PHONOLOGICAL CONTRAST BETWEEN KOREAN AND TURKISH IN TERMS OF LANGUAGE UNIVERSALITY

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This study aims to contrast phonological characteristics of Korean and Turkish in terms of language universality. Considering consonants, both languages have the same number of consonants (21), which is the most typologically plausible structure of consonants. Thus, it can be said that they display high universality in the number of consonants. However, Turkish shows higher universality in regards to their substance, i.e., it differs from Korean when it comes to the structure of plosives and affricates. Turkish has two contrastive consonants, i.e., voiced and voiceless. However, the Korean plosives and affricates consist of neutral, tense and aspirate voiceless. In the case of vowels, both Korean with 10 vowels and Turkish with 8 vowels show lower universality. Yet, all of those vowels belong to the list of the most plausible vowels which makes their universality higher in substance. In respect of the syllable structure, Korean with its (C)V(C) type shows a moderately complex structure while Turkish with its (C)V(C)(C) type has a complex structure. The coda may consist of two consonants in Turkish while only one consonant is possible in Korean. However, onset is composed of one consonant in both languages.

The contrastive study of similarities and differences between Korean and

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Turkish in terms of phonological characteristics will help not only understand the two languages but also provide useful information to increase the efficacy of Korean language education for Turkish learners of Korean, whose number is rapidly increasing.

Keywords: Korean and Turkish, phonological contrasts, universality, consonants and vowels, syllable structure, phonotactic constraints

INTRODUCTION

Both Korean and Turkish belong to the same Altaic language family. For this reason, many attempts have been made in terms of comparative linguistics regarding these two languages. Syntactic comparisons have been made thanks to their similarities, but relatively few phonological studies have been done. This study attempts to contrast the phonological characteristics of both Turkish and Korean in terms of language universality.

According to the Contrastive Analysis Hypothesis (Lado 1957) and the Markedness Differential Hypothesis (Eckman 1977), contrastive studies on the phonological features of Korean and Turkish in terms of universality are meaningful, and provide useful information to Turkish-speaking Korean language learners and to Korean- speaking Turkish language learners. According to the former, learning is easy when there are many common properties between the learners' mother tongue and the target language in foreign language education, but learning is slow when there are many differences. According to the latter, it is difficult to learn an item in a target language when the similar item in the learner's mother tongue is more marked. However, it is easy to learn an item in a target language when the similar item in the learner's mother tongue is less marked. For example, it is more difficult for English-speaking Korean language learners to learn the three different kinds of Korean plosives, but less difficult for Korean-speaking English learners to learn the two different kinds of English plosives. This is because the trinary contrast of Korean plosives based on their aspiration is more marked than the binary contrast of English plosives based on their voicing.

In this paper, I attempt to contrast the phonological characteristics of Korean and Turkish in terms of language universality based on the UCLA Phonological Segment Inventory Database (henceforth, UPSID) and the World Atlas of Language Structure

(henceforth, WALS). The number of consonants and vowels and their inventories in both languages will be dealt with. In addition, the syllable structures of both languages and phonotactic characteristics will be compared.

CONTRAST OF KOREAN AND
TURKISH CONSONANTS

According to UPSID, there are huge differences in the number of segments in natural languages, but 65% of the analyzed languages have 20-35 segments and the average number of segments is just over 31. The ratio of vowel to consonant ranges from 1 to 1.76-16, with about 50% of the languages being distributed 1 to 3-5. The ratio of vowel to consonant in Korean and Turkish is respectively 10:21 and 8:21. Thus, both languages are classified into a language group in which the percentage of vowels is higher. Let us look at the consonant structure of Korean and Turkish.

CONSONANT STRUCTURE OF
KOREAN AND TURKISH

There are 21 consonants in Korean. They are classified according to their place of articulation, manner of articulation, and aspiration. According to the place of articulation, they are divided into five kinds of labial, alveolar, palatal, velar, and glottal, whereas they are divided into three obstruents (plosive, fricative, and affricate) and three sonorants (nasal, liquid, and glide), according to the manner of articulation. Plosives and affricates are classified into neutral, tense, and aspirate, and fricatives are divided into neutral and tense, according to the strength of aspiration. The table below summarizes them.

