VOWEL-ZERO ALTERNATION IN TURKISH

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ABSTRACT

Halil İbrahim İskender, “Vowel-zero Alternation in Turkish”

This work aims at analysing the conditions for vowel-zero alternation in modern Standard Turkish. The purpose is both descriptive and theoretical. The data that has been collected from native speakers of modern Standard Turkish show that vowel-zero alternation is more widespread than has been indicated in dictionaries and in linguistic studies on Turkish. Moreover, the forms which undergo vowel-zero alternation are not lexically conditioned, at least not for certain speakers in contrast to what has been assumed in the literature. The phonological conditions on the site of vowel-zero alternation are discussed within the framework of Government Phonology. The central assertion is that vowel-zero alternation in Turkish (i) is a predictable consequence of phonological structure and (ii) is optional. On the other hand, the realization of the vowel-zero alternation process is also sensitive to some conditions on the natures of the alternating vowels and of the flanking consonants. These conditions are systematic and therefore render vowel-zero alternation predictable.

ÖZET

Halil İbrahim İskender, "Türkçede Ünlü-Sıfır Değişimi"

Bu çalışma, çağdaş Ölçünlü Türkçede ünlü-sıfır değişimini tetkik etmeyi amaçlamaktadır. Çalışmada, hem tanımlayıcı hem de kuramsal olma gayesi güdülmüştür. Anadil konuşurlarından derlenen veriler ünlü-sıfır değişimlerinin sözlüklerde ve Türkçe üzerine dilbilim çalışmalarında gösterilenden çok daha yaygın olduğuna işaret etmektedir. Dahası, ünlü-sıfır değişimine maruz kalan biçimler en azından belli konuşurlar için varsayılanın aksine sözlüksel değildir. Ünlü-sıfır değişimi için gerekli sesdizimsel koşullar Yönetim Sesbilimi bünyesinde tartışılmıştır. Çalışmanın temel savı, Türkçede ünlü-sıfır değişimlerinin (i) sesdizimsel yapının öngörülebilir bir sonucu olduğu ve (ii) seçimlik olduğudur. Öte yandan, ünlü-sıfır değişiminin meydana gelmesi değişen ünlünün ve çevre ünsüzlerin doğasına dair koşullara karşı da duyarlıdır. Bu koşullar düzenli olup ünlü-sıfır değişimini öngörülebilir kılmaktadır.

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ABBREVIATIONS

1.	first person
2.	second person
3.	third person
Abl.	ablative
Acc.	accusative
Adj.	adjectivizer
Agr.	agreement
Aor.	aorist
Cau.	causative
Cop.	copula
Def.	definite
Der.	derivational suffix
Dat.	dative
ECP	Empty Category Principle
Fut.	future
Gen.	genitive
GP	Government Phonology
Imp.	imperative
Indef.	indefinite
Inf.	infinitival
Infl.	inflectional suffix
IPA	International Phonetic Association
Lic	License
Loc.	locative
N	Nucleus
Nom.	nominative
O	Onset
Obl.	oblique
Opt.	optative
Past	past tense
Pf.	perfective
PG	Proper Government
Pl.	plural
Poss.	possessive
Prog.	progressive
Q.	question particle
Rec.	reciprocal
Refl.	reflexive

RTÜK	Radyo ve Televizyon Üst Kurulu (Radio and Television Supreme Council of Turkey)
Sg.	singular
SIFC	Sufficiently identical flanking consonant
SKAAS	Sayısal Kayıt, Arşiv ve Analiz Sistemi (Digital Recording, Archival and Analysis System)
Sub.	sublative
Sup.	superessive
TÜBİTAK	Türkiye Bilimsel ve Teknik Araştırma Kurumu (Scientific and Technological Research Council of Turkey)
TV	Television
UEKAE	Ulusal Elektronik ve Kriptoloji Araştırma Enstitüsü (The National Research Institute of Electronics and Cryptology)

CHAPTER 1

INTRODUCTION

1.1. Aim

The aim of this thesis is to describe the mechanisms of vowel-zero alternation in Turkish and to propose an analysis for it within the framework of Government Phonology (henceforth GP). Based on new data, I venture to suggest that vowel-zero alternation is a phonologically conditioned phenomenon in Turkish and its realization is optional.

1.2. Vowel-zero Alternation in Natural Languages

Vowel-zero alternation has been attested in innumerable linguistically unrelated languages. There are theoretical explanations as to why and how vowel-zero alternation occurs universally[1]. As Scheer (2004) discusses, although languages vary as to whether vowel-zero alternation is optional or obligatory, the phonotactics of vowel-zero alternation is stable (Scheer 2004: 9). Most languages require the

[1] Note that this thesis is concerned only with the question of how vowel-zero alternation works not of why it works. Still, it is worth mentioning very briefly that the existence of vowel-zero alternation has mostly been attributed to economy principles or the term economy itself. As Chomsky (1989) describes, economy is a term used in linguistics for referring to the avoidance of complex structures and longer derivations. Likewise, economy in phonology refers to the minimality of hierarchical structure in the output or deletion of structure on the output which was present in the input (Gouskova 2003: 5). According to this view, vowel-zero alternation is assumed to apply wherever possible unless it is blocked by some constraints (Kisseberth 1970: 111-113).

environment of CvCV for vowel-zero alternation (miniscule "v" symbolizes the position for vowel-zero alternation). The following cross-linguistic samples are provided by Scheer (2004):

(1)	Moroccan Arabic	*k#øb-u* (write Pf. 3. Pl.)	*køt#b* (write 3. Sg.)	*k#tɪ#b* (write 3. Sg. Cau.)
	German	*innør-e* (inner-Infl.)	*inner* (inner)	*inner-lich* (internal)
	Tangale	*dobø-go* (called)	*dobe* (call)	*dobu-n-go* (called me)
	Somali	*nirøg-o* (female camel-Pl.)	*nirig* (female camel-Indef.)	*nirig-ta* (female camel-Def.)
	Turkish	*devør-i* (transfer-Acc.)	*devir* (transfer-Nom.)	*devir-den* (transfer-Abl.)
	Czech	*lokøt-e* (elbow-Gen.(Sg.))	*loket* (elbow-Nom.(Sg.))	*loket-ní* (elbow-Adj.)
	Hungarian	*majøm-on* (monkey-Sup.)	*majom* (monkey-Nom.)	*majom-ra* (monkey-Sub.)
	Hindi	*kaarøk-õõ* (case-(Obl.(Pl.))	*kaarək* (case-Nom.(Sg.))	*kaarək-nee* (case-Agentive)
	Kolami	*kinøk-atun* (break-Present)	*kinik* (break-Imp.)	*kinik-tan* (break-Past) (Scheer 2004: 9)

Nine languages including Turkish are mentioned in (1). All of the left-most forms provide the pattern CvCV[2] and can undergo vowel-zero alternation. The reason why the other two forms of the above words cannot undergo vowel-zero alternation is that the alternation site is not followed by a vowel in any of those forms. For example, in *devir* "transfer" and *devirden* "from the transfer", the alternation is not followed by a CV pair.

[2] This pattern is typical for vowel-zero alternation but not the only pattern for the process as will be discussed in Chapter 5.

Beside the pattern, the nature of the alternating vowel is also important for the realization of vowel-zero alternation. In some languages, only schwa can be alternated with zero. In some others, only high vowels can be alternated with zero while there are also languages in which any vowel can be alternated with zero. Nevertheless, it can be said that high vowels are universally preferred for vowel-zero alternation (Howe and Pulleybank 2004: 7-19, Gouskova 2003: 228-236). There are languages where high vowels are alternated with zero wherever possible, and there are languages where non-high vowels may also be alternated with zero. On the other hand, no language where non-high vowels can alternate with zero but the high ones cannot is attested (Gouskova 2003: 82).

Likewise, most of the languages allow only unstressed vowels to alternate with zero. Some other languages, on the other hand, may also allow stressed vowels depending on the properties of the consonants that surround the alternation site (Blust 2001: 145-149). The validation of these observations is tested with Turkish data in the thesis. The following section summarizes vowel-zero alternation in Turkish.

1.3. Vowel-zero Alternation in Turkish

In this section, I briefly mention vowel-zero alternation in Turkish. Vowel-zero alternation is a well-known phenomenon in the current literature. However, as will be discussed in the following chapters, the data upon which the process is explained are not sufficient. Below, vowel-zero alternation according to the current literature and the new data is presented, respectively.

1.3.1. Vowel-zero Alternation according to the Current Literature

A literature survey in terms of vowel-zero alternation will be presented in Chapter 2. This subsection aims to give only an idea about the current approach to the phenomenon. There seem to be two statements that the grammars agree on:

(2) (i) Vowel-zero alternation is an obligatory process.

(ii) The words that undergo vowel-zero alternation are lexically determined.

The following exemplifies the statements in (2):

(3) *koyun-u* → *koynu,*koyunu* 'the bosom (Acc.)'
(bosom-Acc.)

koyun-u → *koyunu,*koynu* 'the sheep (Acc.)'
(sheep-Acc.)

In the former case, since the word *koyun* "bosom" can and has to undergo vowel-zero alternation lexically, the form *koyunu* "the bosom (Acc.)" is regarded as ungrammatical. In the latter case, however, since the phonetically identical word *koyun* "sheep" cannot undergo vowel-zero alternation lexically, the form *koynu* "the sheep (Acc.)" is regarded as ungrammatical.

Although the two statements are accepted by all grammars discussed in Chapter 2, there are disagreements about the scope of the statements. Firstly, although it is claimed that vowel-zero alternation is an obligatory process, it is observed by many such as Deny (1955) and Banguoğlu (1959), that the optional forms may also be grammatical in certain environments:

(4) *burun-a* → *burna, buruna* ‘to the nose’
(nose-Dat.)

In (4), since the word *burun* “nose” is regarded as lexically marked for vowel-zero alternation, only the alternated form *burna* “to the nose” is expected. However, some people do not evaluate forms like *buruna* “to the nose” as ungrammatical. As will be mentioned in Chapter 2, the grammaticality of such forms is attributed to the non-identity of the following vowel.

Secondly, there is no certain list of the words which have to undergo vowel-zero alternation. There are well-known words like *burun* “nose” that everybody agrees have to undergo vowel-zero alternation lexically, except in some cases where the following vowel is identical to the alternating one as in (4). However, a disagreement on the less frequent words like *nakit* “cash” emerges:

(5) *nakit-e* → *nakde, nakide* ‘to the cash’
(cash-Dat.)

One of the two forms in (5) is regarded as ungrammatical according to whether or not this word is regarded as a lexically alternated word. If the word *nakit* “cash” is accepted as a lexically alternated word, the form *nakide* “to the cash” is regarded as ungrammatical and if it is not, it is the form *nakde* which is regarded as ungrammatical. The relative infrequency of such words seems to be the reason for the disagreement. Different grammars and dictionaries provide different lists of alternated words[3]. In Appendix A, I also try to provide a comprehensive list of the words which lexically can and have to undergo vowel-zero alternation according to

[3] The grammars mostly do not contradict each other since they provide limited data. However, there are clear contradictions in dictionaries.

dictionaries and traditional grammars. Nonetheless, not all words in Appendix A are regarded to undergo vowel-zero alternation by everyone. The next subsection shows that the above two statements in (2) may not be valid at least for some speakers of modern Standard Turkish unlike what the traditional grammars assume.

1.3.2. Vowel-zero Alternation according to the New Data

In this subsection, I briefly mention what the new data tell us about vowel-zero alternation in Turkish. As seen in the previous subsection, according to whether or not the word at issue is able to undergo vowel-zero alternation lexically, one of the two possible forms of a word is regarded as grammatical and correct and the other one is regarded as ungrammatical and incorrect in the traditional grammars. The new data used in this thesis show that beside the attested forms in old data, the forms which are regarded as ungrammatical are, in fact, observable in modern Standard Turkish. See the following:

(6) *koyun-u* → *koynu, koyunu* 'the bosom (Acc.)'
(bosom-Acc.)

koyun-u → *koynu, koyunu* 'the sheep (Acc.)'
(sheep-Acc.)

According to the new data, depending on various factors to be discussed, the accusative form, where all the requirements for vowel-zero alternation are met, can be realized with a vowel *or* with zero. The new data show that the difference between the former and the latter words is due to their frequent forms. The alternated form *koynu* "the bosom (Acc.)" is the common form for the former case whereas it is the non-alternated form *koyunu* "the sheep (Acc.)" which is more frequent for the

latter. However, the less frequent forms *koyunu* “the bosom (Acc.)” and *koynu* “the sheep (Acc.)” are also attested[4]. This indicates that vowel-zero alternation is not obligatory and lexically determined at least for certain speakers. Then, in accordance with the new data, the statements given in the previous subsection can be modified as the following:

(7) (i) Vowel-zero alternation is an optional process.

(ii) The words that undergo vowel-zero alternation are phonologically determined.

Claiming that there is no lexical condition on vowel-zero alternation implies the existence of innumerable words that meet the requirements of vowel-zero alternation and can undergo vowel-zero alternation. One purpose of this thesis is to be able to specify the conditions under which vowel-zero alternation is possible. There are conditions for the nature of the alternating vowel which enable us to predict the presence of the process as will be discussed in Chapter 4. There are also restrictions on the nature of the clusters preceding the alternation site when the pattern is not CvCV and vowel-zero alternation can still work. See the following:

(8) *Ersin-i* → *Ersni* ‘name of a man (Acc.)’
(name of a man-Acc.)

Esrin-i → **Esrni* ‘name of a woman (Acc.)’
(name of a woman-Acc.)

[4] This issue exceeds the scope of this thesis. I shall not investigate the frequency of the forms. On the other hand, also note that, there might be a difference between high-frequency words and lower-frequency words with respect to vowel-zero alternation. Hooper (1976) asserts that vowel change is a function of frequency. In English, the high-frequency words like “mem[o]ry” undergo alternation more readily than lower-frequency words like “mamm[o]ry”. See Hooper (1976) for details.

In the former case, the pattern CCvCV is unexpectedly suitable for vowel-zero alternation at least for some speakers whereas in the latter, it can never apply. Crucially, this difference can be explained by the nature of the preceding consonant clusters. It does not seem a coincidence that the preceding clusters which tolerate vowel-zero alternation are mostly the ones which are admitted word-finally in Turkish[5]. This issue will be discussed in Chapter 5 in detail.

It has also to be noted that there are also vowels which are not interpreted by some speakers depending on the tempo of the speech or some other reason, but which are normally interpreted in the standard dialect. These cases might sometimes involve a loss process which normally does not occur. These are not cases of vowel-zero alternation in the theory. See (9):

(9)	*ilikle ~ ilkle*	'button'
	vuruk ~ vurk	'dent'

The samples in (9) are manifestations of vowel loss. For vowel-zero alternation to be realized, there has to be a vowel-interaction between the alternating vowel and the following vowel which is called "proper government" in GP, as will be mentioned in the following section. In the former example, the following vowel *e* is not able to interact with the alternation site because they are not adjacent. If there was one consonant between them instead of two, *k* and *l*, there could be vowel-zero alternation. In the latter, on the other hand, since there is no vowel which follows the alternation site, there is again no vowel-zero alternation. This time, GP does not

[5] The sequence *rs* is a possible word-final consonant cluster in Turkish whereas *sr* is not.

involve proper government. It is the consonant interaction which makes the vowels at issue silent. In the following section, an overview of the framework will be provided.

1.4. Overview of the Theoretical Framework

GP forms the theoretical footing of this thesis. The fundamental crux of GP is the fact that it abandons arbitrary paradigms and evaluates phonological phenomena within universal principles and language-specific parameters. Since the basic tenets of GP will be discussed in Chapter 3, this section only touches upon the way of evaluating vowel-zero alternation within the framework of GP.

1.4.1. A Very Brief Introduction to GP

As is well known, the second half of the twentieth century witnessed the emergence of the concept of "Universal Grammar". A very simple observation followed this concept: there are principles and parameters. First, all human languages share certain properties, e.g., they all have verbs and consonants. Second, they may make different choices about some other properties. For example, some languages choose to have the object after the verb, while others do not. The first phenomenon is about principles and the second one is about parameters.

GP aims to establish a system based on universal principles and parameters. It focuses on the properties that all languages share with each other. From a GP point of view, there is a close connection between a process and the environment in which it happens. The realization of vowel-zero alternation is also related to the phonological environment as is mentioned in the following subsection.

1.4.2. Vowel-zero Alternation in GP

In contrast to other phonological frameworks like Optimality Theory, GP does not accept vowel insertion and vowel deletion. Vowel-zero alternation involves neither epenthesis nor deletion because the structure of a word is never modified by the application of a phonological process. The vowel which has the property of alternating with zero is a nuclear position. It is not deleted or inserted but always present in the lexical representation of a word. Then, the aim is to determine under which conditions this nuclear position is or is not phonetically interpreted (Charette 1991: 1-2).

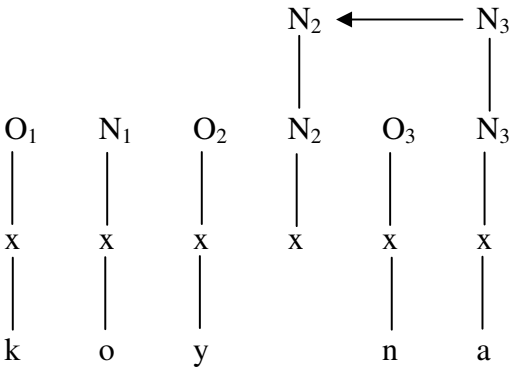
There are certain positions and these positions may remain empty only if the phonological environment is suitable for that. The silence of empty categories is associated to a universal principle called the phonological Empty Category Principle (henceforth ECP). A sound in a certain position becomes audible or silent as in (11) according to the phonological ECP which will be discussed in Chapter 3. For the present, two main conditions related to the phonological ECP might be mentioned for the realization of vowel-zero alternation:

(10) (i) The governor must have phonetic content.

(ii) The governor cannot govern across another governing domain (Kaye 1990b: 144).

Now, see the following representation:

(11) *koyun-a* → *koyna* 'to the bosom', 'to the sheep'
(bosom or sheep-Dat.)



In (11), a typical example for vowel-zero alternation is represented in a GP point of view. Vowel-zero alternation is realized through the proper government of an alternation site which is lexically empty. Put roughly and informally, in accordance with the conditions in (10), the phonetically interpreted vowel *a* makes the vowel *u,* which is in the same domain, remain silent. Stated differently, N_3 properly governs N_2 and prevents it from getting melody from the harmonic domain N_1. Since all these notions will be discussed in Chapter 3, I will not explain them in this chapter. The important point for us here is that lexical differences between words as regards vowel-zero alternation are not easy to explain from a GP point of view. For example, the assumed difference between the words *koyun* "bosom" and *koyun* "sheep" which makes the form *koyna* "to the bosom", "to the sheep" grammatical or ungrammatical is totally unexpected for GP. Since there cannot be any lexical difference between the alternation sites of the two words which are both lexically empty, both of the words are expected to be able to undergo vowel-zero alternation[6].

In that sense, the new data which show that the words in question can and may undergo vowel-zero alternation without any lexical restriction is compatible with GP. Vowel-zero alternation in Turkish is a good testing tool for seeing how GP works in different languages. Through a systematic analysis of the vowel-zero

[6] See 4.2.1 for the discussion of this problem.

alternation in Turkish, GP effectively accounts for the process. I do hope to offer a cohesive and complete account of the vowel-zero alternation in Turkish without forgetting that any analysis can by no means be conclusive. The last section will be about the data used in this thesis and the experimental process.

1.5. Data and the Experimental Procedure

This section mentions the process of collecting data. There are two main sources for the analyses in this thesis: subjects' speeches and TV recordings. I studied with five subjects. Nevertheless, studying with few subjects always has a potential weakness in representing the population as a whole (Shearer 1997: 170). There may be individual idiosyncrasies. To prevent this, I also used TV recordings. Luckily, as a native speaker of the language, I also had an opportunity of benefiting from my own intuitions about Turkish. On the other hand, I used computer technology to represent the pronunciations on the screen. Below, the procedure is described.

1.5.1. Subjects

The participants were five native speakers of modern Standard Turkish, of different ages and sexes with no language deficits. They had at least a high school degree. They were all living in Ankara at the time of the recording. They were all born and grew up in Ankara although their family roots came from different cities. They are not fluent in any foreign language. The following table provides the relevant information:

Table 1. Profiles of Speakers

Speaker	Age	Sex	Family Roots
Subject 1	27	Male	Trabzon
Subject 2	40	Male	Bitlis
Subject 3	27	Female	Ankara
Subject 4	42	Male	Bursa
Subject 5	25	Female	İzmir

For the recording process, I met each subject at different times in quiet environments. All subjects were informed that the recordings would be providing data for a phonological study but none of them were told the purpose of the study. They were not asked to read any material and I did not read anything either. During the conversation, I asked various questions some of which were extemporaneous to make the subject utter certain forms. I carefully tested and retested my subjects in order to be sure about their pronunciations. These speeches are one of the two sources that I shall use. The next subsection is about my second source of data.

1.5.2. TV Recordings

Beside the subject speeches, there is a huge video database which is efficiently utilized in this thesis. Many TV programs were watched to find examples of vowel-zero alternations. For doing this, an archiving technology called SKAAS which was demanded by RTÜK and produced by TÜBİTAK UEKAE has been used. SKAAS is

a large scale digital media archiving and content management system. All TV broadcasts in Turkey have been recorded and indexed by this system since 2007. The current index includes more than a hundred Turkish TV channels. By means of SKAAS, any TV program which is not older than six months can be reached via a computer network (TÜBİTAK 2008). RTÜK has used this technology which is inaccessible to the public for a year. Since I have access to the system, I could easily collect sufficient data from various TV programs. The next subsection is about the equipment which is used in evaluating the data.

1.5.3. Equipment

In the evaluation process, subject speeches were recorded directly by a computer equipped with a sound card. A standard computer microphone was connected to the microphone input from the sound card of the computer. The Microsoft Sound Recorder software, which is included in Microsoft Windows operating systems, was used to record and save the speeches in mono (one channel), at a sampling rate of 44.1 kHz (44,100 samples per second), and in the Microsoft PCM Wav format.

Then these recordings were imported into a speech analysis software, Praat (version 4.6.01 developed by Boersma and Weenink 1992-2008). 1.2.4 summarizes the significant points as regards how the instrumental analysis was done, that is to say, how the Praat program was used in this work.

1.5.4. Instrumental Analysis

Phonetics is concerned with the sounds which are used in human speech. In that sense, the instrumental analysis of speech sounds has been proven helpful in researching the nature of sounds. There are certain instruments including X-ray photography and film, air-flow tubes, spectrographs, mingographs, laryngographs etc. which are used for visualizing the sound on paper or on a computer screen. Among those, the computer softwares provide the most readily available and simplest way of analysis (Filipsson 1995). In this section, I mention the basic notions of the instrumental analysis used in this thesis.

As said, the Praat program was preferred for the instrumental analysis. Praat was used to produce waveforms and spectrograms. It brings up a double view in an easily readable form, with a waveform on top and a spectrogram under it. Waveforms and spectrograms were segmented and labeled by using the same software. Segmentation was realized by visual inspection of waveforms and spectrograms, and by listening to the recordings (Toft 2002: 114). In segmentation, the points which shows the changes in the shape of waves and in the placements of formants were determined (Şayli and Arslan 2003: 18).

1.5.4.1. Waveforms

A sound is a series of pressure changes. Waveforms are the most common representation of a sound. In waveforms, the horizontal axis is the time axis and the curve shows the pressure in the signal (Filipsson 1995). Note that voiced sounds

(vowels and voiced consonants) have lower frequencies than unvoiced sounds (voiceless consonants), and are usually at higher volumes (Townsend 2007).

1.5.4.2. Spectrograms

In spectrograms, the horizontal axis is again the time axis, the vertical axis is frequency, and as a third dimension, shades of darkness represent amplitude (Filipsson 1995). The dark bands in spectrograms are spectral peaks, which show the resonant frequencies produced by the vocal tract. These frequencies are called formants. Formants are shown by red dots in the spectograms produced by Praat. Formants are numbered from the bottom to the top as F1, F2, F3, F4 etc (Türk et al. 2004). Their positions are different for each sound (Filipsson 1995).

Note that, since my aim in using computer technology was only to determine whether certain sounds existed in the words or not, I avoided any unnecessary processes. For example, I did not calculate the vowel formant frequencies of the words. In Appendix B, there are selected figures showing whether or not vowel-zero alternation is realized in various cases.

In this chapter, the topic has been briefly introduced. The concept of vowel-zero alternation, the framework and the data have been mentioned. The rest of the thesis is organized as follows: Chapter 2 summarizes the current literature on vowel-zero alternation in Turkish. Chapter 3 gives a short introduction to the relevant concepts of GP in order to familiarize the reader with the aspects of the analysis. In Chapter 4, a general overview of the vowel-zero alternation process in Turkish is presented. Chapter 5 discusses the significance of the preceding clusters in the process. Chapter 6 focuses on the remaining issues about vowel-zero alternation and

explores the cases where lexical vowels can get lost, and Chapter 7 presents a conclusion.

CHAPTER 2

LITERATURE SURVEY

A survey of the literature related to vowel-zero alternation in Turkish does not show a great diversity of data. There is not adequate data from spoken language and even from written texts. Theorizing upon inadequate data causes the repetition of the same observations. In this chapter, I shall endeavour to summarize the current literature. I shall first present some people's views about vowel-zero alternation in modern Standard Turkish. Then, I shall mention the diachronic changes and touch upon some points concerning the existence of vowel-zero alternation from written texts in Turkic. Lastly, I will provide a brief summary of vowel-zero alternations in dialects of Turkish in the context of my research topic. I only aim to use them to get some instances to support the existence of the alternated forms in the standard dialect.

2.1. Vowel-zero Alternations in the Standard Dialect of Modern Turkish

Vowel-zero alternations in the standard dialect of modern Turkish have been investigated in most of the Turkish grammars. Nevertheless, some of them, like Underhill (1972), do not even contain a brief description. Others, such as Ediskun (1963), Lewis (1967) and Gencan (1979), only note that synchronic changes in Turkish are arbitrary and lexical (Ediskun 1963: 87-88, Lewis 1967: 10, Gencan

1979: 41). Some have more detailed explanations. For instance, according to Ergin (1962), words with more than two syllables have a tendency to drop their vowels in word-medial positions in many cases (Ergin 1962: 54). He relates the existence of such cases to stress. Unstressable vowels are either deleted or they change (Ergin 1962: 55). However, he does not account for under which conditions certain sounds are deleted or changed. On the other hand, there are some other studies that involve comprehensive and original observations and explanations. Below, one may find the summaries of the outstanding works with respect to vowel-zero alternations.

2.1.1. The View of Deny (1941, 1955)

In surveying the literature on vowel-zero alternation in modern Standard Turkish, I prefer to consider Deny (1941, 1955) primarily, since he was the first to describe the phenomenon in a systematic way[7]. Deny (1941) claims that with few exceptions, vowel-zero alternation can lexically be possible only if the alternating vowel is unstressable and high. Besides that, it has to be on the last syllable of the root before the suffix (Deny 1941: 120).

Deny (1955) investigates this phenomenon in more detail. For the realization of vowel-zero alternation, he mentions a condition about the nature of flanking consonants. He claims that one of the flanking consonants has to be a sonorant (Deny 1955: 113-116). According to him, vowel-zero alternation is not a very common phenomenon in Turkish. Still, it is commonly observed that the vowel -which is almost always a high vowel- of the second or rarely third syllable of a word drops (Deny 1955: 113). Also, word final vowels are seldom deleted (Deny 1955: 130).

[7] His original work was published in French in 1921. In this thesis, I used the Turkish translated version (1941).

See the following (> stands for diachronic loss while → stands for synchronic change):

(1) *bura-da → burda* 'here'
(here-Loc.)

yumurta-la-mak > yumurtlamak 'to ovulate' (Deny 1955: 110, 130).
(egg-Der.-Inf.)

There are two main groups which undergo synchronic vowel changes. First, there is a strict number of roots where vowel change is realized by an inflectional suffix. These are mostly kinship terms and words for body parts. The only example which does not belong to these semantic categories is *uğur* "good luck". Deny (1955) suggests that originally it might have been a word for an animal organ[8] (Deny 1955: 127-128). According to him, parts of a human body and parts of community can be considered in a similar way and the same phonological processes may be applied to the words of both these semantic classes. In case those words exhibit the aforementioned condition as regards flanking consonants, the vowel of the second syllable drops. However, he also notes that there are some exceptions where no synchronic change is observed although all conditions are fulfilled. They are given in the following:

(2) *dünür-ü → *dünrü* 'the father-in-law or mother-in-law of one's child (Acc.)'
(the father-in-law or mother-in-law of one's child-Acc.)

*gelin-i → *gelni* 'the bride (Acc.)' (Deny 1955: 127-128).
(bride-Acc.)

[8] Duman (1995) notes that at least in seventeenth century Ottoman texts, its alternated form had not been used (Duman 1995: 58).

Second, there are some diachronic changes. For those, there is no semantic restriction.

(3)	*halife* > *kalfa*	'overseer'
	a:yi:ne > *ayna*	'mirror'

All of Deny's (1955) observations about words of Turkic origin are based on written texts and mostly dictionaries. On the other hand, when he mentions borrowed words, he applies his observations to spoken language. Actually he is again more apt to give examples within the orthography, but he also provides examples from the spoken language:

(4)	*valide* → *valde*	'mother'
	mürüvvet → *mürüvet* → *mürvet*	'happiness'
	zahi:re → *zahire* → *zahre*	'cereal' (Deny 1955: 129).

In (3), there are historical losses of the vowels while in (4) there are synchronic changes. Note that, Deny (1941, 155), like many others, does not make a distinction between diachronic loss and synchronic alternation.

Another point that Deny (1955) touches on is that when a suffix is added to a lexically marked root ending with a consonant, besides vowel-zero alternation, there might be an alternative result. As seen in the following examples, vowel-zero alternation might not apply with a suffix containing a non-high vowel whereas it has to apply if there is a following high vowel. See (5):

(5) (a) *ağız-a → ağza, ağıza* 'to the mouth'
(mouth-Dat.)

burun-a → burna, buruna 'to the nose'
(nose-Dat.)

(b) *ağız-ı → ağzı, *ağızı* 'the mouth (Acc.)'
(mouth-Acc.)

*burun-u → burnu, *burunu* 'the nose (Acc.)'
(nose-Acc.)

As is seen, the dative suffix *–A* may not cause a vowel-zero alternation according to his data. The following section will be on Banguoğlu's (1940, 1959) approach to vowel-zero alternation.

2.1.2. The View of Banguoğlu (1940, 1959)

Banguoğlu (1959) discusses the phenomenon more deeply. Like Deny (1941, 1955), he uses the term syncope for both vowel loss and vowel-zero alternation and he does not make a distinction between diachronic and synchronic changes. Crucially, he points out that beside the lexically marked words which undergo syncope in formal speech, there are innumerable cases in spoken language which undergo syncope despite the fact that no lexical marking is available for those. According to him, syncope causes syllable deletion in Turkish. Word-medial syllables are mostly unstressable and the vowels in those syllables sometimes drop. Like Deny (1955), he also states that high vowels are dropped more easily. He also observes the properties of flanking consonants. There are three possible situations:

(6) (i) Both of the flanking consonants are lateral[9].

(ii) One of them is lateral.

(iii) None of them is lateral.

The first group of words is typical for the realization of vowel-zero alternation. For the second group of words, syncope can be observed in many cases again whereas for the third group, it is difficult to find examples (Banguoğlu 1959: 110-111). Below, one can see some of his examples for the three groups of words, respectively:

(7) (a) *diri-lik* > *dirlik* 'affluence'
(being-Der.)

çevir-e > *çevre* 'environment'
(round-Der.)

(b) *kavuş-ak* > *kavşak* 'junction'
(join-Der.)

koku-la > *kokla* 'smell'
(smell-Der.)

(c) *yat-ası* > *yatsı* 'a time about two hours after sunset'
(go to bed-Der.)

He also points out that syncope is very common in spoken language and besides the lexically marked ones, he gives some interesting examples[10]:

(8) *eller-imiz* → *eller-miz* 'our hands'
(hands-Poss.1.Pl.)

[9] His definition of lateral includes the sounds *l*, *r*, *v* and *ğ* (soft-g), which is phonetically null but phonologically behaves like a vowel as will be discussed in Chapter 6.
[10] He states that his default examples of spoken language are from the standard dialect as long as he does not say something reverse.

yanaklar-ımız → yanaklar-mız 'our cheeks'
(cheeks-Poss.1.Pl.)

götür-ür-üm → götürrüm[11] 'I bring' (Banguoğlu 1959:
(bring-Aor.-Agr.1.Sg.)
64, 113).

Note that, unlike the ones in (7) which are examples of diachronic loss, these cases are examples of synchronic change. Crucially, Banguoğlu (1959) is the first person who provides examples of vowel-zero alternation from spoken language[12].

Just like Deny (1955) does, Banguoğlu (1959) also shows that different suffixes might affect the vowel loss process in a different way. For example, the dative suffix *–A* which includes a non-high vowel does not seem to cause vowel-zero alternation as much as the accusative suffix does. The former is more detectable than the latter:

(9) *omuz-a → omuza* 'to the shoulder'
(shoulder-Dat.)

omuz-u → omuzu 'the shoulder (Acc.)' (Banguoğlu
(shoulder-Acc.)
1959: 114).

This phenomenon is actually more related to the non-identity of the vowels at issue rather than containing a non-high vowel as will be discussed in Chapter 6. As said before, the important point for the claims of this thesis in Banguoğlu's (1940, 1959) works is that he observes that in spoken language, vowel-zero alternation may work optionally for the words which are not lexically marked for the process. However, he

[11] In Chapter 4, it will be seen that such examples are common and regular in modern Standard Turkish. Actually, it is a significant example for the purpose of this thesis.
[12] See Appendix A for a list of lexically alternated words. Also note that like Banguoğlu (1959), Atabay et al. (1978) mention that besides certain examples of synchronic change in the orthography, there are more examples in spoken language but they do not provide examples.

does not attempt to describe the phonological environment in which these vowel-zero alternations take place and unfortunately, after him, no one even mentions them, as will be seen in following subsections.

2.1.3. The View of Swift (1962)

Swift (1962) is interested in synchronic changes, rather than diachronic transformations. He explains synchronic changes in three steps. Syncope cannot be realized in certain cases due to phonological, morphological and lexical constraints. The first step is about phonology. He gives *aziz* "precious" as an example for that. According to him, vowel-zero alternation does not take place, since the resultant form would have a double consonant[13] (Swift 1962: 33).

Secondly, there may be morphologically conditioned cases. See the following:

(10) *isim-e* → *isime* 'to the name'
(name-Dat.)

He claims that syncope is not triggered by dative suffix which includes a non-high vowel. In fact, this is not the case. Firstly, this phenomenon is related to frequency. The form *isme* "to the name" is also attested. Secondly, this difference in frequency seems to be related to the non-identity of vowels at issue, *i* and *e* rather than morphological constraints.

If there is no phonological and morphological constraint and syncope is still unavailable, then it means that the variation is lexically conditioned. For example,

[13] It is actually not because of having a double consonant, but because of the length of the vowel at issue. Such cases will be discussed in Chapter 4.

the case that *bakır,* "copper", would not become **bakr-ı,* "his/ her copper", directly shows that the resultant form is out since the variation is lexically conditioned.

2.1.4. The View of Foster (1969)

Foster (1969) finds that Turkish speakers do not seem to like word-final consonant clusters very much. Then, words with word-final consonant clusters might be regarded as exceptions. Thus, following Lees (1961), he first sets up a rule of epenthesis for the other cases[14]. His view depends on the acceptance of the underlying form which is abstract and may be different from the surface form which reflects the concrete phonetic expressions. At the underlying forms, which are assumed by him, there is no alternating vowel. With some exceptions like the ones in (11b), a high vowel is inserted between the two adjacent consonants of the underlying forms at surface structure:

(11) (a) */burn/, burun* 'nose'
/cehl/, cehil 'ignorance'

(b) */harp/, *harıp* 'war'
*/üst/, *üsüt* 'upper plane' (Foster 1969: 219).

However, he determines two problems for this explanation. First, there are quite a number of exceptions for a hypothesis. Second and most important, this kind of an

[14] I do not allocate another subsection for Lees' (1961) view (Lees 1961: 37-38) since his data are not comprehensive enough and Foster's (1969) and Kornfilt's (1986) views already include Lees' (1961) sights.

explanation could not account for the vowel disharmony observed within such words (Foster 1969: 220). Consider the following:

(12) */vakt-ı/ → *vaktı, vakti* 'the appointed time (Acc.)'
(appointed time-Acc.)

*/gusl-u/ → *guslu, guslü* 'the ablution (Acc.)'
(ablution-Acc.)

*/aks-ı/ → *aksı, aksi* 'the opposite (Acc.)'
(opposite-Acc.)

In Turkish, there is backness harmony. That is, if there is a back vowel at the beginning of a word, the following vowel has to be a back vowel too and if there is a front one, the following vowel has to be front. In that sense, if the underlying forms of the words do not contain a vowel inside the flanking consonants, then there will remain no reason for the realization of vowel disharmony. According to him, palatalization cannot be a reason for that either because in his analysis, it stems from the existence of the front vowel. Hence, he proposes the following kinds of underlying forms:

(13) */vakit-i/ → vakti* 'his/ her appointed time'
(appointed time-Poss.3.Sg.)

/gusül-ü/ → guslü 'his/ her ablution'
(ablution-Poss.3.Sg.)

/akis-i/ → aksi 'his/ her opposite'
(opposite-Poss.3.Sg.)

Since the vowel is itself available in the underlying form, there is nothing unexpected in terms of the vowel harmony. The vowel deletion rule applies to give the correct

forms. Then, there remains no need for the "so-called" epenthetic vowel (Foster 1969: 220). Yet, there is again a problem. Consider (14):

(14) */bayır-ı/ → *bayrı* 'the gentle slope (Acc.)'
(gentle slop-Acc.)

*/davul-u/ → *davlu* 'the drum (Acc.)' (Foster 1969: 222).
(drum-Acc.)

The vowel deletion rule does not work in (14) and thus there always remain exceptions to a rule. As no phonological or morphological criteria could be found for these varieties, semantic reasons were postulated, such as the Body Parts Vowel Dropping Rule. Just like Deny (1955), Foster (1969) mentions a parallel between the words for body parts and the words that undergo synchronic vowel changes. Unlike Deny (1955), however, he expands the possibility of carrying meanings of body parts not only to words of Turkic origin like *uğur* "good luck" but also to borrowings such as *cehil* "ignorance" and *akis* "opposite". He admits to this by stating that he was unable to solve this problem without the help of an ethnologist (Foster 1969: 223-224).

2.1.5. The View of Demircan (1977, 1996)

According to Demircan (1977), vowel-zero alternation is a result of a change in the position of stress. The unstressed vowels drop in certain words. He points out that the alternated form of the same word may carry different meaning:

(15) *yayılım → *yaylım* 'expansion'

yayılım > yaylım 'pasture' (Demircan 1977: 63).

He claims that since the loss of the vowel creates different words, it must be an obligatory process, ignoring the fact that the former is synchronic but the latter is a diachronic case.

