, fr, kl, ʃr, xrsr, xw)* of Sindhi language and then we picked outsome legitimate consonant clusters of Sindhi (*pɽ, pr, tr)* and Pashto (*bl, sw, ʃw, zw, fr, kl, ʃr, xr, tr, pɽ, sr, xw, pr*) languages. Moreover, the illegitimate consonant clusters which were taken by the researchershave level of sonority in the Sindhi language. Through these consonant clusters, thirteen mono (*blif, swap, ʃwek, zwig, frep, klaf, ʃrep, xrum, trig, pɽet, sret, xwar, prem*) and thirteen disyllabic (*belif, sewap, ʃewek, zewig, ferep, kelaf, ʃerep, xerum, terig, peɽet, seret, xewar, perem*) non-words were made by us by inserting schwa */e/* in monosyllabic non-words.
The experiment one was a ''Short or long judgment task''—a proxy for the syllable count procedure which was used in past research in English (e.g., does lbif have one syllable or two;

Berent et al. 2007). And finally, the experiment 2 was an identity judgment task. All non-words were recorded by a male native speaker of Pashto. Pashto allows all syllable types studied in our experiments and those non-words could be produced accurately by a Pashto native speaker. Two lists of non-words were recorded in a single session in a silent room. Twenty six best recorded non-words were selected by a phonologist for both experiments. A set of mini loud speaker was also used while conducting the experiment two: An Identity judgment Task in our methodology of research.

3.2. Experiment 1 Short or long Judgment Task

3.2.1 Participants

Twenty male native-Sindhi speakers and twenty male native Pashto speakers, students from Lasbela University of Agriculture Water and Marine Sciences Uthal, Balochistan, Pakistan. The age of the participants was 21.57 (2.11).

3.2.2. Materials

The materials were corresponded to monosyllabic non-words (*blif*) and thirteen disyllabic non-words (*belif*). Onset clusters were three types in respect of place of articulation: Labial, Coronal, and finally Velar, for example (*blif, swap, xrum*) respectively, that may be seen in Appendices). As the syllable becomes worse in sonority, it is expected errors should increase (e.g., more errors to *"lbif"* relative to *"blif"*.Each stimuli of both list (list 1 mono and list 2 disyllabic non-words) was recorded thrice (per stimulus 1× 3 times repetition × 13 stimuli × 2 types of stimuli = 78 stimuli in total) for accurate finding of the research. The recording of the mono and disyllabic non words was done through Data Recording Device Sony Company, made by China. We were unaware that whether our factitious monosyllables for example (*xrum*) will be represented as two syllables by Sindhi native speakers explicitly or not. There would be shorter form of these stimuli as compare to their disyllabic ones (*xerum*). Accordingly, the participants were directed effectively to notify each and every stimulus as 'short' or 'long'. Our chief focus was that, whether the category of these monosyllables is affected by onset scheme or not. If Sindhi speakers change the onset scheme (*blif >swap >xrum*), then as sonority space becomes less, the likeliness of repairing should grow; therefore, "long" responses should be elicited likely at a greater degree by monosyllables.

3.2.3. Procedure

Before commencing the trial, participants were directed about research goals and its targets thoroughly. Participants seated onchairs in a silent room. There were total two lists of monosyllabic (*blif)* and disyllabic *(belif)* non-words. The recording of native speakers of Sindhi and Pashto were made individually by the researcher. Each stimulus recorded once.An effective practice session comprising on fourteen items in English for example *sport-support*was provided to the participants prior to experiment conduction and proper respond was given on their exactness (accurate and inaccurate reply). Trial order was not randomized.