Table 1: Chart of Korean consonants[1]

MANNER \\ PLACE		LABIAL	ALVEOLAR	PALATAL	VELAR	GLOTTAL
PLOSIVE	NEUTRAL	p	t		k	
	TENSE	p'	t'		k'	
	ASPIRATE	pʰ	tʰ		kʰ	
FRICATIVE	NEUTRAL		s			h
	TENSE		s'			
AFFRICATE	NEUTRAL			ʧ		
	TENSE			ʧ'		
	ASPIRATE			ʧʰ		
NASAL		m	n		ŋ	
LIQUID			r / l			
GLIDE		w		y		

There are also 21 consonants in Turkish. Therefore, consonants in Korean and Turkish are numerically equal. Turkish consonants are classified according to their place of articulation, manner of articulation, and voicing. Here is the list of Turkish consonants.

Table 2: Chart of Turkish consonants

MANNER \\ PLACE	LABIAL	LABIO-DENTAL	ALVEOLAR	PALATAL	VELAR	GLOTTAL
PLOSIVE	p b		t d		k g	
FRICATIVE		f v	s z	ʃ ʒ	ğ	h
AFFRICATE				ʧ ʤ		
NASAL	m		n			
LIQUID			r l			
GLIDE				y		

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[1] Glides /y/ and /w/ are usually regarded as a part of the diphthong in Korean. However, in this paper, following Maddieson (1984), they are presented in the structure of the consonant.

When the consonants of Korean and Turkish are compared in terms of place of articulation, Korean is simpler than Turkish. Korean does not have labio-dentals such as 'f, v'. In the manner of articulation, the plosives of Korean are divided into neutral, tense and aspirate according to their aspiration, whereas Turkish plosives are divided into voiced and voiceless according to their voicing.

In the case of the resonants, i.e., nasal, liquid and glide, Korean and Turkish are different from each other. There are three nasal sounds: labial [m], alveolar [n], and velar [ŋ] in Korean, whereas there is no [ŋ] in Turkish. In the case of liquids, [l] and [r] are phonemically found in Turkish, as in English, but [r] and [l] are in complementary relations in Korean. More concretely, /r/ between vowels is pronounced as [r] as in 다리 [tari] 'legs' and 노래 [norɛ] 'songs', and [l] is realized in the syllable final position as in 달 [tal] 'moon', 날개 [nalgɛ] 'wings'.

CONTRAST OF KOREAN AND TURKISH CONSONANTS IN TERMS OF UNIVERSALITY

The most typologically plausible structure of consonants in natural languages

Maddieson (1984) proposed the most typologically plausible structure of consonants by extracting 21 consonants with the highest frequency in natural languages. This is a hypothetical consonant system in which no languages have the same 21 consonants. The most typologically plausible structure of consonants is given in Table 3 below.

Table 3: The most typologically plausible structure of consonants

MANNER	PLACE	LABIAL		DENTAL / ALVEOLAR		PALATAL		VELAR		GLOTTAL
OBSTRUENT	PLOSIVE	p	b	t	d			k	g	ʔ
	AFFRICATE					ʧ				
	FRICATIVE	f		s	z	ʃ				h
SONORANT	NASAL		m		n	ɲ		ŋ		
	LIQUID			l, r						
	GLIDE		w			y(=j)				

Using five places of articulation, the manner of articulation is divided broadly into obstruents and resonants, and plosives display voiced and voiceless contrast. There are four nasals, two liquids and two glides. According to UPSID, there are 8 to 10 plosives (including affricates) in one language. The remaining consonants appear to vary considerably from language to language. In the case of the fricatives and nasals, 2 to 4 are the most common (48%, 83%, respectively). In addition, one language has two liquids (41%) and two glides (69%), and about 61% of languages have consonants /h/.

CONTRAST OF THE STRUCTURE OF KOREAN AND TURKISH CONSONANTS

Considering the consonants of both languages, they have 21 consonants, which is the same number as in Table 3 above. It means that both languages display high universality in the number of consonants. In Korean, all resonants are included in Table 3. On the other hand, the Korean plosives consist of neutral, tense and aspirate voiceless, and thus only six /p, t, k, ʧ, s, h/ obstruents are the same, and the remaining nine consonants are not shown in Table 3. That is, close to half of the consonants do not belong to the group of the most plausible consonants. Therefore, it is said that Korean consonants are close to the average of natural languages in terms of number, in which case they are universal, but they are not universal in terms of content. However, Turkish consonants show higher universality in regards to their substance. Turkish obstruents have two contrastive consonants, i.e., voiced and voiceless, as mentioned earlier. 12 consonants /p, b, t, d, k, g, f, ʧ, s, z, ʃ, h/ are equal to the consonants in Table 3. That is, /v, ʤ, ʒ/ are the only low frequency consonants.[2] Therefore, the Turkish consonant system is quite universal in terms of both number and content.