Demircan (1996) evaluates words of Turkic origin and borrowed words separately. It is "syncope" for words of Turkic origin whereas it is "epenthesis" for the borrowings (Demircan 1996: 61, 89). His understanding assumes different underlying forms for these two kinds of words. See the following:

(16)	(a)	*/boyun-u/ → boynu* (neck-Acc.)	'the neck (Acc.)'
		/alın-ı/ → alnı (forehead-Acc.)	'the forehead (Acc.)'
		/ağız-ı/ → ağzı (mouth-Acc.)	'the mouth (Acc.)'
	(b)	*/akl-ı/ → aklı* (intellect-Acc.)	'intellect (Acc.)'
		/ömr-ü/ → ömrü (lifetime-Acc.)	'the lifetime (Acc.)'
		/zehr-i/→ zehri (poison-Acc.)	'the poison (Acc.)'

Words in (16a) are of Turkic origin and therefore undergo deletion whereas the borrowed words in (16b) do not undergo deletion since underlyingly there is no vowel to delete at all. He states that the word-final consonant clusters of the borrowed words are inserted with appropriate vowels in case these clusters are not possible in Turkish. When certain suffixes like the possessive suffix are added to these borrowed words, they just regain their original forms (Demircan 1996: 89).

2.1.6. The View of Kornfilt (1986, 1997)

According to Kornfilt's (1986) analysis, there is a rule that inserts a [+high] vowel to break up impermissible syllable-final consonant clusters. These syllable-final consonant clusters consist of the following:

(17) (i) Any cluster whose second member is a sonorant.
(ii) Clusters with a fricative after any obstruent (with the exception of *s*, which is permitted after *k*)
(iii) A stop after another stop (Kornfilt 1986: 80).

Kornfilt (1986) discusses her data on synchronic changes in a CV theory of the syllable. Very briefly, she claims that the rightmost consonant in the stem-final consonant cluster of the vowel-initial suffixed forms undergo a process of resyllabification[15]. It means that the rightmost consonant becomes a part of the following syllable. However, that is a lexical phenomenon. Some words cannot undergo resyllabification although they have impermissible stem-final consonant clusters[16].

From the outline above, one can see a basic divergence between Kornfilt (1986, 1997) and the others. Following Lees (1961), Kornfilt (1986, 1997) prefers to use the term epenthesis for the vowel-zero alternation phenomenon and unlike Foster (1969) she does not consider vowel disharmony as a problem for insertion (Kornfilt 1997: 496, 513). She considers all synchronic changes in Turkish as an insertion of a vowel, not its loss.

[15] Note that resyllabification is not accepted in GP. See 3.2. for details.
[16] Remember the assumed difference between *koyun* "bosom" and *koyun* "sheep" from Chapter 1. On the other hand, some words like *burun* "nose" and *cürüm* "crime" which are accepted to undergo vowel-zero alternation do not include impossible clusters. For example, the words *modern* "modern" and *alarm* "alarm signal" are perfectly acceptable in Turkish. Then, it can be claimed that *burun* "nose" does not undergo insertion in contrast to what she claims.

2.1.7. The View of Tseng (2002)

Tseng (2002) describes the same phenomenon loss of a middle syllable in his monograph. Since whenever a vowel is not pronounced in a word, the word loses one of its syllables, he prefers to name the phenomenon in connection with the syllable structure. He is concerned only with written forms and indicates that there is no certain form for many words (Tseng 2002: 3). He also notes that synchronic changes are highly observable in spoken language, but he does not say anything more than that. He has scanned dictionaries and newspapers to obtain examples.

He lists the words and suffixes which undergo vowel loss in historical process. Here, one may see some of his examples:

(18) *kısır-ak* > *kısrak* ‘mare’
(barren-Der.)

beniz-e > *benze* ‘to the color of face’
(color of face-Dat.)

koku-la > *kokla* ‘smell’
(smell-Der.)

kavuş-ak > *kavşak* ‘junction’
(join-Der.)

ayır-ı > *ayrı* ‘separate’
(separate-Der.)

çevir-im > *çevrim* ‘circuit’ (Tseng 2002: 43-52).
(round-Der.)

According to Tseng (2002), the loss of non-high vowels is exceptional and mostly diachronic. It is observed only when certain suffixes are added. See the following:

(19) *giy-esi* > *giy-si* ‘apparel’
(wear-Der.)

yat-ası > *yatsı* (go to bed-Der.)	'a time about two hours after sunset'
değ-enek > *değnek* (touch-Der.)	'stick'
der-enek > *dernek* (gather-Der.)	'association'

Those changes have been realized in historical process and the older forms are not available in the spoken language anymore. They are shown in the modern orthography as they are now pronounced.

For the alternation of high vowels, on the other hand, he makes some observation, about the phonological and morphological environments. First, the alternated vowel which has to be in the last or penult syllable is always short and unstressed. Second, the following consonant is mostly lateral. Third, the existence of *et* and *ol*, voice suffixes, and the forms of *ile*, *idi*, *imiş*, *iken* are signs of a possible alternation process.

Tseng (2002) also dwells on cases where there is no synchronic change despite the existence of the lexically marked words. First of all, there are reiterative structures (Tseng 2002: 27). See the following:

(20)	*ağız ağıza ~ *ağız ağza*	'mouth to mouth'
	*göğüs göğüse ~ *göğüs göğse*	'chest to chest'
	*omuz omuza ~ *omuz omza*	'shoulder to shoulder'

Secondly, according to his orthographical data, proper names do not allow vowel-zero alternation (Tseng 2002: 27). We can exemplify this with (21):

(21) *Gönlümü Gönül'e/ *Gönle verdim.* 'I gave my heart to Gönül.'

Lastly, he determines that words of Arabic origin with a long vowel in their first syllable do not allow synchronic changes[17] (Tseng 2002: 72). See (22):

(22) *za:lim-e → *za:lme* 'to the atrocious'
(atrocious-Dat.)

*va:kıf-a → *va:kfa* 'to the charitable foundation'
(charitable foundation-Dat.)

*a:ciz-e → *a:cze* 'to the helpless'
(helpless-Dat.)

The examples with asterisks in (20) and (21) are actually attested in our data but the examples in (22) which show the significance of the phonological environment are also not attested by our data. This issue will be discussed in 4.2.4.2 within a GP point of view. Tseng (2002) has also investigated the nature of consonants which flank the alternation site. He states that there is no restriction on the nature of flanking consonants for words of Arabic origin. Regardless of whichever consonants they have, they regain their original forms when a vowel-initial suffix is added. However, for words of Turkic origin, he determines only seven flanking consonants, at least one of which is needed for vowel-zero alternation. These are *r* (75 times), *n* (17 times), *l* (13 times), *v* (29 times), *y* (31 times), *z* (8 times) and *ğ* (26 times) (Tseng 2002: 31-32)

[17] Actually, he also mentions the word *hemfikir,* "like-minded", which consists of *hem* "same" and *fikir* "idea", but he attributes the difference between *fikrim* "my idea" and *hemfikirim* "I am like-minded" to the lexical properties of the word *hem* "same" (Tseng 2002: 27). However, as will be shown in Chapter 6, it is certainly related to the place of stress. The former suffix can be regularly stressed but the latter is a clitic which assigns the stress on the previous vowel. If one finds a context to use this word with a proper suffix, it may be uttered without the alternating vowel as in *hemfikriniz var mı?* "Is there anybody that agrees with you?".

Lastly, Tseng (2002) offers his ideas on why some words like *atılım* "enterprise", *bilişim* "formation" and *oluşum* "informatics" do not undergo synchronic changes. He thinks that it is because these are recent words that were derived as part of the language reform in the twentieth century (Tseng 2002: 51).

2.1.8. The View of Özsoy (2004)

Özsoy (2004) approaches the subject in two ways. Her binary division of alternation processes differentiates phonetic processes from the phonological ones. Phonetic processes may show diversity from speaker to speaker. Also the same speaker may pronounce a word differently in different places and times (Özsoy 2004: 105). Phonological processes, however, do not show such kind of adjustments. They are not related to the place or time in which people speak.

According to Özsoy (2004), especially, in careless and fast speech, some vowels may not be pronounced. It is a phonetic phenomenon. See (23):

(23) *içeri-si → içersi* 'the inside'
(inside-Poss.3.Sg.)

yukarı-da → yukarda 'aloft'
(aloft-Loc.)

o-ra-da → orda 'there' (Özsoy 2004: 106).
(that-Der.-Loc.)

There does not occur a systematic alternation. Thus, they are not phonological facts according to her perspective. Her emphasis, on the other hand, is more on phonological facts rather than on phonetic processes. See (24):

(24) (a) */akl-da/ → akılda* 'in intelligence'
(intelligence-Loc.)

/gönl-de/ → gönülde 'in heart'
(heart-Loc.)

(b) */akl-ı/ → aklı* 'intellect (Acc.)'
(intellect-Acc.)

/gönl-ü/ → gönlü 'heart (Acc.)'
(heart-Acc.)

According to Özsoy (2004), *akl* "intellect" and *gönl* "heart" are the underlying forms of *akıl* "intelligence" and *gönül* "heart". It is lexical information. When they are nominative or when a consonant-initial suffix is added to them, there appears an epenthetic vowel. It is because they are not possible word-final consonant clusters in Turkish. However, when a vowel-initial suffix is added to them, no change occurs in their underlying forms since there is no restriction for word-medial phonetically adjacent consonants in Turkish (Özsoy 2004: 126-127). In that sense, her view overlaps with Kornfilt's (1986, 1997) and Lees' (1961) views in that they all mention epenthesis instead of syncope.

2.1.9. The View of Göksel and Kerslake (2005)

According to Göksel and Kerslake (2005), vowel-zero alternation[18] is not a general phonological process. They only mention alternation process in roots and account for it with the term "epenthetic vowels". They provide well-known examples and restate that whether the final high vowel in the bare form of a root is epenthetic or not is lexical information. See (25):

[18] They prefer to use this term themselves among all the others mentioned above.

(25) *koyun-u → koynu* ‘his/ her bosom’
(bosom-Poss.3.Sg.)

koyun-u → koyunu ‘his/ her sheep’
(sheep-Poss.3.Sg.)

nehir-i → nehri ‘the river (Acc.)’
(river-Acc.)

Nehir-i → Nehiri ‘name of a woman (Acc.)’ (Göksel and
(Nehir-Acc.)
Kerslake 2005: 18).

Importantly, they also provide examples for the case in which a root with an epenthetic vowel is followed by an unstressable suffix beginning with a vowel (Göksel and Kerslake 2005: 19). In accordance with the widely accepted assumption, vowel-zero alternation is unacceptable when there is stress. They show that it is really the case:

(26) *nehir-im → nehrím, *nehirím* ‘my river’
(river-Poss.1.Sg.)

*nehir-im → nehírim, *néhrim* ‘I am a river’ (Göksel and
(river-Cop.1.Sg.)
Kerslake 2005: 19).

Note that the first person singular copula is unstressable in Turkish. Hence, in the latter case, stress remains on the penult syllable and the vowel at issue cannot be syncopated due to the existence of stress.

2.1.10. Summary of Views

In summarizing the views discussed above, we can take Deny (1955) as a starting point with respect to his data. There seem to be two main kinds of cases according to

his data: diachronic cases and synchronic cases. For the former, the older forms of the words are no longer available. However, that does not mean that there is no regularity in their evolution processes. It is a historical phenomenon for words to lose some of their sounds and if they have lost their vowels, this would certainly imply that a kind of synchronic change process has been actualized over a certain amount of time. It is a large subject that requires a particular pursuit. Nevertheless, the important point for the purposes of this thesis is to differentiate the historical loss from the synchronic change.

For the latter, there are again two different cases available. First, there are cases in which the change occurs obligatorily. If there is a vowel-initial suffix after some lexically-marked consonant-ending words, the vowel at the penult syllable alternates into zero. Second, there might be cases where synchronic changes can take place arbitrarily. The main difference between these two kinds of synchronic cases that the former are assumed obligatorily whereas the latter are optional. Examples follow, respectively:

(27)	(a)	*çevir-i → çeviri, çevri* (translate-Der.)	'translation'
		satı-lık → satılık, satlık (sale-Der.)	'for sale'
	(b)	*koyun-u → *koyunu, koynu* (bosom-Acc.)	'the bosom (Acc.)'
		*omuz-u → *omuzu, omzu* (shoulder-Acc.)	'the shoulder (Acc.)'

Özsoy (2004) evaluates the first kind of processes as phonetic rather than phonological. There is an agreement on the conviction that they are available only in colloquial or careless speech.

There is also a tendency which begins with Deny (1955) and reaches its peak with Foster (1969) to find a semantic relationship for the words which undergo vowel-zero alternation. Words for body parts have been evaluated as a source of vowel-zero alternation by all of the researchers. However, as Foster (1969) himself concedes, there are many other words which do not behave this way and which are not for body parts. Furthermore, Yavaş (1980) shows that not all words for body parts are accepted to undergo vowel-zero alternation in dictionaries:

(28) *apış-ı → apışı,*apşı* 'the crotch (Acc.)'
(crotch-Acc.)

*kemik-i → kemiği, *kemki* 'the bone (Acc.)'
(bone-Acc.)

*sinir-i → siniri,*sinri* 'the nerve (Acc.)'
(nerve-Acc.)

*topuk-u → topuğu,*topku* 'the heel (Acc.)' (Yavaş 1980: 204).
(heel-Acc.)

The effect of the suffixes on vowel-zero alternation is another crucial point. As mentioned, some of them, like Banguoğlu (1959), claim that different suffixes might affect the vowel-zero alternation process in a different way. Zülfikar (1977) adds that vowel-zero alternation is often observed in cases where there is more than one suffix. According to this determination, the alternation in the former is more detectable than the one in the latter. See (29):

(29) *alın-ın-ı → alnını* ‘his/ her forehead (Acc.)’
(forehead-Poss.3.Sg.-Acc.)

alın-ı → alnı ‘the forehead (Acc.)’
(forehead-Acc.)

The properties of flanking consonants are also investigated. Among the others, Tseng determines seven required flanking consonants which are *r, n*, *l*, *z*, *v*, *y* and *ğ* for vowel-zero alternation (Tseng 2002: 31-32). See the following:

(30) *omuz-a → omz-a* ‘to the shoulder’
(shoulder-Dat.)

şakı-rak > şakrak ‘cheerful’
(sing-Der.)

süpür-ül-mek → süprülmek ‘to be swept’
(sweep-Pass.-Inf.)

There are two flanking consonants for each vowel. In his data, *v*, *y* and *ğ* are only able to precede the alternating vowel and the preceding consonants show more diversity. Looking at his data, he claims that the significant element is the flanking consonant which follows the alternating vowel, not the one which precedes it.

Lastly, there is also a matter for discussion on stressed and non-high vowels. The alternating vowel has no stress on itself and the place of stress mostly shifts after the vowel-zero alternation process according to the studies I mentioned, but there is no comprehensive explanation on the role of stress on the vowel-zero alternation process. The non-final vowels, on the other hand, are accepted to undergo synchronic and diachronic changes but the limited examples are regarded as exceptions.

To conclude, the data given in most of the previous works have to be divided into two: vowel losses and vowel-zero alternations. The alternated forms are regarded as lexically conditioned. There are also observations on “trivial” synchronic

changes whose existence is mostly accepted but ignored. Among all, only Banguoğlu (1959) gives some examples and accepts that synchronic changes are not confined to certain lexically marked words but are very common in spoken language. The next section will be about the historical process as regards vowel-zero alternations and vowel losses.

2.2. Historical Process

In terms of historical process, as Timurtaş (1977) states, vowel changes (including vowel loss and vowel-zero alternation) have been available in all stages of Turkish. Since the non-final syllables are mostly unstressable in Turkish, vowel changes are very common (Timurtaş 1977: 40). Indeed, the first written Turkic language, Orkhon Turkic, proves the existence of vowel loss, as will be seen in 2.2.2. In 2.2.4, on the other hand, by looking at the orthography, some indications about the existence of vowel-zero alternation in old times is also shown. Below I shall first mention the reliability of orthography in general and in the Ottoman case. Then, I shall present examples of vowel changes from different epochs of Turkish.

2.2.1. Reliability of Orthography

Even though it does seem to show that some sounds are available whereas the others are not in certain positions, orthography is not able to provide us with reliable information about the phonetic content of words. Nevertheless, some clues can be obtained by observing the systematic differences in the spelling of similar words. In

the following examples, the leftmost forms represent Ottoman spelling and the forms in the brackets represent the presumed phonetic form.

(31) *evniz, [ev-iniz]* 'your home'
(home-Poss.2.Pl.)

güllerni, [gül-ler-in-i] 'your roses' (Németh 1962: 37, 41).
(rose-Pl.-Poss.2.Sg.-Acc.)

As is seen, in Ottoman orthography, letters for vowels may not be used. Note that according to Ahmed Cevdet and Mehmed Fuad (1851), on the one hand, the former is not a proper spelling. They insist that it has to be spelt with the letter for the vowel at issue because that vowel is available in the suffix. On the other hand, in his *Medhal-i kavaid*, Ahmed Cevdet (1852) also points out that for words which lose their vowel in their last syllable[19], there is an alternative spelling with an extra letter.

(32) (a) *kitab-lar-ınız ~ kitab-lar-nız* 'your books'
(book-Pl.-Poss.2.Pl.)

kitab-lar-ın-a ~ kitab-lar-n-a 'to your books'
(book-Pl.-Poss.2.Sg.-Dat.)

(b) *emr-im-e ~ *emr-m-e* 'to my order'
(order-Poss.1.Sg.-Dat.)

*emr-imiz ~ *emr-miz* 'our order' (Ahmed Cevdet 1852: 12).
(order-Poss.1.Pl.)

The unavailability of alternative spellings in (32b) can be considered as a sign of vowel-zero alternation. As will be discussed in Chapter 5, **emrme* "to my order" is not a possible pronunciation in Turkish whereas *kitablarnız* "your books" is perfectly

[19] "*Ahirinde harf-i infisal olanlar"* (Ahmed Cevdet 1852: 11).

grammatical according to our data. In other words, because of the nature of the flanking consonants, vowel-zero alternation is not possible in the former whereas it is possible in the latter.

On the other hand, as Tseng (2002) has already cited (Tseng 2002: 22), Şemseddin Sami (1900) also notes that it is a serious mistake to type a word like *karın* "abdomen" with the letter for the sound *ı* since it disappears when the word is followed by a vowel-initial suffix. All these suggest that orthography has some phonetic implications with respect to vowel changes.

2.2.2. Vowel Changes in Orkhon Turkic

Tekin (1968) mentions two kinds of vowel loss for Orkhon Turkic. For trisyllabic words, unstressed short vowels of the medial syllable might disappear in the neighborhood of the consonants *r*, *l*, *n*, *g* and *y* (Tekin 1968: 73). For disyllabic stems, the short high vowel of the final syllable may drop after *r*, *l* and *y* (Tekin 1968: 74). He provides examples from the Orkhon inscriptions:

(33)	**ogılan*[20] *> oglan*	'son'
	**ötürü > ötrü*	'after'
	barıg > bark	'building'
	korık > kork	'fear'

[20] The asterisk shows that this form of the word is not available in written texts, but it is the reconstructed version of the available one.

2.2.3. Vowel Changes in Old Uigur

Von Gabain (1950) also shows that in old Uigur texts, which are written with a different alphabet than Orkhon ones, vowels inside the words are sometimes not indicated in orthography in a systematic way (von Gabain 1950: 43). According to her, it is not a coincidence that these unwritten vowels appear especially around the consonants *l* and *r*. See the following:

(34) *k(a)ra* 'black'

b(ö)dü 'grow up'

b(ı)rt 'break'[21] (von Gabain 1950: 43).

She also observes synchronic changes. See (35):

(35) *işit-il → iştil* 'be heard' (von Gabain 1950: 44).
(hear-Pass.)

Note that both forms in (35) are optionally available also in modern Standard Turkish.

2.2.4. Vowel Changes in Chagatay

Chagatay is a classical literary language which was in use from the fifteenth to the twentieth century in Central Asia (Eckman 1966: 1). Eckman (1966) shows that beside vowel loss, there is also vowel-zero alternation in Chagatay. He states that the

[21] The vowels in parentheses are the ones which are not shown in orthography

syncopated vowel has to be unstressed, high and word-medial. He also notes that vowel-zero alternation is observed especially in the loss of the second vowel of certain nouns followed by vowel-initial suffixes (Eckman 1966: 39). See the following:

(36) *boguz-ıdın → bogz-ıdın* 'from his/ her throat'
(throat-Abl.)

elig-i → elgi 'his/ her hand (Acc.)'
(hand-Acc.)

2.2.5. Vowel Changes in Old Anatolian Turkish

Timurtaş (1977) offers some examples of synchronic vowel changes from fifteenth century Ottoman texts which are regarded as examples of old Anatolian Turkish:

(37) *bögür-i → bögri* 'his/ her flank (Acc.)'
(flank-Acc.)

buyur-uk → buyruk 'behest'
(order-Der.)

eyü-lük → eylük 'goodness' (Timurtaş 1977: 40-41).
(good-Der.)

2.2.6. Vowel Changes in Classical Ottoman Turkish

Duman (1995), in his comprehensive study, takes *Seyâhatnâme (The Travel Log)*, seventeenth century writer Evliyâ Çelebi's masterpiece which carries many properties of daily speech, as base and also looks into some works of western researchers which were written in Turkish with Latin alphabet (Duman 1995: 4-7).

By doing so, he endeavours to determine the phonological properties of seventeenth century Ottoman Turkish. Below, one can see some of his samples for vowel loss in Turkish:

(38)	*aşır-ı* > *aşrı* (cross-Der.)	'excessive'
	boyun-uz > *boynuz* (neck-Der.)	'horn'
	uyu-luk > *uyluk* (a joint of beef-Der.)	'thigh'
	kurtula-mak > *kurtulmak* (to be rescued-Inf.)	'to be rescued'
	yumur-uk > *yumruk* (globular-Der.)	'fist' (Duman 1995: 38-41).

Looking at a seventeenth century latinized text, Gilson (1987) shows that there were also synchronic losses:

(39)	*İngiliz* → *İngliz*	'English'
	tügürük → *tügrük*	'spittle'
	yumuşak → *yumşak*	'soft' (Gilson 1987: 69)

In this section, vowel changes in historical process are investigated. Orthography provides us with examples which show that there were vowel-zero alternations in those times. The fact that most of the above optional forms are still optionally available in Turkish indicates that orthography has also some implications about the existence of vowel-zero alternations. The following section will explore the vowel changes in the dialects of modern Turkish.

2.3. Vowel Changes in the Dialects of the Modern Turkish

Samples from the dialects of modern Turkish for vowel changes are ample. Beside vowel losses, there are also examples of vowel-zero alternation. Some examples as the ones in (40) might seem marginal to the speakers of the standard dialect[22]:

(40) Harput: *dalavera → dalavra* 'manipulation'

Adıyaman: *ara-ya → arya*[23] 'to the between'
(between-Dat.)

In this section, on the other hand, I only mention four works which are related to our subject the most. Korkmaz (1956) and Gemalmaz (1978) investigated southeastern Anatolian dialects and Erzurum dialects respectively. The former dwells on the properties of flanking consonants. According to her, if a vowel is between two similar consonants, it is sometimes syncopated:

(41) *karı-lar → garla* 'women'
(woman-Pl.)

para-sı → parsı 'his/ her money'
(money-Poss.3.Sg.)

sakal-ın-ın → sakalnın 'of his beard' (Korkmaz 1956: 50).
(beard-Poss.3.Sg.-Gen.3.Sg.)

Note that she does not say anything about the height of vowels. Gemalmaz (1978), on the other hand, claims that only word-medial high vowels drop. If a vowel is non-

[22] The forms on the left side are the regular pronunciations of the words in the standard dialect.
[23] See Aksoy (1946: 87), Németh (1970: 86), Güler (1992: 9), Sağır (1995: 66), Günşen (2000: 7), Nakiboğlu (2001: 62).

high, it will first reduce to a high one and then drop. However, he does mention the properties of flanking consonants. See (44):

(42) *hazine → hezne* 'treasury'

taharet → tahiret → tahret 'cleanliness'

çamaşır-ımız → çamaşurmuz 'our cloth'
(cloth-Poss.1.Pl.)

düğün-ün-e → düyünne 'to his/ her wedding' (Gemalmaz
(wedding-Poss.3.Sg.-Dat.)
1978: 142).

Ercilasun (1983) seeks for vowel loss in the Kars dialects of Turkish. He attributes it to the shift of the stress. On the other hand, he points out that some dialects allow their speakers to speak very fast. In those kinds of dialects more than other dialects and written language, there appear to be more vowel losses (Ercilasun 1983: 95). His most interesting observation is about the first person singular forms of aorist. He determines that the vowel between laterals at non-final syllables has a tendency to drop (Ercilasun 1983: 96). Now, consider (43):

(43) *gör-ür-üm → görrem* 'I see'
(see-Aor.-Agr.1.Sg.)

gel-ir-im → gellem 'I come'
(come-Aor.-Agr.1.Sg.)

ver-ir-im → verrem 'I give'
(give-Aor.-Agr.1.Sg.)

otur-ur-uz → oturruh 'We sit'
(sit-Aor.-Agr.1.Sg.)

ol-alım → ollam 'Let's become'
(become-.Opt.)

doldur-ur-uz → doldurruh 'We fill'
(fill-Aor.-Agr.1.Sg.)

It is very clear that the ones in (43) are examples of vowel-zero alternation. Lastly I want to cite some examples from the Afyon dialect. The vowel in the final syllable of a consonant-final word alternates with zero when a vowel-initial suffix is added to the word. Nevertheless, there seem to be no semantic restrictions like the ones for body parts for instance. See the following:

(44) *ceviz-in → cevzin* 'of the walnut'
(walnut-Gen.3.Sg.)

fırın-a → fırna 'to the oven'
(oven-Dat.)

valiz-i → valzi 'the valise (Acc.)' (Boz 2002: 48).
(valise-Acc.)

Due to their purposes, monographs do not differentiate vowel-zero alternation from vowel loss and they do not give regular classification of the data for theoretical implications. However, as will be seen in Chapter 4, the above vowel-zero alternations attested in various dialects are actually available also in modern Standard Turkish.

In this chapter, I have investigated the current literature on the topic. I have presented summaries of relevant works. I have also pointed out that there are indications of vowel-zero alternation in historical process. Beside these, I have mentioned vowel-zero alternations in certain dialects of Turkish. In Chapter 4, it will be shown that, the data in linguistic studies on Turkish, which have been used to analyse the vowel-zero alternation process are not sufficient and systematic. However, before analysing the new data, in the following chapter I would like to expand on the theoretical framework I will be using.

CHAPTER 3

THEORETICAL FRAMEWORK: GOVERNMENT PHONOLOGY

In Chapter 2, the current literature on vowel-zero alternation in Turkish was presented. Before presenting and discussing the topic, I endeavour to give the relevant tenets of the Government Phonology (GP) framework. This chapter is organized as follows: First, the internal structures of segments in GP are briefly described. In the next section, the constituent structure and governing relations in GP are discussed. In 3.3, I explain the reason for preferring to apply non-branching analysis to the data. In 3.4, the phonological ECP which will be used in the following three chapters is presented. Lastly, the interface between morphology and phonology within GP is explained in 3.5.

3.1. Internal Structures of Segments

There have been many language descriptions by innumerable scholars from different frameworks. Most of the phonological properties have been described in various frameworks. For example, the question of which of the consonant clusters occur initially, medially and finally in different languages has been investigated by many (Fischer-Jørgensen 1975: 91). With the advent of GP in the 1980s, one of the main innovations was the attempt to define and to predict the distribution of phonological

expressions according to their internal structures. In that sense, why some consonant clusters do not occur initially is a typical question for GP analysists. The answer can be obtained from the internal structure, that is, the elemental composition of segments.

In this section, the internal structure of segments is investigated. Knowing the internal structure of segments makes it possible to predict the existence of phonological processes in a language. It is, thus, not possible to discuss phonological phenomena of a language without determining its segmental inventory. All speech sounds are phonological expressions -or segments- in GP. A phonological expression is represented as an organized combination of elements[24]. A segment may include one or more than one element. An element is the smallest unit of phonological description. Each element is also a potentially interpretable phonological expression (Kaye 2000). Below, elements, heads and operators and constraints on potential segments in are explained 3.1.1, 3.1.2 and 3.1.3, respectively. The last subsection, 3.1.4 will be about Headedness and Complexity Conditions.

3.1.1. Elements

The GP view on the segmental composition of phonological expressions is dramatically distinct from the earlier views[25]. In traditional frameworks, there are distinctive binary features that describe segments. Put roughly, a consonant must be either [+palatal] or [-palatal] in a traditional framework whilst the same consonant is regarded to have or to lack the element I in GP. Note that, the absence of an element

[24] For instance, the segment *e* can be represented as (A.I) as will be shown in 3.1.2.
[25] The reader is referred to KLV (1985, 1990) for a detailed survey.

in terms of a negative value (e.g. -palatal) is not expressed in GP[26]. The element is put down, if it is available. It clearly demonstrates that GP supplies a richer generative capacity to express segments.

There are six basic elements used in the representations of segmental compositions. See the following:

(1) A represents openness in vowels, coronality in consonants.
I represents height in vowels, palatality in consonants.
U represents roundness in vowels, labiality in consonants.
L represents low tone, slack vocal cords, voice consonants, nasality.
H represents high tone, stiff vocal cords, voicelessness in consonants, friction.
ʔ the glottal stop (Denwood 2004: Class Notes).

It is argued that all sounds of human languages can be represented by the restricted combinations of the elements listed with their main properties above[27]. Otherwise, larger number of elements and no restrictions on their combination would be able to generate extra sounds which are not present in natural languages (Denwood 2004: Class Notes).

Elements are identified in terms of their articulatory properties. Simply, the internal structure of segments depends on the phonetic realization. Each element is pronounceable at all levels of derivation, by itself or in combination with others (Brockhaus 1995: 195). Smartly enough, Scheer (1999) compares this relationship to the relationship between water and H_2O. H_2O cannot appear as something other than water and water is H_2O everywhere[28] (Scheer 1999: 206). Since this relationship

[26] A phonological expression may also be empty. The phonetic interpretation of such a segment varies in different languages, e.g. it is *ı* in Turkish.
[27] Note that, in the earlier versions of GP, there were other elements rather than these six. See Pöchtrager (2006: 12-15) for details.
[28] However, that is a baffling subject. If the phonetic interpretation of a phonological structure is restricted, a given phonological identity is predicted to sound alike in any language. However, this prediction can potentially be falsified by any language (Scheer 1999: 207). See Scheer (1999) for the discussion.

between phonetics and phonology is vital for the boundaries of the thesis, before mentioning heads and operators in GP, I want to elaborate on the relationship between phonetic and phonology a little bit more by referring to phonetics and phonology themselves, not just chemistry.

Ohala (1997) stressed that, on the one hand, phonetics and phonology had not been considered as different until the early twentieth century; and even in later times, there were schools which did not separate phonology and phonetics. On the other hand, there were also scholars who divorce phonetics from phonology completely. Today, however, there is a general acceptance among scholars that phonology and phonetics have a significant overlap (Ohala 1997: 682).

Phonology is concerned with how speech sounds are organized into systems and in language. In other words, it is about the structure of the sounds. Phonetics, however, is about physiological, aerodynamic and acoustic characteristics of the sounds that we make with our vocal organs when we speak (Catford 1988: 193-198). Phonetics seems helpful for the phonology which is interested in the brain rather than the vocal tract. GP, like any other framework, uses the materials that phonetics provides it with[29]. Importantly, there is no distinction between phonetic phenomena and phonological phenomena in GP. Such an approach excludes the views given in Chapter 2 which assume a difference between phonological cases and so-called phonetic cases which are regarded as an outcome of careless speech. In a GP point of view, careless speech does not mean anything. Actually, there is no scientific way of distinguishing careless speech from careful speech. Being careful or careless does not say anything about the validity of the phonological phenomenon. Any pronounceable case deserves to be investigated in GP.

[29] Needless to say, the main hypothesis in this thesis is also based on the phonetic material.

Returning to our subject, elements are assumed to be concrete. Their combinations represent natural speech sounds. The next subsection will be about the ways that elements combine with each other.

3.1.2. Heads and Operators

As mentioned in the beginning of this section, the combinations of certain elements generate all segments. However, six elements do not seem sufficient to produce all the segments that are available in human languages. Hence, GP allows the same elements to form different segments. One of the elements in the combination may have a superior role than the other and it produces a different segment. Here, the roles of head and operator are at issue.

Elements may either be a head or an operator. When the segment consists of a combination of elements, there is an asymmetric relationship between the head of the segment and the operator. Reversing the head and the operator of a segment creates a new segment. For example, the segments (I.U) and (U.I) (the heads are underlined) have different phonetic interpretations although they include the same elements[30]. It is clear that the permutations created by headedness extend the number of potential expressions (Denwood 2004: Class Notes). On the other hand, there are some constraints on the realization of these permutations as discussed in 3.1.3.

[30] Headedness implies tenseness (Charette and Göksel 1996: 3).

3.1.3. Constraints on Potential Segments

The number of phonological expressions that each language has varies from language to language. The number of phonological expressions in general and in a particular language is restricted by universal and language specific constraints, respectively. Elements show different combinatorial behaviors in different languages. See the following conditions for generating a phonological expression:

(2) (i) An element may not occur more than once in the same phonological expression.
(ii) An element is either a head or an operator.
(iii) An expression need not have a head or an operator.
(iv) There can only be one head per expression.
(v) There is no ordered relationship between operators (Denwood 2004: Class Notes).

The ones in (2) are universal constraints on the combination of elements. There must be some extra constraints which differentiate the segmental inventory of particular languages, that is to say, which allow some combinations of elements, but prevent others according to the specific properties of a language. Language specific constraints determine under which conditions an element can combine with another one in order to generate a segment (Charette and Göksel 1996: 4, Denwood 2005: 67). For example, in some languages, it has been proposed that the element I cannot be a head. Such constraints are called licensing constraints. Each language has its own licensing constraints which represent its sound inventory[31]. By using licensing constraints, any phonological expression which is grammatical according to universal constraint can specifically be excluded from a language (Kaye 2000).

[31] There are also sets of licensing constraints for Turkish proposed by Charette and Göksel (1996) and Balcı (2006). The purpose of this thesis does not necessitate discussing them.

3.1.4. Headedness and Complexity

The governing relations between the segments which will be accounted for in 3.3.2.2 are dependent on the headedness and complexity of the relevant segments[32].

Headed expressions are always good governors and bad governees even if they are less complex than the headless ones. A headed segment always governs a headless segment. That is to say, when headedness is involved, no other condition is needed (Denwood 1997b: 81). For example, in a sequence like *lp*, the headed segment *p* occupies the governing position and it governs the headless *l*. Speaking very roughly, headed segments mostly entail plosives and fricatives whilst headless segments include nasals, glides, liquids and obstruents.

Headless segments may also be governors between headless segments. When headedness is not relevant, that is, when a headless segment occupies the governing position, its segmental structure has to be more complex than that of its governee. It is stated in the Complexity Condition.

(3) Complexity Condition

"Let α and β be segments occupying the positions A and B respectively. Then if A governs B, β must be no more complex than α" (Harris 1990: 274).

The number of its elements determines the complexity of a segment. Simply, the governor must not be less complex than its governee[33]. Hence, the liquids, containing

[32] There is also the concept of "charm" for explaining the governing relations. It is charmless and positively or negatively charmed segments that determine whether a governing relationship is possible or not. However, this old concept is replaced by the concepts of headedness and complexity. We can say informally that the charmed segments refer to headed segments and charmless ones to headless ones. See KLV (1985) for the details.

a single element, are likely to be governees, whereas nasals and obstruents are more likely to be governors because they are composed of more than one element. For instance, in a sequence like *lm*, the headless segment *m* occurs in the governing position because the segmental structure of *m* is more complex than that of *l*. In this section, the internal structures of segments are presented from a GP point of view. The following section handles the constituent structure in GP.

3.2. Constituent Structure

The sequences of segments in GP are well-formed. They are not random but subject to governing relations. This is the main property of the constitute structure in GP. In this section, first the constituent structure is mentioned shortly, and then constituent and inter-constituent governments are explained particularly.

While some frameworks use CV tier, GP uses skeletal points. It aims to derive phonological phenomena from universal constraints on the organization of skeletal points. A series of governing relationships between the skeletal points represents phonological phenomena. Note that, GP assumes that phonological expressions must have an association with a skeleton in order to be phonetically interpreted. Constituent structure in GP can be represented as in (4):

(4)

Constituents	O_1	N_1	O_2
Skeletal points	x_1	x_2	x_3
Segments	α	β	γ

[33] Note that the Complexity Condition allows a governing relation when both of the headless segments contain the same number of elements.

As is seen, the hierarchical structure in GP entails three levels: constituent level, skeletal level, segmental level. Importantly, the way structures are organized is universal.

First, the three constituents[34], which are conventionally left-to-right, as KLV (1989) propose, are onset (O), nucleus (N) and rhyme (R)[35]. The nucleus is the head of the rhyme. Onsets and rhymes constitute minimal pair sequences from which all phonological expressions derive. Onset refers to consonants and nucleus refers to vowels. Rhyme, on the other hand, is only a projection of the nucleus as will be seen in 3.2.2 (KLV 1990: 199-202).

Every nucleus must license a preceding onset and every onset must be licensed by a following nucleus. Since every licensor must dominate a skeletal point, every nucleus must dominate a skeletal point (Kaye 2000). See the following:

(5) (a) O N (b)* O N

x x

As seen, the representation in (5b) is impossible because the nucleus, which is a licensor, has no skeletal point. Indeed, a word like **k* is impossible in human languages whereas *a* is possible.

Second, the skeletal points, which are also conventionally left-to-right, constitute the phonological string. The phonological string provides GP with a syllabic structure by a series of governing relationships. These governing relationships are formed in the lexicon. Hence, it is not possible to change them. That

[34] Although syllable is not recognized as a constituent in GP, these constituents are named as syllabic constituents in the framework (KLV 1990: 198).
[35] GP does not accept the coda as a possible constituent (KLV 1990: 201).

is stated in the Projection Principle:

(6) Projection Principle

"Governing relations are defined at the level of lexical representation, and remain constant throughout a phonological derivation" (KLV 1990: 221).

In accordance with the Projection Principle, resyllabification is illicit in GP. Consonants and vowels cannot change the constituents they occupy[36].

And third, the segmental level hosts the phonological expressions. Below, I present the two types of phonological government: constituent government, a governing relation between the skeletal points within a constituent and inter-constituent government, a governing relation between the skeletal points in two adjacent constituents.

3.2.1. Constituent Government

Government is a binary and asymmetric relationship between two adjacent positions, the governing position and the governed position. The former is called "governor" whilst the latter is known as "governee". Together they form a government domain. For them to do this, as is first described by KLV (1990) and Kaye (1990a), there are two universal constraints to be satisfied: strict locality (adjacency) and strict directionality[37]:

[36] The terms "consonant" and "vowel" are not preferred in GP but they are still used informally for practical reasons as has been used in this thesis.
[37] Note that, beside these two, there are substantive constraints involving the elemental properties of segments that determine the governing relations as were discussed in 3.1.4.