3.3. Experiment 2: An Identity Judgment Task

3.3.1. Materials

In Experiment 2, the materials were corresponded to the previously mentioned similar items from Experiment 1. However, here the items were randomized systematically into pairs: Half were alike (mono and disyllabic), and half were repair-related for instance (blif-blif; belif-belif); or epenthetically related (blif-belif; belif-blif). Participants heard two items—either identical tokens or non-identical and were directed to classify whether the two components are exactly alike or not. As pair members share alike beginning consonant, and they were presented in very near proximity, their opposite phonological hierarchal order might now become more salient to participators. If talkers are sensitive to onset hierarchal order, then worse formed monosyllables should exhibit greater inclination to be recorded as their disyllabic counterparts (blif→belif). Resultantly, the degree of misidentification should high as sonority distance becomes low. The material was arranged in one list and that contained identity stimuli i.e., Large Rise > Small Rise (blif> *swap*), (e.g., CCVC *blif-blif, swap-swap, xrum-xrum*; CəCVC *belif-belif, sewap-sewap, xerum-xerum* and the list also contained non-identity stimuli i.e., Large Rise > Small Rise (e.g., CCVC-CəCVC *blif-belif, swap-sewap, xrum-xerum*; CəCVC-CCVC *belif-blif, sewap-swap, xerum-xrum*). Both items such as identical and non-identical were appeared simultaneously.

3.3.2. Procedure

An identity judgment task was used. Participants seated near a laptop computer and a mini set of loudspeaker. In a trial, participators were offered with two auditory stimuli and their task was to

judge the item whether it is “identical” or “non-identical” by writing their responses on the given pages clearly. Alike experiment 1, intentionally, it would be very difficult to demonstrate the given task with Sindhi words.

3.4. Analysis of data

Praat software (Boersma et.al.2017) and Prosodypro (Xu, 2017) were used to get Degree of freedom and duration of syllables from recordings. Later, the recordings were moved to MS Excel from the Prosodypro output files. For farther analysis, the data were moved to SPSS files. Degree of freedom (F) and mean syllable duration of onset consonant clusters of Sindhi and Pashto native speakers were compared to see if there is any significant difference or not. The results have been presented and analyzed in subsequent section.

4. Presentation and Analysis of Data

The current study interprets and analyses the Language Universals and Misidentification by Sindhi and Pashto native speakers only on initial onset consonant clusters of their languages. In this respect, degree of freedom and mean syllable duration in the speech of forty native speakers (Sindhi and Pashto) were taken by using advanced computer software.

An analysis of variance (ANOVA) was applied on the selected data to confirm significance of difference between the initial onset consonant clusters of Sindhi and Pashto native speakers’ in production and perception. The tests were applied according to the research questions of the study. The main objectives of the study were to focus the universal confinement on beginning consonant order, onset clusters on Sindhi and Pashto languages and whether native Sindhi speakers are sensitive to the entire sonority hierarchy or not.

4.1. Presentation of Data

The results of these tests will be displayed together with those of the parametric analyses in relation to the research questions in the below sub-sections.

4.1.1 Comparison of Initial Onset Consonant Clusters through Perception and Production in terms of Voice

Do Sindhi and Pashto speakers of Balochistan misperceive generally infrequent onset clusters as compare to universally more-frequent ones? To get the answer of our research question some

tests were conducted by using two types of onset clusters such as mono and disyllabic non-words in respect of place of articulation, voice and group respectively.

4.2. Comparison of Initial Onset Consonant Clusters through Production in terms of Voice (Experiment 1- Short or long Judgment Task)

Table 4.1: Comparison of Initial Onset Consonant Clusters through Production in terms of Voice

Production	Dependent Variables	T	Df	Sig. (2-tailed)	Mean
Pair 1	pr –tr	.065	39	.948	.31764
Pair 2	bl – kl	.954	39	.346	4.76061
Pair 3	sw – zw	.506	39	.616	2.47114

