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Application of sonority theory in standard Albanian

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ABSTRACT

The Sonority Theory, which is the fundamental model in syllabification, has been one of the most researched theories for more than a century. Although this theory has been treated by Albanian linguists, it is necessary that a few supplementations and precisions be made. Through this paper, we intend to provide a more comprehensive view of this theory and its mechanisms in Standard Albanian. The aim of this paper was to prove that the sonority theory is applicable to the standard Albanian, because the interviewed students were its native speakers. The object of this paper were bi-consonantal clusters, that are numerous in Albanian. Based in the material comprised in the *Dictionary of Present-Day Albanian (1980)* we explored bi-consonantal clusters appearing in onsets and codas, which were classified into three kinds: a) consonant clusters in full compliance with the sonority sequencing principle, b) consonant clusters that violate the sonority sequencing principle, and c) consonant clusters that have the same scale of sonority. From the undertaken analysis, conclusions were drawn as to the dispersion of sounds in the onset and coda for the syllable model of standard Albanian, and suggestions were given according to the orthography of some words with consonantal clusters that violate the sonority principle.

Contribution/ Originality: This study contributes to the field of Albanian phonetics, enriching the related literature about the effectiveness of the Sonority Theory. The study with the help of the analysis of dispersion of sounds in the onset and coda, would help gain useful insights about the analysis process of syllabification in standard Albanian.

1. INTRODUCTION

It is widely recognized in linguistic domain that the Sonority Theory, which is based on acoustic criteria, plays a major part in the organization of syllables and continues to be intensely debated in the phonetic and phonological aspect (Blevins, 1995; Clements, 1990; Clements, 2006; DeLisi, 2015; Gregová, 2021; Jarosz & Rysling, 2017; Krämer & Zec, 2020; Nakajima, Ueda, Fujimaru, Motomura, & Ohsaka, 2017; Noelliste, 2019; Parker, 2002; Parker, 2012; Staroverov, 2016; Tossonian, Ferrand, Lucas, Berthon, & Maïonchi-Pino, 2020). There is general agreement across standard theories of the syllable in conceiving it as a unit that organizes speech sounds in terms of their intrinsic sonority, whereby each syllable corresponds to a sonority peak around which sounds are arranged (Passino, 2018). According to the Sonority Theory, sonority rises from the onset towards the syllable peak and then starts to descend gradually from the peak to the coda. Thus, the ideal profile of syllable sonority is low at the

boundaries and high at the peak (Eddington, Treiman, & Elzinga, 2013a). In fact, this statement is generally valid for the final syllables since, according to the Sonority Dispersion Principle (Clements, 1992) sounds of a low sonority profile are only preferred at the onset, whereas at the coda the preference is for high sonority sounds, such as glides and liquids. As it is known, this theory is based on different degrees of sonority of sounds; that means, each sound must have a relative value of sonority, which is determined in the sonority scale. Of all sounds, the most sonorous are the low vowels and the least sonorous are the voiceless stops; the other sounds between these two extremes are rated according to sonority (Dodi, 2004).

The earliest recorded attempt to classify speech sounds based on a notion similar to sonority was made by the Sanskrit grammarians, particularly by Pānini, about 500 years before Christ (Parker, 2002). Pānini's scale groups the Sanskrit phonemes in 14 natural classes according to openness degree. Pānini's pattern of the organization of speech sounds is indicative of his good knowledge of articulation phonetics and phonology. In Lyons (1968) the Indians' scientific research can be considered as superior, especially in Phonetics. "The Indian classification of language sounds was built upon more detailed, more precise, and better experimentation and observation than anything that was ever achieved in Europe before Phonetics had the decisive influence of the discovery and translation of the Indian scientific work by the western scholars by the end of the XIX century in Europe" (p. 35).

According to Parker (2002) Jespersen's work is a historic achievement in the history of sonority. His sonority scale is the first to demonstrate such subdivisions that the difference with respect to sounding between some classes of sounds is less than one.

Table 1. Jespersen's sonority scale (1904), cited by Parker (2002).