(7) (i) Strict Locality Condition

"No positions must intervene between a governor and its governee".

(ii) Strict Directionality Condition

"In a given governing domain, at the skeletal level, the direction of government is universally invariable[38]" (Kaye 1990a: 306).

Given these two conditions, the following is derived:

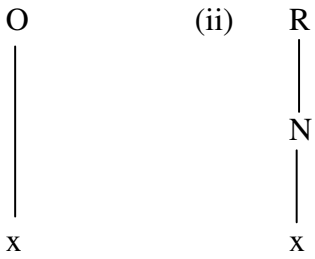
(8) Binarity Theorem

"All syllabic constituents are maximally binary" (Kaye 1990a: 306).

In accordance with the aforementioned conditions, constituents can appear at five types of representations. See the following:

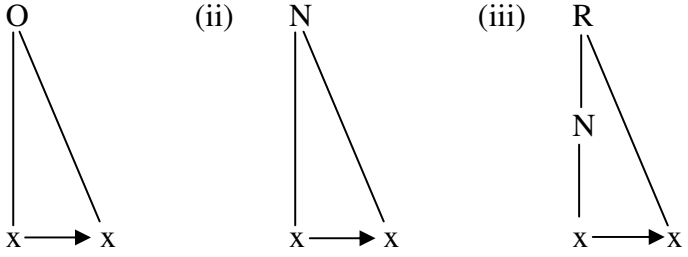
(9) (a) Non-branching cases

(i) (ii)



(b) Branching cases

(i) (ii) (iii)



[38] It is always left-to-right.

Kaye (1995) proposes that phonological processes do not apply if they are not necessary. He states this in his Minimalist Hypothesis:

(10) Minimalist Hypothesis

"Processes apply whenever the conditions that trigger them are satisfied" (Kaye 1995: 291).

The constituents may or may not branch. It is a parametric variation within individual languages. A given language either allows onsets, rhymes and nuclei to branch or not. Some languages do not have branching onsets, some languages do not possess branching rhymes, while some languages do not have branching nuclei and therefore no vowel-length contrast (Harris 1994:150). English, for example, allows branching in all constituents. Turkish, on the other hand, is regarded as not allowing any kinds of branching because of its syllabic inventory[39]. Since branching is assumed not to be available, there is no constituent government in Turkish. That is to say, the representations in (9b) are not preferred in languages like Turkish.

The representations in (9b) demonstrate a branching onset, a branching nucleus and a branching rhyme respectively. There are left-to-right government relations within an onset, a nucleus and a rhyme. In (9a), however, there is only one skeletal point of a constituent and thereby there is no government relation within the constituent.

In (9b), a phonological expression can be associated with one of two skeletal positions of a constituent. Within each constituent, there is a governing relation where one skeletal point governs the other. This is called constituent government, a

[39] This issue will also be discussed in the following section.

governing relation established between the skeletal points of the same constituent. As seen, the left branches of the constituents are governors which govern the right branches. The direction of phonological government between two segments of a branching constituent is universally left-to-right. In other words, its government direction is head-initial in all human languages.

3.2.2. Inter-constituent Government

Beside constituent government, there is also inter-constituent government which is more crucial for the aims of this thesis. As discussed, there need to be two skeletal points for a governing relation to be realized. However, these two skeletal points do not necessarily have to be under the same constituent. They might be dominated by different constituents.

Inter-constituent government, which is also contingent on the strict locality and the strict directionality conditions, holds between skeletal positions pertaining to adjacent constituents. Unlike constituent government, it goes from right-to-left. That is to say, its direction is universally head-final: the governor follows the governee.

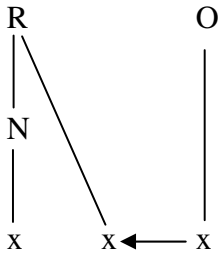
All phonological positions, except for the heads, need to be licensed and thus all processes within GP result from "licensing". It is an asymmetrical relationship between two phonological positions. The Licensing Principle lies behind this relationship:

(11) Licensing Principle

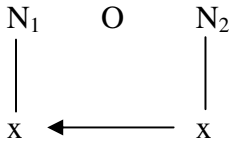
"All phonological positions save one must be licensed within a domain. The unlicensed position is the head of this domain" (Kaye 1990a: 306).

Now, consider the two types of inter-constituent government in (12):

(12) (a) Government between an onset and a rhymal position



(b) Government between two adjacent nuclei



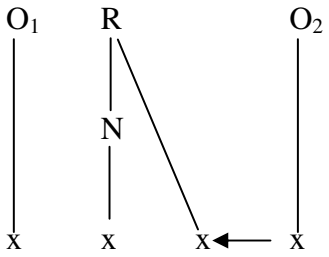
First of all, although constituent governors are headed, inter-constituent governors may be either headed or headless. Since governors must be more complex than their governees, in both examples, to satisfy the Complexity Condition, the rightmost position which is the governor has to be more complex than the governee. Also, in (12a), the rhymal position must be governed by an onset. That is formalized as the Coda Licensing Principle:

(13) Coda Licensing Principle

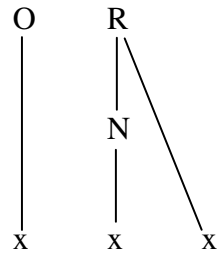
"A post-nuclear rhymal position must be licensed by a following onset" (Kaye 1990a: 311).

Several coda-onset sequences can show how the principle works. Consider (14) now:

(14) (a)



(b) *



Although it does not violate the binarity theorem, (14b), which is a domain final branching rhyme, is ruled out because it violates the Coda Licensing Principle. In (14a), however, since the onset governing the rhymal position provides the licensing for this position, there is no violation of the principle and the representation is acceptable. The rhymal part of the branching rhyme is governed/ licensed by an onset. That is, the relationship is formed between two consonants. The Coda Licensing Principle also implies that words in all human languages end in a nucleus.

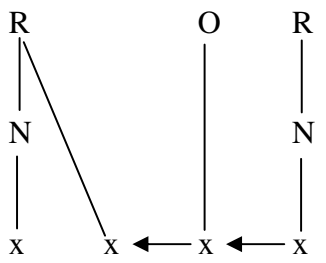
Here, the Government-Licensing Principle has to be mentioned. Informally put, governing relations within onset clusters need the licensing support of the following nucleus:

(15) Government-Licensing

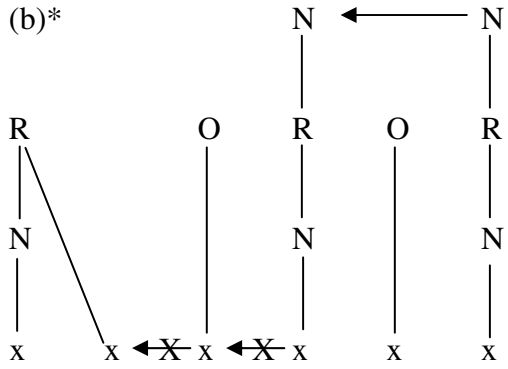
"For a governing relation to hold between a non-nuclear head α and its complement β, α must be government-licensed by its nucleus" (Charette 1990: 242).

See the following representations:

(16) (a)



(b)*



As is seen in (16a), there is an inter-constituent government between the phonological expressions in the onset and post-nuclear rhymal positions. The governor of the post-nuclear rhymal position is government-licensed by its following nucleus. It is a grammatical structure. In (16b), however, since the government-licenser is itself properly governed by the following nucleus, it cannot government-license the governor of the post-nuclear rhymal position. Therefore, the structure is out.

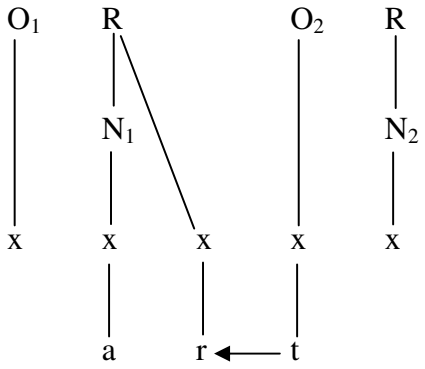
In this section, we have mentioned (i) the levels of constituent structure in GP, (ii) the universal conditions for governing relations between adjacent skeletal positions and essentially (iii) the basic properties of the inter-constituent government relationship. The conditions that were given state that all constituents are maximally binary branching. That is, tertiary or greater branching is impossible because such branching would inhibit licensing by violating the Licensing Principle.

There are two main types of government: a governing relation within a constituent, constituent government and a governing relation between two constituent, inter-constituent government. The same principles are mostly valid for both. Before going into the details on inter-constituent government, I want to explain whether branching or non-branching analysis will be applied to Turkish data in this thesis.

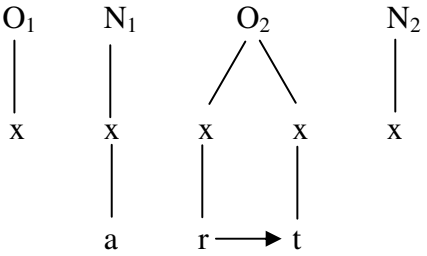
3.3. Branching or Non-branching?

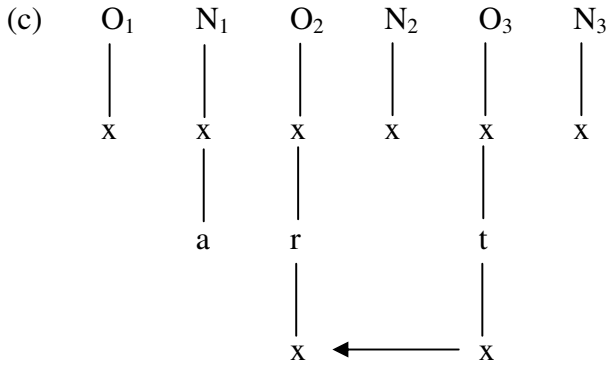
In 3.2.1, it is stated that some languages (e.g. most of the Indo-European languages) are analysed with branching constituents whereas some others like Turkish are analysed with non-branching constituents within the standard GP. According to Lowenstamm (1996), any kind of phonological entity in any language can be inferred from a non-branching analysis in the absence of branching constituents (Lowenstamm 1996: 419). In other words, in such a version of GP, there is no need for branching in any human language in contrast to what is assumed by standard GP. This issue is beyond the scope of this thesis. The proper question for this thesis might be on whether Turkish may have branching or not. First see the three logically possible representations for the Turkish word *art* "sequel".

(17) (a)



(b) *





Although (17b) is logically possible, it is theoretically out since *r* can never govern *t* according to the Complexity Condition. In (17a), there is an inter-constituent government between *t* and the post-nuclear rhymal segment *r*. It is a possible structure. In (17c), on the other hand, there is an intervening nucleus between *r* and *t*. As will be discussed in 3.4.2.2, it is right-to-left inter-onset government which makes N_2 remain silent. It is a non-branching constituent structure. Both of the representations in (17a) and (17c) can be applied to Turkish. Following the current literature on Turkish within the GP framework[40], I shall adopt a non-branching version of the theory.

There is one and only one template and different cases like long vowels, consonant clusters and diphthongs in traditional frameworks can be represented in the same way by using intervening empty constituents between sequences of successive constituents as we shall see in the following section (Yoshida 1993: 128). In 3.4, it will be seen more clearly that the governing relations between skeletal points which are not structurally adjacent are able to explain the phonological phenomenon in accordance with the phonological ECP.

[40] The non-branching way of analysing Turkish data has already proven insightful. For instance, see Denwood (1998, 2002, 2006) and Charette (2004, 2007, 2008) among others.

3.4. Phonological Empty Category Principle

Beside constituent and inter-constituent governments, there is another kind of governing relation called projection government. Projection government is a higher level of governing relationship between structurally non-adjacent skeletal points. In projection government, directionality is not universal. It might be left-to-right as well as right-to-left according to different phonological phenomena in different languages. The realization of the Projection Principle is directly dependent on the phonological Empty Category Principle (henceforth ECP).

As already mentioned, GP permits empty positions. The phonetic interpretation of these empty positions is determined by the phonological ECP. Vowel loss and vowel-zero alternation result from this process. The phonological ECP enables us to elaborate all of these phenomena together. In other words, since all these phenomena are all related to empty positions, they are not treated as different phenomena. The phonological ECP is as follows:

(18) The Phonological ECP
A p-licensed (empty) category receives no phonetic interpretation.

(a) P-licensing:
(i) Domain-final (empty) categories are p-licensed (parametrized)
(ii) Properly governed (empty) nuclei are p-licensed.
(iii) A nucleus within an inter-onset domain.

(b) Proper Government
α properly governs β if
(i) α and β are adjacent on the relevant projection,
(ii) α is not itself licensed, and
(iii) no governing domain separates α from β (Kaye 1995: 295).

The phonological ECP is a part of Universal Grammar. Its basic dictation is that an empty nucleus is not phonetically interpreted if it is licensed. That is to say, a p-licensed empty nucleus cannot be realized phonetically.

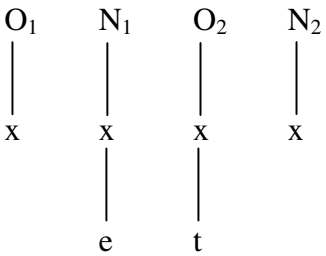
On the other hand, the licensing conditions for empty nuclei vary according to the different positions of the nuclei. Below, the ways of both p-licensing a domain-final empty nucleus and a domain-internal empty nucleus will be discussed.

3.4.1. Domain-final P-licensing

In GP, onsets and nuclei cannot be separated because all onsets must be licensed by a nucleus. Then there has to be an explanation for the words ending with a consonant. Since an onset has to be followed by a nucleus, the last nucleus can be licensed to remain silent in some way.

In accordance with the ECP, languages can p-license their domain-final empty nuclei (Kaye 1990a: 314), but some languages do not do it. In that sense, the licensing of domain-final empty nuclei is parametric: In some languages like Turkish which license domain-final empty nuclei, words may end in consonants phonetically whereas in some other languages like Japanese which do not license domain-final empty nuclei, words have to end in a vowel. Then, the parameter for the former kind of languages is Yes whilst it is No for the others. See the following:

(19) *et* ‘meat’



Since Turkish can p-license its domain-final empty nuclei, words like in (19) which may end with a consonant are grammatical. In the next subsection, the domain-internal licensing will be discussed.

3.4.2. Domain-internal Licensing

There are two main ways which determine the interpretation of domain-internal empty nuclei. These are proper government and inter-onset government[41]. An internal empty nucleus can be licensed if it is properly governed by a following nucleus or an inter-onset government is established between two onsets surrounding it. If these two requirements are not satisfied, the internal empty nuclei have to be interpreted.

3.4.2.1. Proper Government

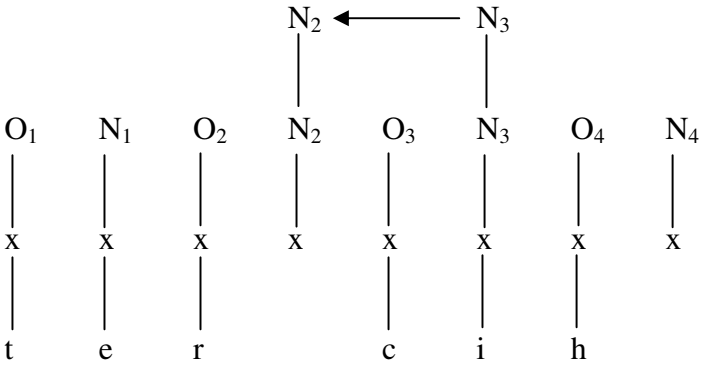
The phonological ECP lets the empty nuclei receive no interpretation under proper government (Kaye 1990b: 139). A domain-internal empty nucleus is licensed and has no phonetic interpretation, if it is properly governed by an adjacent interpreted nucleus. Otherwise, it cannot remain silent.

As is given in (18b), proper government necessitates three main conditions: (i) the governor and the governee have to be adjacent on the relevant projection, (ii)

[41] In fact, there is another way of domain-internal licensing called "Magic Licensing" which is related to the special properties of the segment *s*. I do not mention it in detail since it is not directly related to our discussion. However, as will be seen in Chapter 5, the segment *s* exhibits unusual properties also in Turkish. See Kaye (1992) for details.

the governor cannot be licensed and, (iii) there can be no intervening governing domain between the governor and the governee. Consider the following:

(20) *tercih* 'preference'

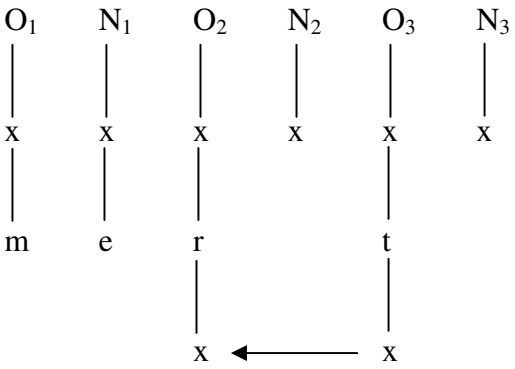


As seen, N_4, as a domain-final empty nucleus, is parametrically p-licensed. Since (i) N_2 and N_3 are adjacent on the relevant projection, (ii) N_3 is not licensed and (iii) there is no intervening governing domain between N_2 and N_3, N_3 governs N_2 properly and makes it remain silent.

3.4.2.2. Inter-onset Government

In certain cases, proper government which is an inter-nuclear relation is not sufficient to license empty nuclei. Here, the inter-onset government, which is a relationship between the two adjacent onsets, is included in the issue. Briefly, the inter-onset government can make the intervening nucleus between the onsets remain silent. Note that, the direction of inter-onset government is parametric unlike other kinds of governments. In Turkish, it is right-to-left parametrically. See (21):

(21) *mert* 'brave'



In (21), the inter-onset government whose direction is right-to-left allows the empty nucleus to remain silent since the elemental compositions of the phonological expressions in the relevant onsets are suitable for a government relationship.

Recall from 3.1.4 that the governing properties of consonants are determined by the internal structure of segments. It is argued that headed segments can and must govern headless segments in a governing relation. Among headless segments, on the other hand, the governor must be more complex than the governee or at least equally complex in comparison with the governee.

Here, O_3 is a good governor because *t* is a more complex sound that *r* and O_2 is a good governee because *r* is a less complex sound than *t*[42]. In that sense, as already pointed out, the internal structures of the segments are essential for an inter-onset government relationship.

In this section, I discuss the phonological ECP which is crucial for the subject of this thesis. In the following section, I shall look at the morphological structure in GP which is also very important for our topic.

[42] A proposal on the headedness and complexity of Turkish consonants may be found in Balcı (2006: 121-122). He accounts for the inter-onset government between *r* and *t* by headedness. As is said in 3.1.4, I shall not use headedness to explain inter-onset relations in Turkish. See also 5.2.3.

3.5. Morphological Structure in GP

The morphological structure plays a major role in vowel-zero alternation. It enables us to answer why in some cases there is vowel-zero alternation while in others there is not.

In order to account for two different shapes of the same suffix, such as irregular and regular suffix forms in the Indo-European languages, two types of morphological structures are held in GP: analytic and non-analytic. Analytic morphology is visible to phonology, that is, the root and the suffix can be distinguished, whilst non-analytic morphology is invisible to phonology and therefore the morphological complexity has no importance for phonology.

Analytic morphology is divided into two: dependent analytic morphology and independent analytic morphology. These can be represented informally as [[A]B] and [[A] [B]][43]. As can be inferred from the places of brackets, an analytic structure may entail internal domains[44]. Nevertheless, there is no internal domain but a single domain in a non-analytic structure which can be represented as [AB]. Note that, a non-analytic structure, which is obtained directly from the lexicon, does not necessarily have to be a root. Some types of morphology may be invisible to phonology[45] (Kaye 1995: 308).

In the dependent analytic structures, first the phonological processes apply to A, second the result reunites with B, and third the phonology applies to the whole.

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[43] The third logical structure [A[B]] is rejected by Kaye (1995) because the final-empty nucleus of A could not be licensed in this structure.

[44] In GP, square brackets are used to show the domains.

[45] Some suffixes may be invisible to phonology. Kaye (1995) compares English suffixes *-hood* and *-al*. He observes that the pronunciations of *parent-hood* and *parent-al* are different in that the pronunciation of the root *parent* is preserved in the former whereas it changes in the latter. According to him it is because the latter suffix is invisible to phonology whilst the former is visible.

With respect to the independent analytic structures, the phonological processes apply to A and B separately. The results chain to form a single (non-analytic) domain and the phonological processes apply to that domain this time.

In non-analytic structures, on the other hand, the phonological processes simply apply to the result of unification. Unlike analytic forms which are phonologically parsable, these forms are not phonologically parsable. Non-analytic structures are perceived like morphologically simplex words. In other words, morphologically complex structures may constitute one domain for phonology (Kaye 1995: 310). Crucially, domains block certain phonological phenomena. For instance, proper government or government-licensing cannot apply over a domain. That is to say, morphological domains block the governing relations with the outside of the domain. Therefore, non-analytic morphology is needed to explain phonological processes like vowel-zero alternation[46]. In this thesis, I assume that all suffixes in Turkish combine with the roots non-analytically.

In this chapter, I have introduced the main ingredients of GP. Relying on the theoretical background given in this chapter, I shall investigate the Turkish data in the following three chapters. Especially the phonological ECP will be the basis of the discussions on the vowel-zero alternation process.

[46] On the other hand, analyses about vowel-zero alternation do not necessarily have to be non-analytic. See Denwood (2006) for an analysis of vowel-zero alternation within analytically combined templates.

CHAPTER 4

VOWEL-ZERO ALTERNATION IN TURKISH AND THE PHONOLOGICAL ECP

In this chapter, I shall try to show that in contrast to what has been assumed by traditional grammars, the words that undergo the vowel-zero alternation process are not lexically marked but phonologically conditioned at least for some speakers of modern Standard Turkish. As listed in Appendix A, there are a limited number of nouns that undergo vowel-zero alternation in the dictionaries. However, our data show that this phenomenon is much more wide-spread. No matter how fast or slowly they speak, at least some speakers of modern Standard Turkish may not articulate some segments and this is not random and unsteady.

In terms of the phenomenon in question, I shall divide the cases into two: the obligatory cases and the optional cases. The obligatory cases have two subcases depending upon the presence of the vowel-zero alternation process. For certain forms, to vocalize the alternation site is not allowed whilst for the others, it is an obligation to vocalize the alternation site:

(1) (i) Obligatory Cases:

a. Subcases where vowel-zero alternation must take place.

b. Subcases where vowel-zero alternation must not take place.

(ii) Optional Cases:

Cases where vowel-zero alternation may or may not take place.

This first kind of subcases is very rare and related to a lexicalization process. The subcases where the vocalization of the alternation site is obligatory, however, are governed by certain phonological constraints. These constraints limit the optionality to alternate vowels with zero and enable us to predict where and when vowel-zero alternations are realized in Turkish. These will be discussed in detail in Chapter 5. This chapter is about the alternation of the empty nuclei, that is, of the nuclei including non-lexical elements with zero. The specific cases where the nucleus can get lost even though it includes a lexical element, that is, the element A, are not the subject of this chapter but of Chapter 6.

Below, first, the vowel-zero alternation, that is, the proper government of the alternation site will be described from a GP point of view in 4.1. Second, the alternation site and the related subjects are explored in 4.2. Then, the new data, which indicate that vowel-zero alternations are more widespread than in dictionaries, will be presented and according to new data, the obligatory and optional cases will be evaluated in 4.3 and 4.4.

4.1. The Phonological ECP and the Basic Representation

Before presenting and exploring the new data, I shortly want to evaluate the old data -which has already been discussed in the literature- within a GP point of view. Vowel-zero alternation is in a direct relationship with the phonological ECP in GP.

In fact, it is a manifestation of the phonological ECP. See the different forms of the well-known example *burun* "nose" in (2):

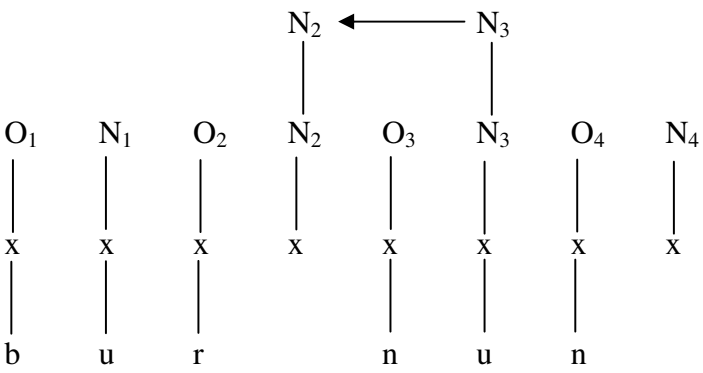
(2) (a) *burun-un* → **burunun, burønun* 'your nose'
(nose-Poss.2.Sg.)

(b) *burun-dan* → **burøndan*, *burundan* 'from the nose'
(nose-Abl.)

burun → **burøn* 'nose'
(nose (Nom.))

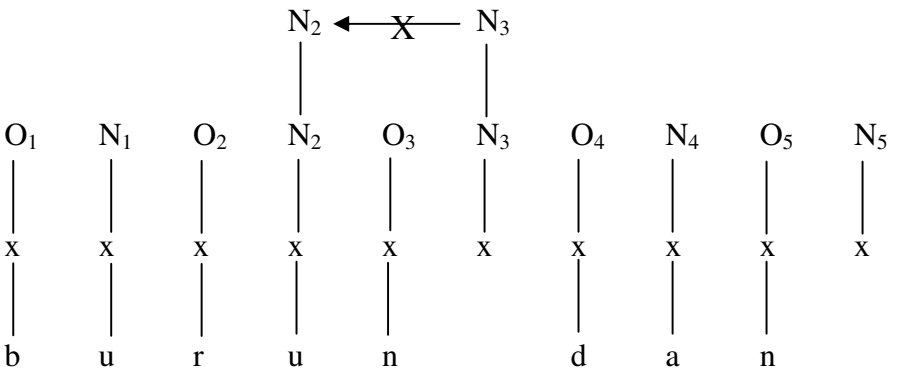
Here, the first grammatical judgement is not mine: the form *burunun* "your nose" in (2a) is mostly regarded as unacceptable in the literature but it is documented in our data[47]. As seen in (2), the alternation site can and must not be vocalized only if the consonant which follows it is itself followed by another vowel. In (2a), since there is a potential governor for the alternation site, it is able to alternate with zero whereas since neither of the examples has a potential governor for the alternation site, there is no vowel-zero alternation in (2b). See the representations:

(3) (a) *burønun* 'your nose'



[47] Actually, the forms *burn* "nose" and *burndan* "from the nose" can also be observed in a very limited context but this phenomenon is not a manifestation of vowel-zero alternation as will be discussed in 5.2.4.

(b) *burundan* ‘from the nose’



Before explaining the representations, recall (18b) from Chapter 3 for convenience:

(4) α properly governs β if
(i) α and β are adjacent on the relevant projection,
(ii) α is not itself licensed, and
(iii) no governing domain separates α from β (Kaye 1995: 295).

As can be inferred from the above principle, the following nucleus has to be interpreted to govern the alternation site. In (3b), N_3 cannot properly govern N_2 because it is phonetically uninterpreted. Since proper government is not possible, N_2 gets its melody from the harmonic head N_1. In (3a), however, in accordance with (4), since N_3 and N_2 are adjacent on the relevant projection, N_3 is not itself p-licensed and no governing domain separates N_3 from N_2, N_3 can properly govern N_2. The p-licensed category N_2 can receive no phonetic interpretation: the element U does not spread from N_1, since the position is p-licensed. Thus, *burnun* “your nose” is a possible pronunciation in Turkish.

In this section, the GP’s way of analysing the old data is presented. In Appendix A, the well-known samples which are available in the dictionaries are listed. On the other hand, there are other examples which are not listed in the

dictionaries but may undergo vowel-zero alternation. In the next section, I center on the empty nucleus and the alternation site in Turkish within the new data.

4.2. Empty Nucleus and the Alternation Site in Turkish

In this section, the distribution of empty nuclei and the nature of the alternation site in Turkish will be described with examples. Note that if the alternation site includes the element A, it cannot be alternated with zero although it can get lost in a certain environment. In this chapter, only the nuclei without the element A will be exemplified. The ones including A will be discussed in Chapter 6. Before I start to investigate the alternation site, I present a sketch of Turkish word structure.

In Turkish, the domain-final empty nuclei can be silent in accordance with the domain-final parameter of the phonological ECP. The domains may also end with the consonant clusters[48]. See the following minimal pairs:

(5)	(a)	*anɪt*	'monument'
		ant	'oath'
	(b)	*kurut-lar* (dried dairy product-Pl.)	'dried dairy products'
		kurt-lar (wolf-Pl.)	'wolves'

[48] In Turkish, domains do not necessarily have to end with a cluster. The theoretical problem in words like *anɪt* "monument" where there is no inter-onset relation although there seems no obstacle for that was discussed by Denwood (2006) in detail. Very roughly, there assumed an additional onset position with a skeletal point which precedes the nuclear position at issue and this position needs to be governed by a phonetically interpreted nucleus. Therefore, the segment *ɪ* is interpreted in the word *anɪt* "monument". However, for practical reasons, I simply ignore that problem in this thesis. See Denwood (2006) for details.

As is seen in (5), the silence of the intervening vowel creates different words. However, not all consonant clusters are allowed in the domain-final positions but only the right-headed ones are. See (6):

(6) *bakır ~ *bakr* ‘copper’

*kumul ~ *kuml* ‘sand dune’

In (6), as will be discussed in Chapter 5, since *r* and *l* are not good governors for *k* and *m* and left-to-right inter-onset government is not possible in Turkish, the forms **bakr* and **kuml* are ungrammatical. In domain-internal positions, on the other hand, almost any kind of consonant sequences seem to be present[49]. See (7):

(7) *kartal* ‘eagle’

katre ‘a drop’

In (7), both the right-headed cluster *rt* and the left-headed cluster *tr* are possible in domain-internal positions by means of the proper government of the intervening empty nuclei. On the other hand, it is mostly accepted that neither right-headed nor left-headed clusters are possible in the domain-initial positions in Turkish. It seems, however, that left-headed clusters may be pronounced domain-initially in Turkish. It is an optionality as will be discussed in 4.2.4.3. See the following:

(8) *bırakmak ~ brakmak* ‘to leave’

tiren ~ tren ‘train’

[49] There are certain exceptions most of which include *g*.

Turkish, as a language in which the consonant clusters can appear in different positions, allows vowel-zero alternation within two different patterns. The following presents the cross-linguistically existing patterns for vowel-zero alternation. Note that, the position which is symbolized with minuscule "v" is for alternation sites.

(9) (i) CvCV

(ii) CCvCV

CvCCV (Scheer 1998a: 42, 49).

As was exemplified in Chapter 1, CvCV is typical for vowel-zero alternation in many linguistically unrelated languages. The unusual patterns in (9ii), where a consonant cluster precedes or follows the alternating vowel, create theoretical problems in providing the conditions to meet p-licensing.

In 4.1, we saw the standard GP representation of a well-documented vowel-zero alternation case. The word *bur[u]nun* "your nose" includes the typical pattern for vowel-zero alternation, the CvCV pattern, as also accepted in the literature. However, the new data documented in the present work show that beside CvCV, another pattern for vowel-zero alternation CCvCV which has not been documented in Turkish before is, in fact, suitable for vowel-zero alternation.

In this section, I shall first mention the two proper patterns. Then, I shall discuss the violations of the proper patterns, the possible places for the alternation site in a word, the possible ambiguities and the number of alternation sites in a word, respectively.

4.2.1. Distribution of Empty Nuclei in Turkish

In Turkish the initial, that is, the leftmost nucleus is the harmonic head and always lexical. The non-initial nuclei, on the other hand, are either empty or lexically dominated by the element A (Charette and Göksel 1996: 6-7). This hypothesis provides an account for the vowel harmony as discussed in Charette and Göksel (1996) and vowel-zero alternation as discussed in Charette (2004, 2007) and Denwood (2006). The vowel harmony issue will be mentioned in Chapter 6. As for vowel-zero alternation, in Turkish, except certain cases, only high vowels, that is nuclei without A are alternated with zero. As said above, these nuclei are lexically empty. The non-high vowels, that is, the lexically filled nuclei, on the other hand, do not alternate with zero.

Then, for a GP point of view, there are two totally unexpected cases in Turkish. The first one is not a real problem for our data but the second one has to be mentioned and discussed for the forthcoming analyses in this work. Firstly, if all non-initial high vowels are lexically empty in Turkish, then there seems no account for the assumed difference between the phonetically identical words *koyun* "bosom" and *koyun* "sheep" in terms of vowel-zero alternation[50]:

(10)	*/koyøn/*	*[koyun]*	'bosom'
	/koyøn/	*[koyun]*	'sheep'

[50] In fact, there are some attempts to explain this assumed difference within the Template Hypothesis. Very roughly, there is an extra empty onset with a skeletal point before the alternation site in words like *koyun* "sheep" and since the alternation site has to govern this extra onset to make it silent, it cannot be alternated with zero but because the onset position in question is without a skeletal point in words like *koyun* "bosom", it does not need to be governed by the alternation site and therefore the alternation site can be properly governed by the following nucleus. See Denwood (2006) and Charette (2007) for details.

The vowel *u* (U) is lexically empty: the element U that it has, comes from the initial vowel *o* (A.U). Obviously, if both words have an empty nucleus, then both of them should behave the same in contrast to what is assumed by traditional grammars. Our data show that there is no real problem: vowel-zero alternation may work for both of the words in accordance with what is expected by GP. The difference, if there is one, between the two words is about frequency not about the lexical properties of the words as stated before.

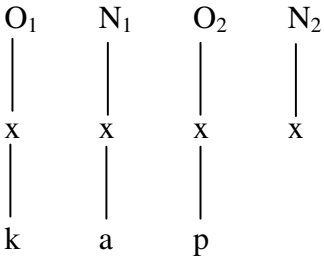
As seen, this first problem is not a real problem for our data. However, there is another problem which is first addressed by Kaye (1990a) and discussed by Denwood (1997a, 1998, 2006) and Charette (2000, 2004, 2006, 2007, 2008) in detail. As mentioned above, in Turkish, words can end in a consonant or in a vowel. If a word ends with a consonant, it can be accounted for by the fact that domain-final empty nuclei are parametrically p-licensed in Turkish. When it ends with a vowel, there are two possible cases: it may end with a high vowel or a non-high vowel. The existence of non-high vowels in word-final positions is not a problem since they are lexically there. However, since the non-initial high vowels are lexically empty as is hypothesized in the literature, the high vowels are expected not to be able to exist in the word-final position. However, this is not the case: there are many words ending with phonetically realized empty nuclei in Turkish:

(11)	*/kapø/*	*kapı*	'door'
	/koyø/	*koyu*	'dark'

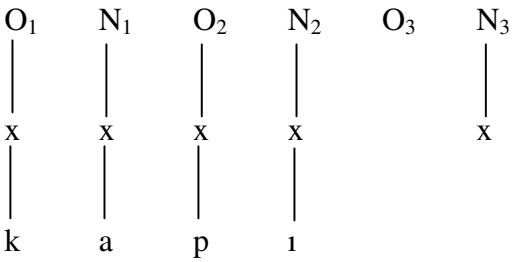
The vowel *ı* in the former example is just the phonetic interpretation of the empty nucleus and includes no elements. Therefore, it cannot be lexical even in the word-

initial position theoretically. The vowel *u* in the latter, on the other hand, includes the element U which comes from the harmonic domain *o*. The empty nuclei in the above forms should have been parametrically p-licensed and accordingly the surface forms of the above words should have been *kap* and *koy*, respectively. However, this is not the case. As first mentioned by Kaye (1990a), this phenomenon can be explained by assuming that these empty nuclei are not in word-final positions but followed by an onset position lexically[51]. See the following representations:

(12) (a) *kap* 'container'



(b) *kapı* 'door'



The representations in (12) accounts for how the empty nucleus in *kapı* "door" can be phonetically interpreted. In (12a), the word *kap* "container" has the parametrically p-licensed empty nucleus N_2 and it is silent as is expected. For the word *kapı* "door" in (12b), on the other hand, there is an extra ON pair. The phonetically interpreted

[51] See Denwood (2006: 500-501) for historical evidence which confirms that Turkish has uninterpreted onsets after word-final empty nuclei.

empty nucleus N_2 is followed by an onset without skeletal point and a parametrically p-licensed empty nucleus. In this subsection, I focus on the distribution of empty nuclei in Turkish. I account for the cases where the empty nuclei can occur word-finally. The following subsections will be about the possible alternation sites and the restrictions on the alternation of empty nuclei with zero.

4.2.2. CvCV Pattern

Examples of the CvCV pattern have already been well-documented in dictionaries as may be seen in Appendix A. The new data provide more examples:

(13)	*bilim-e → biløme, bilime* (science-Dat.)	'to the science'
	durum-a → durøma, duruma (situation-Dat.)	'to the situation'
	giriş-e → girøşe, girişe (entrance-Dat.)	'to the entrance'
	ikiz-e → ikøze, ikize (twin-Dat.)	'to the twin'

In (13), the patterns of the domains are suitable for vowel-zero alternation. Such examples -which have not been documented before- show that the alternation sites can and may be alternated with zero regardless of the lexical properties of the words.

4.2.3. CCvCV Pattern

The CCvCV pattern has not been documented in the literature. Below, some examples are given:

(14) *alkış-a → alkøşa, alkışa* 'to the clapping'
(clapping-Dat.)

çirkin-e → çirkøne, çirkine 'to the ugly one'
(ugly-Dat.)

olgun-a → olgøna, olguna 'to the mature'
(mature-Dat.)

santur-a → santøra, santura 'to the santur'
(a musical instrument-Dat.)

As is said, the nature of the preceding cluster can block vowel-zero alternation in certain cases. The examples in (14) are possible in Turkish since the preceding consonant clusters which have right-to-left inter-onset relations do not block vowel-zero alternation unlike the ones in (15):

(15) *kibrit-e → *kibrøte, kibrite* 'to the matchstick'
(matchstick-Dat.)

*seçkin-e → *seçkøne, seçkine* 'to the elite'
(elite-Dat.)

The preceding consonant clusters *çk* and *br* in (15) block vowel-zero alternation. None of both have right-to-left inter-onset relation in contrast to the ones *lk*, *rk*, *lg* and *nt* in (14). This is a comprehensive issue which will be discussed in Chapter 5 in detail.

4.2.4. Cases where the Empty Nuclei cannot be Properly Governed

As will be indicated, the domains which do not provide one of the two proper patterns cannot undergo vowel-zero alternation. In this subsection, in 4.2.3.1, 4.2.3.2 and 4.2.3.3 respectively, it will be shown that the length of the alternating and

preceding nuclei and being in a domain-initial position blocks vowel-zero alternation. 4.2.3.4 is about the other cases where the empty nuclei cannot be properly governed.