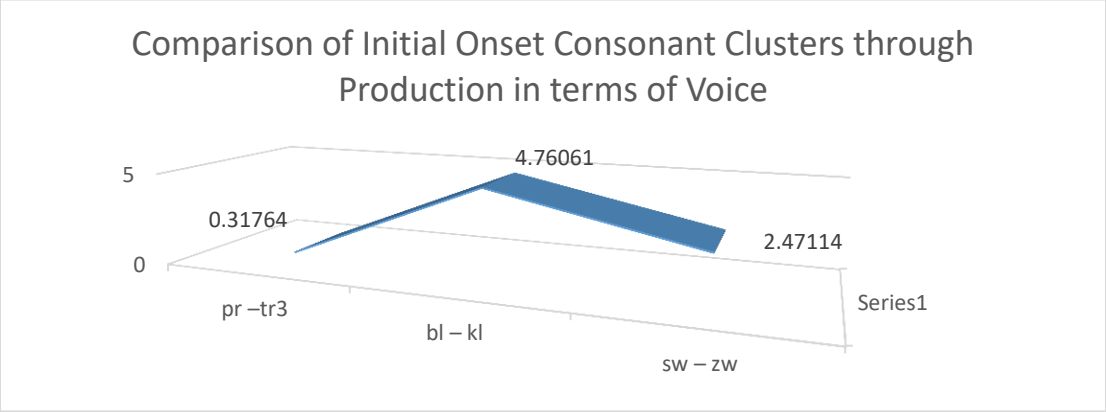

Figure 4.1: Comparison of Initial Onset Consonant Clusters through Production in terms of Voice

The above graph presents a visual picture about the comparison of initial consonant clusters in respect of voicing through production. The graph shows that no any statistically significant difference exists of initial onset consonant clusters in the values of above mentioned pairs.

In Table 4.1, the comparison of initial consonant clusters has been done in respect of voicing through perception. Evidently, no any significant effect of initial onset consonant clusters has

been observed in the values of above mentioned pairs statistically. It means voice feature contrast has no any effect of the initial consonant clusters in respect of perception. The findings of perception and production share totally deviate results from each other in terms of voice feature. The fundamental reason of these deviate results is intrinsic restrictions of the short or long syllable judgment task in Production (in Experiment 1) and an identity judgment task in Perception (in Experiment 2). This justification was considered improbable by us because the previous findings share rich proofs and demonstrations that the syllable judgment task is very sensitive to the onset mechanism (Berent et al. 2015). And the results of native English speakers also reinforce the current assertion (Zhao, X et al. 2015). Distinctive findings state that syllable priorities are induced from experience, as phonotactic learning models can show the onset hierarchical order in spite of having no inherent restraints on syllable structure (Hayes, 2011). However, there are a few proofs that a part of the initial hierarchal order is abided by Mandarian speakers (bllb), this examination of hierarchal order is incomplete and no differences have been found between phonological or phonetic causes for this priority (Berent 2014; Zhao, X. et. al. 2015). A remarkable challenge was faced through short or long syllable judgment task to the Mandarin participants because it evoked the judgment of unusual stimuli which were offered in isolation or in other words, certain phonetic equivocations could have been evoked in the syllable judgment task because unusual monosyllabic non words were offered in isolation. Thus, our results are also in line with the studies of the syllable judgment task (short or long judgment task) has strong effect that can be masked by the native speakers' heightened sensitivity to phonetic properties and it might exhibits considerable phonetic obstructions to the native speakers of Sindhi and Pashto languages.

4.4. Comparison of Initial Onset Consonant Clusters through Perception in terms of Voice (Experiment 2- An Identity Judgment Task)

Table 4.2: Comparison of Initial Onset Consonant Clusters through Perception in terms of Voice

PoA	Dependent Variables	T	Df	Sig. (2-tailed)	Mean
Pair 1	tr – pretPeret	-.274	39	.785	-.03750
Pair 2	bl – kl	-5.718	39	.000	-.86250
Pair 3	sw – zwigZewig	13.385	39	.000	2.08750

In Table 4.2; the comparison of initial consonant clusters has been done in respect of voice feature through perception. Evidently, no any effect has been observed between the values of first consonant clusters pair *(tr-pr, p= -.03750)*. However, we found highly strong significant effect of the initial consonant clusters of the remaining pair of 2nd and 3rd statistically *(bl-kl, p= .000 and sw-zw, p =.000)* respectively.