Then, let us consider the ratio of obstruents to resonants. As shown in Table 3, there are 8 sonorants among the total 21 consonants. This corresponds to 38% of the total consonants. However, this is a virtual system, and in fact natural language consists of 70% obstruents and 30% resonants (Lindblom & Maddieson 1988). The ratio of obstruents to resonants in both languages is as follows.

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[2] Maddieson (1984) claims that fricatives and affricates such as /ts, x, v, ʤ/ are also common, and thus /z/ in the most typologically plausible structure of consonants can be replaced by one of these consonants. It means that the only consonant with low frequency in Turkish is /ʒ/.

Table 4: Ratio of obstruents to resonants in Korean and Turkish

	NO. OF CONSONANTS	NO. OF OBSTRUENTS	NO. OF RESONANTS	OBSTRUENTS : RESONANTS
KOREAN	21	15	6	71.4 : 28.6
TURKISH	21	16	5	76.2 : 23.8

As can be seen from the above table, the ratio of obstruents to resonants in Korean and Turkish does not deviate much from the universality of natural language.

According to UPSID and WALS, the existence of nasal sounds is confirmed in all languages except for about 10 languages, and both languages here have nasals. In Korean there are three nasals, whereas in Turkish there are only two nasals. A velar nasal [ŋ] is not found in Turkish. Therefore, in the case of nasals, Korean is more universal than Turkish.

A liquid is a universal consonant, which is found in most natural languages (95.9%). The number of liquids is ordered by two (41%) > one (23%) > three (14.5%) in natural languages (Maddieson 1984). From this point of view, Turkish with two liquids is more universal than Korean with only one liquid.

A glide is so common that more than 90% of natural languages have it (Maddieson, 1984). In Korean, there is a palatal glide /y/ and a labial glide /w/, but in Turkish there is no /w/. Having both /y/ and /w/ (71.3%) is a general feature of natural languages, and thus Korean is more universal than Turkish.[3]

Next, let us compare the obstruents of both languages. In natural languages, there is a language without a resonant, but no languages without an obstruent (Maddieson, 1984). Obstruents are much more varied than resonants in terms of number and manner of articulation. From this point of view, the characteristics of the consonant structure of a language are determined by obstruents rather than by resonants.

The number of plosives shown in Table 3 is 8. They become 9 with the affricate /ʤ/, which is included in the 21 consonants. This is about 40% of the total number of consonants. According to this, it can be said that both Korean (12/21, which is 57%) and Turkish (11/21, which is 52%) have more plosives. The maximum number of articulation places of plosives is six in natural languages. More than half (53.9%)

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[3] As mentioned earlier, glides /y/ and /w/ are usually regarded as a part of the diphthong in Korean. However, in this paper, to compare Korean and Turkish, they are also presented in the structure of the consonant. However, when we deal with diphthongs, they are treated as a part of the diphthong in Korean.

of natural languages have three articulation places. In this respect, it can be seen that both Korean and Turkish have a universal character of natural languages.

Next, let us look at the manner of articulation of plosives. As mentioned earlier, there are three kinds of consonants in Korean, whereas there are two kinds of consonants in Turkish. In terms of manner of articulation, two kinds are the most common (51.1%), and three kinds come second (24%). As a result, it can be said that Korean is somewhat less universal than Turkish in the manner of articulation.

Finally, if we look at fricatives, three fricatives /s, s', h/ are used in Korean, whereas, as can be seen in Table 2, Turkish has seven common fricatives /s, z, f, v, ʃ, ʒ, h/.[4] It means that Turkish is far more universal than Korean. In the next section, let us compare the vowel system of Korean and Turkish.

CONTRAST OF VOWELS IN KOREAN AND TURKISH

Structure of Korean and Turkish Vowels

Both Korean and Turkish vowels are characterized by three features: front/back, high/low, and rounded/unrounded. Korean has 10 simplex vowels and 11 diphthongs.[5] Table 5 shows Korean simplex vowels.