4.2.4.1. Length of the Alternating Vowel

As discussed by Kaye (1990a) in detail, Turkish has underlyingly long vowels. These long vowels shorten when followed by an uninterpreted empty nucleus. The length of the alternating vowel is one of the determining factors as regards vowel-zero alternation:

(16)	(a)	*demir-e → demøre, demire* (iron-Dat.)	'to the iron'
		durum-a → durøma, duruma (situation-Dat.)	'to the situation'
		emir-i → emøri, emiri (order-Acc.)	'the order (Acc.)'
	(b)	*vücut-a → *vücøda, vücu:da* (body-Dat.)	'to the body'
		*zemin-e → *zemøne, zemi:n* (floor-Dat.)	'to the floor'
		*emir-i →*emøri, emi:ri* (sovereign-Acc.)	'the sovereign (Acc.)'

The difference between (16a) and (16b) is a result of the quantity of the vowels. The alternating vowels in (16b) are originally long[52]. Their length can be realized only if

[52] It is noteworthy that, when such words are with short vowels in an idiolect, a vowel-zero alternation process would be expected. For instance, */zemin/* instead of */zemi:n/* 'floor' would become *zemni* 'the floor' if the alternating vowel was short, in contrast to what is written in the dictionaries. This prediction is borne out.

there is a phonetically realized nucleus which follows them. This is called "closed syllable shortening" in the literature: a long vowel would shorten in a closed syllable. On the other hand, this is not a universal phenomenon. Long vowels do not alternate with short vowels in some languages like Somali whereas in some other languages like Turkish, these vowels are subject to variations in length depending on the presence of the following phonetically expressed nucleus[53] (Scheer 1998b: 274-278, 2004: 251).

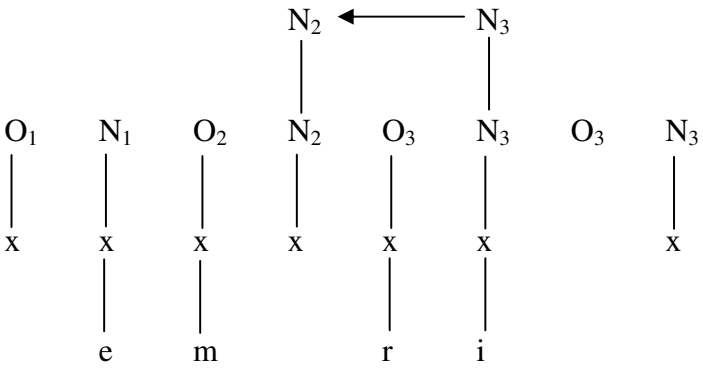
Yoshida (1993) hypothesizes that the Government-licensing Principle which will be discussed in Chapter 5 should be extended to nuclear relations[54]: "for a nuclear head to govern its complement, the head must be government-licensed by the following nucleus" (Yoshida 1993: 151)[55]. In branching analyses, long vowels are considered as branching nuclei and head-initial. In non-branching analyses, however, it is the inter-nuclear relation which makes a vowel long. According to Yoshida (1993), the relation is again head-initial (Yoshida 1993: 152). See the following representations:

[53] In Turkish, if there is no interpreted following nucleus, a single following consonant can be sufficient to trigger shortening as in *a:na* "to the instant" but **a:n* "instant". However, different languages may exhibit different properties. For example, English allows long vowels before a single consonant but not before a consonant cluster as in *[ki:p]* "keep" but **[ke:pt]* "kept". See Kaye (1990a: 309-312) for an analysis.

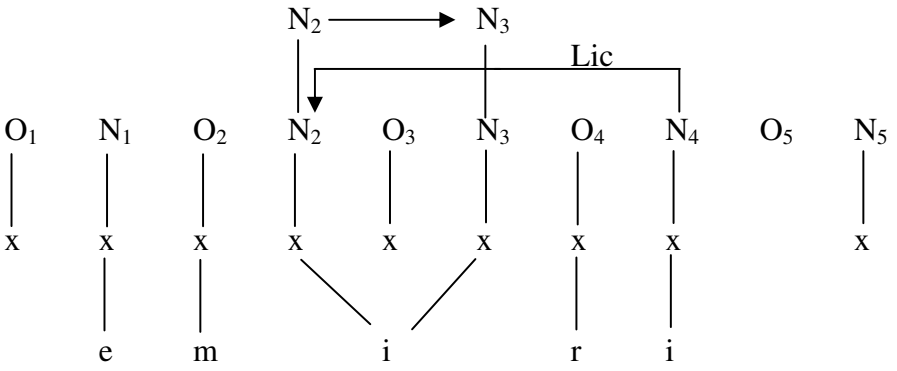
[54] As can be remembered from Chapter 3, according to the Government-licensing Principle, for a consonantal governor to govern its governee, it has to be government-licensed by its following nucleus (Charette 1990: 242). It will be discussed in Chapter 5 in detail.

[55] Then, it can be assumed that in languages like Somali, either (i) phonetically uninterpreted nucleus can government-license the head of the long vowel, or (ii) there is no need for a government-licenser for the head of the long vowel to govern its complement.

(17) (a) *emøri* 'the order (Acc.)'



(b) *emi:ri* 'the sovereign (Acc.)'



As can be remembered from (16), there is no phonetic difference between the pronunciations of these two words unless a vowel-initial suffix is added to them. Their nominative forms are phonetically identical. The following nucleus leads to different phonological changes for the two.

The alternation site in (17a) is kept silent by proper government whereas the one in (17b) cannot remain silent. Instead, the shortening process is blocked. In (17a), N_3 properly governs N_2 and makes it silent. In (17b), however, N_2 is government-licensed by N_4 to govern N_3[56]. N_3 cannot be properly governed by N_4

[56] See Charette (1989) for an explanation within the Minimality Condition of the fact that branching nuclei cannot be properly governed by the following nucleus either. According to her analysis, it is because this government relation would involve government within the immediate projection of the nuclear head in which a complement is already governed by its head (Charette 1989: 173-174). See

because there is an empty onset O_3 which has to be governed by the following nucleus N_3 to remain silent. In sum, when an underlyingly long vowel is followed by an interpreted nucleus, it can easily be seen that it is the government-licensing which takes place, not proper government[57].

4.2.4.2 Length of the Preceding Vowel

As investigated in 4.2.4.1, the long vowels which are followed by consonants need to be government-licensed in order to preserve their length. In rule-based systems, it is observed by many that "in languages in which shortening takes place before a single final consonant, vowel syncope will always feed shortening" (Kaye 1990a: 324). That is to say, vowel-zero alternation can cause the shortening of the vowel which precedes the alternation site. It has a theoretical explanation as already discussed above. On the other hand, the reverse case is also possible logically: the length of the preceding vowel can block vowel-zero alternation. Then, there seem to be two possibilities:

(18) (i) The alternation site will fail to be properly governed to government-license the preceding nucleus or,

(ii) the alternation site will be properly governed, therefore it cannot government-license the preceding nuclei[58]

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also Denwood (2006: 496-497) for an interesting analysis of the forms *taç* "crown" and *ta:cın* "of the crown" within the Template Hypothesis.

[57] There is another example of licensing which leads to consonant length instead of vowel-zero alternation. That is *mühim-e* → *?mühme, mühimm-e* 'to the important'. However, since there are only a few such words in Turkish and there is an increasing tendency to treat them as if they can be alternated, I shall not allocate more space to these obsolete exceptions.

[58] Here, there is a clear parallel with government-licensing for clusters. Charette (1990) discusses such a difference between French and Tangale one of which chooses government-licensing and the other one chooses proper government. These two logical possibilities are completely parallel to the

Turkish chooses the first option. The length of the preceding vowel is an essential blockage for the realization of vowel-zero alternation in Turkish. Nevertheless, there are also languages which select the second option parametrically. See the following examples from Yawelmani[59]:

(19)

saalik-hin (non-future)	*saløk-al* (dubitative)	'to wake up'
hootin-hin (non-future)	*hotøn-ol* (dubitative)	'to take the scent'

(Scheer 2004: 12).

As is seen, the alternation site is properly governed and the preceding vowel shortens. However, since empty nuclei preceded by long vowels are not allowed to alternate with zero, such a shortening process is not possible in Turkish[60]:

(20)

*a:lim-e → *a:løme, *aløme, a:lim-e* (scholar-Dat.)	'to the scholar'
*ca:hil-e → *ca:høle, *cahøle, ca:hile* (ignorant-Dat.)	'to the ignorant'
*ka:til-e → *ka:tøle, *katøle, ka:tile* (killer-Dat.)	'to the killer'
*ma:vi-ler → *ma:vøler, *mavøler, ma:viler* (blue-Pl.)	'blue ones'
*za:lim-e → *za:løme, *zaløme, za:lime* (atrocious-Dat.)	'to the atrocious'

The examples in (20) cannot undergo vowel-zero alternation supporting the hypotheses that (i) all the long vowels in Turkish have to be government-licensed by

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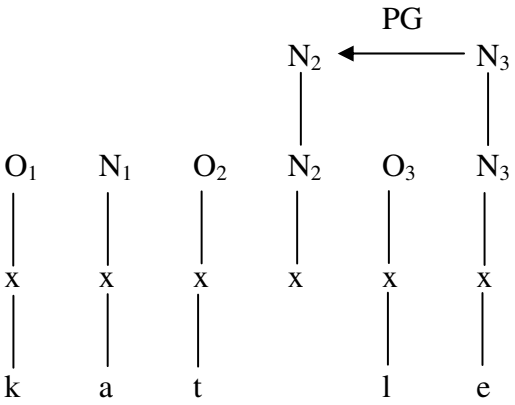
two logical possibilities that she mentions, except that she investigates clusters while I investigate long vowels here. To make a comparison, see 5.3 where her analysis is elaborated.

[59] The examples in Scheer (2004) are preferred because he provides the glosses. More examples from Yawelmani are available in Kaye (1990a: 302). Also, similar data from Hopi may be found in Gouskova (2003: 94).

[60] See Appendix B (Figure 3).

the following nuclei[61] as shown in*a:løme* “to the scholar” and (ii) the phonetically interpreted empty nuclei which government-license the preceding long vowels cannot be alternated with zero parametrically[62] as in **aløme* “to the scholar”. It can be said that government-licensing has precedence in Turkish while it is the proper government in Yawelmani. Now consider (21) and (22) which represent the difference between Turkish-type languages and Yawelmani-type languages, respectively:

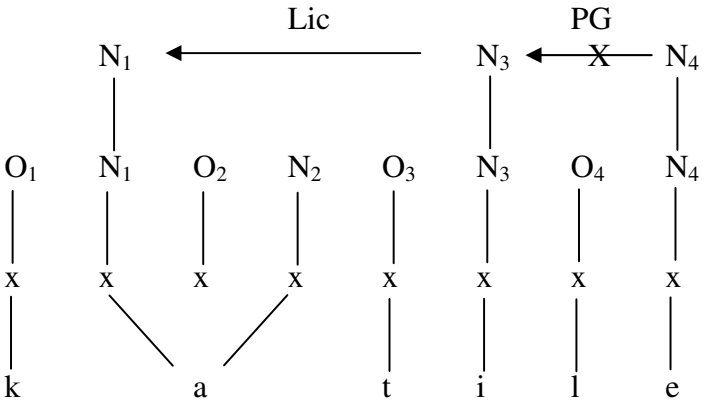
(21) (a) *katøl-e* ‘to the killing’



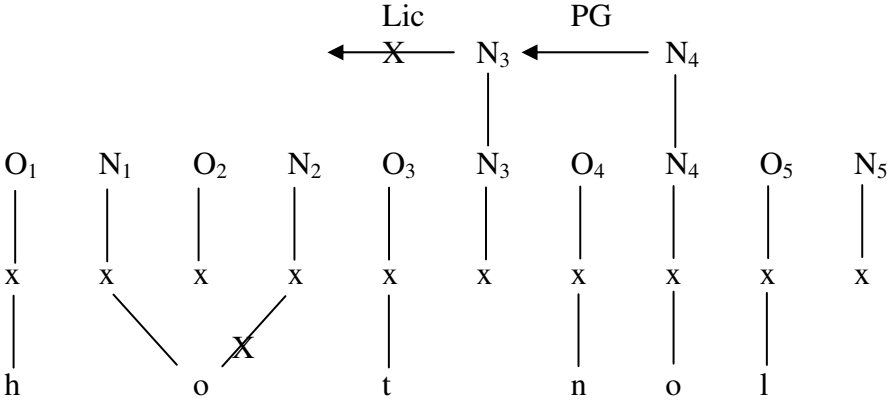
[61] If long vowels did not alternate with short vowels in any environment, then no sensitivity to the vowel-zero alternation would be expected. That is to say, a form like *a:lme* “to the scholar” would be perfectly grammatical. In fact, there are languages like Somali which display this property as is said in 4.2.4.1.

[62] Unlike the form **a:lme* “to the scholar”, *alme* is not an impossible form in Turkish but it is not available due to the parametric choices. If the word *alim* were with a short vowel in an idiolect, there would probably be a vowel-zero alternation process. In fact, this prediction is borne out. The word *ha:tır* “sake” which is originally with a long vowel is mostly pronounced with a short vowel like *hatır* in spoken language and its “correct” accusative form is accepted to undergo vowel-zero alternation as in *hatrı* “the sake (Acc.)” by some people. This word is therefore included in Appendix A. See also Footnote 52 for a similar case.

(b) *ka:tile* ‘to the killer’



(22) *hotønol* ‘to take the scent’



The sole difference between the two words in (21), the length of the segment *a*, allows vowel-zero alternation to be realized in (21a) and blocks it in (21b). In (21b), N_3 fails to be properly governed because it has a function. It seems this is significant in languages like Turkish but not in languages like Yawelmani as is seen in (22). In (22), N_3, which does not have any phonetic content, cannot government-license N_2 and because of that, the vowel shortens. To sum up, the presence of a preceding long vowel implies a pattern like VVCvCV which is not proper for vowel-zero alternation in Turkish. Empty nuclei in such positions cannot be properly governed by the following nuclei parametrically.

4.2.4.3. Word-initial Consonant Clusters

It is widely accepted in the literature that the phonetically adjacent consonants in word-initial positions are not permissible in Turkish. Indeed, it is claimed that even the ones in words of western origin are pronounced with an intervening vowel in Turkish:

(23)	*blok*	*[bılok]* or *[bulok]*	'city block'
	Fransa	*[fıransa]*	'France'
	tren	*[tiren]*	'train'
	kravat	*[kıravat]*	'cravat'

As is seen, although the original spellings might be preserved in the orthography, the words are pronounced with an intervening vowel. However, this generalization does not apply across the board: the word-initial consonant clusters are not totally unfounded in Turkish. Some speakers do pronounce the above words without the intervening vowels. It is usually attributed to their educational background in foreign languages like English and French. However, these speakers may also pronounce non-western origin Turkish words with word-initial consonant clusters.

Furthermore, this is not a recent phenomenon. The existence of word-initial consonant clusters was first determined in the seventeenth century (Gilson 1987: 69). The usage of word-initial consonant clusters in the certain words is also documented in some grammars (Deny 1941: 89, 193, Ergin 1962: 64, Lewis 1967: 9)[63]. See some examples:

[63] These cases are mentioned but not discussed by any of these authors.

(24)	*bırak ~ brak*	'leave'
	Fırat ~ Frat	'the Euphrates'
	kılavuz ~ klavuz	'guide'
	pınar ~ pnar	'spring'
	tıraş ~ traş	'shave'

The pairs in (24) are optionally available in modern Standard Turkish[64]. Then, this optionality might be attributed to the proper government of the empty nucleus, that is, to vowel-zero alternation. If this were the case, then the pattern #CvCV would be claimed as a suitable pattern for vowel-zero alternation in Turkish. However, as pointed out before, in Turkish, only left-headed clusters are permissible in the word-initial position[65]. The right-headed word-initial clusters are ungrammatical in Turkish. See the following:

(25)	*liman ~ *lman*	'harbour'
	*nitelik ~ *ntelik*	'quality'
	*Rıfat ~ *Rfat*	'name of a man'
	*Rıza ~ *Rza*[66]	'name of a man'

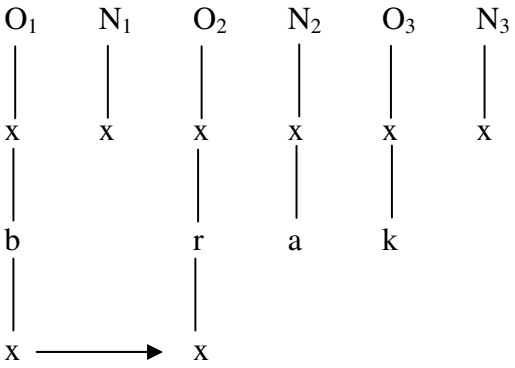
[64] The intervening vowel of the consonant clusters in Turkish is typically *ı* which is empty. *i*, *u* and *ü* seem to be possible too in certain words but I do not have enough data to claim this. The vowels which include A, *a, e, o* and *ö,* however, must be phonetically interpreted. The existence of the phonetically adjacent consonants in the word-initial position has not been discussed extensively in this section since the aim of the thesis is not directly related to this issue. I leave this to future work.

[65] There are two types of languages which tolerate word-initial consonant clusters. In some languages (e.g. English), the least complex consonant must appear to the right of the more complex one whereas in some others (e.g. Moroccan Arabic), both right-headed and left-headed sequences in the word-initial position are available (Lowenstamm 1999: 154).

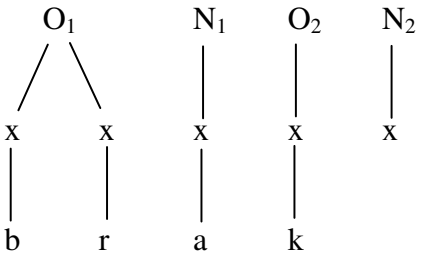
[66] It is *Rza* (name of a man) in the Caucasian languages which allow right-headed sequences (Scheer 2007: 354).

The ungrammatical forms in (25) show that the silence of the intervening cluster is related to the inter-onset relation, not to proper government. The word-initial consonant sequences are discussed widely within the GP framework. For Turkish, there seem two possible representations for the forms with word-initial clusters:

(26) (a) *brak* 'leave'



(b) *brak* 'leave'



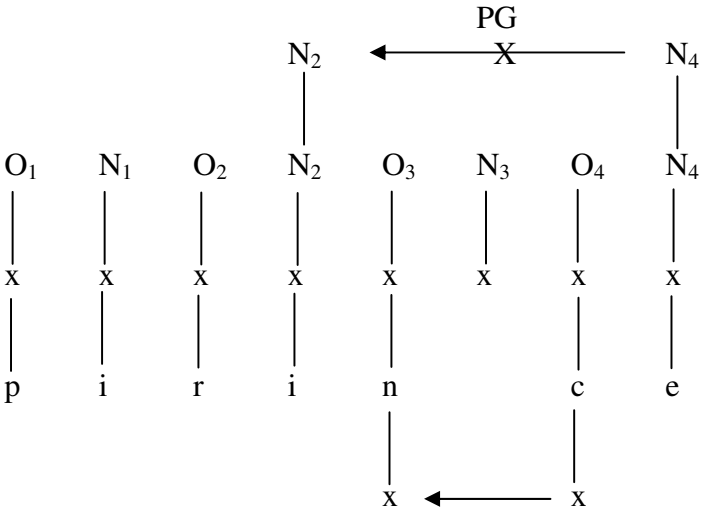
For those who have word-initial clusters in their idiolects, there is either head-initial inter-onset government as in (26a), which is normally not found in Turkish as will be discussed in Chapter 5, or branching onset which is assumed not to be available in Turkish in the literature (Charette 2004, Balcı 2006, Denwood 2006). Since I apply a non-branching analysis to my data, the former representation seems more acceptable

to me[67]. However, it does not matter for the purpose of this work whether (26a) or (26b) is a more proper representation for Turkish. Both non-branching and branching onset analyses have stressed the fact that the word-initial consonant clusters can be realized by consonant interaction[68] not by inter-nuclear relations. Then, it is clear that the pattern #CvCV is not suitable for vowel-zero alternation.

4.2.4.4. Following Consonant Clusters

If a word does not have one of the two proper patterns mentioned above, there cannot be any vowel-zero alternation. Preceding consonant clusters may not block vowel-zero alternation if certain requirements are met but the following clusters block the process in accordance with the phonological ECP. See (27):

(27) *pirinç-e* → **pirønce, pirince* 'to the rice'
(rice-Dat.)



[67] Moreover, I shall also claim in 5.2.3 that beside head-final inter-onset government, Turkish also has head-initial inter-onset government.
[68] I shall not go into details since this topic is not directly related to our concerns. Scheer (2004: 94-116, 2007) may be seen for a detailed discussion. Interestingly, he claims that in languages like Moroccan Arabic which allow right-headed clusters in word-initial positions, it is not the inter-onset relation but the proper government which makes the intervening nuclei of the word-initial clusters silent (Scheer 2007: 358).

In (27), there is an inter-onset government between n and c: c governs n and the intervening empty nucleus is kept silent via this right-to-left inter-onset relation. N_2 cannot be properly governed by N_4 since there is an intervening governing domain between O_4 and O_3. It is in accordance with the phonological ECP which states that intervening governing domains block proper government as given in (4iii). In this subsection, the cases where the empty nuclei cannot be properly governed are explored with examples. The following subsections will be about the positions of alternating vowels.

4.2.5. Alternating Vowels in the Suffixes

Importantly, the alternation sites do not necessarily have to be in a root, an inflectional form of a word can also undergo the vowel-zero alternation process. See (28):

(28) *adam-ın-ın → adamnın* — 'of his/ her man'
(man-Poss.3.Sg.-Gen.3.Sg.)

kitab-ın-ı → kitabnı[69] — 'his/ her book (Acc)'
(book-Poss.3.Sg.-Acc.)

yol-umuz → yolmuz — 'our way'
(road-Poss.1.Pl.)

In (28), the alternating vowels are not in the roots but in the inflectional suffixes. The alternation site is appropriate for vowel-zero alternation also in the suffixes. In fact, it is the expected state of affairs. The phonological environment renders the process available also in the following subsection.

[69] Remember from Chapter 2 that in Ottoman orthography, *kitabnı* is preferred to *kitabını* "his/her book (Acc.)". This may indicate that the same phonetic fact might have been valid then.

4.2.6. Alternating Vowels in the Stem-final Positions

In traditional grammars, consonant-initial suffixes are considered not to lead to any change in the preceding domain regardless of the phonological environment (Denwood 2006: 486). To explain the old data, Charette (2000) proposes that vowel-zero alternation is not possible in stem-final positions since the stem-final high vowels are metrical heads. Although there might be such an explanation, it is certainly an unexpected phenomenon for GP. In any case, our data invalidate the classical assumption:

(29)	*deri-ler → derøler* (skin-Pl.)	'skins'
	gezi-si → gezøsi or *gesøsi* (journey-Gen.3.Sg.)	'his/ her journey'
	hep-i-si → hepøsi[70] (all-Poss.3.Sg.-Poss.3.Sg.)	'all of them'
	satı-lık → satølık (sale-Der.)	'for sale'
	saygı-lı → saygølı (respect-Der.)	'respectful'
	soru-dan → sorødan (question-Abl.)	'from the question'

The examples in (29) clearly show that the alternating vowels do not have to be stem-internal. On the other hand, looking at the fact that vowel-zero alternations in stem-final positions (e.g. *kar[ı]-n-ı* "your wife (Acc.)") are evidently less observed than the ones in stem-internal positions (e.g. *kar[ı]n-ı* "the abdomen (Acc.)"), it may be assumed that there may be other factors that have a role in the preference of the

[70] It is *hepsi* "all of them" also in the orthography.

speakers as regards vowel-zero alternation. However, confirming such an assumption requires a comprehensive field study which is beyond the scope of this thesis[71].

4.2.7. Possible Ambiguities

It is considered in the literature that vowel-zero alternations in Turkish remove the present ambiguities as in the *koyunu* "the sheep (Acc.)" versus *koynu* "the bosom (Acc.)" case. This might sometimes be true for some speakers. However, our data indicate that vowel-zero alternation can create ambiguities in Turkish. First see the following where vowel-zero alternation does not remove any of ambiguities:

(30)	*iris-i, iri-si → irøsi* (iris-Acc.), (bulky-Poss.3.Sg.)	'the iris of eye (Acc.)', 'the bulky one'
	kurul-u, kur-ulu → kurølu (committee-Acc.), (establish-Der.)	'the committee (Acc.)', 'established'
	karın-ı, karı-n-ı → karønı (abdomen-Acc.), (wife-Poss.3.Sg.-Acc.)	'the abdomen (Acc.)', 'your wife (Acc.)'
	kayıd-a, Kayı-da → kayøda (record-Dat.), (Kayı-Loc.)	'to the record', 'in the Kayı'
	sorun-a, soru-n-a → sorøna (problem-Dat.), (question-Poss.2.Sg.-Dat.)	'to the problem', 'to your question'

In (30), there seems no barrier for the vowel-zero alternation process. Although the roots are different, all the examples provide the proper pattern. This accounts for the fact that the alternation sites in the stem-final positions or in the suffixes can undergo vowel-zero alternation just like the ones in the stem-internal positions. There is no phonetic distinction between the non-alternated forms of the above words which

[71] It should be noted that the infrequency of vowel-zero alternations in domain-final positions has already been observed in the literature. For a detailed discussion of the phenomenon within the Optimality Theory, see McCarthy and Prince (1995) and Gouskova (2003: 152-154).

consist of different roots and different suffixes. The alternated forms only save this ambiguity. On the other hand, ambiguity can be created by vowel-zero alternation. See the following alternated and non-alternated words:

(31) (a) *aşı-lı → aşølı* 'vaccinated'
(vaccine-Der.)

arı-sız → arøsız 'without bee'
(bee-Der.)

(b) *aş-lı → aşlı* 'with food'
(food-Der.)

ar-sız → arsız 'vigorous'
(modesty-Der.)

The alternated forms of the words in (31a) and the words in (31b) can be distinguished only by the context.

4.2.8. Number of Alternation Sites in a Word

There can be more than one alternation site in the same word, if the conditions are met. The choice is optional: The speakers may (i) select one alternation site randomly, (ii) prefer not to alternate any of them, or (iii) select more than one in accordance with the phonological ECP. Consider (32):

(32) (a) *burun-umuz-un* → *burønumuzun* 'of our nose'
(nose-Poss.1.Pl.-Gen.3.Sg.)
→ *burunømuzun*
→ *burunumøzun*

(b) *alkış-ımız-ın* → *alkøşımızın* 'of our clapping'
(clapping-Poss.1.Pl.-Gen.3.Sg.)
→ *alkışømızın*

→ *alkışımøzın*

As is seen, both kinds of words, the ones with the CvCV pattern and the ones with the CCvCV pattern may embrace more than one alternation site. There are three alternation sites in (32a) and (32b). The last two alternation sites in (32b) have a CvCV pattern like the ones in (32a). It seems very difficult to find more than one CCvCV pattern within a word in Turkish.

The four possible combinations of the vowel-zero alternations in the word *burunumuzun* "of our nose" are presented in (33):

(33) (a) *burun-umuz-un* → *burønumøzun* 'of our nose'
(nose-Poss.1.Pl.-Gen.3.Sg.)
→ *?burønømuzun*[72]

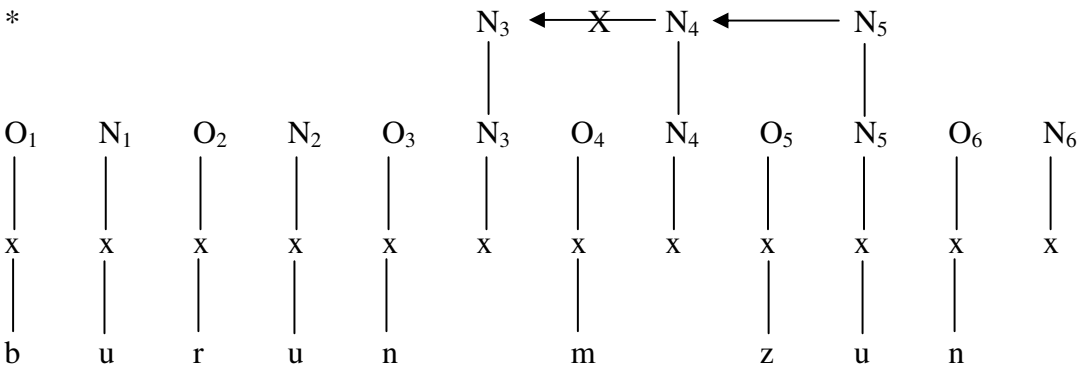
→ **burunømøzun*

→ **burønømøzun*

As is seen, the existence of two vowel-zero alternations in a word is possible if both of the alternation sites are followed by phonetically interpreted nuclei[73]. In other words, two or more following vowel-zero alternations are ruled out by conditions of the theory. See the following representation:

[72] I do not use an asterisk because such pronunciations are not totally out of use at least for some speakers as already noted in Footnote 47. What is important for the current discussion is that the silence of the nucleus is not due to proper government but due to inter-onset government.
[73] Theoretically, the existence of more than two vowel-zero alternations in a word is not impossible. Nonetheless, it is very difficult to find such a long word with the proper domain patterns.

(34) **burunømøzun* ‘of our nose’



According to the phonological ECP, a properly governed nucleus cannot govern another nucleus. In (34), N_4, which is already governed by N_5, cannot govern N_3. Thus, the structure is out. In this section, the alternation site in Turkish is described. In the remainder of the chapter, I shall discuss the obligatory and optional cases in terms of the new data.

4.3. Obligatory Cases

According to our data, most of the well-documented examples, which are considered to undergo vowel-zero alternation obligatorily, may, in fact, not undergo vowel-zero alternation as will be shown in 4.4. However, there are also certain cases where the presence or absence of vowel-zero alternation is obligatory. There are two kinds of obligatory cases as regards vowel-zero alternation: obligatory alternations and obligatory vocalizations. Obligatory alternations are very limited in Turkish. The lexicalization process can explain those cases. Obligatory vocalizations, on the other hand, are determined by the phonological environment. They limit the optionality of alternating vowels with zero.

4.3.1. Obligatory Alternations

As mentioned in Chapter 1, contrary to the general assumption, it is claimed in this thesis that no words are lexically marked for vowel-zero alternation in Turkish. Vowel-zero alternation is restricted by the phonological environment not by the lexical properties of words. This is one of the major proposals of this thesis. However, there are certain cases in which vowel-zero alternation must work.

The obligatory alternations in Turkish can be observed within certain compound verbs and two suffixes. These are lexicalized borrowings from Arabic. Below, the case of the compound verbs and the so-called triggering suffixes are described.

4.3.1.1. Case of Compound Verbs

Obligatory vowel-zero alternations in Turkish can be observed in certain compound verbs. A noun and a light verb may combine as a compound verb in Turkish. If the nominal part of the compound verb is of Arabic origin, then there will be vowel-zero alternation. First see the following nouns of Arabic origin:

(35) *hapis* 'prison'
hazım 'digestion'
kayıp 'lost'
sabır 'patience'

These examples may be the nominal parts of compound verbs as in (36):

(36) (a) *hapis etmek → *hapisetmek, hapsetmek* ‘to imprison’
(prison-Light verb)

*hazım etmek → *hazımetmek, hazmetmek* ‘to digest’
(digestion-Light verb)

*kayıp olmak → *kayıpolmak, kaybolmak* ‘to get lost’
(lost-Light verb)

*sabır etmek → *sabıretmek, sabretmek* ‘to show patience’
(patience-Light verb)

(b) *akıl etmek → akıletmek, akletmek* ‘to be able to think
(intelligence-Light verb)
about something’

zehir etmek → zehiretmek, zehretmek ‘to render
(poison-Light verb)
something unpleasant’

In (36), there are combinations of the light verbs *etmék* “to do” or *olmák* “to be” and nouns of Arabic origin. As discussed in Chapter 3, normally, compounds are expected to combine analytically. With respect to the independent analytic structures, the phonological processes apply to each component of a compound separately. Since proper government cannot apply over domains, vowel-zero alternation is not expected to work in these forms. However, that is not the case.

The forms in (36) show that, analytic morphology is not possible for certain compound verbs in Turkish. In (36b), vowel-zero alternation may apply optionally while in (36a), unexpectedly, vocalization of the alternation site is not possible. The forms with asterisks in (36a), interestingly enough, are not available even in the idiolects of the speakers who tend not to alternate the vowels with zero. This phenomenon can be accounted for by lexicalization. Since these limited forms have been lexicalized in Turkish, they cannot be parsed by an empty nucleus. In other words, just like the word *kartal* “eagle” is never pronounced as *karıtal* in Turkish,

the form *sabretmek* "to show patience" is never pronounced like *sabıretmek* because it is lexicalized as *sabretmek*. The optional forms in (36b), however, show that not all compounds with a noun of Arabic origin are lexicalized in Turkish.

It has to be noted that all the examples in (36) include a noun of Arabic origin. If there is no noun of Arabic origin, the compound verbs may always have two optional forms like the ones in (36b). See the following:

(37)	*oyun etmek → oyunetmek, oynetmek* (play-Light verb)	'play a trick'
	sinir etmek → siniretmek, sinretmek (nerve-Light verb)	'aggravate'
	sorun etmek → sorunetmek, sornetmek (problem-Light verb)	'to stew over'
	yardım etmek → yardımetmek, yardmetmek (help-Light verb)	'to help'

In (37), vowel-zero alternation may work optionally. Lexicalization is peculiar only to certain compound verbs with a noun of Arabic origin.

4.3.1.2. So-called Triggering Suffixes

All suffixes which lead to the appropriate context for vowel-zero alternation seem to make the alternation site remain silent in Turkish. They combine with the stems non-analytically and therefore can trigger vowel-zero alternation. Among those, there are two suffixes which seem to render vowel-zero alternation obligatory. These are *–An* and *–i:* which are borrowed from Arabic. See the following:

(38) (a) *keyif-en → *keyifen, keyfen* 'arbitrarily'
(exhilaration-Adv.)

*ilim-en → *ilimen, ilmen* 'scientifically'
(theoretical knowledge-Adv.)

(b) *keyif-i: → *keyifi:, keyfi:* 'arbitrary'
(exhilaration-Adj.)

*ilim-i: → *ilimi:, ilmi:* 'scientific'
(theoretical knowledge-Adj.)

Returning to the question raised in 4.3.1.1, I argue that the ungrammaticality of the vocalized forms in (38) is again connected with lexicalization. Indeed, these two suffixes are not productive: they are used only within certain nouns of Arabic origin[74]. Since the clusters in such forms are lexically imparsable, there is no way for the empty nucleus at issue to get its melody from the harmonic head. In that sense, it can be argued that vowel-zero alternation is obligatory for these very limited cases. The next subsection will be about obligatory vocalizations.

4.3.2 Obligatory Vocalizations

Innumerable examples of vowel-zero alternation can be given from the spoken language where undocumented cases may be observed. Nevertheless, there are several constraints that prevent speakers from alternating vowels with zero in certain cases although the phonological ECP is satisfied. The absence and presence of vowel-zero alternation can be predicted by these constraints. There seem to be two constraints that lead to obligatory vocalizations in Turkish:

[74] The forms *tercí:han* "preferably" instead of *?tercí:hen* and **terci:hén* and *áklen* "by way of reasoning" instead of **áklan* and *aklén* which violate vowel harmony and the usual stress pattern in Turkish also indicate that this suffix is a manifestation of the lexicalization process. See also Çakır (2006: 13).

(39) (i) The nature of the alternating vowel

(ii) The nature of the preceding cluster

The length, the place of stress and the elemental composition constitute the nature of the alternating vowel. First, if the vowel at issue is itself a long vowel or preceded by a long vowel, it can never be alternated with zero as in **emøre* but *emi:re* "to the sovereign" and **a:løme* but *a:lim-e* "to the scholar". These phenomena have already been discussed in 4.2.4.1 and 4.2.4.2. Second, if the alternating vowel is stressed or it includes the lexical element A, it cannot be properly governed unless certain requirements on the nature of the preceding clusters are met. As is said, this issue will be discussed in Chapter 6.

Even if there is no problem with the nature of the alternating vowel, the nature of the preceding clusters will again affect the alternation process. Beside, the nature of the preceding clusters, the presence of k-zero alternation may also render the vocalization of the alternation site obligatory. These will be investigated in Chapter 5.

Obligatory vocalizations are phonologically conditioned and highly observed in Turkish. Since these cases will be discussed in the following two chapters, in this subsection, I am content with presenting several examples:

(40) *sakat-ı → *saktı, sakatı* 'the disabled (Acc.)'
(disabled-Acc.)

*seçkin-e → *seçkne, seçkine* 'to the elite'
(elite-Dat.)

*soluk-un → *solkun, soluğun* 'of the breath'
(breath-Gen.3.Sg.)

*sorún-um → *sórnum, sorún-um* 'I am a problem'
(problem-Cop.1.Sg)

In (40), vowel-zero alternation is not possible although the proper patterns for the process are available. **seçkne* "to the elite" and **solkun* "of the breath" are unacceptable because of the nature of the flanking consonants. **saktı* "the disabled" is out due to the nature of the alternating vowel which includes a lexical element. **sórnum* "I am a problem", on the other hand, is unacceptable because of the place of the stress. Note that the fact that **sórnum* "I am a problem" and **saktı* "the disabled" are unacceptable in Turkish is also related to the nature of the flanking consonants. Then, it can be claimed that the nature of the flanking consonants is the primary factor of obligatory vocalization. The following section will elaborate the optional cases within the new data.

4.4. The Phonological Optionality: Alternate or Vocalize!

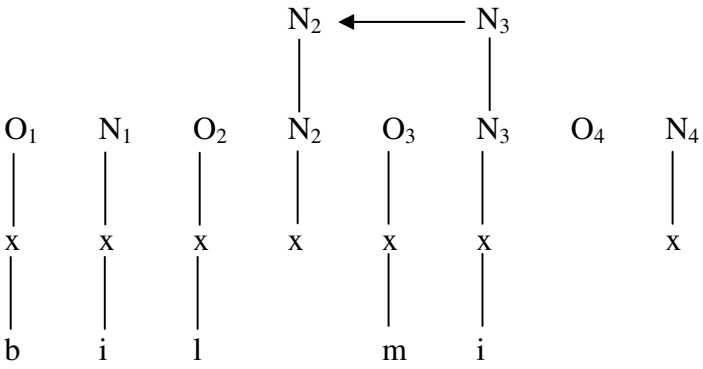
As mentioned in Chapter 1, languages vary as to whether vowel-zero alternation is optional (e.g. German) or obligatory (e.g. Czech) (Scheer 2004: 9). It is mostly accepted in the literature that vowel-zero alternation is obligatory in Turkish for certain forms. However, our data show that it is optional even in these forms at least for some speakers. See the following examples:

(41)

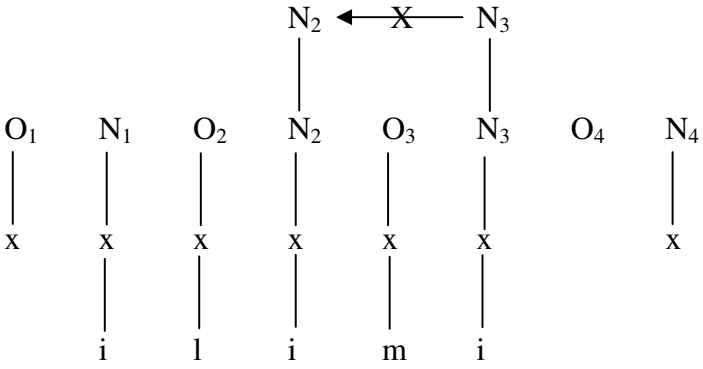
ayıp-ı → aybı, ayıbı (shame-Acc.)	'shame (Acc.)'
boyun-u → boynu, boyunu (neck-Acc.)	'the neck (Acc.)'
haciz-i → haczi, hacizi (distraint-Acc.)	'the distraint (Acc.)'
keyif-i → keyfi, keyifi (exhilaration-Acc.)	'exhilaration (Acc.)'