1.	(a)	Voiceless stops
	(b)	Voiceless fricatives
2.		Voiced stops
3.		Voiced fricatives
4.	(a)	Voiced nasals
	(b)	Voiced laterals
5.		Voiced *R*-sounds
6.		(Voiced) High vowels
7.		(Voiced) Mid vowels
8.		(Voiced) Low vowels

Table 1 presents the Jespersen's version of the sonority scale. According to Parker (2002), the numbering scheme in Table 1 suggests very strongly that, in Jespersen's view, not all sonority distances are equal; for instance, the sonority difference between voiceless stops (1a) and voiceless fricatives (1b) is presumably less than that between voiced stops (2) and voiced fricatives (3). However, the use of non-numerical indices as *1a* and *1b* makes it impossible for this sonority scale to be assessed from such a limitation as the *Sonority Dispersion Principle* (p. 62). In order to amend this 'flaw', Parker (2002) proposes the implementation of numerical indices, by converting the indices *1a* and *1b* to *1.0* and *1.5* (respectively and similarly for *4a* and *4b*). This simple adjustment is certainly consistent with the spirit of Jespersen's proposal, and at the same time it makes his scale more compatible with the mechanisms of current phonological theory (Parker, 2002).

According to Clements (1990) the notion of *scalar* or multivalued features was first introduced into generative phonology by Foley (1972) as a fundamental alternative for the binary features system of Jakobson, Fant, and Halle (1952); Chomsky and Halle (1968). "Foley's chief proposal was that all binary features should be replaced by a set of scalar features, and that these scales do not refer to the phonetic characteristics of the segments, but are justified only by recurrent cross-linguistic aspects of the segment behavior, as evidenced particularly in sound change." (p. 4). In Foley's scale, based on the resonance feature, sounds are divided in six groups, starting from the less sonorous sounds: $\text{stops}_1 < \text{fricatives}_2 < \text{nasals}_3 < \text{liquids}_4 < \text{glides}_5 < \text{vowels}_6$. Foley's work spread widely in scholars' opinion

and, with its later adaptations, had a major influence on the development of the syllabic theory in generative phonology. Owing to the difficulty to reach a steady phonetic characterization of sonority, some linguists suggest as an alternative that sonority is a secondary construction that derives from a combination of some phonologic parameters (Blevins, 1995; Clements, 1990; Parker, 2002). The most representative model is Clements (1990) which resembles a metric grid and divides the sound classes into five groups: obstruents < nasals < liquids < glides < vowels.

Table 2. Sonority scale model according to Clements (1990).

O	<	N	<	L	<	G	<	V	
–		–		–		–		+	Syllabic
–		–		–		+		+	Vocoid
–		–		+		+		+	Approximant
–		+		+		+		+	Sonorant
0		1		2		3		4	Sonority value

Note: The sonority scale is derived by taking the sum of the plus-specifications for each feature.

Table 2 presents the definition of the sonority scale in terms of binary features. This sonority scale is determined by the binary features [± syllabic], [±vocoid], [± approximant] and [±sonorant]. The sum of the positive values of the features for a certain class renders the sonority value (rank).

In general, scholars have been interested in determining the physical nature of sonority. According to Ohala and Kawasaki (1984) nobody has yet succeeded in measuring sonority by any way, or at least applied a widely recognized method, based on a single parameter that fits with a linguistically motivated sonority scale. The lack of a stable physical parameter for characterizing sonority has led some researchers casting doubt on the theoretical validity of sonority. Ohala (1990a) known in linguistic literature as the greatest critic of this theory, claimed that 'sonority' and its cousin 'strength' do not exist and should be abandoned for the sake of explaining universal sequential constraints. Nevertheless, in linguists' opinion, the lack of a clear phonetic definition for the notion of sonority is not an argument for abandoning it since, as it is known, a clear phonetic definition has not been given either for the phoneme notion or the syllable notion, even though these play an important role in modern phonology. Among the main correlates of sonority are: the openness degree (of the vocal tract), intensity, strength, audibility, loudness, acoustic energy, resonance and duration. The word 'sonority' has been translated as loudness, although the term *sonority* does not fully correspond to the word loudness because, as justly observed by researchers Sawicka and Dargiel (2018) loudness refers to the so-called formant zero [F_0], which is related to presence of the laryngeal tone in the sound; consequently, even certain obstruent are voiced, despite possessing low sonority (p. 22). In support of this argument, according to Memushaj (2004), two tones of the same height and intensity may be perceived as two different sounds (p. 89). The difference ought to be sought in the specific timbre that each speech sound has.