Table 5: Korean Vowels

FRONTNESS / HEIGHT	FRONT		BACK	
	UNROUNDED	ROUNDED	UNROUNDED	ROUNDED
HIGH	ㅣ [i]	ㅟ [ü]	ㅡ [ɨ]	ㅜ [u]
MID	ㅔ [e]	ㅚ [ö]	ㅓ [ə]	ㅗ [o]
LOW	ㅐ [ɛ]		ㅏ [a]	

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[4] English has the same fricatives /s, z, f, v, ʃ, ʒ, h/ as Turkish, if we exclude the interdental fricatives /θ, ð/. They are found in examples such as site, zoo, flower, victory, sugar, pleasure, high. Unlike Korean, both languages show high universality in terms of fricatives.

[5] Korean vowels are slightly different depending on spoken area, speaker's age, and so forth. However, in this paper, following *pyojunbareumbeop* (the Norm of Standard Korean) from the National Institute of Korean Language, we assume that Korean has 21 vowels (10 simplex vowels and 11 diphthongs).

Among the ten vowels listed above, /ㅟ/ [ü] and /ㅚ/ [ö] are commonly pronounced as the diphthongs [wi], [we] respectively by the younger generation. If we look at 10 Korean simplex vowels, there are 5 front vowels and 5 back vowels. There are also four high vowels, four mid vowels, and two low vowels in terms of the height of the tongue. Looking at the shape of the lips, there are four rounded vowels and six unrounded vowels.

Korean has six /y/-diphthongs and four /w/-diphthongs with [ɨy]. All diphthongs are rising diphthongs, except [ɨy].[6]

Table 6: Korean Diphthongs

DIPHTHONGS	EXAMPLE
/y/-TYPE	ㅑ [ya], ㅕ [ə], ㅛ [yo], ㅠ [yu], ㅖ [ye], ㅒ [yɛ]
/w/-TYPE	ㅘ [wa], ㅝ [wə], ㅙ [wɛ], ㅞ [we]
OTHERS	ㅢ [ɨy]

There are a total of eight Turkish vowels, i.e., four front vowels versus four back vowels, four high vowels versus four low vowels, and four rounded versus four unrounded vowels. The Turkish vowel system is very symmetric. The following table shows Turkish vowels.

Table 6: Turkish Vowels

FRONTNESS HEIGHT	FRONT		BACK	
	UNROUNDED	ROUNDED	UNROUNDED	ROUNDED
OPEN	i	y	ɯ	u
CLOSED	e	Ø	a	o

With some exceptions, native Turkish words incorporate either exclusively back vowels (a, ɯ, o, u) or exclusively front vowels (e, i, ø, y), for example, as in the words *karanlıktaydılar* ('they were in the dark') and *düşünceliliklerinden* ('due to their

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[6] In Korean, falling diphthongs such as in English 'boy [boy], buy [bay], cow [kaw]' are not found, except [ɨy]. Because of this, Korean speakers think of these falling diphthongs as a sequence of two simplex vowels. That is, those words above are regarded as two syllable words.

thoughtfulness'). Vowels /o, ø/ only occur in the initial syllable (Zimmer and Orgun 1999).

Turkish also has /y/ diphthongs which are similar to Korean diphthongs. However, there are no /w/ diphthongs. Moreover, /y/ diphthongs are not classified into diphthongs, but recognized as a 'consonant + vowel' structure. As a result, Turkish is analyzed as having no diphthongs.[7]

Contrast of Korean And Turkish Vowels in Terms of Universality

The most common vowels in a language range from five to seven. The five-vowel system languages are the most common. The statistics for the number of vowels in UPSID are as follows (Schwartz et al. 1997).

Table 7: Number of vowels in natural languages

NO. OF VOWELS	NO. OF LANGUAGES	NO. OF VOWELS	NO. OF LANGUAGES
3	19(6.0%)	9	24(7.6%)
4	25(7.9%)	10	8(2.5%)
5	109(34.4%)	11	4(1.3%)
6	60(18.9%)	12	2(0.6%)
7	44(13.9%)	13 이상	3(1.0%)
8	19(6.0%)	Total: 317 languages	

On this basis, Korean with 10 vowels and Turkish with 8 vowels have a large number of vowels. The most preferred vowels in natural languages are [a, i, u, e, o, ɛ, ɔ, ɨ, ə, ü, ö] (Schwartz et al. 1997). They are generally preferred in the order of a, i, u> e, o or ɛ, ɔ> ɨ, ə> ü, ö. Based on this, Korean and Turkish have a large system in terms of number of vowels, but all the vowels are included in the most preferred vowels. Accordingly, it can be said that both languages have high universality in terms of contents.