In stark contrast to what is documented in the traditional grammars, *ayıbı* “contempt (Acc.)”, *boyunu* “the neck (Acc.)”, *hacizi* “the distraint (Acc.)” and *keyifi* “exhilaration (Acc.)” are acceptable in Turkish. According to the traditional approaches, there must be vowel-zero alternation processes due to the lexical properties of these words. The vocalized forms in (41) may indeed not be available for some speakers. For some other speakers, on the other hand, they are totally acceptable. See the following representations of the alternated forms which are not documented in the traditional grammars:

(42) (a) *bilmi* ‘the science (Acc.)’



(b) *ilimi* ‘the theoretical knowledge (Acc.)’



The point is that it is generally accepted in the grammars that the word *bilim* “science” cannot undergo vowel-zero alternation whereas the word *ilim* “theoretical

knowledge" has to undergo vowel-zero alternation. This is assumed to be lexically conditioned.

However, in both (42a) and (42b), the alternation site can be properly governed in conformity with the phonological ECP. As is seen in (42b), there may be no governing relationship between N_2 and N_3, although the phonological ECP is satisfied: N_3 and N_2 are adjacent on the relevant projection, N_3 is not itself p-licensed and no governing domain separates N_3 from N_2. Then, there remains one way of explanation for this case: There is no barrier for the proper government of the empty nucleus but still it may not occur since vowel-zero alternation is optional in Turkish. In (42a), however, N_2 is properly governed by N_3. Vowel-zero alternation is again optional. If there is no theoretical restriction or some barrier in the language, then any word may undergo vowel-zero alternation optionally. These examples clearly show that vowel-zero alternation is phonologically conditioned in Turkish.

Below, I give examples of vowel-zero alternation in both nouns and verbs. Note that these are undocumented in traditional grammars.

4.4.1. Vowel-zero Alternation in Nouns

The following nouns are some of the many that undergo vowel-zero alternation in Turkish. See (43):

(43) *acı-sız → acısız, acsız* 'painless'
(pain-Der.)

bahis-in → bahisin, bahsin 'of wager'
(wager-Gen.3.Sg.)

deri-ler → deriler, derler 'skins'
(skin-Pl.)

dışarı-sı → dışarısı, dışarsı (outside-Poss.3.Sg.)	‘the outside’
giriş-e → girişe, girşe (entrance-Dat.)	‘to the entrance’
içeri-den → içeriden, içerden (inside-Abl.)	‘from the inside’
kanıt-a → kanıta, kanta (proof-Dat.)	‘to the proof’
kes-ici → kesici, kesci (Cut-Der.)	‘cutter’
konum-a → konuma, konma (location-Dat.)	‘to the location’
kuru-du → kurudu, kurdu (get dry-Past.)	‘It got dry’
obur-a → obura, obra (glutton-Dat.)	‘to the glutton’
omuz-um → omuzum, omzum (shoulder-Der.)	‘my shoulder’
oruç-a → oruca, orca (fast-Dat.)	‘to the fast’
sarı-lık → sarılk, sarlık (yellow-Der.)	‘jaundice’
satı-lık → satılık, satlık (sale-Der.)	‘for sale’
ütü-lü → ütülü, ütlü (iron for clothes-Der.)	‘ironed’
yukarı-da → yukarıda, yukarda (aloft-Loc.)	‘aloft’

In (43), there are nouns with suffixes which lead to the appropriate context for vowel-zero alternation. The pattern is CvCV in (43), see the following vowel-zero alternations with the pattern CCvCV:

(44)	*alıntı-lı → alıntılı, alıntlı* (quotation-Der.)	‘with quotation’
	görgü-lü → görgülü, görglü (cultivate-Der.)	‘cultivated’
	karşı-lık → karşılık, karşlık (opposite-Der.)	‘comeback’
	örtü-lü → örtülü, örtlü (cover-Der.)	‘covered’
	örtü-süz → örtüsüz, örtsüz (cover-Der.)	‘uncovered’
	sargı-lı → sargılı, sarglı (bandage-Der.)	‘bandaged’
	saygı-dan → saygıdan, saygdan (respect-Abl.)	‘because of respect’
	terzi-si → terzisi, terssi (tailor-Poss.3.Sg.)	‘tailor’
	yergi-ci → yergici, yergci (satire-Der.)	‘satirist’

As is seen, the alternation sites may optionally be properly governed by the following nuclei when there is a suitable pattern and no other blockage. In this subsection, nouns that undergo vowel-zero alternation are exemplified. The next subsection will exemplify vowel-zero alternation in verbal forms.

4.4.2. Vowel-zero Alternation in Verbs

It has already been shown that the nouns which allow vowel-zero alternation are not lexically marked at least for some speakers of modern Standard Turkish. In the literature, it is also accepted that when vowel-zero alternation takes place, it is confined to nouns. However, the data indicate that vowel-zero alternation applies whenever its conditions are met, irrespective of morphological categories. There are

five basic combinations of a verb root and inflectional suffixes which provide a suitable pattern for vowel-zero alternation in verbal forms:

(45) (i) Verb + Future

(ii) Verb + Progressive

(iii) Verb + (Causative) + Aorist + Agreement

(iv) Verb + Causative/ Passive/ Reciprocal/ Reflexive[75] + Aorist

(v) Verb + Reciprocal/ Reflexive + Passive

We can exemplify these forms respectively with the following:

(46) (a) *sev-[A]cAk → sevecek → sevicek*[76] *→ sevcek*
(love-Fut.)

(b) *say-[I]yor → sayíyor → sáyyor*
(count-Prog.)

(c) *kor[u]-r-Im → korúrum → kórrum*
(protect-Aor.-Agr.1.Sg.)

kor[u]-t-[I]r-Im → korutúrum → kortúrum
(protect-Cau.-Aor.-Agr.1.Sg.)

(d) *duy-[I]r-Ir → duyurur → duyrur*
(hear-Cau.-Aor.)

duy-[I]l-Ir → duyulur → duylur
(hear-Pass.-Aor.)

gör-[I]ş-Ir → görüşür → görşür
(see-Rec.-Aor.)

[75] Note that the reflexive suffix is not productive. There are very few examples with this suffix in Turkish (Kornfilt 1997: 140). Most of the alternated examples include the causative, reciprocal and especially the passive marker.

[76] This pronunciation is more common than the ones with the element A. It can be assumed that this form is not needed for analysing vowel-zero alternation. However, as will be seen in Chapter 6, the alternation sites with A have to satisfy some requirements as regards the flanking consonants. The fact that these forms with future tense marker can be alternated although they do not satisfy these requirements indicate that there should be a medial form without the element A.

gör-[I]n-Ir → görünür → görnür
(see-Refl.-Aor.)

(e) *gör-[I]ş-Il → görüşül → görşül*
(see-Rec.-Pass.)

gör-[I]n-Il → görünül → görnül
(see-Refl.-Pass.)

The alternating vowels are shown in brackets. As is seen, the verbal forms can also undergo vowel-zero alternation if one of the two proper patterns is provided. There is no limitation on the nature of the flanking consonants for verbal forms like the ones in (46a), (46d) and (46e) which exemplify (45i), (45iv) and (45v). For verbal forms like the ones in (46b) and (46c) which exemplify (45ii) and (45iii), however, there are certain limitations on the nature of the flanking consonants due to the place of the stress.

The aorist and the progressive marker bear the stress in (46b) and (46c). Since the alternation sites are stressed, it is not easy to alternate them with zero. Very roughly, the reason for the grammaticality in spite of the presence of the stress on the alternation sites in (46b) and (46c) is the identity of the flanking consonants as will be discussed in Chapter 6.

Due to the fact that the stems are too short in Turkish, there seems to be a need for inflectional suffixes to form a proper context for vowel-zero alternation. Actually, the alternation site which is properly governed is mostly in the inflected part of the verbal forms as seen in (46). However, there are also examples where the alternation of empty nuclei which do not belong to the inflectional part can be observed. These are mostly derived verbs:

(47) *ac-ık-ır → acıkır, ackır* ‘He/ she gets hungry’
(hungry-Der.-Aor.)

bir-ik-ir → birikir, birkir (one-Der.-Aor.)	'It accumulates'
dayı-lan → dayılan, daylan (uncle-Der.)	'swagger'
deli-len → delilen, dellen (crazy-Der.)	'go crazy'
duru-la → durula, durla (limpid-Der.)	'rinse'
emzir-ir-im → emziririm, emzririm (nurse-Aor.-Agr.1.Sg.)	'I nurse'
ilgi-len → ilgilen, ilglen (interest-Der.)	'be interested in'
sancı-mak → sancımak, sancmak (ache-Inf.)	'to ache grippingly'
serp-il-ir → serpilir, serplir (sprinkle-Pass.-Aor.)	'It is sprinkled'

In (47), the alternation sites are not on the inflectional suffixes but on the stems. As is shown, vowel-zero alternation is a highly observed phenomenon in Turkish. Importantly, only the phonological context is essential for the realization of vowel-zero alternation. Since we hypothesize that vowel-zero alternation is a phonologically conditioned phenomenon, we have to determine these phonological conditions for the process to be realized. In this chapter, most of those have already been mentioned. The next chapter will be about the restrictions on the nature of preceding consonant clusters and the theoretical problems related to the pattern CCvCV.

CHAPTER 5

THE PROPER PATTERNS AND THE PRECEDING CLUSTERS

As is exemplified in Chapter 4, the data documented in the present work show that beside CvCV, there is CCvCV where vowel-zero alternation can also take place with the additional condition that the alternation site in this pattern is sensitive to some extra conditions on the nature of the preceding cluster. Then, a classification chart for the proper patterns in Turkish may be like the following:

		The presence of k-zero alternation blocks the process	There are restrictions on the nature of the flanking consonants
(1)	CvCV	yes	no
	CCvCV	yes	on the nature of the preceding cluster

A word in Turkish must provide one of these two patterns in order for the alternation site to be properly governed. As discussed in Chapter 4, CCvCV lets vowel-zero alternation be realized only if certain requirements about the nature of the preceding cluster are satisfied. One issue that this chapter will address is these requirements.

The second main issue in this chapter will be the theoretical problem observed in the vowel-zero alternations in CCvCV. As mentioned in Chapter 4, vowel-zero alternation in the environment of consonant clusters is not attestable in

most languages. On the other hand, as Scheer (1998a) mentions, there are also certain linguistically unrelated languages in which the flanking consonant clusters in the environment of the alternation site (e.g. preceding clusters in Polish, following clusters in Czech) may not block the vowel-zero alternation process. In Turkish, vowel-zero alternation is allowed in the presence of preceding consonant clusters, that is to say, in the pattern CCvCV. This creates problems related to the Government-licensing Principle proposed by Charette (1990)[77]. In this chapter, I explore the Turkish data in the light of Charette's (1990, 1991, 1992) works.

Below, I shall first explain the k-zero alternation process in the environment of vowel-zero alternation in 5.1. In 5.2, the requirements for the inter-onset relations will be focused on within the examples of the possible domain-final consonant clusters in Turkish. In 5.3, the Government-licensing Principle will be discussed in detail. Lastly, in 5.4, following up on the discussions in 5.2 and 5.3, the vowel-zero alternations in the pattern CCvCV will be explored.

5.1. K-zero Alternation in the Environment of Vowel-zero Alternation

This section sets out to inquire into the cases where one of the flanking consonants is empty, that is, into the cases with k-zero alternation[78]. In Turkish, domain-final *k* in certain words alternates with zero if it is followed by a vowel[79]. This is a

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[77] See Scheer (2004: 29-33) for an analysis of vowel-zero alternation in CvCCV. Scheer (2004) argues that vowel-zero alternation in CvCCV violates the phonological ECP which states that intervening governing domains block proper government (Kaye 1995: 295).

[78] Note that there are two different phonological segments represented with the letter "*k*" in Turkish: the voiceless velar stop *k*, */k/* and the voiceless palatal stop *k*, */c/*. Since these do not exhibit different properties in terms of consonant-zero alternation, I do not mention them separately. Also note that, there are other consonant-zero alternations in Turkish. The very few examples ending with the voiced velar stop */g/* and the voiced palatal stop */ɟ/* undergo consonant-zero alternation. Like */k/* and */c/*, these segments are also alternated with zero when the identical conditions are satisfied: *sinagog-u* → **sinagogu, sinagoğu* 'the synagogue (Acc.)'. I do not allocate more space to such cases either.

[79] If the word-final *k* is not in an intervocalic position, it cannot alternate with zero as in *Türk-ü* "the Turkish (Acc.)". Since there is an inter-onset relationship between the two phonetically adjacent

morphological phenomenon. See the following examples in which k-zero alternation and vowel-zero alternation overlap:

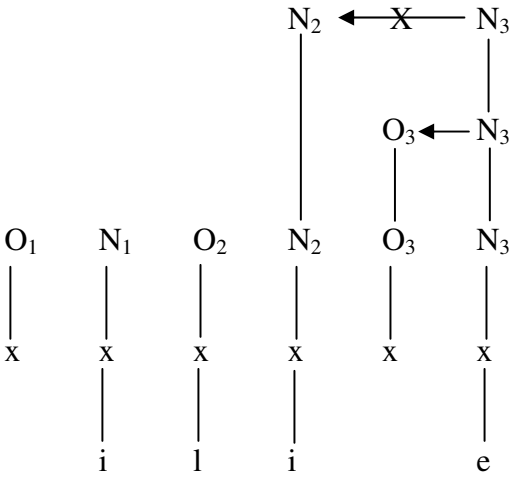
(2)	*artık-ın → *artkın, artığın*[80] (redundant-Poss.3.Sg.)	'of the redundant one'
	*ilik-e → *ilke, iliğe* (buttonhole-Dat.)	'to the buttonhole'
	*sarık-ın → *sarkın, sarığın* (turban.Poss.3.Sg.)	'of the turban'
	*sönük-e → *sönke, sönüğe* (unexciting-Dat.)	'to the unexciting one'
	*suluk-un → *sulkun, suluğun* (water cup-Poss.3.Sg.)	'of the water cup'
	*sümsük-e → *sümske, sümsüğe* (slothful-Dat.)	'to the slothful'

The examples in (2) present the suitable patterns CvCV and CCvCV. The only problem for the realization of vowel-zero alternation stems from the presence of k-zero alternation. Since *k* should not be there morphologically, forms like **artkın* "of the redundant one" are ungrammatical just like forms like **artıkın*. See the following representations:

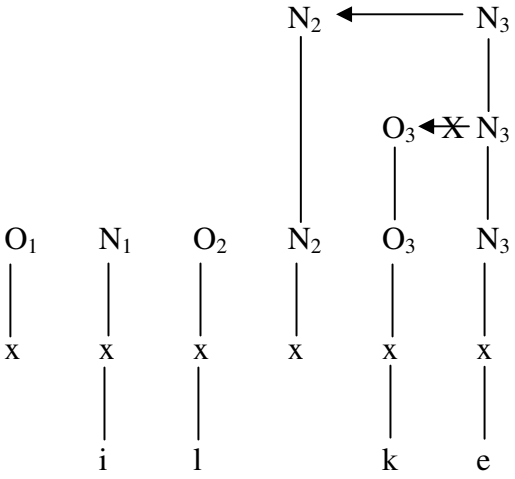
onsets, the rightmost onset which hosts *k*, as a governor, cannot be governed by the following nucleus which hosts *ü* (Denwood 2002: 92-93).

[80] Note that, the letter called soft-g, *ğ* has no phonetic content in modern Standard Turkish as will be discussed in Chapter 6.

(3) (a) *iliğe* ‘to the buttonhole’



(b) **ilke* ‘to the buttonhole’



In (3a), since N_3 already governs the empty onset O_3, according to the phonological ECP, a governing relationship between N_2 and N_3 is impossible: O_3 cannot properly govern two empty positions at the same time. Thus, the form *iliğe* “to the buttonhole” instead of **ilğe* is realized. In (3b), on other hand, although the representation is theoretically legal, just like **ilike*, the form **ilke* “to the buttonhole” is ungrammatical simply for morphological reasons[81].

[81] Note that, some speakers and especially some children have a tendency not to apply k-zero alternation. For example, forms like**ilike* “to the buttonhole” are observable among children. Then, the alternated forms like **ilike* “to the buttonhole” are also expected to be possible. This is another topic which has to be studied. It has been included here only for expository purposes.

As is seen, k-zero alternation is possible only within intervocalic positions. However, not all intervocalic positions allow k-zero alternation[82]. As Sezer (1981) cited in detail, there are cases where the k-zero alternation process is not possible in Turkish:

(4)	(a)	*huku:k-u → huku:ku, *huku:ğu* (jurisprudence-Acc.)	'the jurisprudence (Acc.)'
	(b)	*ak-ı → akı, *ağı* (white-Poss.3.Sg.)	'the white of'
	(c)	*acık-ır→ acıkır, *acığır* (get hungry-Aor.)	'He/ she gets hungry'

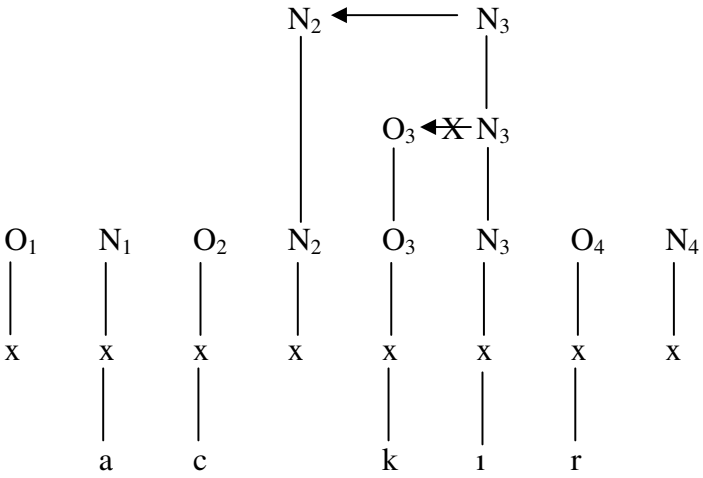
The stem-final *k* segments in (4) are in intervocalic positions. However, they cannot alternate with zero. In (4a), the preceding long vowel blocks k-zero alternation just like it can block vowel-zero alternation as discussed in Chapter 4. This can be predicted by the phonological environment. Also, certain monosyllabic words[83] like the one in (4b) are lexically exceptional for k-zero alternation. Such monosyllabic words do not include a suitable pattern for vowel-zero alternation either, unlike the ones in (4a) and (4c). (4c) shows that the verbal morphology is another blockage for the realization of k-zero alternation although it does not have any influence on the realization of vowel-zero alternation which is a phonological phenomenon. As can be inferred from such examples, the existence of domain-final *k* is not a blockage for

[82] If the case were so, we could predict the realization of the process and accordingly the case could not be evaluated as morphological.

[83] These monosyllabic words are regular and can be explained with the information of their historical transformations. Simply put, only the ones which have historically long vowels allow k-zero alternation. For instance, *çok* "many" becomes *çoğu* "many of", as the segment *o* was once long. See Tekin (1975) for a detailed explanation. See also Denwood (2002) for an evaluation of the three kinds of exceptional cases within the Template Hypothesis.

vowel-zero alternation. This is further supported by the fact that when k-zero alternation is barred, vowel-zero alternation can regularly take place. See the following:

(5) *ackır* 'He/ she gets hungry'



In (5), since verbal morphology blocks k-zero alternation, there is no empty onset that has to be governed by N_3 and therefore N_3 does properly govern N_2. In this section, the cases where k-zero alternation and vowel-zero alternation overlap are introduced. It is shown that when there is an empty onset following the alternation as a result of the k-zero alternation process, vowel-zero alternation cannot work. In the next section, the inter-onset relations in Turkish will be discussed.

5.2. Inter-onset Relations in Turkish

In traditional terms, a group of consonants which have no intervening vowel composes a consonant cluster. By definition, a consonant cluster cannot be intervened by a vowel. As has already been mentioned in 4.2, Turkish allows domain-final consonant clusters. Nevertheless, the domains can end only with the

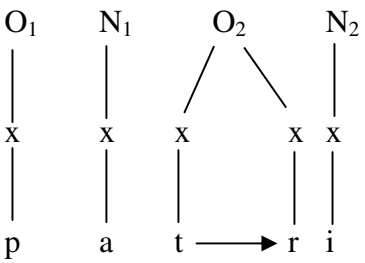
right-headed clusters. That is to say, only right-to-left government is possible between the onsets.

In accordance with the phonological ECP which was discussed in Chapter 3, an empty nucleus can remain silent if it is (i) parametrically p-licensed, (ii) properly governed by the following interpreted nucleus or (iii) if it is closed within an inter-onset government domain. (i) and (ii) might be used to explain the word-medial consonant clusters while (iii), which is the subject of 5.2.3, can also explain the domain-final consonant clusters. In this section, I first mention how consonants can be phonetically adjacent in GP. Second, I clarify the requirements for the realization of inter-onset relations in Turkish. I offer a new hierarchical list for inter-onset government. Then, I explore the optional inter-onset relations in modern Standard Turkish.

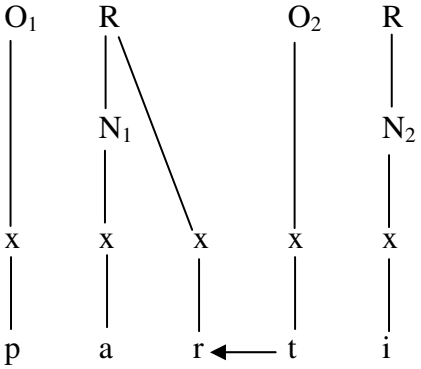
5.2.1. Structurally Non-Adjacent Clusters

In GP, consonants can be phonetically adjacent even if they are structurally non-adjacent. Unlike Turkish, some languages, like most of the Indo-European languages, are assumed to allow "structurally" adjacent consonants. See the French examples from Charette (1990):

(6) (a) *patrie [patri]* 'fatherland'



(b) *partie [parti]* 'party'



(Charette 1990: 235).

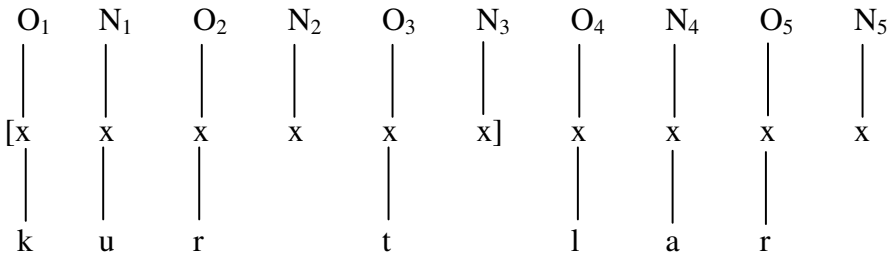
In (6a), there is a constituent government in which a branching onset is governed in a left-to-right relationship, whilst in (6b), there is an inter-constituent one, that is, a branching rhyme is followed by an onset according to Kaye's (1990a) Coda Licensing Principle. In both (6a) and (6b), both of the consonants are structurally adjacent.

Logically, being structurally adjacent entails being phonetically adjacent. If two structurally non-adjacent onsets are phonetically adjacent, there must be an uninterpreted intervening nucleus between the two onsets in question. This intervening nucleus can be kept silent in three ways. These are analytic morphology, inter-nuclear relations and inter-onset relations. Below, these three processes are examined with Turkish examples.

5.2.1.1. Via Analytic Morphology

The domain-final empty nucleus may intervene between the consonant clusters as can be exemplified in (7):

(7) *kurtlar* *[[kurtø]lar]* ‘wolves’

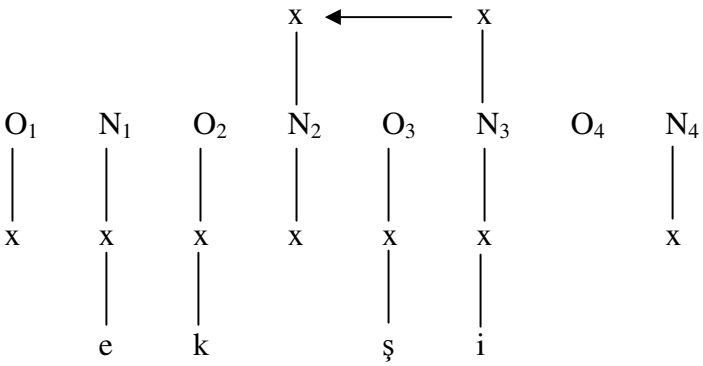


Beside proper government, the silence of N_3 can also be explained by dependent analytic morphology. If it is accepted that the root and the suffix combine analytically, then N_2 which is parametrically p-licensed as a domain-final nucleus can remain silent although it is in a word-medial position[84]. The last phonetically expressed segment of the word *kurt* “wolf”, *t* and the initial segment of the plural suffix *–lar* which is *l* are phonetically adjacent even though they are structurally broken up by the domain-final empty nucleus N_3.

5.2.1.2. Via Inter-Nuclear Relations

A nucleus can make its preceding nucleus silent by proper government as may be seen in (8):

(8) *ekşi* ‘sour’



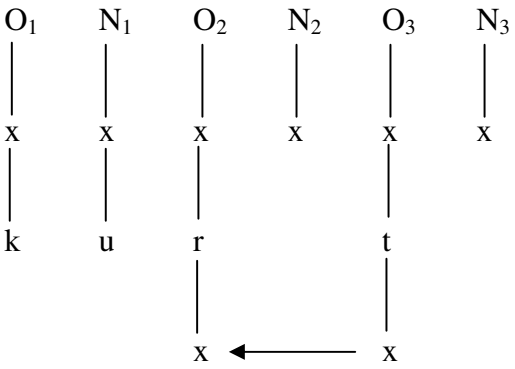
[84] Note that, it is just a possibility. N_3 may also be properly governed by i N_4 in a non-analytic domain.

In (8), the consonant cluster *kş* is structurally non-adjacent. N_3, as a phonetically interpreted nucleus, properly governs N_2 and makes it remain silent. In the absence of N_3, the form **ekş* is impossible in Turkish. Instead, a non-existing form like *ekiş* with an interpreted intervening vowel is expected.

5.2.1.3. Via Inter-Onset Relations

As is mentioned in 3.3, some languages like Turkish are assumed not to have branching constituents. Because there is no branching onset or branching rhyme in such an analysis, the only way to get domain-final consonant clusters is by making the intervening nucleus silent by the inter-onset relation. The only possible inter-onset relation in standard GP is the inter-onset government. See the following:

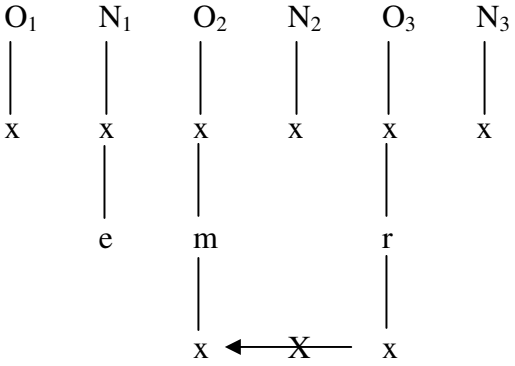
(9) *kurt* 'wolf'



In (9), N_3 itself is not a potential proper governor because it is parametrically p-licensed. There seems to be neither analytic morphology nor proper government available. What makes N_2 remain silent, then, is the inter-onset government relationship between O_2 and O_3. Here, the essential point is that the elemental properties of the phonetically adjacent consonants make the inter-onset government

possible. In other words, the cluster in *kurt* "wolf", which consists of the possible governor *t* and the possible governee *r*, is capable of making N_2 remain silent but there are also clusters which cannot build an inter-onset government relation in Turkish. See (10):

(10) (a) **emr ~ emir* 'order'



Whether the empty nucleus is phonetically interpreted or not is directly related to the elemental properties of the consonants separated by the empty nucleus. In (10), *r* cannot govern *m* due to their elemental properties: O_3 is not good governor for O_2 and O_2 is not a good governee for O_3. The following subsection is about the possible governors and governees for inter-onset government in Turkish.

5.2.2. Possible Governors and Governees for Inter-onset Government

In order to be able to predict whether a consonant cluster is possible in the domain-final position in Turkish, the possible governors and governees for inter-onset government need to be determined. Balcı (2006) investigates this issue. This subsection shows that his list of possible governors and governees excludes certain existing clusters and predicts impossible clusters in Turkish.

Balcı (2006) ascertains thirty-four existing word-final consonant clusters in Turkish as listed in (11)[85]:

(11) *rk, rt, rp, rz, rç, rs, rş, rm, rn, rj, rf,*

lk, lt, lp, lç, ls, lm,

nk, nt, ns, nç, mt, mp, mk, ms,

ft, ht, vk, şt, şk, sk, st, sp, ks (Balcı 2006: 97-98, 108).

By looking at all of those existing word-final consonant clusters, he determines the possible governors and governees in Turkish:

(12) (i) Possible governors: p, t, k, ç, z, j, ş, n, m, s, f

(ii) Possible governees: l, r, [ŋ][86], v, h, n, m, s, f (Balcı 2006: 106, 121-122).

The order of consonants depends on their elemental composition. To identify their elemental composition, the complexity and headedness of the consonants need to be taken into account. Balcı (2006) proposes representations for all consonants in Turkish. As was mentioned in Chapter 3, there are six basic elements which are used in representations of phonological segments. For instance, (U.H) which is the

[85] Beside those thirty-four, there are some other clusters like *lf* and *nz* available in *golf* "golf" and *bronz* "bronze". These two clusters can also be predicted by his list given in (12).

[86] This segment is in a complementary distribution with *n* in Turkish. It only occurs before velar consonants. In other words, beside *ŋk*, it is not possible to find a cluster like **nk* in Turkish. Also note that, this list lacks the voiceless palatal stop /c/, the voiced palatal stop /ɟ/ and the velar lateral /ɬ / which are not shown with a different letter in the Turkish alphabet. Importantly, they may not be in complementary distribution with their counterparts in several cases. For example, both *lp* and *ɬp* are possible in the words *kalp* "heart" and *kalp* "counterfeit", respectively. Therefore, instead of *ŋ*, the segments /c/, /ɟ/ and /ɬ / might have been added to the list.

combination of the elements U and H and includes no head is the representation for the segment *f* in his analysis.

According to his analysis, some consonants, like voiceless fricatives and nasals, are always headless and some others are always headed. Also, the governees have to be headless whilst the governors may also be headed according to his analysis. If the governor is headed, there is no need for any other criteria for the inter-onset government to be realized. If the governor is headless, however, the complexity values of the consonants at issue must be looked for. The governors have to be equally or more complex than the governees in terms of their elemental compositions in accordance with the Complexity Condition proposed by Harris (1990) (Balcı 2006: 106-110).

I will not talk about his whole argumentation here, instead will discuss a few points, the most important of which is that his representations cannot predict all the inter-onset relations in Turkish. First, crucially, not all potential governees precede all potential governors in Balcı's (2006) list. Otherwise, clusters like **mf* and **nm* would be expected in Turkish. For example, the realization of the logical combination *nm* depends on the elemental combinations of *n* (A.L) and *m* (U.L). The possible governee *n* is headless as it has to be according to his analysis. Since the possible governor *m* is also headless, the complexity values have to be looked for: they both have the same number of elements. Then, there is no obstacle for an inter-onset relation to be formed between the two according to the Complexity Condition. However, **nm* is an impossible cluster in Turkish[87].

Second, his list excludes some existing consonant clusters in some real words such as *şerh* "commentary", *zırh* "armor", *sulh* "peace", *mezc* "adulteration", *gayz*

87 Balcı (2006) observes that *m* and *n* cannot be in the right onset of the clusters after consonants except for *r* and *l* but he does not provide a theoretical explanation for the phenomenon (Balcı 2006: 99).

"grudge", *gayb* "imperceptible", *zeyl* "addendum", *Kureyş* "a clan name", *miting* "mass meeting" and *hamd* "glorification", some of which are commonly used. Also, among the hundreds of logical possibilities, there might be some possible non-existing domain-final clusters which cannot be predicted by his list.

Third, the non-existing clusters that can be generated according to his list must be checked. Actually, to check his list, Balcı (2006) tests some consonant clusters. He asks native speakers of Turkish to pronounce his made-up words ending with **tr*, **zr*, **pr*, **tl*, **çr*, **kr*, *vp*, *fç*, *lj* and *mç*. He observes that the subjects pronounce only the last four of the ten without interpreting the empty nucleus inside the consonant clusters (Balcı 2006: 114-115). The others which are not generated by his list cannot be pronounced as they are in Turkish. As he says, this test also confirms his list of possible governors and governees. However, his list envisages eighty-eight combinations[88]. Beside thirty-four existing clusters, there seem to be fifty-four non-existing logical combinations available. Among them, there might be possible non-existing clusters rather than the four that he mentions. He tests only four of the fifty-four and six others which are expected to be unacceptable according to his list. This hardly confirms anything.

Lastly, our data show that there are some other inter-onset relations which are only realized between the members of word-medial clusters. For example, the alternated form of the *öykünürüm* "I imitate", *öyknürüm* includes the cluster *yk* word-medially. As will be shown in 5.4, although it is excluded by the above list, there must be an inter-onset relation between *y* and *k* because the form is grammatical.

Balcı's (2006) proposal is a serious attempt to predict the possible inter-onset relations in spite of all its deficiencies in the prediction of the possible inter-onset

[88] I do not count the velar nasal *ŋ* since it is in a complementary distribution with *n*.

relations. Determining the elemental compositions of the consonants is a must for explaining the inter-onset relations. Nonetheless, I shall not discuss the elemental compositions of the segments to explain the other possible clusters that Balcı's (2006) analysis lacks. Depending on my observations, I shall only provide a hierarchical list which provides a tool to predict the possible inter-onset relations.

5.2.3. A Government Index and Possible Inter-onset Relations

Instead of dividing consonants as possible governors and possible governees, observing the relative governing powers of the consonants seems more convenient for the purposes of this thesis. In this subsection, depending on the government hierarchy of the consonants, possible inter-onset relations are determined without referring to the elemental compositions of the consonants. Importantly, this subsection provides only observations, not explanations. See the following:

(13) Government Index for Turkish

(i) the glide y (j in IPA)

(ii) the rhotic r

(iii) liquids

(iv) nasals

(v) fricative obstruents

(vi) non-fricative obstruents

The inter-onset relations in Turkish are in conformity with the above index[89]. All of the domain-final consonant clusters in Turkish form a right-to-left inter-onset relation. Governing is always a relative property. Each segment can be a good governor for different sets of governees. To put it informally, less complex segments are better governees and more complex segments are better governors: any less complex element can be governed by any equally or more complex element. In other words, the governor has to contain at least as many elements as the governee in a government relationship (Harris 1990: 273-274). As said before, (13) is just an index relying on my observations. However, there seems to be a parallelism to some extent between the complexity values of the consonants and the level ordering: the less complex elements are also the better governees in the index. See the following hierarchy of Turkish consonants shown by IPA symbols (< stands for "good governee for")[90]:

(14) j < r < l, ɫ < n, m < z, ʒ, v, s, f, ʃ, h < b, d, g, ɟ, p, t, k, c, ʤ, ʧ

Note that the best governee *j* is very rarely observed in consonant clusters. It should also be noted that in Turkish, the voiced stops *b*, *d*, *g*, and ʤ are not available in domain-final positions with certain exceptions. Thus, *b*, *d*, *g*, ɟ and ʤ cannot be members of consonant clusters, except for a few examples such as *cezb* "traction", *lord* "English nobleman", *şezlong* "chaise-longue" and *genc* "treasure" in which they are preceded by certain consonants. The most common consonant clusters in Turkish

[89] As said before, it is just an index relying on my observations. However, there seems to be a parallelism to some extent between the complexity values of the consonants and their governing powers. The less complex elements are also the better governees.

[90] Since the aim of the thesis does not entail using them, I shall not use IPA symbols in the examples for practical reasons. The letters *c*, *ç*, *j*, *ş* and y are symbolized by /ʤ/, /ʧ/, /ʒ/, /ʃ/ and /j/ by IPA.

consist of *r*, *l* and *ɬ* as governee and the consonants of the most complex level as a governor. See the following:

(15) *alp* 'hero'
alt 'underside'
ark 'canal'
art 'sequel'

As seen, the forms with the clusters of different levels do not allow an intervening vowel. Although forms like *alıp, arık, alıt* and *arıt* are possible in Turkish, these are not possible realizations of the above words. Those clusters of different levels cannot be broken up. On the other hand, the clusters of neighboring levels may allow intervening vowels. The clusters of the same level cannot form a domain-final consonant cluster in Turkish. The segment *s*, on the other hand, can violate the government index. Below, the clusters of the same level, the ones of the neighboring levels and the special status of the segment *s* are described, respectively.

5.2.3.1. Clusters of the Same Level

Being members of the same level makes inter-onset government impossible between the consonants at issue as is exemplified in the following:

(16) *çapút ~ *çápt* 'patch'
*demín ~ *démn* 'just now'
*havúz ~ *hávz* 'pool'

*Hitit ~ *Hitt*	'Hittite'
*vasíf ~ *vásf*	'quality'

None of the above forms without the intervening vowel can possibly exist in Turkish despite the fact that the forms **havz* 'pool' and **vasf* 'quality' are existing words in the source language, Arabic. All of the clusters, **pt,*mn, *vz, *tt* and **sf* are impossible in Turkish. On the other hand, there are four recent loans in Turkish which include a cluster of the same level, *kt*:

(17)	*antrákt*	'entractes'
	efékt	'effect'
	katarákt	'cataract'
	pákt	'pact'

All of the above words which are highly infrequent in Turkish include the cluster *kt*[91]. It seems that *kt* clusters in these words cannot be broken up by an intervening vowel although in older borrowings like **vakt ~ vakit* "appointed time", there has to be an intervening vowel. This exceptional case which violates the government index can be explained by the Complexity Condition. As mentioned in Chapter 3, the Complexity Condition may allow a governing relation even when both of the segments contain the same number of elements. In fact, *k* (H.ʔ) has even less elements than *t* (H.A.ʔ) and accordingly is a good governee in the cluster *kt*. The

[91] It is noteworthy that there seems a length difference between the *k* segments in the forms *paktlar* "pacts" and *pakta* "to the pact". It seems that when it is followed by a vowel, it is shorter and when it is not followed by a vowel, it is longer. A similar phenomenon is also available in Estonian. See Pöchtrager (2006: 248-255, 272-273) for a comparison between English in which there is no such length difference and Estonian from a GP point of view.

existence of these four exceptions might be attributed to an increasing tendency in Turkish to allow more various consonant clusters in the domain-final position.