Returning to the study of the phonetic basis of sonority, Clements (2006) suggests that the sonority notion is not phonetically indefinable, but it may be rooted in the property of perceived resonance. "Sonority is related not to loudness or audibility as such, but to the relative *resonance* of speech sounds. While the words 'sonority' and 'resonance' overlap in their everyday meaning, resonance adds a suggestion of repetition to the base meaning of sonority (resonance = re + sonance). A resonant sound can be understood as one whose inherent sonority is repeated, prolonged, or augmented in some way." (Ibid, p. 3). Hence, resonance is not exactly the same as loudness or audibility. Loud noises are audible by definition, but they are not necessarily resonant. For instance, the chiming of a bell is resonant, whereas the hiss of a teakettle or the burst of a firecracker is not. Studying sonority from such a perspective, Clements (2006) also accepted the opinion of other linguists such as Kent and Charles (1992); Stevens (1997); Fujimura and Erickson (1997) who were in a better position to understand why the sonority scale has the

form it has. Vowels stand at the top of the sonority scale because they have a clear, well-defined formant structure. Sonorants [which have a formant structure similar to that of the vowels] follow down in the scale [glides > liquids > nasals], and finally, the obstruent, which do not have a clear formant structure.

1.1. Research Questions

- What is the most suitable phonetic version of the sonority scale in the Albanian language?
- Do standard Albanian consonant clusters that appear in the onset and the coda mainly depend on the sonority sequencing principle?
- Could we have simpler and more generalizing solutions for determining the syllabic boundary in the practical aspect, based on the sonority sequencing principle in standard Albanian?

2. METHODOLOGY

In carrying out the present research, we applied the analytical method and the quantitative method of data collection. Relying on the material contained in the *Dictionary of Present-Day Albanian* (1980) we identified bi-consonantal clusters that appear in syllable onsets and codas. Through a comparative and analytic approach, conclusions were drawn about the dispersion of sounds in onsets and codas, as well as about the syllable model in standard Albanian; we also pinpointed the consonant clusters in complete agreement with the sonority sequencing principle, as well as the consonant clusters that violate the sonority principle. The detailed data are given in Appendix A.

In addition, since the two-consonant group *obstruent + sonorant* in the coda is very rare in Albanian, in order to see in practice the perspective development of this group, we carried out a survey with 209 pupils of the 9-grade school "Ismail Qemali" (117 sixth-grade participants, aged between eleven and twelve and 92 nine-graders, aged between fourteen and fifteen), as well as 96 students of the University "Ismail Qemali" (Vlora, Albania), 20-24 years old, where application requirements of the standard norm are programmed. We were present in the classroom, and we handed out to the participants a sheet of paper containing a simple sentence: *Ata kishin një hasm/hasëm të vjetër pranë shtëpisë.* [*They had an old vendetta foe near their house.*]. The participants were required to mark the norm version of the word *hasm*. The detailed data from the survey are shown in Appendix B.