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[7] The structure of /y/ or /w/ is different in languages depending on their phonological behavior. In English, /y/ or /w/ before a vowel is not regarded as a part of a rising diphthong, rather as a consonant. This view is supported by the restriction that it is found between the preceding onset and the following glide. More concretely, /y/ can occur freely, whereas /w/ can take place only after alveolar, as shown in examples such as 'twin, swing, dwell'.

CONTRAST OF KOREAN AND TURKISH SYLLABLE STRUCTURE AND PHONOTACTIC CHARACTERISTICS

Syllable structures of Korean and Turkish and phonotactic characteristics

The way in which syllables are formed differs slightly depending on the language, but syllables are basically composed of 'onset-nucleus-coda'. The onset is the initial consonant pronounced in front of the vowel, the nucleus is the vowel, and the coda is the pronounced consonant in the final position. Generally, there can be no onset and coda, but nucleus is an indispensable factor. The possible syllable structure in Korean is as follows.

Table 8: Korean Syllable Structure

SYLLABLE STRUCTURE	ONSET	NUCLEUS	CODA	EXAMPLE
V (V)		ㅏ (a)		아[a], 오[o]
C + V (CV)	ㄷ (t)	ㅗ(o)		도[to], 가[ka]
V + V (VC)		ㅗ(o)	ㄴ (n)	온[on], 입[ip]
C + V + C (CVC)	ㅁ (m)	ㅜ(u)	ㄹ (l)	물[mul], 공[kong]

The characteristics of the Korean syllable structure and its phonotactic constraints are summarized as follows.

Firstly, the basic syllable structure is (C)V(C). In other words, a vowel must be present, but only one consonant can optionally appear in an onset and coda position. There are no syllabic consonants such as the last nasal or liquid of English words such as 'cotton [kɑtn̩], bottom [bɑtəm̩], kettle [ketl̩]' (Kim 2011).

Secondly, there is a restriction in the word-initial consonant. Because consonant clusters cannot appear, as already mentioned, some consonants are not allowed word-initially. In the case of native Korean words, a liquid 'ㄹ' [r/l] and a velar nasal 'ㅇ' [ŋ] do not appear in the initial position. Accordingly, when borrowing words with consonant clusters in the onset position from English, the vowel 'ㅡ [ɨ]' is inserted between the two consonants as in '프린트 [pʰɨrintʰɨ] print, 크림 [kʰɨrim] cream, 트리 [tʰɨri] tree', breaking up the consonant cluster. In the case of a liquid 'ㄹ', it is pronounced as [n] when borrowing from Chinese as in '노인 [r[n]oin] old person, 노동 [r[n]odong] labor'. However, it is pronounced as its original sound value when

borrowing from other foreign languages such as English or French, as in 리본 [ribon] ribbon, 라디오 [radio] radio. In the case of a velar nasal 'ㅇ' [ŋ], the vowel 'ㅡ [ɨ]' is added before forming a vowel-initial word so that the Vietnamese nguyễn 'to promise' is pronounced as [ɨŋuyen].

Thirdly, there is also a constraint in word-final consonant. Because consonant clusters cannot appear, as already mentioned, some consonants are not allowed word-finally. More concretely, released obstruents are not permitted. Only the seven consonants, i.e., resonants 'n, m, ŋ, l' and unreleased plosives 'p, t, k' are allowed in this position. Therefore, in the case of native words, when two consonants are in a row, one of the consonants is deleted as in 값 [kap̚] 'value' and 닭 [tak̚] 'chicken'. In the case of loanwords, however, the vowel [ɨ] is added after the final consonant and thus the two consonants are all pronounced.[8] More precisely, the first consonant is pronounced as a final consonant of the former syllable, and the last consonant as an initial consonant of the later syllable, such as 텐트 [tʰentʰɨ] 'tent', 캠프 [kɛmpʰɨ] 'camp', 펄프 [pʰəlpʰɨ] 'pulp'. When a consonant which cannot be pronounced appears in this position, in the case of native words, it is pronounced as their unreleased counterpart in the same place of articulation. Some relevant examples are presented below:

(1) 옷 os [ot̚] 'clothes'   밖 pak' [pak̚] 'outside'
    잎 ipʰ [ip̚] 'leaf'   부엌 puəkh [puək̚] 'kitchen'
    낮 natʃ [nat̚] 'day'   꽃 k'otʃh [k'ot̚] 'flower'