By demonstrating and analyzing the values in respect of voice feature, we observe significant variances in the above paired values. There, no any effect of consonant clusters was found between the first pair (pr-tr) due to identical voice feature. The feature [p] is [- voice] similarly, the feature [t] is also [- voice]. Therefore, the first pair of consonant clusters has no significant impact. The second pair (bl-kl) and third pair (sw-zw) share highly significant effect. It is because of voicing contrast or in other words it is due to non-identical voice feature. Both of the pairs share initial consonant clusters in contrast of voicing such as the first pair has the combination of voiced and voiceless consonant clusters. Illustration in terms of feature is hereby: [b] is [+ voice] while [k] is [- voice]. Because of voice feature contrast there values are strongly significant. Similarly, the third pair (sw-zw) also shares significant values. Obviously, it is because of the voicing confliction between the pairs. The initial consonant cluster [s] has [- voice] feature while [z] has [+ voice] feature respectively. Hence, the pairs which have voice feature contrast between their initial consonant clusters share significant impact in their values statistically while the pairs which do not share identical voice feature have no any significant effect statistically.

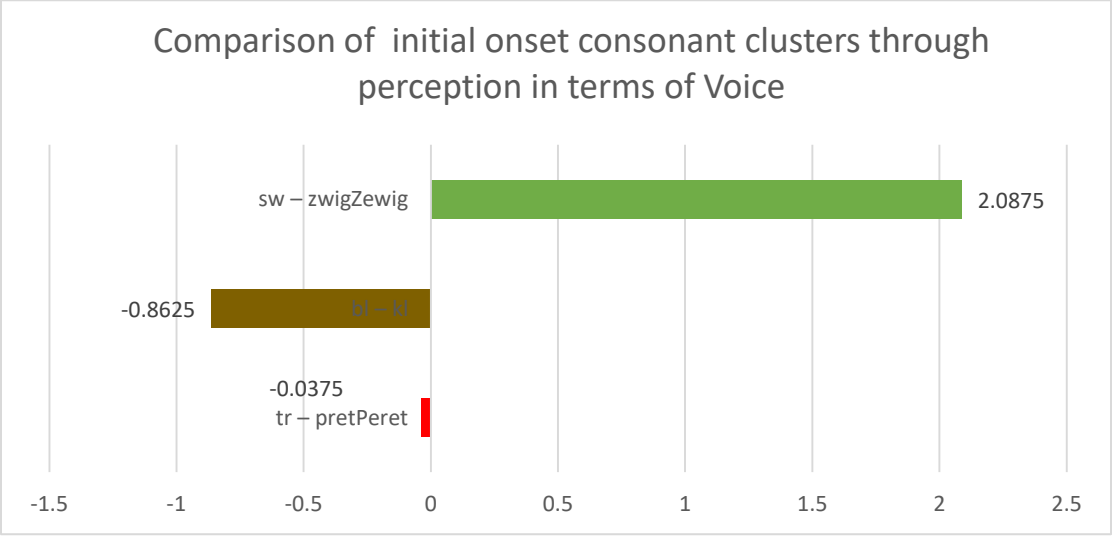

Figure 4.4: Comparison of Initial Consonant Clusters through Perception in terms of Voice

The above graph depicts the visual picture of Comparison of initial onset consonant clusters through perception in terms of Voice. Because of identical voice features there no any significant effect of consonant clusters was found between the first pair (pr-tr). The second pair difference of consonant clusters (bl-kl) is found to be statistically significant and third pair (sw-zw) share highly significant effect.

4.8. Summary of the results

Going by the analysis of the data and the results obtained, it will claimed that the activeness of universal confinement on beginning consonant cluster order is active in the native speakers of Sindhi and Pashto regardless of syllables' presence or absence in their language and this statement is also strengthen by past various research findings (Steriade et.al.2007). The native speakers of Sindhi and Pashto languages have been found with significant effects of the initial consonant clusters in voice through perception while they were remained non-significant in voice through production. One of the possible reasons of this non-significant effect of initial consonant cluster on the speakers through production may be short or long judgment task which exhibited strong effect that can be masked by the native speakers' heightened sensitivity to phonetic properties and it might exhibits considerable phonetic obstructions to the native speakers of Sindhi and Pashto languages. Broadly speaking, the native speakers of both languages were found different in perception and alike in the production due to the significant effect of the initial onset consonant clusters. In addition, their goodness in the production may be because of their phonological experience with their languages or other commonly spoken languages surrounded by the speakers. Results were coherent with the hypothesis, the current study displays universally dispreferred onset clusters are more frequently misperceived than universally preferred ones. The current findings suggest that language universals show universal linguistic knowledge is active in all speakers' brains; it is universal phenomenon but not language specific and speakers were also found sensitive to the entire sonority hierarchy.