3. RESULTS AND DISCUSSION

In addition to the adaptation he made to Jespersen's scale, Dodi (2004) also applied a three-scale system: vowels$_3$ > sonorants$_2$ > obstruents$_1$, probably influenced by Saussure for the realization of three phonological classes of segments in the Indo-European languages (Goldsmith, 2011). Memushaj (2015) applied a six-scale system: vowels$_6$ > sonorants$_5$ > voiced fricatives$_4$ > voiced stops$_3$ > voiceless fricatives$_2$ > voiceless stops$_1$. Rather than Clements' scale, we preferred to use the universal sonority scale for Albanian, by dividing the obstruent into two classes, as in Foley's system: vowels$_6$ > glides$_5$ > liquids$_4$ > nasals$_3$ > fricatives$_2$ > stops$_1$. Generally speaking, from the acoustic point of view, in contrast with the stop consonants, fricatives are clear sounds, noisy and of high intensity, particularly the sibilants. Nevertheless, the researchers who divide obstruent into only two classes (fricatives > stops), usually based on the feature [± continuant] (Parker, 2002). This binary feature serves to differentiate these sounds in standard Albanian too: the fricatives are [+ continuant], whereas the stops are [– continuant].

Showing a particular interest in differentiating relative sonority between stops and fricatives, Gnanadeskian (2004) experimented it on her 2-year-old daughter's phonological characteristics over a six-month period. In her pronunciation of the words *sky*, *spill*, *snow* and *spill*, the consonant group in the onset simplified: the initial fricative /s/ was deleted in the groups /sk/ and /sp/, on the grounds that it was more sonorous than the stops /k/ and /p/, but it was preserved in the groups /sn/ and /sl/, because it was les sonorous than /n/ and /l/. We also analyzed

this occurrence in Albanian, by considering the phonological characteristics of my daughter (two-and-a-half years old), which remained consistent for a two-month period. The onset cluster fricative + stop at initial position reduced in the pronunciation of the words *stoli* [ˌtoli] 'stool', *ski* [ˌki] 'ski', *shkopi* [ˌkopi] 'the stick', *shpoj* [ˌpoj] 'to pierce', *shtata* [ˌtata] 'seven', rendering thus clearer onsets, as Gnanadeskian had noticed too (Xhaferaj, 2022).

As to the Albanian /j/, Bevington (1974); Buchholz and Fiedler (1987) include it in the glides (for further details see Jubani (2012)). Considering its acoustic properties in present-day Albanian, it appears that its different variants, fricative or not, seem to go towards the realization as a sonant and a semi-consonant, and it is a part of diphthongs in phonetic contexts where it is accompanied by a vowel (Ibid, p. 67). Hence, we also think that, from the acoustic view, /j/ is classified in the sonority scale in the same rank with the glides.

A good example of the sonority theory in Albanian is provided by the monosyllabic words with a structure CCVCC, such as *brisk* 'razor', *krushk* 'in-law', *prift* 'priest', *trust* 'trust, corporation' etc., with a sound order stop + liquid + vowel + fricative + stop (SLVFS). Figure 1 provides a clear view of the sonority curve of the word *drejtim* 'direction', as well as the syllable segments that display almost periodical upward or downward trends of sonority, each repeated part of which can be called a sonority wave, or a sonority cycle, in Clements (1990).

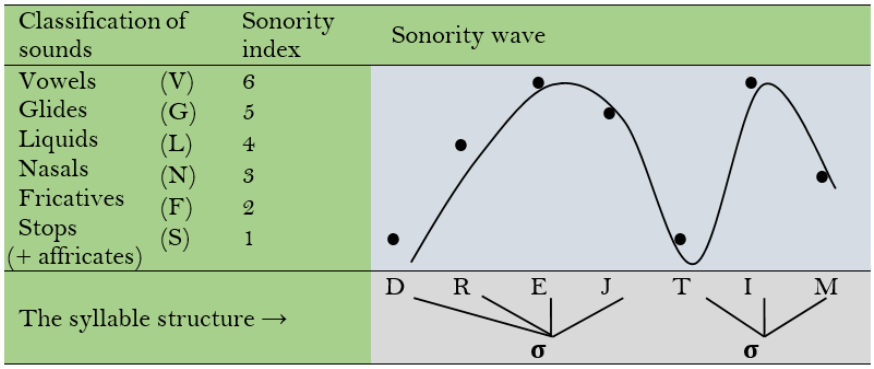

Figure 1. The sonority waves and syllabification of the word *drejtim* 'direction'.