In the case of loan words, the final consonant is pronounced by adding the vowel [ɨ] as in 버스 [pəsɨ] 'bus', 초크 [tʃʰokʰɨ] 'chalk', 커트 [kʰətʰɨ] 'cut'. However, when the final consonant is an affricate, the vowel [i] is added as in 브리지 [pɨritʃi] 'bridge', 비치 [pitʃʰi] 'beach', and 매치 [mɛtʃʰi] 'match'.[9] From the loan word adaptation, we may note that Korean has an onset-dominant phenomenon.

Fourthly, because of consonant assimilation, more precisely, nasalization, 'obstruent + nasal', 'nasal + liquid', and 'obstruent + liquid' cannot be pronounced as they are. In these sequences, the two adjacent consonants are all realized as 'nasal +

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[8] In Vietnamese, the onset-dominant principle does not apply when borrowing words from a foreign language. Because of this, the English words 'camp', and 'tent' are pronounced as [kɛm] and [ten], respectively. However, in Korean, the two consonants remain intact by adding a vowel as above.

[9] According to Kaye (1989), affricates include the element I in their internal structure. Therefore, unlike other consonants, affricates can have the vowel 'i' instead of 'ɨ' at the end of a syllable. However, a discussion on this topic is beyond the scope of this paper.

nasal' (Kim 2013). For instance, as shown in the following examples, obstruents and liquids are pronounced as nasals in the same place of articulation.

> (2) 국물 kukmul [kuŋmul] 'soup'　　　　막내 maknɛ [maŋnɛ] 'last child'
> 　　심리 simri [simni] 'psychology'　　　정리 ʧəŋri [ʧəŋni] 'arrangement'
> 　　입력 ipryək [imnyək̚] 'input'　　　　국립 kukrip [kuŋnip̚] 'national'

Let us now consider the features of Turkish syllable structure and phonotactic constraints. Firstly, Turkish syllable structure is (C)V(C)(C). Turkish syllables can be open or closed with one or two consonants. There is no syllabic consonant like Korean, unlike English.

Secondly, there is no consonant cluster in the onset position. Only one consonant appears optionally, but /r/ is restricted from occurring in native Turkish words, like in Korean. Therefore, loan words with word-initial clusters may be made to conform to the phonotactic characteristics of Turkish by breaking up the clusters by vowel insertion, like in Korean. The following examples are reproduced from van der Hulst and van de Weijer (1991):[10]

> (3) grup [gurup] 'group'
> 　　kral [kɨral] 'king'
> 　　prens [pirens] 'prince'
> 　　smokin [sɨmokin] 'dinner jacket'

The epenthetic vowel harmonizes in frontness with the following root vowel after labial and dental consonants. Another way of treating word-initial clusters appears to consist of the prothesis of a (usually harmonic) /i/ or /ɨ/ before the onset (typically 'sp-, st-, sk-'), shifting the syllable boundary. Again, the following examples are taken from van der Hulst and van de Weijer (1991):

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[10] It is also possible to have a consonant cluster in the onset position in some loan words such as 'program, propaganda, stres, tren', which have been relatively recently borrowed from English, French and Italian

(4) ɨspanak 'spinach' [11]
    istatistik 'statistics'
    iskelet 'skeleton'
    ɨstaka 'billiard cue'

Thirdly, as mentioned earlier, one or two consonants can appear in the coda position. However, there are no voiced consonants such as / b, d, g, z, ʤ, v, ʒ / in the coda position due to final devoicing. All voiced consonants are pronounced as their voiceless counterparts. There is also a strict restriction between C_1 and C_2 when there is a consonant cluster (C_1C_2) in the final position. The first consonant is / r / or / l / and the second consonant is plosive.[12] Therefore, in some loan words where this condition is not met, one of the consonants is either deleted in word-final clusters or a vowel is added after the final consonant, resulting in the syllable boundary being shifted. Some examples are given below:

(5) direk 'direct'
    pɨrotesto 'protest'
    liste 'list'
    adapte 'adapt'

Fourthly, due to consonant assimilation, the plosives and fricatives except /h/ and /f/ can only come along with the same voicing, whether voiced or unvoiced. For example, as shown in the following examples, the initial consonant of a suffix is voiceless when attached to a word that ends with a voiceless consonant. However, a suffix with the initial voiced consonant is added when attached to a word ending in a voiced consonant. Examples are taken from Göksel and Kerslake (2005):

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[11] An anonymous reviewer pointed out that the word ɨspanak 'spinach' is not borrowed from English, but rather it is taken from the Persian *espenax*, which is curiously enough taken by French and English through Arabic. But, I keep this word here because the examples in (4) are taken from van der Hulst and van de Weijer (1991).