5.2.3.2. Clusters of the Neighboring Levels

The clusters of neighboring governing levels are less observed than the ones of different levels. The presence of similar governing powers may trigger the vocalization of the empty nucleus between the onsets. See the following:

(18)	(a)	*?ílm ~ ilím*	'theoretical knowledge'
		film ~ filím	'film'
	(b)	*alárm ~ ?alarím*	'alarm signal'
		modérn ~ ?moderín	'reform'

The segment *r* is a better governee than the segment *l* according to our index. The consonants in (18a) have similar governing powers. Hence, the forms with intervening vowels are more likely to be uttered[92]. The governing levels of the ones in (18b), on the other hand, are different. This accounts for the fact that like the words in (15), the ones in (18b) cannot be broken up by vocalized empty nuclei.

[92] Note that not all words with such clusters may allow an intervening vowel. Some words like *Şarl ~ *Şarıl* (name of a foreign man) and *şems ~ *şemis* "sun (in poetry)" have only one form. It might be due to the fact they are not frequently used or it might also be about the properties of the members of the consonant clusters.

5.2.3.3. Special Status of *s*

According to our government index, *s*, as a member of the second rightmost level, could have been governed only by the consonants of the first rightmost level:

(19)	*ást*	'inferior in rank'
	arabésk	'arabesque'
	gásp	'usurpation'

The segments, *t, k* and *p* are good governors for *s* and can govern it as in (19). However, *s* can also govern the consonants of its own level and even the rightmost level as in the following:

(20)	*cíps*	'potato chips'
	néfs	'one's bodily appetites'
	ráks	'dance'

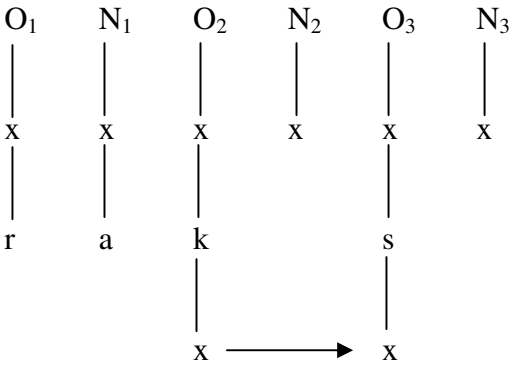
None of the obstruents in (20) are good governees for *s* according to our index. The segments *k* and *p* occupy the rightmost level and *f* shares the same level with *s*. Only the reverse orders of *ps* and *ks* are expected but beside the reverse orders, these orders are also perfectly grammatical in Turkish as an explicit violation of our index.

Actually this is not an unknown phenomenon. Such strange properties of *s* have already been noted by Kaye (1992). He mainly discusses the left-headed #*sC* sequences in which *s* precedes a consonant which is more complex than itself as in "stop" and proposes Magic Licensing which is used to account for the p-licensing of

a nucleus before a cluster containing *s*. Put more explicitly, *s* is assumed as in a rhymal complement headed by an empty nucleus. However, there seems no source of p-licensing for the nucleus in question. The silence of this nucleus is explained by Magic Licensing (Kaye 1992: 306-307). The segment *s* exhibits extraordinary properties also in word-final positions cross-linguistically[93]. The above case is a typical manifestation of the unusual properties of *s*.

As mentioned in Chapter 3, the inter-onset government can be both right-to-left and left-to-right and it is right-to-left in Turkish. However, for instance, in Polish, it is left-to-right, as Gussmann and Kaye (1993) discuss. Then, it might be claimed that the left-to-right government is possible in Turkish only for the sequences in which *s* is preceded by an obstruent. See the following representation:

(21) *raks* 'dance'



The reverse direction of the relationship might be attributed to the unusual properties of *s.* In this subsection, a government hierarchy has been proposed for Turkish. Obviously, further research on the elemental compositions of the consonants is required to confirm and explain our index. However, such an analysis exceeds the

[93] As an example, a very similar case where the unusual clusters can exist with *s* may also be observed in Swedish (Engstrand and Ericsdotter 1999: 49).

scope of this thesis. The government index given in this subsection will be referred to in the following parts of this chapter.

5.2.4. Optional Inter-onset Relations

In the previous subsection, it has been shown that for certain words, Turkish does not allow the vocalization of empty nuclei within certain clusters. Stated differently, there are certain words which lexically disallow clusters to be broken up:

(22)	*ant*	'oath'
	ilk	'first'

However, our data show that for some other words which are normally pronounced with an empty nucleus, the loss of this empty nucleus can sometimes be observed. That is to say, certain words may allow optional inter-onset relations if certain conditions are met. First see the following:

(23)	*anít*	'monument'
	ilík	'buttonhole'
	beníz	'color of face'
	vurúk	'dent'
	yanít	'answer'

As seen, the words in (23) are pronounced with a phonetically interpreted empty nucleus. On the other hand, these cases might also involve a loss process which

normally does not occur in the formal dialect. Depending on the tempo of the speech or some other reason, the above examples can and may be pronounced without the intervening vowels between the members of the possible consonant clusters by some speakers:

(24)	*ánt*	'monument'
	ílk	'buttonhole'
	bénz	'color of face'
	vúrk	'dent'
	yánt	'answer'

Interestingly, the word *ant* "oath" can never be pronounced like *anıt* whereas the word *anıt* "monument" can be pronounced like *ant*. The conditions for vowel loss observed above are not very different from the conditions for vowel-zero alternation which were discussed in Chapter 4. The unpronounced vowels in the above examples (i) are hosted by the CvC pattern, (ii) do not include the element A, (iii) are not long and (iv) intervene the members of a possible consonant cluster[94]. Below, there are examples which show that the empty nuclei between the members of the impossible clusters cannot be phonetically uninterpreted:

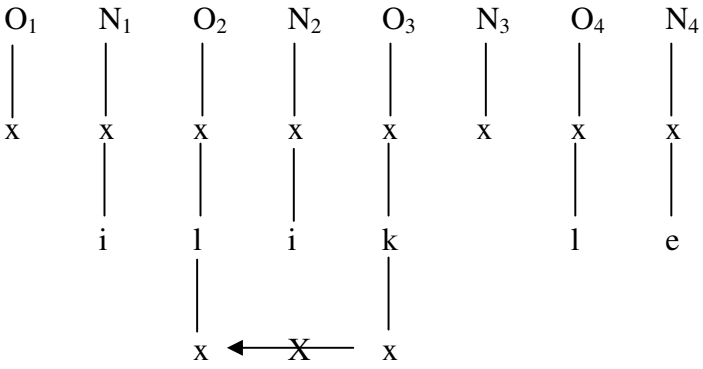
(25)	*adím ~ *ádm*	'step'
	*asíl ~ *ásl*	'original'
	*atík ~ *átk*	'garbage'
	*dumúr ~ *dúmr*	'atrophy'

[94] An unexpected fact is that these vowels can be lost even if they are stressed. It is certainly a peculiar phenomenon.

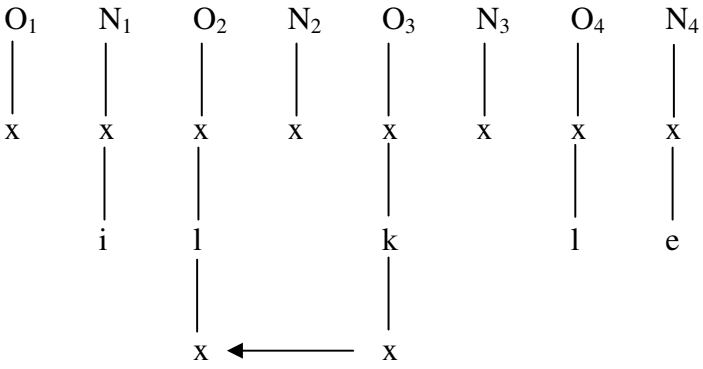
*tanı́m ~ *tánm* ‘definition’

None of the above words include members of a possible consonant cluster. Therefore, the intervening nuclei have to get their melody from the harmonic domain. See the following representations:

(26) (a) *iliklé* ‘button’



(b) *ilklé* ‘button’



In (26a), there is no inter-onset relation and N_2 can get its melody from the harmonic domain N_1. In (26b), however, the inter-onset government between O_2 and O_3 makes the intervening empty nucleus remain silent. Both *iliklé* and *ilklé* may optionally be

used[95]. The points mentioned in this subsection will help us to distinguish such cases of vowel loss from the vowel-zero alternation processes in CCvCV. However, before discussing the Turkish case, there will be an intervening section which discusses the theoretical problems related to the vowel-zero alternation in CCvCV.

5.3. Government-licensing vs. Proper Government

According to the Government-licensing Principle proposed by Charette (1990), consonant clusters cannot exist in the absence of a vowel to their right except in word-final positions. Then, it can be said that the vowel-zero alternations in CCvCV create a theoretical problem for GP. See the following:

(27) *Ersin-i → Ersøni, Ersini* 'name of a man (Acc.)'
(name of a man-Acc.)

As already mentioned in Chapter 4, for some speakers of modern Standard Turkish, such forms like *Ersni* (name of a man) are possible. However, when vowel-zero alternation is realized, there remains no phonetically interpreted nucleus to the right of the consonant cluster *rs*. This section will evaluate this problem and present a solution depending on Charette's (1991, 1992) assumption that some languages may parametrically allow their properly governed domain-internal nuclei to government-license their preceding onsets. Note that Charette's (1990, 1991, 1992) analysis was intended for a version of GP with branching constituents and my addition will be to apply her proposal to a non-branching analysis.

[95] It should be noted that in comparison to the form *ilk* "buttonhole", *ilklé* "button" is a more common pronunciation in Turkish. This is probably related to the place of stress.

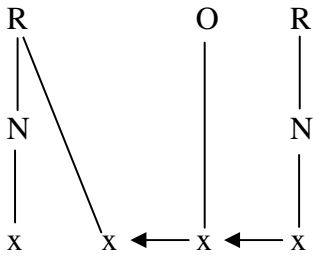
As is said, Charette (1990) explains the consonantal relations with the presence of vocalic support. According to her analysis, a non-nuclear point must be government-licensed in order to be able to govern a complement. Remember from Chapter 3 that for a consonantal governor to govern its governee, it has to be government-licensed by its following nucleus as is stated in (28):

(28) Government-Licensing

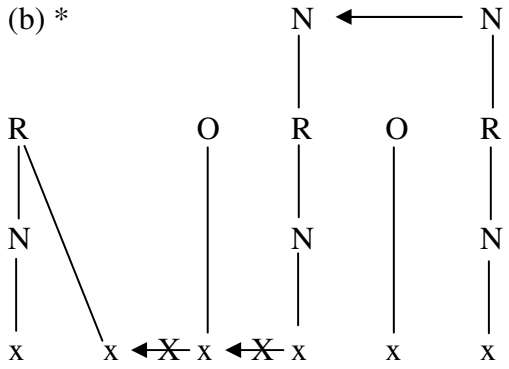
"For a governing relation to hold between a non-nuclear head α and its complement β, α must be government-licensed by its nucleus" (Charette 1990: 242).

As was discussed in Chapter 3, an unlicensed consonant cannot properly govern its complement. Recall (16) from Chapter 3:

(29) (a)



(b) *



As is seen in (29a), there is an inter-constituent government which is supported by the following nucleus. In (29b), however, since the government-licenser is itself properly governed, it cannot government-license the governor of the post-nuclear rhymal position and this position cannot be governed by its potential governor. Then, there might be two logical possibilities for the cases where a properly governable empty nucleus follows a consonant cluster:

(30) (i) "To license the consonant to govern, the empty nucleus will fail to be properly governed or,

(ii) proper government will apply, preventing the non-nuclear head from governing its complement, which entails the loss of this complement or of this head" (Charette 1990: 233).

The following two subsections will investigate this either/ or situation within Charette's (1990) data. 5.3.3 will argue that there is actually a third option which can account for vowel-zero alternation in CCvCV.

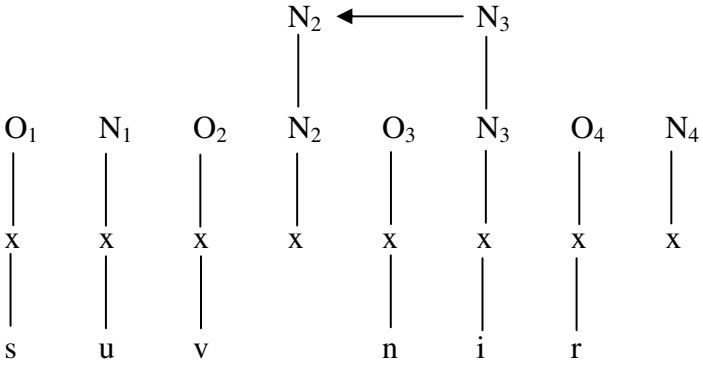
5.3.1. Government-Licensing Wins

Both of the above possibilities are theoretically acceptable. In other words, two different languages can make different choices parametrically. Indeed, there are languages that show such diversity. Charette (1990) discusses French and the Billiri dialect of Tangale to exemplify these two possibilities. First see the French examples:

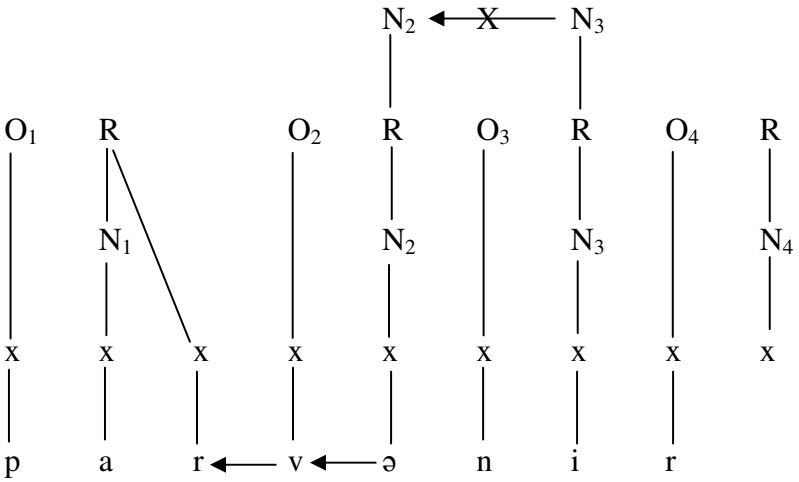
(31)	*souvenir*	*[suvnir]*	'to remember'
	parvenir	*[parvənir]*	'to reach'

The absence of schwa in (31a) and its presence in (31b) are attributed to the status of the preceding consonant by Charette (1990). See (32):

(32) (a) *souvenir* *[suvnir]* ‘to remember’



(b) *parvenir* *[parvənir]* ‘to reach’



It does not seem difficult to account for the absence of the schwa in (32a). Since there is no barrier for N_3 to govern N_2, vowel-zero alternation does work. In (32b), however, there is a rhymal complement which needs to be governed. Its potential governor requires the following nucleus to government-license itself in accordance with the Government-licensing Principle[96] (Charette 1990: 241).

Since the properly governable empty nucleus has to be phonetically realized to government-license the post-nuclear rhymal position, it falls to be properly

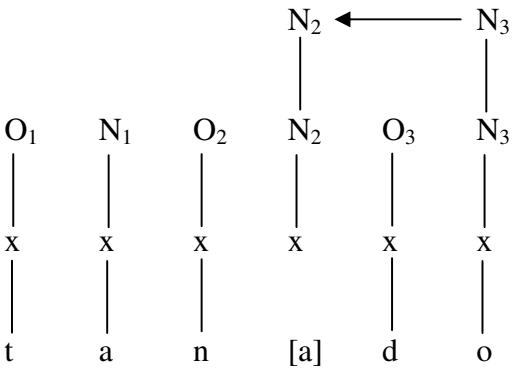
[96] For similar examples from Czech where a properly governable nucleus is preceded by a consonant cluster, and therefore cannot be properly governed, Scheer (1998a: 63) may also be seen.

governed. Note that the same phenomenon is also observed with preceding branching onsets which need to be government-licensed (Charette 1990: 241).

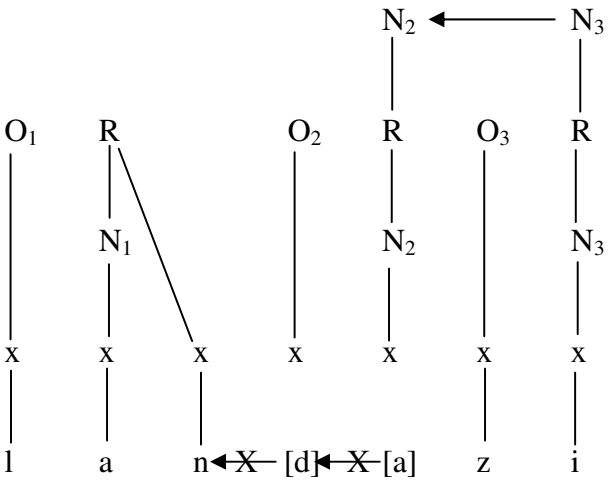
5.3.2. Proper Government Wins

There are also languages whose dominant principle is the proper government of an empty position. See the following representations of the Billiri words:

(33) (a) *tanado → tando* 'her cow'

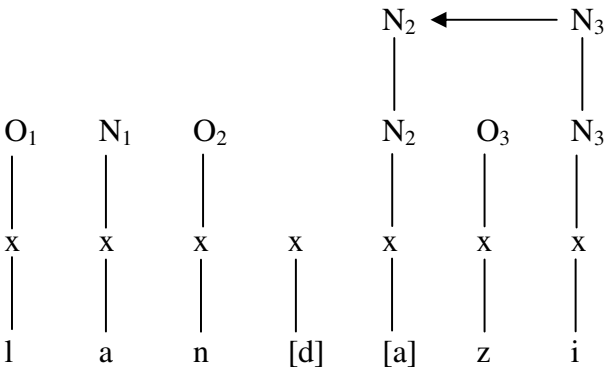


(b) **landazi → lanzi* 'your (female) dress'



Vowel-zero alternation is possible in both examples. As can be seen in (33b), beside the properly governed vowel, one consonant of the cluster disappears[97]. The properly governable vowel *a* is preceded by a consonant cluster *–nd*. O_2 needs to be government-licensed to govern the rhymal complement. However, since the proper government has the precedence in Billiri, there remains no phonetic content in N_2 to government-license O_2. The rhymal complement dissociates from the rhyme and attaches to the onset. Consequently, the form is realized with a unique consonantal segment[98] (Charette 1990: 247). The surface representation is, then, like the following[99]:

(34) *lanzi* 'your (female) dress'



(Charette 1990: 248)

In fact, there are two possibilities: either the nucleus within the cluster *nd* gets its phonetic content as in *lanadzi* or one member of the cluster alternates with zero as in *lanzi*. The phonotactics of Billiri selects the form *lanzi* instead of **lanadzi*.

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[97] This phenomenon can also be exemplified in Turkish optionally in case the phonetically uninterpreted onset must be between two sufficiently identical consonants: *kendi-n-e → kendne, kenne* "to yourself". However, it is not a regular case. As an example, the form *yangına* "to the conflagration" is not pronounced like **yanna* although its phonetic environment is more or less similar to the *kendine*. The existence of such exceptional examples might be about the frequency.

[98] Polgárdi (1998) notes that it is Kaltungo not Billiri which behaves like that. However, as she says, it is not important in terms of the argumentation.

[99] As has been determined by Polgárdi (1996), since *n* is resyllabified from a rhymal position to an onset, the surface form in (10) cannot be derived from the lexical form in (9b) within the GP framework (Polgárdi 1996: 598, 1998: 26). Polgárdi (1996, 1998) suggests that such cases have to be analysed as cases of non-analytic morphology similar to *keep/ kept* in English (Polgárdi 1996: 601, 1998: 28).

When the proper government of empty positions is in conflict with the Government-licensing Principle, the choice of which principle has precedence is determined parametrically (Charette 1990: 250). From the above outline, it can be seen a basic divergence between the choices of French and Billiri in terms of vowel-zero alternation. French prefers government-licensing whereas Billiri opts for proper government[100]. That is to say, in French, vowel-zero alternation does not work in CCvCV because of the role that the alternating vowel has to play whilst in Billiri, it does work but it also entails a consonant-zero alternation in the preceding cluster. However, as Charette (1991, 1992) observes, there seems to be a third possibility.

5.3.3. A Third Possibility: Both Wins

There are also languages in which the proper government of the government-licenser cannot deter it to government-license the preceding onset. As said above, p-licensed domain-final empty nuclei have a power of government-licensing. In that sense, it can be argued that some languages may also be able to allow the properly governed domain-internal nuclei to act as if they are domain-final. Below, first the government-licensing power of the domain-final empty nuclei is described. Then, the question of how the domain-internal empty nuclei can government-license their preceding onsets is discussed within the data from different languages.

[100] In the same way, the genitive singular of the Czech last name *Kadl-ec* is not **Kadl-øc-e*, but *Kadl-ec-e* although the vowel-zero alternation is awaited by the phonotactics of Czech (Ségéral and Scheer 1999: 19). Scheer (2004) also notes that whether proper government or government-licensing has precedence is optional in that example. If the speaker has a tendency to alternate the alternation site with zero, one member of the consonant cluster has to be dropped as in *Kadce* (Scheer 2004: 154, 186). It seems to be what has been predicted by Charette's (1990) analysis but note that the sequence *dl* cannot be a branching onset or a coda-onset cluster. In that sense, it is different from Charette's examples. See also Szigetvári (413-415) for more information about such clusters which are named as bogus clusters.

5.3.3.1. P-licensed Domain-final Empty Nucleus is a Government-licenser

As may be remembered from Chapter 3, the phonological ECP allows the domain-final empty nuclei to remain phonetically silent. The licensing of domain-final empty nuclei is parametric: some languages (e.g. Turkish) p-license their domain-final empty nuclei, but some languages (e.g. Japanese) do not do it (Kaye 1990a: 314).

According to the Government-licensing Principle, branching onsets and branching rhymes can stand only with the help of the following nucleus and this government-licenser nucleus must have a phonetic content to government-license the governor of the preceding governing domain. Then, it might be predicted that in languages which p-license their domain-final empty nuclei, there should not exist any domain-final clusters due to the lack of the government-licenser. However, this is not the case. Charette (1991) discusses this issue.

Charette (1991) hypothesizes that the domain-final empty nucleus can government-license the preceding onset. This accounts for the fact that branching onsets and branching rhymes can exist word-finally in some languages (e.g. French). On the other hand, she also determines that there are languages (e.g. Wolof) which do not allow branching onsets and branching rhymes word-finally although they p-license word-final empty nuclei. The following parameter distinguishes these two types of languages:

(35) "A licensed word-final empty nucleus is a government-licenser: Yes/ No" (Charette 1991: 134).

Wolof and Pulaar are some of the languages which select the No option. No word-final consonant cluster is possible in these languages. However, since the parameter is Yes for languages such as French and English, word-final consonant clusters are available in these languages. Crucially, there is again a parametric difference between the languages whose parameter is Yes. Languages like French admit any cluster in the word-final position whilst languages like English allow only right-headed clusters. For example, both of the words *[kart]* and *[katr]* are possible in French whereas only *[kart]* is possible in English (Charette 1991: 139). This difference is explained by the distinction between direct and indirect government-licensing.

In direct government-licensing, the government-licenser and the licensee have to be strictly adjacent, that is, the licensee must follow a rhyme. In indirect government-licensing, however, the government-licenser and the licensee are not strictly adjacent, that is the licensee is in the branching onset. Here is the parameter for this difference:

(36) "A licensed word-final empty nucleus may indirectly government-license: Yes/ No" (Charette 1991: 140).

The parameter is Yes for French whereas it is No for English. In languages like French where the parameter is Yes, the word-final empty nucleus can government-license the onset to govern its complement within the branching onset or in the preceding rhyme. However, in languages like English where the parameter is No, the word-final empty nucleus can government-license only the onset in the preceding rhyme to govern its complement (Charette 1991: 140).

5.3.3.2. Properly-governed Domain-internal Empty Nucleus may be a Government-licenser

Following the observations made by two persons for certain dialects of French and European Portuguese, Charette (1991) notes that it had better not restrict the proposal that "a licensed word-final empty nucleus is a government-licenser" to domain-final empty nuclei. Rather, it seems to be relevant for domain-internal empty nuclei in certain languages (Charette 1991: 140). See the following data from an idiolect of European Portuguese[101]:

(37)	(a)	*[karsør#]*	'jail'
		[salvøm#]	'save me'
	(b)	**[igrøm#], [igr#m#]*	'abrupt'
		**[s#krøtaria], [s#kr#taria]*	'secretary's office'

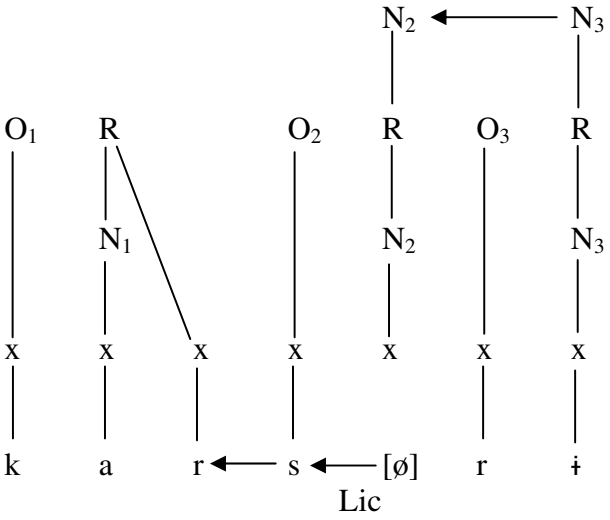
(Charette 1991: 141).

As is seen, the preceding consonant clusters in (37b) block proper government. It is what is expected by the Government-licensing Principle. In (37a), however, in contrast to the expectation, the proper government does work despite the presence of the preceding consonant clusters. The difference between the examples in (37a) and (37b) stems from the nature of the consonant clusters. The clusters in (37a) are right-headed whereas the ones in (37b) are left-headed. In other words, the ones in (37b)

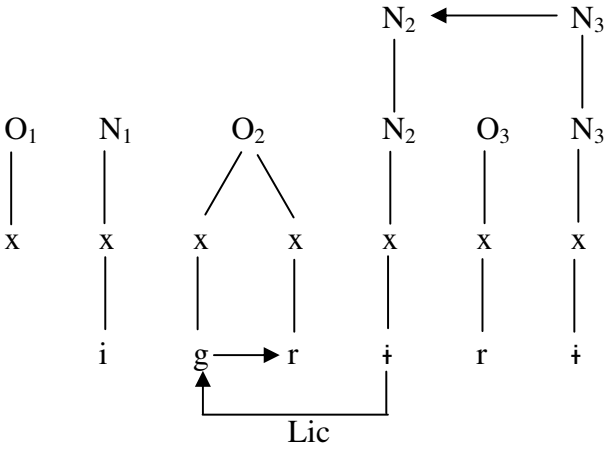
[101] An identical case may also be observed in Khalkha Mongolian and in a dialect of French spoken in Saint-Etienne. The reader is referred to Denwood (1997: 90-91) and Charette (1991: 140-141) for space limitations.

form branching onsets in a branching analysis whilst there are branching rhymes in (37a). Consider the following representations:

(38) (a) *[karsør̩]* 'jail'



(b) **[igrøm r̩],* *[igr̩m r̩]* 'abrupt'



In (38a), there is a branching rhyme. The rhymal complement *r* has to be governed by the following onset O_2 and O_2 has to be government-licensed by the following nucleus N_3. Although N_3 is properly governed and thereby phonetically null, it can government-license O_2. In (38b), on the other hand, there is branching onset. Because properly governed empty nuclei cannot government-license the heads of the

preceding branching onsets in this language, N_2, as a government-licenser, cannot be properly governed by N_3. Here, following Charette's (1991) suggestion, I want to expand her parameter for the domain-final position to the domain-internal positions:

(39) A properly-governed domain-internal empty nucleus is a government-licenser: Yes/ No.

A certain dialect of European Portuguese selects the Yes option whereas many other languages select the No option. Once this parameter is accepted, a successive parameter may also be proposed looking at the distinction between French-type languages and English-type languages which is discussed above with respect to government-licensing. Similarly, two types of languages can be envisaged: one type does not allow properly governed nuclei to government-license the heads of right-headed clusters but only of left-headed clusters while the other type allows them to government-license the heads of both types of clusters. The following parameter may be proposed in order to distinguish these two probable types of languages:

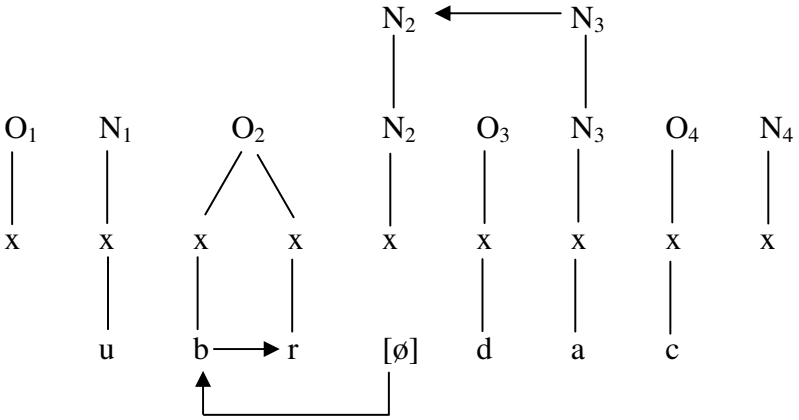
(40) A properly-governed word-medial empty nucleus indirectly government-license: Yes/ No.

For the dialect of European Portuguese which does not allow domain-internal left-headed clusters without a vocalic support, the parameter is No. However, it does not mean that there cannot be any languages whose parameter is Yes. In fact, there is Polish. Consider the following example from Charette (1992):

(41) *[ubrødac]* 'imagine'

As can be seen, there is a consonant cluster which consists of the more complex consonant *b* and the less complex consonant *r*. The properly governed empty nucleus government-licenses the head of the preceding left-headed cluster. It can be concluded that the parameter "a properly-governed word-medial empty nucleus indirectly government-license" is Yes for Polish. See the following representation:

(42) *[ubrødac]* 'imagine'



Since the parameter is Yes for Polish, N_3 can properly govern N_2 and N_2, in spite of its null content, can government-license the head of the preceding branching onset, *b*.

The analyses of European Portuguese and Polish data imply the violation of either the uniqueness of the domain-final position or the Government-licensing Principle. Charette (1991, 1992) renders the domain-final position ordinary and indistinctive by assuming that the peculiar features of the domain-final position can also be possessed by any domain-internal position in certain languages[102]. Polgárdi (1996, 1998), however, attributes the existence of the unusual data to the violability of the Government-licensing Principle (Polgárdi 1996: 602, 1998: 43-47). The difference between European Portuguese-type data and Polish-type data makes

[102] A sharp criticism against Charette's (1991, 1992) view comes from Scheer (2004). According to him, her view violates the universal hierarchy of nuclear categories (interpreted vowel > domain-final empty nucleus > domain-internal empty nucleus) which has been attested cross-linguistically. However, he does not say anything about the vowel-zero alternation cases in CCvCV.

Charette's (1991, 1992) view more convincing. Accepting the violability of the Government-licensing Principle cannot account for this difference. In this section, it has clearly been shown that there is a way of explaining the vowel-zero alternation process in CCvCV if the existence of a parametrical difference between languages as regards the government-licensing power of the domain-internal nucleus is accepted. In the following section, I evaluate the Turkish case in the light of the above discussion.

5.4. Analysis of Vowel-zero Alternations in CCvCV

In Turkish, although relatively little has been discussed yet, there is almost a mutual agreement on the cases where three phonetically adjacent consonants are possible. First, it is not possible for three consonants to be phonetically adjacent at the end of a word. Second, they do not occur word-initially either. And third, they may appear word-medially. Nevertheless, the sole way to get three phonetically adjacent consonants inside a word is adding a consonant initial suffix to a word ending with a consonant cluster. That is to say, nothing else but analytic morphology is believed to create such cases.

According to Balcı (2006), the presence of three phonetically adjacent consonants is a good parsing cue for Turkish. He exemplifies this proposal with the word *kurtlar* "wolves". Since there are phonetically adjacent three consonants, we can easily predict that there are two separable morphological units: a word and a suffix. And since there is no unit beginning with *tl* in Turkish, it is not difficult to determine the stem *kurt* "wolf" which is followed by a domain-final empty nuclei (Balcı 2006: 68). On the other hand, our data show that the vowel-zero alternations

in CCvCV create phonetically adjacent consonant sequences which consist of three consonants despite the fact that the empty nucleus between the onsets is not domain-final[103]. However, not all combinations of any three consonants are allowed as will be discussed. The consonant clusters which precede the alternation site are restricted.

In Chapter 4, some examples with CCvCV have already been presented. In this section, the data will be evaluated based on the discussions in 5.3.3. As stated before, vowel-zero alternation can and may be possible in CCvCV only if the preceding consonant cluster is right-headed. In 5.2.3, the possible inter-onset relations are discussed. According to the government hierarchy, there are 185 probable right-headed onset-to-onset clusters in Turkish. Even if we totally exclude /j/, /l/, /b/, /d/, /g/, /ɟ/, /c/ and /ʤ/ which are very rarely observed within consonant clusters, there still remain ninety-two possible clusters. However, including the left-headed ones with the segment *s* and an obstruent, there are less than fifty existing word-final clusters available in Turkish. There seems to be a lexical gap.

This lexical gap is partly removed by the optional inter-onset relations discussed in 5.2.4. The second phenomenon that fills the lexical gap is the vowel-zero alternations in the pattern CCvCV. The preceding right-headed clusters can exist in the absence of domain-internal nuclei. To reiterate simply, except the ones in domain-final positions, consonant clusters, normally, do not exist in the absence of a vowel to their right. However, as shown in 5.3.3.2, some languages allow consonant clusters without a vowel to their right also in domain-internal positions parametrically. Depending on Charette's (1991, 1992) proposal, it can be claimed that the word-medial empty nuclei may be properly governed and nevertheless

[103] It can be asserted that Balcı's (2006) claim that the existence of three phonetically adjacent consonants is a parsing cue in Turkish is falsified with the new data. The rightmost consonant in a sequence of three consonants can belong to the same domain as the other two. See İskender (2008) for details.

directly government-license the preceding onset also in Turkish. First see some examples in which vowel-zero alternation is possible in CCvCV:

(43)	*alkış-ı → alkşı* (clapping-Acc.)	'the clapping (Acc.)'
	alıntı-la → alıntla (quotaiton-Der.)	'quote'
	çirkin-i → çirkni (ugly-Acc.)	'the ugly one (Acc.)'
	Ersin-i → Ersni (name of a man-Acc.)	'name of a man (Acc.)'
	irkil-ir-im → irklirim (blench-Aor.-Agr.1.Sg.)	'I blench'
	kurtulurum → kurtlurum (rescue-Pass.-Aor.-Agr.1.Sg.)	'I am rescued'
	öksür-ür-üm → öksrürüm (cough-Aor.-Agr.1.Sg.)	'I cough'
	sars-ıl-ır → sarslır (shake-Pass.-Aor.)	'It is shaken'
	serp-il-ir → serplir (sprinkle-Pass.-Aor.)	'It is sprinkled'

All of the above examples include a consonant cluster before an unrealized domain-internal nucleus. The clusters *lk*, *nt, rk, rs, rk, rt, rs* and *rp* are possible clusters in Turkish according to our government index given in 5.2.3. The only cluster which violates the government hierarchy, the left-headed cluster *ks*, can be explained by the unusual properties of *s* as may be remembered from 5.2.3.3.

Any clusters that are able to exist in word-final positions can also precede the alternation site in CCvCV. However, there are also preceding right-headed clusters which do not exist word-finally in Turkish. See the following:

(44) *birbir-in-i → birbrini* 'each other (Acc.)'
(each other-Poss.3.Sg.-Acc.)

emzir-ir-im → emzririm 'I nurse'
(nurse-Aor.-Agr.1.Sg.)

ergin-i → ergni 'the adult (Acc.)'
(adult-Acc.)

öykün-ür-üm → öyknürüm 'I imitate'
(imitate-Aor.-Agr.1.Sg.)

No word with domain-final *rb, mz, rg* or *yk* clusters is attested in modern Standard Turkish. The fact that such clusters are perfectly grammatical in the above cases indicates that there is a lexical gap rather than a language-specific restriction. On the other hand, a proper question might follow this statement: why is there such a huge disproportion then? There are 185 possible clusters but only less than fifty exist word-finally. Unfortunately, I do not have a convincing answer for that question. Unfortunately, I do not have a sufficient amount of data to show that all those "non-existing" clusters are, in fact, able to exist in the absence of a vowel to their right in CCvCV or within optional inter-onset relations. I have not tested all of the clusters with made-up words either. There might, of course, be impossible clusters which are in accordance with the index. As I said, this is an index which is based on my own observations and grammatical judgements. It is clear that without determining the elemental compositions of consonants, it is not possible to get a conclusive solution. However, it is, at least, in accordance with my data: the clusters that are or are not able to exist in CCvCV can be predicted by this index and it seems enough for the purposes of this study. Now, see the following examples in which vowel-zero alternation is not possible:

(45) *bekçi-nin → *bekçnin* ‘of the watchman’
(watchman-Gen.3.Sg.)

*bıkkın-a → *bıkkna* ‘to the bored one’
(bored-Dat.)

*Esrin-i → *Esrni* ‘name of a woman (Acc.)’
(name of a woman-Acc.)

*kibrit-e → *kibrte* ‘to the matchstick’
(matchstick-Dat.)

*kıvrım-ı → *kıvrmı* ‘the curl (Acc.)’
(curl-Acc.)

*seçkin-i → *seçkne* ‘the elite (Acc.)’
(elite-Dat.)

*toplum-u → *toplmu* ‘the society (Acc.)’
(society-Acc.)

*yutkun-ur-um → *yutknurum* ‘I gulp’
(gulp-Aor.-Agr.1.Sg.)

*sanrı-lı→ *sanrlı* ‘hallucinator’
(hallucination-Der.)

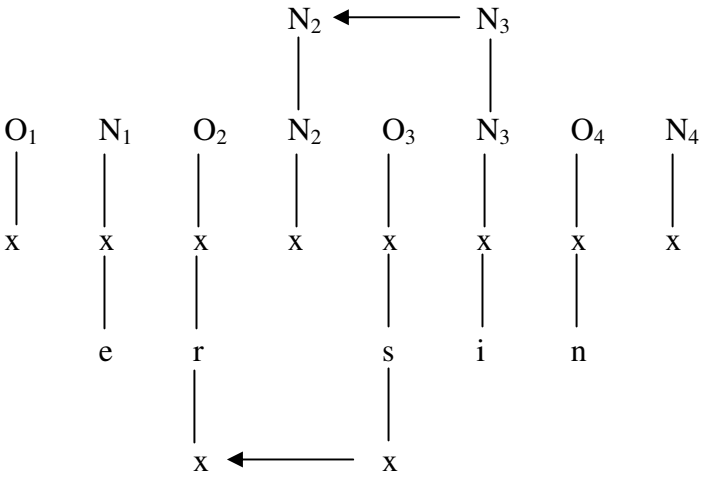
*uranyum-u → *uranymu* ‘the uranium (Acc.)’
(uranium-Acc.)

*vitrin-e → *vitrne* ‘to the showcase’
(showcase-Dat.)