Each wave's peak that is situated on its apex, on the most sonorous element [+ syllabic], corresponds precisely with the number of syllables. According to Goldsmith (2011), the first outlook, which sees spoken language as organizing sounds into wave-like groupings of increasing and then decreasing sonority, is one of the general approaches, with the greatest lifespan. The other view sees the chain of segments as organized into constituents (p. 165). However, according to Goldsmith, we cannot choose between the view based on the syllable's sonority and the one based on constituents, because in many analyses efforts have been made to establish clear links between the present segments' sonority and the syllable's constituents (onset, coda, nucleus) in which these segments are situated. The coexistence of these concepts can clearly be seen in Figure 1. Nevertheless, Goldsmith (2011) concedes that sonority and the wave-like recurrence of peaks of sonority is the fundamental pattern of syllabification in language (p. 194).

Based on the sonority scale, according to Clements (1990) the consonant clusters appearing in onsets and codas can be classified into three kinds:

a) Consonant clusters in total agreement with the sonority principle.
b) Consonant clusters that violate the sonority principle.
c) Consonant clusters that have the same scale of sonority.

Since at the onset sonority increases towards the syllable nucleus, theoretically, stops and fricatives mainly appear as the initial element of the group, whereas the second element consists of glides, liquids or nasals. Sonority starts to decrease in the coda; consequently, glides, liquids or nasals appear as the first element. Thus, from the

analysis conducted, the bi-consonantal clusters of Albanian to be found in onsets and codas, according to the sonority principle, will be shown in Table 3. (For further details, see the tables in Appendix A).

Table 3. Consonant clusters that follow the sonority sequencing principle in Albanian.

Onset clusters			Coda clusters		
Type of cluster	**Words**		**Type of cluster**	**Words**	
S + G	pjek	'bake'	G + S	ujk	'wolf'
F + G	dhjamë	'fat'	G + F	qejf	'pleasure'
S + L	blej	'buy'	L + S	lart	'high'
F + L	flas	'speak'	L + F	morth	'rash'
S + N	tmerr	'horror'	N + S	kamp	'camp'
F + N	thnegël	'ant'	N + F	lëmsh	'thread ball'
L + G	rrjedh	'flow'	G + L	krajl	'serbian king'
N + G	mjaltë	'honey'	G + N	lajm	'news'
N + L	mllef	'pique'	L + N	pjalm	'pollen'
S + F	pse	'why'	F + S	peshk	'fish'

Bi-consonantal clusters that violate the sonority principle in the onset are limited in number. The most commonly met are the nasal + stop combinations (e.g. *skaj* 'edge', *shpat* 'slope', *zgjoj* 'waken'). Consonant clusters that violate the sonority principle in the coda are even less frequent: stop + nasal combinations (*britm* 'any of the three months of autumn', dated) and fricative + stop (*krezm* 'incense', *hasm* 'vendetta foe'), which only appear in certain dated words, as well as the combination stop + fricative (*makth* 'nightmare', *laps* 'pencil') (see Table 4).

Table 4. Consonant clusters that violate the sonority principle in Albanian.

Onset clusters			Coda clusters		
Type of cluster	**Words**		**Type of cluster**	**Words**	
N + S	'mbaj	'hold'	S + N	britm	'any of the three months of autumn'
F + S	'skaj	'edge'	F + N	hasm	'vendetta foe'
			S + F	makth	'nightmare'

We can also infrequently encounter consonant clusters in which the two members belong to the same sonority scale; in the onset and the coda appear such combinations as: fricative + fricative (*fshat* 'village'; *sfidë* 'challenge'; *rrafsh* 'plane'); stop + stop (*tkurr* 'contract'; *çka* 'somehow'; *bretk* 'frog') as well as nasal + nasal (*Mneri* 'a family name'; *himn* 'hymn') (See Table 5).

Table 5. Consonant clusters that have no difference in sonority in Albanian.