5. Conclusion

The present study focuses on Language Universals and Misidentification by native speakers of Sindhi and Pashto languages. The study used Praat (Boersma et.al.2017) and Prosodypro (Xu, 2017) softwares to achieve Degree of freedom, and syllable duration in the participants' speech. The current study follows the previous related research methodologies such as Berent et al. (2017); Lennertz, T. (2010).The targeted languages are Sindhi and Pashto. However, there were total forty native speakers in the present study; half were Sindhi and half Pashto. They were applied through two different experiments: experiment one was about production and experiment two was about perception. All non-words were recorded by a Pashto native speaker because, Pashto allows all syllable types studied in our experiments. We used eight pairs of stimuli as controlled items. The convenience sampling technique was used by us to select the participants. The recording of the mono and disyllabic non words were done through Data Recording Device. Before commencing the trial, participants were directed about our research goals and its targets thoroughly. In Experiment 1,the materials were corresponded to (13) monosyllabic non-words (*blif, swap, ʃwek, zwig, frep, klaf, ʃrep, xrum, trig, pɽet, sret, xwar, prem*) and thirteen disyllabic non-words (*belif, sewap, ʃewek, zewig, ferep, kelaf, ʃerep, xerum, terig, peɽet, seret, xewar, perem*).The experiment 1 examined the linguistic priorities of Sindhi and Pashto talkers using a syllable judgment task. In Experiment 2, the materials were corresponded to the previously mentioned similar items from Experiment 1. However, here the items were randomized systematically into pairs: Half were alike (mono and disyllabic), and half were repair-related for instance (blif-blif; belif-belif); or epenthetically related (blif-belif; belif-blif). Participants heard two items—either identical tokens or non-identical and were directed to classify whether the two components are exactly alike or not. Both items such as identical and non-identical were appeared simultaneously. On the behalf of the current results, it is claimed by us that the activeness of universal confinement on beginning consonant cluster order is active in the native speakers of Sindhi and Pashto regardless of syllables' presence or absence in their language and this statement is also strengthen by past various research findings. The native speakers of Sindhi and Pashto languages have been found significant effects of the initial consonant clusters in voice through perception while they were remained non-significant in voice through production. Broadly speaking, the native speakers of both languages were found different in perception and alike in the production due to the significant effect of the initial onset consonant clusters. In

addition, their goodness in the production may be because of their phonological experience with their languages or other commonly spoken languages surrounded by the speakers.

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Appendices

Appendix A1. Monosyllabic nonwords used in Experiments 1.

Trial No	Monosyllables
1	Blif
2	Swap
3	Shwek
4	Zwig
5	Frep
6	Klaf
7	Shrep
8	Xrum
9	Trig
10	pɽet
11	Sret
12	Xwar
13	Prem

Appendix A2. Disyllabic nonwords used in Experiments 1.

Trial No	Monosyllables
1	Belif
2	Sewap
3	Shewek
4	Zewig
5	Ferep
6	Kelaf
7	Sherep
8	Xerum
9	Terig
10	peɽet
11	Seret
12	Xewar
13	Perem

Appendix B. Randomized pairs of mono and disyllabic nonwords used in Experiments 2.

Trial no	Syllables
1	blif-belif
2	sewap-swap
3	shwek-shewk
4	zwig-zewig
5	ferep-frep
6	klaf-kelaf
7	sherep-shrep
8	belif-blif
9	swap-sewap

10	rum-xerum
11	terig-trig
12	shrep-sherep
13	sret-seret
14	xewar-xwar
15	pɽet-peɽet
16	trig-terig
17	perem-prem
18	seret-sret
19	pret-peret
20	belif-belif
21	xwar-xewar
22	kelaf-klaf
23	xwar-xwar
24	zwig-zwig
25	sret-sret
26	prem-prem
27	frep-ferep
28	shewek-shewek
29	xerum-xerum
30	blif-blif