[12] It is well known that there is a restriction when two consonants appear in an onset and coda position, for example, in English, C1 is one of the obstruents and C2 is a liquid or a nasal in an onset position. However, the order is reversed in the coda position, as in 'tree, play, cream, small, snow' vs. 'cart, camp, tent, pink'. For more detailed discussion about the restriction between two consonants within a syllable, refer to Kaye (1989), Heo (1995), and Kim (1996) among others.

(5) şev (slope) + locative particle: [şevde] 'on the slope'
    şef (chef) + locative particle: [şefte] 'on the chef'
    ad (name) + diminutive particle: [adcık] 'little name'
    at (horse) + diminutive particle: [atçık] 'little horse'

Contrast of Korean And Turkish Syllables in Terms of Universality

As we can see, the syllable structure may be different depending on the language, which is closely related to the number of consonants that can appear in the onset and the coda. According to WALS, there are three types of syllable structures appearing in natural languages, namely, simple types (CV), moderately complex types (CCV, CVC), and complex types (CVCC, CCVC, CCCV). According to WALS, languages that belong to the simple type include Yoruba and Hawaiian, which account for only 12.5%. Moderately complex and complex type languages are 56.4% and 31.1%, respectively.

Since Korean can only have one consonant in the onset and the coda position, i.e., (C)V(C), Korean belongs to the moderately complex type, while Turkish allows a consonant cluster in coda position, i.e., (C)V(C)(C), meaning the complex type. This is the biggest difference between Korean and Turkish syllable structure. The three types of syllable structure are somewhat related to the size of the consonant system, as shown in the following table. The smaller the number of consonants, the simpler the syllable structure, and the more consonants, the more complex the syllable structure.

Table 9: Average number of consonants according to syllable structure type
(WALS, 12)

SYLLABLE TYPE	AVERAGE NO. OF CONSONANTS
SIMPLE SYLLABLE STRUCTURE	19.1
MODERATELY COMPLEX SYLLABLE STRUCTURE	22
COMPLEX SYLLABLE STRUCTURE	25.8

In Korean, the number of consonants is 21, and it is universal because it belongs to the moderately complex type of syllable structure. However, Turkish, which has

the same number of consonants, is somewhat uncommon because it belongs to the complex syllable type.

CONCLUSION

We have observed the following facts by comparing the phonological characteristics of Korean and the Turkish in terms of universality.

In the case of consonants, both languages have a universality in number, but Turkish is more universal than Korean in content. This is due to the difference in the composition of plosives and fricatives. That is, in the case of plosives, Korean has three consonants in each place of articulation, but there are only two in Turkish. In the case of fricatives, the segments used in Turkish are all universal, whereas the distinction between /s/ and /s'/ at the level of phoneme is very unusual.

In terms of the number of vowels, it can be said that universality is low both in Korean and Turkish which have 10 and 8 vowels, respectively. However, universality is high in content, since all the vowels used in the two languages belong to the list of vowels which are commonly found in natural languages.

In syllable structure, the Korean type (C)V(C) belongs to the moderately complex group, whereas the Turkish type (C)V(C)(C) belongs to the complex group. There is a common point that only one consonant is allowed in the onset position in both languages. However, in the case of coda, only one consonant is permitted in Korean, while two consonants are possible in Turkish. Considering the number of consonants and the syllable structure type, Korean with 21 consonants can be said to be universal because it belongs to the moderately complex type. However, Turkish with the same number of consonants can be said to be less universal because it belongs to the complex type. When considering phonotactic constraints, both Korean and Turkish do not have 'r' word-initially. However, in word-final position, released obstruents are not allowed in Korean while voiced obstruents are not permitted in Turkish. Turkish has consonant harmony in terms of voicing, while Korean has consonant assimilation in terms of nasality.

This contrast between Korean and Turkish in terms of phonological characteristics can be helpful not only to understand both languages but also to increase the efficiency of Korean language education for Turkish learners, whose number is rapidly increasing.

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