Onset clusters			Coda clusters		
Type of cluster	**Words**		**Type of cluster**	**Words**	
S + S	tkurr	'to contract'	S + S	bretk	'frog'
F + F	fshat	'village'	F + F	rrafsh	'plane'
N + N	Mneri	'a family name'	N + N	himn	'hymn'

It can clearly be seen from this analysis that the dispersion of sounds in the onset and coda in the Albanian language is generally based on the sonority principle; as a consequence, the one-peak syllable model is prevalent. "The one-peak structure is more natural, as it facilitates a more precise production and contrasting of the segments. This is the most optimal structure, and, with time, languages generally turn to the one-peak model" (Sawicka & Dargiel, 2018). Typical cases that violate the principle of sonority increase in the onset, besides the nasal + stop combination (e.g. *mbaj* 'keep / hold'), which is a characteristic of Albanian, also include fricative + stop groups (e.g.

skuq 'fry / redden'), which also appear in other Indio-European languages, as, for instance, *star* or *skin* in English, *stylo* 'pen' in French, *spìna* 'thorn' in Italian, *spiel* 'game' or *stadt* 'city' in German etc.

Violations of the relative sonority principle in such structures are linguistically common (see Wright (2004)) as the sonority of the nasals and the fricative sibilants in the respective groups, which are easily pronounced, is considerably reduced.

If Czech permits initial groups of the type liquid + obstruent (e.g. *lkát* 'cry', *rvat* 'to tear') (Sawicka & Dargiel, 2018) such groups do not appear in word-initial position in Albanian. However, if we compare the LO initial structures of the Czech language with the NS structures of Albanian (e.g. *mbaj* 'keep / hold', *nga* 'from'), we do not think we are in the same articulating conditions, which is why, in considering the standard Albanian syllable model, despite the increasing sonority violation (which can also be flat), the above cases cannot be discussed as two-peak syllables, as in Czech. Relative sonority violations in the coda are quite rare, though.

As can be seen in Table A.2 in Appendix A, typical cases comprise such combinations as stop + nasal (*britm* 'any of the three months of autumn') and fricative + nasal (*krezm* 'incense', *hasm* 'vendetta foe'), which are to be found in certain dated word, and in whose articulation the sonant /m/ is reduced. Nevertheless, while articulating these words, the [ë] sound is added between the two constituents of the obstruent + sonorant group (see also Sawicka and Dargiel (2018)).

In order to investigate the perspective development of this occurrence, we conducted a survey with students and schoolchildren, where the curricula deem application of the standard norm compulsory. So as the subjects would not be influenced by the standard form, we chose a simple sentence: *Ata kishin një* ***hasm/hasëm*** *të vjetër pranë shtëpisë* [They had an old vendetta foe near their house].

The survey outcomes revealed that 83% of the participants chose the form *hasëm* as normative. Since the development trends mainly pertain to the younger generation, an increased can be noticed from 73% of the college students to 95% of the 6-grade schoolchildren (See in Appendix B). That is why, in our opinion too, standardization of the forms with an [ë] (e.g. *hasëm* 'vendetta foe', *britëm* 'any of the three months of autumn', *buzëm* 'firelog', dated) seems to be the right choice, since it avoids violation of the sonority sequencing principle in the syllable coda.

In regard to syllable boundary determination, we do not agree with the opinion of researchers Sawicka and Dargiel (2018) on which it is clear that Dodi has relied for the syllable model, founded on the analysis of consonant clusters in word-initial position and word-final position.

According to Dodi (2004) syllabification based on word-initial clusters' analysis helps determine the syllable boundary correctly, although in practice it can be taken with reservations, because in certain cases it is clear that syllabification is done in conflict with the initial clusters of the word. For instance, there are no words in Albanian starting with the group */sr-/*, and yet there is no doubt that this group could be divided in the word [mi-sri] 'maise'.