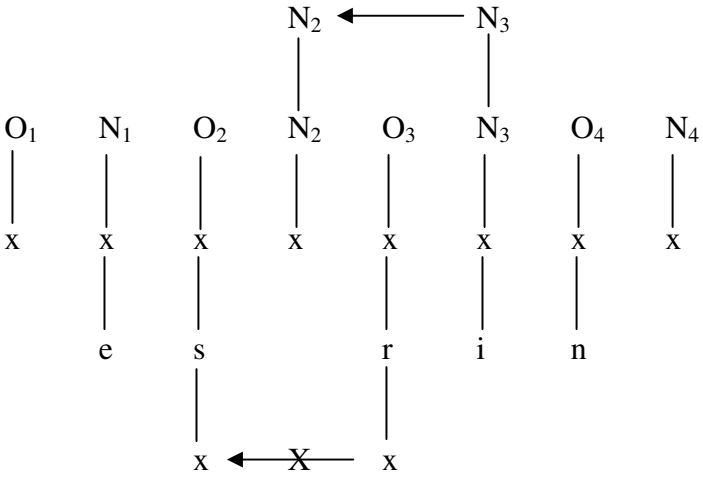
In (45), none of the consonant clusters are right-headed. *çk* and *tk* are clusters of the same level according to the government index. *kk* is a geminate. *kç* also consists of two consonants from the same level. s*r, br, vr, pl, nr, mr, ny* and *tr*, on the other hand, are typical left-headed clusters. Similar to the European Portuguese case discussed in 5.3.3.2, the preceding left-headed consonant clusters block vowel-zero alternation.

After giving the examples, I want to compare the structures of the two cases. See the following representations:

(46) (a) *Ersin* ‘name of a man’

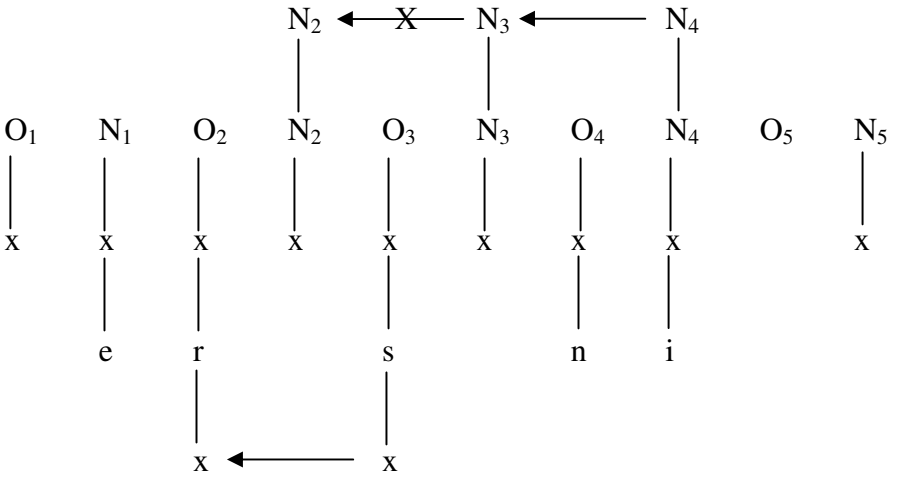


(b) *Esrin* ‘name of a woman’

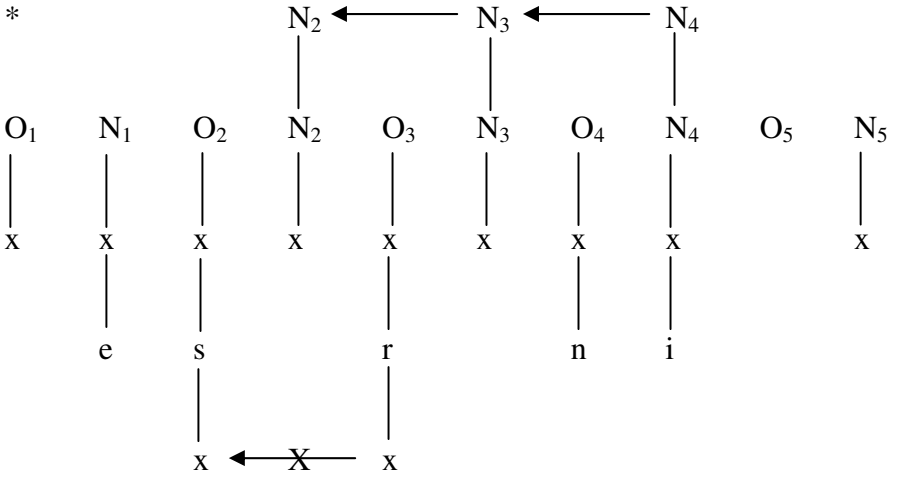


In both (46a) and (46b), N_3 can properly govern N_2 according to the phonological ECP. In (46a), since there is an inter-onset government relation between O_2 and O_3, there is no need for proper government: *s* can govern *r* in an inter-onset relation and N_2 can remain silent. In (46b), however, it is not possible to set such a relation within the cluster *sr* because *r* is not a good governor for *s*. Therefore, only proper government can make O_2 remain silent. Now, consider the following representations:

(47) (a) *Ersni* ‘name of a man (Acc.)’



(b) **Esrni* ‘name of a woman (Acc.)’

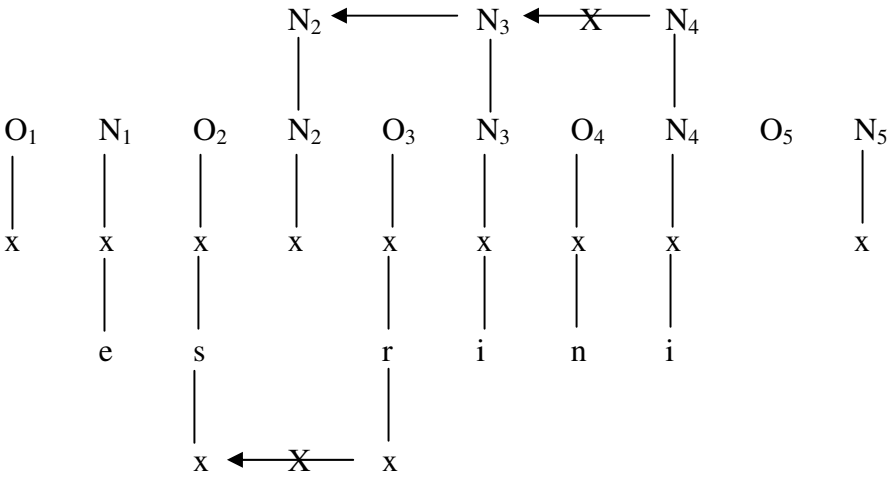


In (47a), N_4 properly governs N_3. Therefore, in accordance with the phonological ECP, N_3, as an unrealized empty nucleus, cannot properly govern N_2. Even though N_2 does not undergo any nuclear relation, its phonetic realization is blocked by the inter-onset government relation between O_2 and O_3. As already discussed in 5.2.3, *rs* sequence can set an inter-government relation. Since in Turkish properly-governed domain-final nuclei N_3 can government-license their preceding onsets as discussed in 5.3.3.2, the structure *Ersni* is perfectly grammatical in Turkish.

In (47b), on the other hand, because there cannot be any inter-onset government relation available within the *sr* sequence, the only way to make N_2 silent is proper government. However, since N_3 is properly governed by N_4, it cannot properly govern N_2. If an empty nucleus remains silent although it is not properly governed, it can be regarded as a clear violation of the phonological ECP. Hence, (47b) is not a proper representation. The structure **Esrni* is out in Turkish.

The proper government of N_3 is theoretically possible but such a governing relation would deter N_3 from properly governing N_2 and generate a structure like *Esirni* which is a possible but unavailable word in Turkish. None of the above clusters, *rs* and *sr* in the words *Ersin* and *Esrin* are parsable (as in *Erisin* and *Esirin*) in Turkish[104]. The representation for the grammatical form *Esrini* is presented below:

(48) *Esrini* 'name of a woman (Acc.)'



As can be seen, since *sr* can never be broken up lexically, N_3 has to properly govern N_2 to make it silent. Thus, N_3 cannot be properly governed by N_4 and gets its melody from the harmonic domain. Now, see the following:

[104] As discussed in 5.2.4, that is a lexical property of these words. The question of why Turkish does have imparsable clusters in certain words is beyond the scope of this work. It might be explained by the existence of branching onsets or the existence of an intervening empty onset position without a skeletal point in such cases. See Denwood (2006: 489-491).

(49) (a) *benzin-e → benzne* ‘to the gasoline’
(gasoline-Dat.)

kantin-i → kantni ‘the canteen (Acc.)’
(canteen-Acc.)

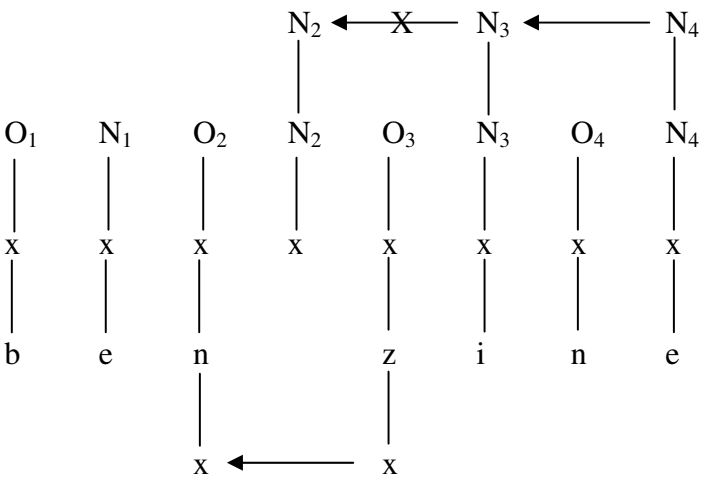
(b) *beniz-in-e → benizne, benzne* ‘to the color of your face’
(color of face-Poss.2.Sg.-Dat.)

kanıt-ın-ı → kanıtnı, kantnı ‘your evidence (Acc.)’
(evidence-Poss.2.Sg.-Acc.)

In (49a), the sequences *nz* and *nt,* which are both lexically imparsable, are appropriate for inter-onset government. Therefore, the alternation sites that they precede can be properly governed by the following nuclei. The same phenomenon is valid for the forms in (49b). On the other hand, the forms in (49b), unlike the ones in (49a) which have imparsable clusters, have phonetically interpreted nuclei. In fact, these nuclei are normally interpreted in formal speech. However, as discussed in 5.2.4, it may sometimes not be interpreted by certain speakers. Below, one may see the representation which is valid for the two kinds of forms:

(50) *benzín-e → benzné* ‘to the gasoline’

beníz-in-e → benzné ‘to the color of your face’



As mentioned in 4.2.8, two adjacent alternation sites cannot be properly governed together in accordance with the phonological ECP. The important point in (51) is that it is the optional inter-onset relation which makes the nucleus at issue remain silent for the form *benzne* "to the color of your face". Stated differently, it is a vowel loss which is a manifestation of inter-onset government not a vowel-zero alternation which is a manifestation of proper government: N_4 properly governs N_3 and since there is inter-onset government between O_2 and O_3, there is no need for N_2 to be properly governed by N_3.

In this section, the vowel-zero alternation process in CCvCV is discussed within a non-branching analysis. Charette's (1991, 1992) proposal that some languages may parametrically allow their domain-internal positions to government-license the preceding onsets is assumed to be valid in Turkish with my modifications. It accounts for how the alternation sites which are preceded by consonant clusters can remain silent.

This chapter has been about the cases where the nature of the flanking consonants is influential on vowel-zero alternation. As shown, a morphological phenomenon, the presence of k-zero alternation in the environment of vowel-zero alternation blocks the process. It has also been indicated that the nature of the flanking consonants which precede the alternation site in CCvCV can block vowel-zero alternation and the realization of vowel-zero alternation in CCvCV causes theoretical problems for GP. To find a solution to that problem, special attention has been devoted to the analyses of inter-onsets relations in Turkish and of the Government-licensing Principle. This chapter and also the preceding one have investigated the proper government of empty nuclei. The following chapter will be about the loss of vowels including the element A and some remaining issues.

CHAPTER 6

FURTHER EXTENSIONS

This chapter aims to investigate the loss of lexically filled nuclei in certain positions and to discuss certain remaining issues related to vowel-zero alternation. The preceding two chapters were about the loss process in the case of non-lexical vowels which is called vowel-zero alternation. In this chapter, I shall discuss under which conditions lexical vowels can unusually be lost in Turkish. As was discussed in Chapter 4, unlike the elements U and I, the element A is always lexical in Turkish and as is well-known, the phonological ECP is only valid for empty nuclei. Therefore, the vowels with A do not alternate with zero but there seems to be a very limited context where these vowels can be lost in the environment of vowel-zero alternation. I shall claim that these losses stem from a lexicalization process which is predictable. Certainly, the cases discussed in the previous chapters were more frequent and easier to observe than the ones in this chapter. On the other hand, the analyses in this chapter basically rely on my own observations and grammatical judgements. Most of the forms given in the following pages are unfortunately not available in the data collected from my informants.

As shown in Chapter 5, vowel-zero alternation may fail to apply depending on the nature of the preceding cluster. This chapter will show that the loss of lexical vowels is again related to the nature of flanking consonants. Below, first, it will be

shown that lexical vowels, that is, vowels including the element A, can be lost only if the flanking consonants are (i) sufficiently identical or (ii) able to form a possible cluster. For the second kind of cases, there is an extra requirement: the alternation site has to co-occur with the two neighboring vowels including A. Second, the remaining issues about vowel-zero alternation will be discussed. This section will reveal voicing alternations, vowel disharmony, vowel lowering, vowel reduction, stress and the so-called soft-g in the environment of vowel-zero alternation, respectively.

6.1. Element A in the Environment of Vowel-zero Alternation

In this section, the unusual cases where nuclei including the element A in the environment of vowel-zero alternation can be lost are explored. Turkish has an eight vowel system: *a* (A), *ı* (I), *u* (U), *e* (A.I), *ı* ( ), *ü* (U.I), *o* (A.U), *ö* (A.U.I)[105]. In order for an alternation site to be alternated with zero, the elemental composition of the alternating vowel has to be lexically empty. The fact that the non-high vowels, *a, e, o* and *ö* do not alternate with zero is attributed to the lexical existence of the element A.

According to Charette and Göksel (1996), in Turkish, there may be lexical A, U and I in the leftmost nucleus of a word but only lexical A can exist in other nuclei (Charette and Göksel 1996: 6-7)[106]. The elements U and I in the leftmost nucleus can spread into the following nuclei. The existence of the vowels rather than *ı* ( ) and *a*

[105] Note that for the purposes of this thesis, the question of which vowels are headed in Turkish is not significant. Following Denwood (1997a), I assume that Turkish vowels are headless and therefore do not underline the elements. See Charette and Göksel (1996) for a different approach.

[106] In this thesis, I accept this hypothesis. However, there are also counter-examples like *kavun* "muskmelon" and *kavim* "tribe" some of which are of Turkic-origin where the non-initial nuclei in question do not take their melody from the harmonic domain for sure. Following Balcı (2006), I assume that they get their melody from the adjacent consonants and therefore are not lexical. It accounts for the fact that these vowels can also alternate with zero. See also 6.2.2.

(A) in non-initial positions is explained by vowel harmony. See the following from Charette (2008):

(1)	*/dilak/*	*[dilek]*	'wish'	
	/fillar/	*[filler]*	'elephants'	
	/gözøm/	*[gözüm]*	'my eye'	
	/ikø/	*[iki]*	'two'	
	/koløm/	*[kolum]*	'my arm'	
	/ütø/	*[ütü]*	'iron for clothes'	(Charette

2008: 55)

In the above forms, it is the vowel harmony which provides the empty nuclei with a melody. For example, in the word *gözüm* "my eye", the non-initial nucleus is lexically empty but the elements U and I in the harmonic domain *ö* (A.U.I) spread into the nuclear position at issue and provides it with a melody at surface. However, in the word *filler* "elephants", although there is again I-spreading, the element A in the non-initial nuclear position is lexically there: it does not come from anywhere else. In that sense, it is not unexpected that nuclei without A instead of nuclei including A undergo vowel-zero alternation in Turkish. See the following examples:

(2)	(a)	*ikiz-e → ikze* (twin-Dat.)	'to the twin'
		kurum-u → kurmu (association-Acc.)	'the association (Acc.)'
		öküz-e → ökze (ox-Dat.)	'to the ox'
		yalın-ı → yalnı (bare-Acc.)	'the bare one (Acc.)'

(b) *eren-i* → *?erni* ‘the saint (Acc.)’
(saint-Acc.)

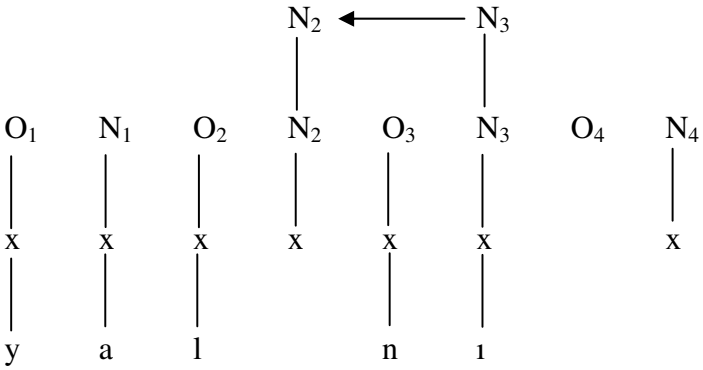
limon-a → **limna* ‘to the lemon’
(lemon-Dat.)

tümör-e → **tümre* ‘to the tumor’
(tumor-Dat.)

yalan-ı → *?yalnı* ‘the lie (Acc.)’
(lie-Acc.)

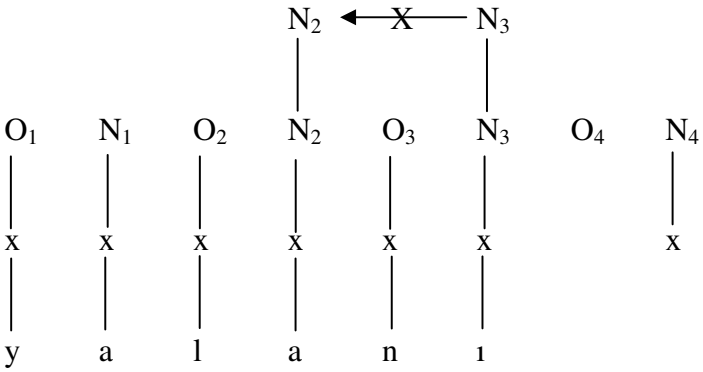
As seen, in (2a), none of the alternation sites are lexically filled. The vowels get their melody via spreading. Thus, all of them can be alternated with zero. In (2b), however, since the alternation sites *a* (A), *e* (A.I), *o* (A.U) and *ö* (A.U.I) include the element A lexically, all the forms are unacceptable in Turkish[107]. Although the vowels without the element A are also phonetically interpreted in the absence of vowel-zero alternation, since the melody that they get from the harmonic head is not available before the realization of vowel-zero alternation, they are able to alternate with zero. However, the element A always exists: the lexical vowels do not get A by spreading or any other process. See the following representations:

(3) (a) *yalnı* ‘the bare one (Acc.)’



[107] As noted in the beginning of the chapter, most of the grammatical judgements in this chapter are mine. Therefore, I use a question mark instead of asterisk when I cannot be totally sure about the grammaticality of the forms.

(b) *?yalnı* ‘the lie (Acc.)’



In (3), the phonological environments are identical. The sole difference between (3a) and (3b) is the contents of the two alternation sites. Since *ı* ( ) includes nothing, it can be alternated with zero whereas *a* (A) cannot be alternated with zero because of its content which consists of a lexical element. In (3a), N_2 cannot get its melody from N_1 because it is properly governed by N_3. In (3b), however, N_2 does not need to get its melody from any other position. It has its own melody, lexically.

On the other hand, although the alternation sites include a lexical element, the nature of the flanking consonants may allow the non-realization of lexical vowels. That is to say, for certain speakers, the lexical vowels may not be available at surface in a limited context. As mentioned in the beginning of the chapter, if the identity of flanking consonants is provided, lexical vowels can get lost without any extra restriction as in *geleli* → *gelli* “since coming”. However, when they are surrounded by non-identical consonants, things get complicated. There seem to be three conditions that prevent a lexical nucleus from being realized:

(4) (i) The alternation site has to be followed by a nucleus including A.

(ii) The flanking consonants have to be able to constitute a right-headed cluster.

(iii) The alternation site has to be preceded by a nucleus including A.

I have observed that any nucleus which satisfies the above conditions may not be pronounced at surface. However, as I said, the data are not sufficient to confirm this observation. There might be cases which are grammatical although they do not satisfy these conditions and there might also be cases which are ungrammatical although they satisfy all three conditions. My grammatical judgements and limited data, on the other hand, can be explained by the above statements. Below, firstly, the identity of flanking consonants is discussed in detail. Secondly, the cases where nuclei including A may not be pronounced in the absence of identical flanking consonants are investigated.

6.1.1. Identity of Flanking Consonants and the Element A

In this subsection, it is shown that the identity of flanking consonants can provide lexical nuclei with a suitable site to get lost. Below, in the first two sub-subsections, the issue is clarified by using examples from different languages. In 6.1.1.3, the alternation sites including A between the identical consonants are investigated.

6.1.1.1. Cross-linguistic Peculiarities of Identical Flanking Consonants

There is a considerable discussion in the literature concerning the identity of adjacent elements (McCarthy 1986: 207-208). For the purposes of this section, I only mention the relevant points. According to McCarthy's (1986) data, vowel-zero alternation is prevented from producing geminate clusters cross-linguistically. McCarthy (1986)

uses the term "antigemination" for the constraint which blocks the vowel-zero alternation process due to the existence of identical flanking consonants. According to him, the presence of a vowel is conditioned by the avoidance of identical flanking consonants. He exemplifies this phenomenon with an impressive amount of data from various languages to indicate that antigemination is a universal constraint. See the following from East Cushitic language, Afar among many others:

(5) (a) *ʔagara → ʔagr-i* 'scabies'

xamil-i → xaml-i 'swamp grass'

(b) *gonan-a → *gonna* 'He searched for'

*xarar-e → *xarare* 'He burned' (McCarthy 1986: 220-221)

While vowel-zero alternations can be realized in (5a), they cannot in (5b). The identity of the flanking consonants blocks the vowel-zero alternation process in accordance with the antigemination constraint.

McCarthy's (1986) proposal is a serious attempt to explain the peculiarity of the identical flanking consonants. However, the universality of his proposal is falsified by data from linguistically unrelated languages[108]. Contrary to McCarthy (1986), Odden (1988) offers six configurations which potentially create or separate consonant clusters by deletion and insertion (Odden 1988: 462). Three of his configurations are about deletion and the other three are about insertion. As can be remembered from Chapter 1, there is only alternation instead of deletion and

[108] Because of space limitations, I do not provide examples here. Examples from Mussau which falsify McCarthy's (1986) proposal will be given in 6.2.5. See also Odden (1988).

insertion in GP. Then, from a GP point of view, his configurations can be reduced to three from six by alternating vowels instead of deleting and inserting them:

(6) (i) Alternate a vowel unless flanking consonants are identical,

(ii) alternate a vowel blindly or,

(iii) alternate a vowel only if flanking consonants are identical.

It will be shown below that the loss of nuclei including A in Turkish can be predicted by (6iii). However, before that, I want to determine the identity of flanking consonants in Turkish.

6.1.1.2. Being Sufficiently Identical

The explanatory value of (6i) and (6iii) depends on the question of how identical, consonants have to be. Odden (1988) discusses the "sufficient" identity of the flanking consonants when criticizing the universality of antigemination. He seeks an answer to the question of which features need to be shared for consonants to be sufficiently identical (Odden 1988: 461).

According to Odden (1988), there might be cross-linguistic differences between languages in terms of the required features for sufficient identity. However, some basic features like voicing which are not required for sufficient identity are to some extent general for many languages. See the Lithuanian examples from Baković (2005):

(7) (a) *ati-duoti* → **adduoti* ‘to give back’

api-berti → **abberti* ‘to strew all over’

(b) *ati-ko:pti* → *atko:pti* ‘to rise’

api-kalbeti → *apkalbeti* ‘to slander’ (Baković 2005: 279).

In Lithuanian, the identity of flanking consonants blocks vowel-zero alternation in accordance with (6i). In (7b), since the flanking consonants *t, k* and *p, k* are not identical, vowel-zero alternation can be realized. In (7a), on the other hand, the existence of the flanking consonants *t, d* and *p, b* blocks vowel-zero alternation although these are not completely identical. In Lithuanian, voicing and palatalization are the features which do not necessarily have to be shared by flanking consonants to be sufficiently identical. In other words, the flanking consonants should share all other features except these two to be sufficiently identical (Baković 2005: 280).

Turkish does not require the flanking consonants to be completely identical to exhibit peculiar properties either. Voicing seems to be the only feature which may not be shared for being sufficiently identical in Turkish. The next sub-subsection will be about an unusual vowel-zero alternation case in the environment of the sufficiently identical flanking consonants (SIFC hereafter) in Turkish.

6.1.1.3. SIFCs and the Element A

The sufficient identity of flanking consonants can make the alternation sites including the element A unrealized. See the following:

(8) *boza-sı* → *bossı* or *bozsı* 'his /her boza'
(a fermented drink-Poss.3.Sg.)

balo-lar → *ballar* 'balls, dances'
(ball-Pl.)

hamam-ı → *hammı* 'the Turkish bath (Acc.)'
(Turkish bath-Acc.)

geleli → *gelli* 'since coming'
(come-Ger.)

kebap-ı → *kebbı* 'the roasted meat (Acc.)'
(roasted meat-Acc.)

salata-dan → *saladdan* or *salatdan* 'from the salad'
(salad-Abl.)

sebep-i → *sebbi* 'the cause (Acc.)'
(cause-Acc.)

terör-ü → *terrü* 'the terror (Acc.)'
(terror-Acc.)

yarar-ı → *yarrı* 'the benefit (Acc.)'
(benefit-Acc.)

zarar-ı → *zarrı* 'the damage (Acc.)'
(damage-Acc.)

As seen in (8), the vowels which include the element A may not be pronounced between SIFCs. As said, a lexically filled position is simply not subject to the phonological ECP. If the above positions are lexical filled, their silence cannot be accounted for by proper government. Then, it can be proposed that for those unusual cases, (i) there is no lexically filled nucleus, namely, the element A between SIFCs is not lexical in some way, (ii) there is a kind of consonant interaction between the SIFCs which needs to be government-licensed by the following nucleus[109] or, (iii) there is a predictable lexicalization process. I tend to accept the third logical possibility because regarding vowels in identical positions which include the same

[109] For instance, **onun* "his" is possible but **onn* is not. There is a need for a government-licenser. Also, cases like *on* "his" are also out in Turkish but for instance not in Crimean Tatar. See also Footnote 125.

elements as lexically different depending on the nature of the flanking consonants does not sound plausible. Second, the silence of a lexical vowel by an inter-onset relation is again a problem for the phonological ECP. The only proper account seems to be the presence of a lexicalization process. In this subsection, the relation between the sufficient identity of flanking consonants and nuclei including A has been investigated. On the other hand, as will be shown in the following subsection, there are other cases where the element A can simply be lost although there are no SIFCs.

6.1.2. Element A in the Absence of SIFCs

In the absence of SIFCs, the non-realization of lexical vowels may still be possible. This time, the lexicalization process is predictable in two ways:

(9) (i) Morphologically predictable cases

(ii) Phonologically predictable cases

The non-realization of nuclei including A can also be predicted in the absence of SIFCs. Firstly, I want to mention the morphologically predictable lexicalization processes. There are certain words in Turkish which may be pronounced with or without nuclei including A. See (10):

(10) *ne-re-si* → *nɛrsi* ‘what part?’
(where-Dat.-Poss.3.Sg.)

o-ra-ya → *orya* ‘to there’
(that-Der.-Dat.)

bu-ra-lar → *burlar* ‘these places’
(this-Der.-Pl.)

şu-ra-da → *şurda* (this-Der.-Loc.)	'it is here'
üze-re → *üzre* (?-Der.)	'about to'

The forms in (10) seem to satisfy the conditions for the realization of vowel-zero alternation except that the nuclei in question include the element A. In spite of that, these nuclei may not be realized in spoken language. They are lexicalized in two different forms. Crucially, all the above forms include the suffix *–rA* which is evaluated as a derivative suffix in modern Turkish although it was a case marker in Old Turkic (Erdal 2004: 373-374). Today, this suffix is no longer productive and it is not used with any other root rather than the above five[110]. The existence of this suffix is an indication for the non-realization of the lexical vowels in question.

On the other hand, beside these morphologically predictable cases, there are also cases where the phonological environment is sufficient to predict the non-realization process. As given in the beginning of the section, there are three conditions in (4) that a nucleus with A has to satisfy in order to alternate with zero if it is between two SIFCs. Recall (4) for convenience:

(11) (i) The alternation site has to be followed by a nucleus including A.

(ii) The flanking consonants have to be able to constitute a right-headed cluster.

(iii) The alternation site has to be preceded by a nucleus including A.

[110] It does not seem even morphologically parsable in *üzere* "about to". Also note that in *üzere* "about to", it is the vowel preceding *–rA* which may not be pronounced.

Two of these, (11i) and (11iii) are about the elemental compositions of the neighboring nuclei: they have to include A. And the other condition, (11ii) is about the nature of flanking consonants: the flanking consonants have to be able to constitute a right-headed cluster. Now, I explain these conditions with examples. Note that the asterisks used below reflect my own grammatical judgements. The examples were not confirmed by the data. Before discussing the cases, I first want to recall the following data of Deny (1941) from Chapter 2. Please ignore his asterisks:

(12)	(a)	*ağız-a → ağza, ağıza* (mouth-Dat.)	'to the mouth'
		burun-a → burna, buruna (nose-Dat.)	'to the nose'
	(b)	*ağız-ı → ağzı, *ağızı* (mouth-Acc.)	'the mouth (Acc.)'
		*burun-u → burnu, *burunu* (nose-Acc.)	'the nose (Acc.)'

As can be remembered from Chapter 2, vowel-zero alternation is considered as an obligatory process in the literature. Therefore, the forms with asterisks in (12b) which are attested in our data are regarded as unacceptable. Similarly, the non-alternated forms in (12a) should have been unacceptable but they are unexpectedly acceptable in his data. It seems that the non-identity between the alternating vowel and the following vowel makes vowel-zero alternation optional[111]. Deny's (1941) observation is important for us as he unconsciously differentiates identical following

[111] As is seen, the dative suffix may not trigger vowel-zero alternation according to Deny's (1941) data. The fact that the nuclei which are followed by their identical nuclei are more likely to be alternated with zero is observed by many in the literature. Among others, Banguoğlu (1959: 114) and Swift (1962: 34) may be seen. Note that, Deny (1941) and Swift (1962) attribute this phenomenon to the morphology, namely, they propose that the morphological properties of dative suffix block the process. Banguoğlu (1959), however, proposes that it is the non-high vowel of the dative suffix which causes this phenomenon.

vowels from non-identical following vowels in that the former have more of a tendency to trigger vowel-zero alternation than the latter[112].

Indeed, this is a cross-linguistically attested phenomenon (Kimper 2006: 12-15). The identity of neighboring vowels leads to vowel-zero alternation[113] (Kimper 2006: 16). The Turkish case can also be explained with a similar approach. On the other hand, there seems to be no need for a complete identity between neighboring vowels. It can be said that the alternation site and the two neighboring nuclei have to share the element A to be sufficiently identical. That is to say, *ı* ( ), *i* (I), *u* (U) and *ü* (U.I) should not follow the alternation site. On the other hand, since *o* (A.U) and *ö* (A.U.I) cannot be available within a suffix due to the phonotactics of Turkish[114], only *a* (A) and *e* (A.I) seem to be able to follow the alternation site without blocking the vowel-zero alternation process. See the following:

(13)	(a)	*balon-a → balna* (balloon-Dat.)	'to the balloon'
		yalan-a → yalna (lie-Dat.)	'to the lie'
	(b)	*balon-u → ?balnu* (balloon-Acc.)	'the balloon (Acc.)'
		yalan-ı → ?yalnı (lie-Acc.)	'the lie (Acc.)'

[112] This observation seems to be valid also for our data. For instance, *kurum-u → kurm-u* "the association (Acc.)" seems to be more detectable than *kurum-a → kurm-a* "to the association"which includes two different vowels. However, since the frequency rate of the different forms in terms of vowel-zero alternation is beyond the scope of this thesis, this issue was not discussed in Chapter 4.

[113] Kimper (2006) states a specific constraint for that: "identical vowels in adjacent syllables are prohibited" (Kimper 2006: 15). See also Gouskova (2003: 266-269) for the relationship between identical neighboring vowels and vowel-zero alternation.

[114] It can be predicted that, nuclei including A followed by *o* or *u* might be lost in disharmonic roots but it is not easy to find such roots in Turkish: *amazon → amzon* "amazon" might be given as an example.

Both of the forms in (13a) are equally acceptable. The alternation site including A in the former includes also U whilst the one in the latter includes only A. Since both share the element A with their neighboring nuclei and the flanking consonants *l* and *n* are able to form a right-headed cluster[115], the vowels at issue may not be realized. The forms in (13b), however, are out since the alternation sites do not share A with their following nuclei. Consider the following:

(14)	*Acem-e → ?acme* (Iranian-Dat.)	'to the Iranian'
	haham-a → ?hahma (rabbi-Dat)	'to the rabbi'
	kartal-a → ?kartla (eagle-Dat.)	'to the eagle'
	*lakap-a → *lakba* (agnomen-Dat.)	'to the agnomen'
	masal-a → ?masla (tale-Dat.)	'to the tale'
	onay-a → ?onya (applause-Dat.)	'to the applause'
	*profesör-e → *profesre* (professor-Dat.)	'to the professor'
	*şeker-e → *şekre* (sugar-Dat.)	'to the sugar'

All of the following nuclei in (14) include the element A. This satisfies (11i) which states that the alternation site has to be followed by a nucleus including A. Some of the forms also satisfy (11iii) which states that the alternation site has to be preceded by a nucleus including A. For instance, the alternation site in *lakaba* "to the agnomen" is identical to its preceding nucleus. Despite these, all the forms above are

[115] Note that, there is no word ending in *ln* in Turkish but our government index given in the preceding chapter generates this cluster. In fact, the existence of the above forms confirms the government index.

ungrammatical in Turkish because (11ii), that is, the condition on the nature of the flanking consonants is violated: none of the flanking consonants are able to form a right-headed cluster in accordance with the government index proposed in 5.2.3. For example, in the form *lakaba* "to the agnomen", the flanking consonants *k* and *b* cannot form a right-headed cluster because *b* is not a good governor for *k*. The following examples present the cases where both the natures of flanking consonants and of following nuclei are suitable, but the nature of the preceding nuclei is not suitable and therefore the process does not apply:

(15)

kural-a → *?kurla* (rule-Dat.)	'to the rule'
kuşet-e → **kuşte* (couchette-Dat.)	'to the couchette'
külota → **külta* (underpants-Dat.)	'to the underpants'
pilot-a → **pilta* (pilot-Dat.)	'to the pilot'
surat-a → **surta* (face-Dat.)	'to the face'
tansiyon-a → **tansiyna* (blood pressure-Dat.)	'to the blood pressure'
viraj-a → *?virja* (bend-Dat.)	'to the bend (in a road)'
yılan-a → *?yılna* (snake-Dat.)	'to the snake'

The examples in (15) satisfy both (11i) and (11ii). Nevertheless, the preceding vowels do not share the element A with the alternation site. Since they violate (11iii), they are not acceptable. See the following acceptable examples which satisfy all of the three conditions:

(16) *ahiret-e → ahirte* 'to the future life'
(future life-Dat.)

beleş-e → belşe 'to the freebie'
(frebie-Dat.)

horon-a → horna 'to the horon'
(a folk dance-Dat.)

moloz-a → molza 'to the rubble'
(rubble-Dat.)

tören-e → törne 'to the ceremony'
(ceremony-Dat.)

vasat-a → vasta 'to the mediocre'
(mediocre-Dat.)

yalaz-a → yalza 'to the flame'
(flame-Dat.)

In (16), the flanking consonants are able to form a right-headed cluster. The following and preceding nuclei have the element A. There is no obstacle for non-realization of the nuclei including A. Therefore, all the above forms are acceptable even without nuclei including A.

This subsection clarifies that even in the absence of SIFCs, lexical vowels may not be pronounced and this lexicalization process can be predicted by a morphological or phonological environment. Before ending this section, I want to emphasize that such non-realizations are rarely observed in Turkish. On the other hand, there seems to be no phonetic difference between the non-realizations of lexical and of non-lexical vowels:

(17) (a) *alan-a → alna* 'to the area'
(area-Dat.)

yalan-a → yalna 'to the lie'
(lie-Dat.)

(b) *alın-a → alna* 'to the forehead'
(forehead-Dat.)

yalın-a → yalna 'to the bare one'
(simple-Dat.)

The only way to differentiate the alternated forms in (17a) and (17b) is to look at the contexts where they are used. In this section, it is shown that the non-realization of nuclei including A in the environment of vowel-zero alternation can be predicted in the presence of information about the natures of the flanking consonants and of the neighboring vowels. However, this phenomenon differs from the non-realization of empty nuclei in that the former is the manifestation of a lexicalization process whereas the latter is the manifestation of vowel-zero alternation. The following section will be about the remaining issues of vowel-zero alternation.

6.2. The Remaining Issues about Vowel-zero Alternation

In this section, the remaining issues relevant to vowel-zero alternation in Turkish will be discussed. Below, voicing alternations, vowel disharmony, vowel lowering, vowel reduction, stress and the so-called soft-g in the environment of vowel-zero alternation will be investigated, respectively.

6.2.1. Voicing Alternations

This subsection investigates the relationship between vowel-zero alternation and voicing alternation. In Turkish, there are two kinds of voicing alternations: stem-final alternations and suffix-initial alternations (Balcı 2006: 34)[116]:

(18) *dolap-da → dolapta, dolapda* 'in the cupboard'
(cupboard-Loc.)

*dolap-ı→ *dolapı, dolabı* 'the cupboard (Acc.)'
(cupboard-Acc.)

In the former example, the suffix-initial voiced consonant *d* may alternate with its voiceless counterpart *t* and it is the formal pronunciation. Yet, the devoicing process is not obligatory for some speakers: *dolapda* "in the cupboard" is also a possible pronunciation. In the latter example, on the other hand, there is no optionality: the stem-final voiceless consonant *p* alternates with its voiced counterpart *b*. Note that, in Turkish, all voiceless consonants are able to trigger the devoicing of the following consonant and all vowels are able to trigger the voicing of the preceding consonant[117]. See the following:

(19) *dolap-ın-a → *dolapna, dolabna* 'to his/ her cupboard'
(cupboard-Poss.3.Sg.-Dat.)

koku-dan → koktan, kokdan 'because of the smell'
(smell-Abl.)

[116] Different frameworks have different explanations for this phenomenon. Since they are not directly related to our topic, I shall not mention them. The reader is referred to Balcı (2006: 34-53).
[117] The contexts are lexically and morphologically conditioned (e.g. *dip-i → *dipi, dibi* "the bottom (Acc.)" but *ip-i → ipi, *ibi* "the rope (Acc.)"). See Tekin (1975) for details.