In support to this argument, in Table 6 we presented the syllabification in practice of the words containing various groups of non-initial consonant clusters in intervocalic position, which belong to the second syllable onset, in Dodi's view. We hold that the division of the intervocalic group LO (liquid + obstruent) between two syllables (e.g. *dar-ka* 'dinner', *por-ti* 'seaport', *zar-fi* 'envelope', *mar-si* 'March') agrees with the sonority theory, more precisely, with the *Syllable Contact Law* (one pattern of this theory) (Xhaferaj, 2018) according to which, the non-initial bi-consonantal cluster in intervocalic position is divided, if the first consonant is more sonorous than the second. In this case, the phonetic division based on the sonority principle matches with the phonological division based on an analysis of the word-initial consonant clusters.

The groups of type nasal + stop (e.g. */mb/*, */nd/*, */ng/*) are also not divided because they can appear at initial position (Sawicka & Dargiel, 2018) but because we have to do with homorganic consonants. They are pronounced together, in a single composite articulation; this has to do with the articulating features of Albanian, which differ from those of other languages; that is why in syllabification too, they necessarily go together (Dodi, 2004).

Table 6. Syllabification of non-initial (Medial) clusters according to Dodi (2004).

Type of cluster	Non-initial cluster	Syllabification V-CCV		Type of cluster	Non-initial cluster	Syllabification V-CCV	
F + S	fk tht	ka-fka i dja-thti	'scull' 'the right'	S + F	gjv	zo-gjve	'birds'
S + N	cm gjn qn	nga-cmoj di-gjni hi-qni	'tease' 'burn 'remove	N + S	mt nc nç	pre-mti-mi pi-nca vi-nçi	'promise' 'pliers' 'crane'
F + N	shnj	fo-shnjë	'infant'	N + F	ns nz nv	me-nsa be-nzi-na pra-nve-ra	'cafeteria' 'gasoline' 'spring'
S + L	gjl tl	të ve-gjlit a-tla-si	'the young' 'atlas'	F + L	sr	mi-sri	'maise'
S + S	gjt kt pt tb	zo-gjtë pa-kti ku-pti-mi fu-tbo-lli	'birds' 'pact' 'meaning' 'football'	L + G	lj llj rj	me-da-lje va-llja tha-rja	'medal' 'the dance' 'drying'

4. CONCLUSION

An important correlate in defining the phonetic basis of sonority is the resonance feature; therefore, based on the formant structure of sounds, unlike Dodi (2004) and Memushaj (2015) we find the phonetic version of the classification of sounds according to sonority increase more appropriate for the Albanian language, as in Figure 1.

Our analysis shows that sound dispersion in the onset and the coda mainly follows the sonority sequencing principle, and that the one-peak syllable model is prevalent in the Albanian language. According to the data in Table A.1 in Appendix A out of the 92 bi-consonantal clusters in agreement with the sonority sequencing principle at the beginning of the syllable, 70 groups appear in word-initial position, while 22 of them appear in non-initial (medial) position. For instance, out of 15 bi-consonantal clusters of the stop + nasal type in intervocalic position, 7 groups are distinguished in initial position, while 8 groups in non-initial position; it follows that in intervocalic position, the syllabic boundary should be the same in the words [la-gni] 'you wet' and [hi-qni] 'you remove', if we rely on phonetic criteria, since the sonority curve and the acoustic perception are the same, but if we rely on phonological criteria, the medial group /-qn-/ should be divided between two syllables in the word [hiq-ni], because it does not appear in word-initial position in standard Albanian. Therefore, in summary, if we rely on the sonority theory, which constitutes the fundamental model of syllabification, the solutions to defining the syllabic boundary are more inclusive for practical application, avoiding the exceptions for the non-initial clusters.

Likewise, the Sonority Dispersion Principle posit obstruent + liquid onsets as universally preferred (Jay & Parker, 2020). Our results show that onset clusters of type stop + liquid and fricative + liquid have more frequent usage in Albanian (out of 70 bi-consonantal clusters that appear in word-initial position, 32 of them [stop + liquid and fricative + liquid] are the most preferred). Furthermore, taking into consideration the initial consonant clusters in the onset (Table A.1 in Appendix A), unlike Dodi (2004) we can explain that, in Albanian, the sonority sequencing principle is perfectly applicable starting from the first syllable.

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Appendix A. Bi-consonantal clusters in Albanian.

Table A.1. Consonant clusters that follow the sonority sequencing principle.

Type of cluster	Onset consonant clusters	Type of cluster	Coda consonant clusters
S + G	*Initial*: bj, cj, çj, dj, kj, pj, tj. *Non-initial*: qj.	G + S	jk, jq, jt.
F + G	*Initial*: dhj, fj, sj, thj, vj, zj. *Non-initial*: shj.	G + F	jf, jsh, jth.
S + L	*Initial*: bl, bll, br, çl, çr, çrr, dr, gl, gll, gr, grr, kl, kll, kr, krr, pl, pll, pr, prr, tr. *Non-initial*: gjl, tl.	L + S	lb, lc, lç, ld, lk, lq, lt, llc, llç, llg, llk, llp, llt, rb, rc, rç, rd, rg, rk, rp, rt, rxh, rrc, rrç, rrk.
F + L	*Initial*: fl, fll, fr, sl, sll, shl, shll, shr, vl, vll, vr, zll. *Non-initial*: sr	L + F	lf, ls, lth, rdh, rf, rs, rsh, rth, rv, rz.
S + N	*Initial*: çm, çn, çnj, gn, km, pn, tm. *Non-initial*: cm, dm, gm, gjn, kn, pm, qn, tn.	N + S	mb, mc, mç, mp, nc, nç, nd, ng, ngj, nk, nt, nxh, njt.
F + N	*Initial*: sm, sn, shm, shn, thn, zm. *Non-initial*: dhn, shnj, thm, zn.	N + F	mf, msh, mth, ns, nth, nz.
L + G	*Initial*: rrj. *Non-initial*: lj, llj, rj.	G + L	jl, jll.
N + G	*Initial*: mj	G + N	jm, jn.
N + L	*Initial*: ml, mll, mr, mrr.	L + N	lm, llm, rm, rn.
S + F	*Initial*: gdh, ks, ksh, kth, ps, psh. *Non-initial*: gjv, qv.	F + S	fç, fk, ft, sk, st, shk, shp, shq, sht, vd, vg, zg, zhd, zhg.

Note: S = stop + affricate, F = fricative, N = nasal, L = liquid, G = glide.

Table A.2. Consonant clusters that violate the sonority sequencing principle in Albanian (Sonority reversals).

Type of cluster	Onset consonant clusters	Type of cluster	Coda consonant clusters
N + S	*Initial*: mb, mp, nd, ng, ngj, nk, nx. *Non-initial*: mt, nc, nç, njt, nq, nt, nxh.	S + N	tm
N + F	*Non-initial*: mf, ms, msh, mth, mz, mzh, nf, ns, nv, nz.	F + N	sm, zm.
F + S	*Initial*: fq, ft, sk, sp, sq, st, shk, shp, shq, sht, vd, vgj, zb, zd, zg, zgj, zhb, zhd, zhg, zhgj. *Non-initial*: fk, dht, tht.	S + F	ks, ksh, kth, ps, psh, pth, qth.

Table A.3. Consonant clusters that have the same sonority scale (Sonority plateaus).

Type of cluster	Onset consonant clusters	Type of cluster	Coda consonant clusters
N + N	*Initial*: mn	N + N	mn
F + F	*Initial*: fsh, sf, shf, zv, zhdh, zhv.	F + F	fsh, thsh.
	Non-initial: thsh.		
S + S	*Initial*: tk, çk.	S + S	tk

Appendix B. Data relating the usage of the word *hasm* 'vendetta foe' (With the consonant cluster *obstruent* + *sonorant* in the syllable coda).

Subjects	Number of participants	Word			
		hasëm		hasm	
		No.	%	No.	%
Six-grade pupils	117	111	95%	6	5%
Nine-grade pupils	92	71	77%	21	23%
Students	96	70	73%	26	27%
Total	305	252	83%	53	17%