In (19), the expected forms **dolapna* is ungrammatical whereas *dolabna* and *kokdan* are unexpectedly grammatical. It is not difficult to explain the former case: since suffix-initial devoicing is optional in Turkish, both *koktan* "from the smell" and *kokdan* are acceptable[118]. For the latter case, on the other hand, the existence of nasals seems to be sufficient for an explanation. See the following:

(20)	*sanat-ımız → sanatımız, sanadmız* (art-Agr.1.Pl.)	'our art'
	at-ın-ı → atını, adnı (horse-Poss.3.Sg.-Acc.)	'his/ her horse (Acc.)'

There are exceptional words in (20). The stem-final segments cannot undergo voicing lexically. In spite of that, when vowel-zero alternation is realized, they undergo voicing. It is due to the existence of phonetically adjacent nasals. When there is no intervening vowel, there can be an interaction between the consonants in question. Then, the case in (19) can be accounted for by this process. See the following:

(21)	(a)	*kapı-sız → kapsız* (door-Der.)	'without door'
		kapı-lar → kaplar (door-Pl.)	'doors'
	(b)	*kapı-m-ı → kabmı* (door-Poss.1.Pl.-Acc.)	'my door (Acc.)'
		kapı-n-a → kabna (door-Poss.2.Sg.-Dat.)	'to your door'

[118] The form *kokdan* "from the smell" is certainly more common.

As seen, since the consonants following the alternation site are not nasal, there is no voicing in the alternated forms in (21a). In (21b), on the other hand, the preceding consonants undergo voicing by the phonetically adjacent nasals. To sum up, the existence of vowel-zero alternation has an influence on voicing alternations in Turkish. 6.2.2 will be about vowel-zero alternation in disharmonic words.

6.2.2. Vowel Disharmony

In this subsection, the relationship between vowel disharmony and vowel-zero alternation is investigated. In GP, vowel harmony is based on the assumption that phonological expressions are composed of elements. It is a relationship between the head of the harmonic domain and the following nuclei. Some elements in the head of the harmonic domain spread into the segments in the harmonic domain. Then, the two well-known vowel harmonies of Turkish, front harmony and roundness harmony can just be defined as I-spreading and U-spreading, respectively (Charette and Göksel 1996: 9). Charette and Göksel (1996) clearly show that the element I can spread into both lexically filled and empty nuclei whilst the element U can spread only into empty nuclei in Turkish. The element A, on the other hand, cannot spread into anywhere. See the following:

(22)	*/kapø/*	*[kapı]*	‘door’
	/koyø/	*[koyu]*	‘dark’
	/yürAk/	*[yürek]*	‘heart’

As seen in (22), A cannot spread into the empty nucleus whereas U and I can. In *kapı* "door", the element A cannot spread into the empty nucleus and *ɪ* ( ) surfaces since there is no context for spreading[119]. In *koyu* "dark", the element A again cannot spread whilst the element U can spread into the empty nucleus. In *yürek* "heart", on the other hand, the element U cannot spread into the element A but the element I can spread. On the other hand, in Turkish, roots do not necessarily have to be harmonic. While some of the roots are harmonic like the ones above, some of them are not:

(23) *kavun* 'muskmelon'

vakit 'appointed time'

There are two ways of explaining this kind of data: either the lexical appearances of U and I in certain roots are accepted, that is, such disharmonic nuclei are evaluated as non-empty nuclei, or another source for the appearances of these elements is sought for. This source is element sharing. Onsets are assumed to share the elements I and U with the nuclei[120]. Accordingly, in the absence of spreading, the empty nucleus can still have the elements I and U. Following the current literature (among others, Clements and Sezer 1982, Balcı 2006, Charette 2008), I prefer this latter approach since it can also be used for the disharmony in the suffixation process.

Swift (1962) points out that when there is a vowel-zero alternation process, the following vowel in the suffix is determined by the alternating vowel (Swift 1962:

[119] The existence of such forms is a problematic issue for GP. The vowel *ɪ* ( ) does not include any of A, U and I. Hence, its appearance cannot be lexical theoretically. Then, what makes *ɪ* phonetically realized in a word like */kapø/ kapı* "door" is the question. The reader is referred to Charette (2004, 2008) and Denwood (2006) for a detailed discussion.

[120] Importantly, I assume that all the consonants in Turkish -including the labials (e.g. *kavim-i* → *kavmi* "the tribe (Acc.)") which do not like palatalization- can be palatalized.

32). It means that the alternating vowel still has its effect on vowel harmony even though it does not exist at surface. See the following:

(24) *akis-i → aksi, *aksı* 'its opposite'
(opposite-Poss.3.Sg.)

According to Swift (1962), the fact that the suffixed form is pronounced like *aks*i "its opposite" but not like **aksı* which is the expected and required pronunciation according to vowel harmony is an indication of the permanent influence of the alternation site[121] (Swift 1962: 33). However, this claim can easily be refuted by assuming that it is the palatalized consonants which make the word disharmonic. See the following:

(25) *kalp-i → kalbi* 'the heart (Acc.)'
(heart-Acc.)

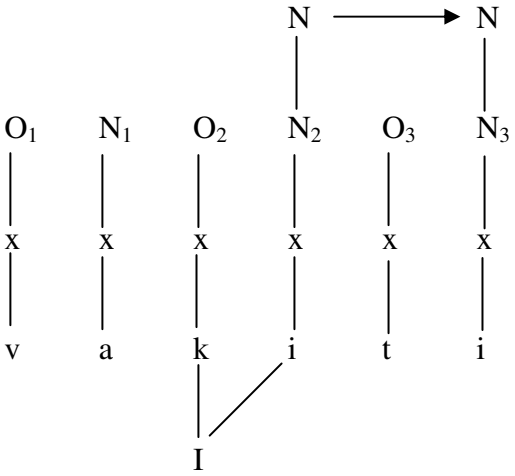
kalp-ı → kalpı 'the counterfeit one (Acc.)' (Clements and Sezer 1982: 237).
(counterfeit-Acc.)

In the first example, the consonant *l* is palatalized and it makes the following nucleus disharmonic. However, in the second example, since there is no palatalized consonant, the following nucleus is realized in accordance with vowel harmony (Clements and Sezer 1982: 236-239)[122]. Following Denwood (1997b), Balcı (2006) also accounts for the vowel disharmony by the palatalized consonants within GP. According to his analysis, as a lexical property, consonants may have a shared I-operator with the following nucleus in their elemental composition and there may be

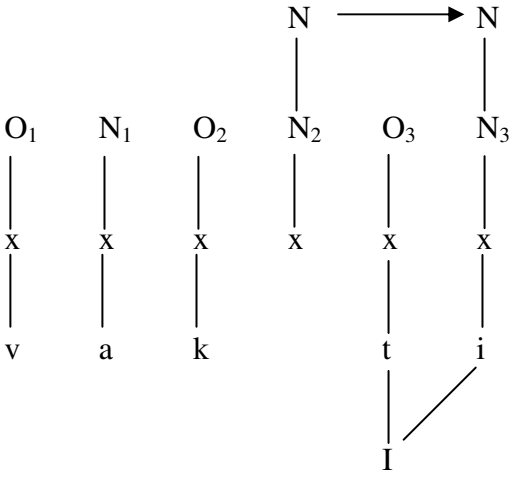
[121] As can be remembered from Chapter 2, Foster (1969) uses similar data to assert that the existence of insertion cannot be proposed for such cases due to the existence of disharmony.
[122] See Parker (1997) for the summary of approaches to this problem (Parker 1997: 75-81)

an inter-dependent relationship between the onset and the nucleus[123]. That is to say, it is not the case that the nucleus palatalizes the onset or vice versa. An onset and a nucleus share the element I (Balcı 2006: 141-142). In that sense, the assumed influence of alternating vowels can also be accounted for by palatalized consonants. See the following representations (→ stands for spreading):

(26) (a) *vakiti* 'the appointed time (Acc.)'



(b) *vakti* 'the appointed time (Acc.)'



[123] They are, however, different from true palatals which contain an I-head. Note also that, he assumes an extra position for sharing. Following Haworth (1994) and Charette (1998), he calls these categories pseudo-empty nuclei. See Balcı (2006: 147-151) for details.

In (26a), there is no vowel-zero alternation: O_2 and the phonetically realized empty nucleus N_2 have to share the element I. Since N_2 is dominated by the element I, it can, as the new domain head, spread the element I into the following nucleus. In (26b), on the other hand, N_2 is alternated with zero by proper government. In that case, N_3 which shares I with its preceding onset is the head of the domain and N_2 does not even have the chance to share melody with an adjacent consonant. In this subsection, vowel disharmony is evaluated in terms of its relation with vowel-zero alternation. The next subsection will be about vowel lowering in the environment of vowel-zero alternation.

6.2.3. Vowel Lowering

This subsection is about the cases where vowel-zero alternation applies in the environment of the segment *e*. There is a difference between the initial vowels in the words *ver* "give" and *verir* "he/ she gives". In Turkish, the segment *e* is lowered before *m, n, r* and *l* if there is no following vowel after these consonants. It alternates with *ɛ* in such situations. See the following examples from Kornfilt (1997):

(27) *gel* *[gɛl]* 'come'

gel-di *[gɛldi]* 'He/ she came'
(come-Past)

gel-ir *[gelir]* 'He/ she comes' (Kornfilt 1997: 512)
(come-Aor.)

As is seen, *e* and *ɛ* are in a complementary distribution in Turkish. However, there are also cases where both *e* and *ɛ* might optionally be used:

(28) *yem ~ yɛm* ‘fodder’

Zerrin ~ Zɛrrin ‘name of a woman’

For these words, the unusual forms without vowel lowering, *yem* and *Zerrin* are actually more common. A similar case is also observed when vowel-zero alternation applies:

(29) *deli-r-ir → dɛlrir, delrir* ‘he/ she goes crazy’
(crazy-Der.-Aor.)

gel-iş-ir → gɛlşir, gelşir ‘It develops’
(come-Der.-Aor.)

ver-ir-im → vɛrrim, verrim ‘I give’
(give-Aor.-Agr.1.Sg.)

In (29), the preferred forms are again the ones without vowel-lowering, that is, *delrir* “he/ she goes crazy”, *gelşir* “it develops” and *verrim* “I give”. Vowel lowering may also apply although this is not commonly observed. The next subsection will be about vowel reduction.

6.2.4. Vowel Reduction

This section focuses on the vowel reduction process. Vowel-zero alternation and vowel reduction can be observed in identical environments cross-linguistically[124]. Vowel reduction can and may be available in alternation sites in Turkish:

[124] In Harris’ (1997) words, “vowel reduction to schwa and vowel syncope are the two sides of the same coin” (Harris 1997: 361).

(30) (a) *balon-a → balna, baluna* 'to the balloon'
(balloon-Dat.)

yalan-a → yalna, yalına 'to the lie'
(lie-Dat.)

(b) *balon-u → ?balnu, balunu* 'the balloon (Acc.)'
(balloon-Acc.)

yalan-ı → ?yalnı, yalını 'the lie (Acc.)'
(lie-Acc.)

As is seen, in (30a), both vowel-zero alternation and vowel reduction may be applied whereas only vowel-reduction can work in (30b). In Turkish, the element A in the alternation sites may also be removed wherever the vowel-zero alternation cannot apply. In such cases, there remains a phonetic content to utter. See the following:

(31) *ahiret-i → ?ahirti, ahiriti* 'the future life (Acc.)'
(future life-Acc.)

*al-ma-yan → *almyan, almıyan* 'The one who does not take'
(take-Neg.-Sbj.P.)

ana-lar → ?anlar, anılar 'mothers'
(mother-Pl.)

*düzen-e → *düzne, düzine* 'to the system'
(system-Dat.)

kalan-ı → ?kalnı, kalını 'the remaining one (Acc.)'
(remaining-Acc.)

kontör-e → ?kontre, kontüre 'to the subscriber's meter'
(meter-Dat.)

merkez-i → ?merkzi, merkizi 'the center (Acc.)'
(center-Acc.)

oran-ı → ?ornı, orını 'the proportion (Acc.)'
(proportion-Acc.)

Vowel-zero alternation fails to apply in these forms as discussed in 6.1.2. On the other hand, these forms can and may undergo vowel reduction. Their alternation sites

can be uttered without the element A. If there are elements other than A in the alternation site, only these elements are uttered. For example, in *ahireti* "the future life (Acc.)" the vowel *e* (A.I) can be uttered as *i* (I) after A is reduced from the structure and in *tümöre* "to the tumor" the vowel *ö* (A.U.I) can be pronounced as *ü* (U.I) in the absence of A. If there is no element other than A, however, the alternation site is uttered simply as *ı* ( ) in the absence of the elements A, I and U. As an example, the vowel *a* in *suratı* "the face (Acc.)" can be uttered as in *surıtı*.

It should be noted that neither vowel-zero alternation nor vowel reduction can apply if the alternation site is stressed:

(32) *sebéb-im* → **sebíbim* 'I am the cause of it'
(cause-Cop.1.Sg.)

In this subsection, vowel reduction phenomena in the environment of vowel-zero alternation are briefly mentioned. Like the previous subsection, this subsection presents only observations. The analysis of the phenomenon is left for the further studies. 6.2.5 will focus on the stressed vowels in the alternation site.

6.2.5. Stress

The place of stress is an important factor in the vowel-zero alternation process because the stressed vowels normally do not alternate with zero. As mentioned in Chapter 1, stressed vowels resist vowel-zero alternation cross-linguistically. However, there are languages that allow stressed vowels to alternate with zero in limited environments. Among those, Mussau, a language spoken in Melanesia, allows the vowel-zero alternation of stressed vowels only between SIFCs:

(33) *gorúru → górru* ‘edible green seaweed’

makíkile → mákkile ‘sour’

mumúmu → múmmu ‘to suck’

rarárasa → rárrasa ‘saw grass’ (Blust 2001: 144)

As is seen, the stressed vowels alternate with zero between SIFCs. In that sense, vowel-zero alternations between identical consonants are not only permitted but also needed in Mussau[125] (Blust 2001: 145). In Turkish, this is exactly the case: stressed vowels can be alternated with zero only if they are between SIFCs. Below, I first mention the place of stress and its influence on the vowel-zero alternation process. I discuss the possibility that the pre-stressing suffixes combine with the roots analytically in Turkish. Then, I indicate how the SIFCs procure the stressed vowels to be alternated with zero.

For Turkish, at first glance, the place of stress does not seem to be a problem for vowel-zero alternation because most roots in Turkish are stressable on the final syllable (Lees 1961: 41, Göksel and Kerslake 2005: 26). That is to say, stress is usually not on the alternation site which has to be followed by a nucleus as in *burunú ~ burnú* “nose (Acc.)”. However, the story is not that simple. There are irregular cases. Clitics and certain suffixes do not take stress on themselves in Turkish[126]. Recall Göksel and Kerslake’s (2005) examples from Chapter 2:

(34) *nehir-im → nehrím* ‘my river’
(river-Poss.1.Sg.)

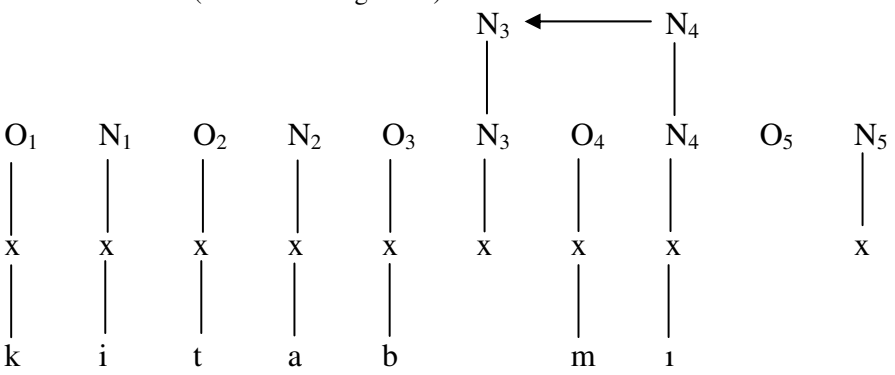
[125] In fact, the Mussau case is expected according to Odden’s (1988) configurations given in (6). There are also languages in which vowel-loss is triggered by the identity of flanking consonants. For example, in Crimean Tatar, the form *soğan-ı́-n* “his/ her onion (Acc.)” can be pronounced as *soğán* without the stressed nucleus *ı* which is surrounded by identical consonants and its following onset *n* (Kavitskaya 2004: 168). See Kavitskaya (2004) for a detailed analysis.

[126] These exceptional ones are listed by many. One may see Inkelas (1999: 150) or Özsoy (2004: 60-61) for example.

nehir-im → **néhrim* ‘I am a river’ (Göksel and Kerslake
(river-Cop.1.Sg.)
2005: 19).

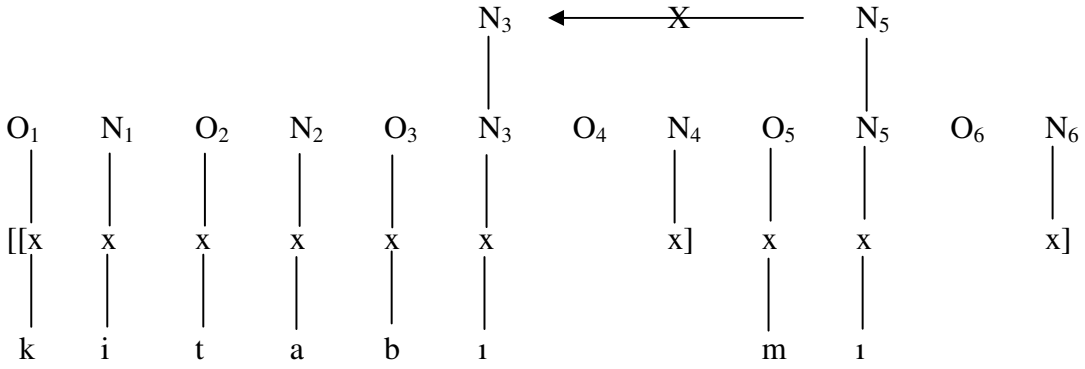
As was mentioned in Chapter 2, the first person singular copula in the latter example is unstressable in Turkish. It is a clitic and it assigns the stress to the previous vowel[127]. This seems to be the reason for the fact that, **néhrim* “I am a river” is ungrammatical in Turkish. In the former, however, since the alternation site is not stressed, it can remain silent. From a GP point of view, the difference between the two suffixes may be explained by analytic morphology: the possessive suffix in the former example combines with the root non-analytically, whereas the copula in the latter combines with the root analytically. See the following representations for clarity:

(35) (a) *kitab-ım-ı* → *[kitabømí_ø]* ‘my book (Acc.)’
(book-Poss.1.Sg.-Acc.)



[127] There are two main ways of analysing irregular stress in Turkish. Inkelas (1999) assumes that there are underlyingly stressed and pre-stressing suffixes (Inkelas 1999: 163). According to Kabak and Vogel (2001), however, the “phonological word” which consists of a root and suffixes but not the unstressable suffixes is the determining factor: the stress is always on the final syllable of the phonological word.

(b) *kitab-ı-mı → [[kitabı́_ø]mı_ø]* ‘The book (Acc.)?’
(book-Acc.-Q.)



There is a difference between the forms in (35a) and (35b) with respect to their domains. Since the question particle *–mI* combines with the stem *kitabı* “the book (Acc.)” analytically in (35b), a governing relation between N_5 and N_3 is not possible over the inner domain. However, in (35a), there is no such blockage for proper government because and the accusative suffix *ı* and the stem *kitabım* “my book” combine non-analytically and there is no inner-domain which blocks the proper government between N_4 and N_3. In (35b), the position which cannot be properly governed stays stressed. The crucial point in this analysis is that the stressed nucleus cannot be properly governed not because it is stressed but because it is not licensed in the inner domain. Therefore, stress is completely irrelevant. According to this analysis, the analytic suffixes which are all interestingly pre-stressing render vowel-zero alternation impossible.

On the other hand, if the flanking consonants are sufficiently identical, the alternation site can be alternated with zero despite the presence of the assumed analytic domains. See the following:

(36) *büy-ǘyor → bǘyyor* ‘He/ she is grow up’
(grow-Prog.)

gemí-mi → gémmi (ship-Q.)	'Is it a ship?'
gönder-ír-im → göndérrim (send-Aor.-Agr.1.Sg.)	'I send'
hafíf-im → háffim (light-Cop.1.Sg.)	'I am light'
iyí-yim → íyyim (good-Cop.1.Sg.)	'I am good'
kapalı́lar → kapállar (closed-Cop.3.Pl.)	'They are closed'
korú-r-um → kórrum (protect-Aor.-Agr.1.Sg.)	'I protect it'
lezíz-im → lézzim (delicious-Cop.1.Sg.)	'I am delicious'
on-ún-um → ónnum (3.Pronoun-Gen.3.Sg.-Cop.1.Sg.)	'I belong to him/ her'
yara-sı́z-ım → yarássım or *yaraszım* (wound-Der.-Abl.)	'I am unwounded'

As seen, the rightmost vowels are not stressed. However, the alternation sites may not be pronounced in between SIFCs. Then, as in 6.1.1.4, it can again be assumed that there is a certain kind of consonant interaction between SIFCs and this relation needs to be government-licensed by a following vowel. This time, it is also in accordance with the phonological ECP because these nuclei are empty unlike the nuclei including A. However, this explanation invalidates the above proposal about inner domains: if pre-stressing suffixes combine with the roots analytically, such relations cannot be formed over the inner domain. Then, this hypothesis needs to be revised[128]. For now, it can be accepted that like other suffixes in Turkish, pre-stressing suffixes combine with the roots non-analytically and stressed vowels

[128] There is also another problem for this analysis: if the copula attaches analytically, then there should also be *[[kitabø]_ømø]* "I am a book". Hence, the segment *b*, as a domain-final consonant, should be devoiced as in **kitapım* according to the devoicing pattern in Turkish but this is not the case. It also shows that it is not easy to claim that pre-stressing suffixes are analytically combine with the stems. See also 6.2.1 for voicing alternations in Turkish.

"somehow" resist vowel-zero alternation. Certainly, further research is needed to account for the relationship between stress and vowel-zero alternation. The following subsection will investigate the cases in which there is a soft-g in the environment of vowel-zero alternation.

6.2.6. So-called Soft-g

In this section, a phonetically null phonological segment, the so-called soft-g, *ğ* will be explored in terms of its effects on the vowel-zero alternation process[129]. Below, first, the fact that the existence of this segment in the environment of vowel-zero alternation does not block the process will be revealed. Second, the fact that compensatory lengthening does not block the process will be discussed.

6.2.6.1. Soft-g Preceding the Alternation Site

It is well-known that soft-g is just a remnant of hard-g historically[130]. However, the segment hard-*g* is still available in modern Standard Turkish. See the examples:

(37)	*dogma*	'dogma'
	damga	'official seal'

[129] Very roughly, suffixes surface as if there is a word-final consonant (e.g. *dağ-sı → *[dası], [daı]* "his /her mountain). See Lees (1961) and Sezer (1986) for a detailed discussion. Also note that, although it is phonetically null in modern Standard Turkish, it is pronounced as a voiced velar fricative /ɣ/ in some dialects (Göksel and Kerslake 2005: 7).

[130] In modern Standard Turkish, there are two segments symbolized by the letter *g*: the voiced velar stop */g/* usually appears in the environment of back vowels and the voiced palatal stop /ɟ/ usually appears in the environment of front vowels. Note that /ɟ/ may also appear in the environment of back vowels in certain cases as in *gavur* "infidel". That is, these two segments are not in a complementary distribution. Note also that both the soft-g and the hard-g were spelt with the same letter in Arabic Turkish alphabet. On the other hand, there were two letters to differentiate the voiced velar stop */g/* and the voiced palatal stop /ɟ/.

ga:zi	'war veteran'
psikolog	'psychologist'
yoga	'yoga'

As is seen in (37), the segment *g* can exist in any position. On the other hand, although they are commonly observed in certain dialects, it is very difficult to find examples with *g* except in word-initial positions (e.g. *ga:zi* "war veteran") and post-coda positions (e.g. *damga* "official seal") in modern Standard Turkish[131]. With some exceptions, the non-initial *g* in old Turkish is either phonetically null or interpreted as *k* in modern Standard Turkish. More explicitly, it is null in the word-final positions of monosyllabic words, in inter-vocalic positions and in coda positions while it is interpreted as *k* in word-final positions of polysyllabic words[132].

As Lees (1961) stressed, the soft-g has a tendency to reduce to vowel length or to zero (Lees 1961: 8). See the following:

(38)	(a)	*ağaç*	*[a:ç]*[133]	'tree'
		soğan	*[soan]*	'onion'
	(b)	*dağ*	*[da:]*	'mountain'

[131] See Scheer (2004: 119) for the special properties of word-initial and post-coda positions. They resist phonetic changes cross-linguistically. As can be inferred from the examples, *g* in other positions occur usually with recent words.

[132] As can be remembered from 5.1, phonetically empty onset positions block vowel-zero alternation in accordance with the phonological ECP (e.g. *kemik-i* → **kemki, kemii* "the bone (Acc.)"). In that sense, the existence of soft-g would be a morphological blockage for vowel-zero alternation. However, since there is no word-final soft-g in polysyllabic words, it is not possible for soft-g to follow the alternation site. In other words, there is no case of CvğV or CCvğV because of a lexical gap in Turkish.

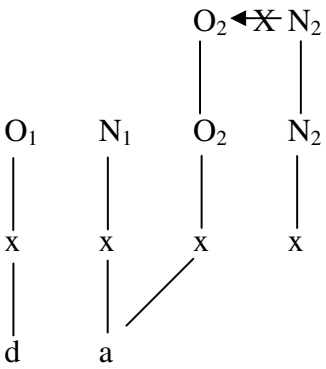
[133] There is no phonetic difference between regular long vowels and this kind of "pseudo" long vowels which stem from compensatory lengthening. Nevertheless, phonetically identical objects may have different phonologies (Scheer 2004: 469). Certain phonological differences between pseudo long vowels and regular long vowels as regards the vowel harmony have already been shown in detail in İskender (2007a).

düğme *[dü:me]* ‘button’

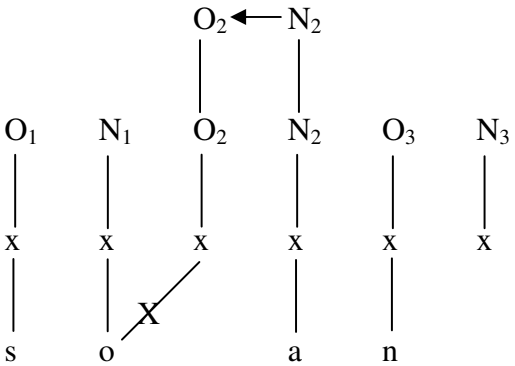
In (38a), the soft-g does not have any phonetic impact on the structure in inter-vocalic positions. In *ağaç* “tree”, it is just not available, therefore the two identical vowels which are structurally non-adjacent can form a long vowel. In *soğan* “onion”, on the other hand, although soft-g has again no phonetic content, the two different vowels *o* and *a* cannot form a long vowel.

In (39b), however, although it does not have any phonetic content, soft-g seems to require some phonetic change on the preceding nucleus. It causes compensatory lengthening both in *dağ* “mountain” in word-final position and in *düğme* “button” in coda position. See the following representations:

(39) (a) *dağ* *[da:]* ‘mountain’



(b) *soğan* *[soan]* ‘onion’



In (39a), N_2, as a domain final empty nucleus, is phonetically empty and it cannot govern O_2. Thus, the soft-g can make the preceding vowel longer. In (39b), however, N_2 is phonetically interpreted and it can govern O_2. Since O_2 is properly governed, it cannot make the preceding vowel longer. Now, see the fol1lowing:

(40) *ağız-ı → ağzı* ‘the mouth (Acc.)’
(mouth-Acc,)

eğin-i → eğni ‘the dorsal side (Acc.)’
(dorsal side-Acc.)

As can be remembered from Chapter 2, many grammars take such forms as regular examples of vowel-zero alternation. However, since soft-g has no phonetic interpretation, these cannot simply be taken as ordinary cases. First see the phonetic representations of the above roots:

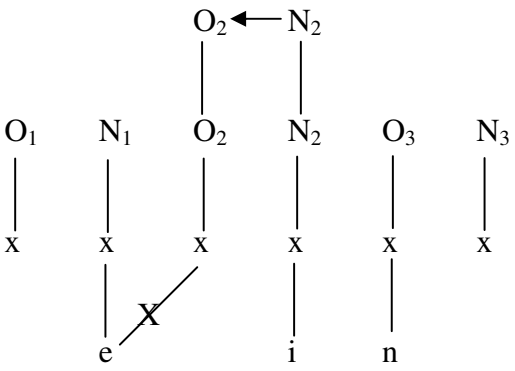
(41) *ağız* *[aız], [a:z]* ‘mouth’

eğin *[ein], *[e:n]* ‘dorsal side’

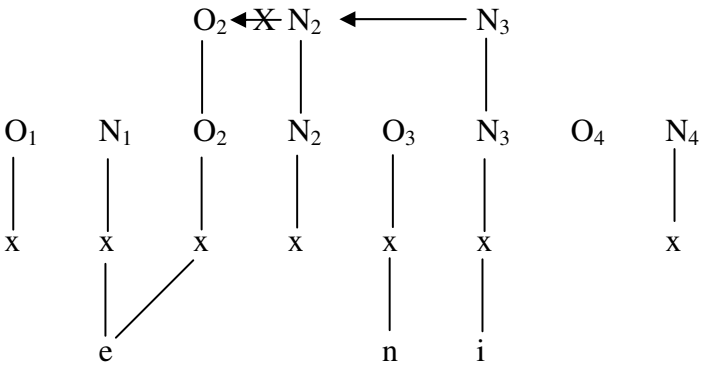
For the former word, because vowel assimilation is possible between *a* and *ı*, there is an optional pronunciation, *[a:z]*, whereas for the latter, there is only one possible pronunciation. Since there are people whose pronunciations are like *[a:z]* “mouth” already as a result of what is called vowel assimilation (Sezer 1986: 244), it cannot be possible to know whether the form *[a:zı]* “the mouth (Acc.)” is a result of vowel-zero alternation or vowel assimilation. However, forms like *[ein]* “dorsal side” which can never be pronounced like **[e:n]* provide us with a good sample to test whether there is really vowel-zero alternation or not. Logically, vowel-zero alternation should make the leftmost vowel longer in *[eini]* “the dorsal side (Acc.)” since when the

alternation site is properly governed, the soft-g, as an ungoverned segment, could make the preceding vowel longer. Actually, this prediction is borne out:

(42) (a) *eğin* *[ein]* 'dorsal side'



(b) *eğini* *[e:ni]* 'the dorsal side (Acc.)'



The existence of *[e:ni]* "the dorsal side (Acc.)" clearly shows that it must be vowel-zero alternation which makes the *e* longer in the absence of vowel assimilation. In (42b), in contrast to (42a), N_2 cannot govern O_2 since it is already properly governed by N_3. O_2, as an ungoverned onset, can make *e* longer. The next sub-subsection shows that the lengthening that the soft-g leads to does not block vowel-zero alternation either.

6.2.6.2. Compensatory Lengthening

As discussed in detail in 4.2.4.2, the length of the vowel preceding the alternation site blocks vowel-zero alternation in Turkish.

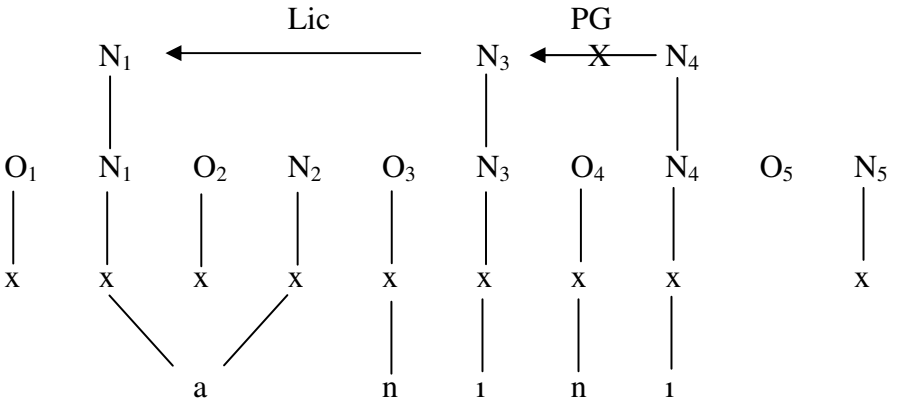
(43)	*a:lim-e* → **a:lme, a:lim-e* (scholar-Dat.)	'to the scholar'
	ca:hil-e → **ca:hle, ca:hile* (ignorant-Dat.)	'to the ignorant'

Forms like the ones in (43) cannot undergo vowel-zero alternation in Turkish. This accounts for the fact that despite the absence of a government-licenser, forms with compensatory lengthening like **a:ç* "tree" are grammatical whereas forms with regular lengthening like **a:n* "instant" are out. This observation allows us to predict that vowel-zero alternation should be possible after such pseudo long vowels which stem from compensatory lengthening. In fact, this is the case:

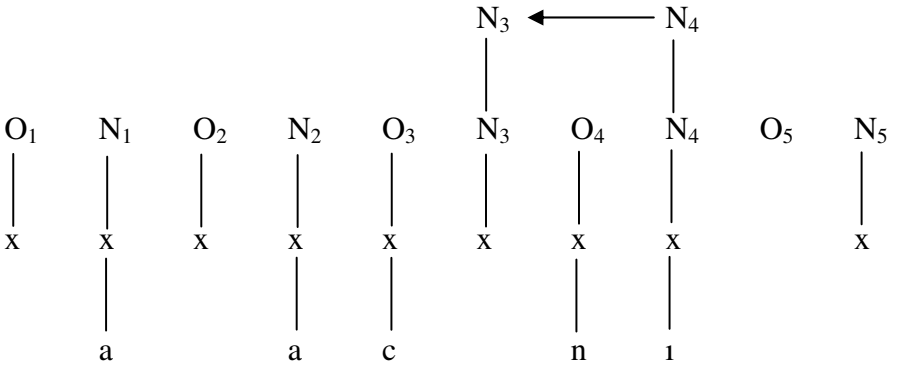
(44)	*ağaç-ın-ı* → *[a:cnı]* (tree-Poss.-Acc.)	'his/ her tree (Acc.)'
	çağır-dı-m → *[ça:rdım]* (call-Past-Agr.1.Sg.)	'I called him/ her'

As is seen, both of the forms are acceptable although the alternation sites are preceded by phonetically long vowels. See the following representations

(45) (a) *a:n-ın-ı → *a:nnı, a:nını* 'his/ her instant (Acc.)'



(b) *ağaç-ın-ı → [a:cnı]* 'his/ her tree (Acc.)'



Although both of the forms in (46), **a:nnı* "his/ her instant (Acc.)" and *a:cnı* "his/ her tree (Acc.)" are phonetically similar, the former is ungrammatical whereas the latter is perfectly grammatical. It is because their phonological structures are different. In (46a), a government-licenser is needed for the lengthening process. In accordance with Yoshida's (1993) extended Government-licensing Principle, for N_1 to govern N_2, it has to be government-licensed by the following nucleus N_3. On the other hand, N_4 cannot properly govern N_3 because N_3 has a significant function in the structure[134]. That is the case for regular lengthening in Turkish.

However, there is no need for government-licensing in compensatory lengthening. In (46b), since there are two identical vowels in different positions,

[134] Remember that this is a parametric choice. In Yawelmani, for example, it is the proper government which applies not the government-licensing. See 4.2.4.2 for details.

there is no need for a government-licenser. The phonetic absence of soft-g renders the identical vowels phonetically adjacent and leads to lengthening. Vowel-zero alternation, on the other hand, can apply without any problem. In this subsection, soft-g in the environment of vowel-zero alternation and its effects are investigated. It is indicated that vowel-zero alternation is possible with both the preceding soft-g and the preceding long vowels created by the soft-g.

This final chapter has focused on certain relevant issues as regards the vowel-zero alternation process in Turkish. It has been shown that nuclei with A, that is, lexically filled nuclei, may get lost and this loss process is predictable. Also, the six remaining issues which are voicing alternations, vowel disharmony, vowel lowering, vowel reduction, stress and the so-called soft-g in the environment of vowel-zero alternation have been discussed.

CHAPTER 7

CONCLUSION

7.1. Summary

In this thesis, vowel-zero alternation in modern Standard Turkish has been investigated empirically and theoretically. This study has aimed to offer a unified account of the vowel-zero alternation process within the GP framework. It has been shown that vowel-zero alternations are more common than generally assumed and it has become clear that it is the phonological environment which makes vowel-zero alternation possible. From a wider perspective, this study differs from previous proposals on the realization of the vowel-zero alternation process in Turkish by proposing the following:

(1) (i) Vowel-zero alternation is an optional process.

(ii) The words that undergo vowel-zero alternation are phonologically determined.

Vowel-zero alternation is a well-known and generally accepted phenomenon in Turkish. First, it is asserted by grammars of Turkish that it is an obligatory process in Turkish. And second, it is argued that the alternated examples are restricted by

lexical information (e.g. Deny 1941: 145, Lees 1961: 38). For example, according to the dictionaries and the current work in the literature, the word *koyun* "bosom" has to undergo vowel-zero alternation whenever the required conditions are satisfied whereas its phonetically identical counterpart *koyun* "sheep" can never undergo vowel-zero alternation. These two statements are invalidated by our data. This implies that the assumed difference between certain words is related to frequency, not to lexical information. As discussed in Chapter 4, the conditions underlying the new data are predicted by GP.

This thesis has elaborated on the phonological environment which is needed for vowel-zero alternation. The first question which naturally arises in discussing the phonological context is which constraints are influential on the realization of the process. There are three constraints that have to be taken into consideration to predict vowel-zero alternations in Turkish:

(2) (i) The phonological ECP

(ii) The nature of the alternating vowel

(iii) The nature of the flanking consonants

If all the conditions that these three constraints require are satisfied, any word in Turkish may optionally undergo vowel-zero alternation. In conclusion, the main contribution that this thesis makes to the study of phonology is an empirical and theoretical reanalysis of vowel-zero alternation in Turkish.

7.2. Open Issues for Further Research

In this thesis, I discuss some topics which are - directly or indirectly – related to vowel-zero alternation in Turkish. However, there are of course issues that this work has ignored, though they are probably very significant. In this section, three main issues which are left open for further studies are briefly mentioned.

Firstly, three different tendencies among speakers seem to be available with respect to vowel-zero alternation. According to our data, vowel-zero alternation is a common and certainly an optional phenomenon in spoken language. The same word can be pronounced in both its alternated and non-alternated forms even in the same sentence. Nonetheless, certain speakers seem to have certain tendencies. Although even the pronunciations of the most "careful" speakers may exhibit unexpected features, there are obviously speakers whose speech patterns reflect the rules in classical grammar books and dictionaries. On the other hand, beside this documented one, there seem to be two other tendencies in modern Standard Turkish. Some speakers prefer to alternate vowels with zero as much as the phonological environment permits them whereas some others always tend to articulate them. Part of the observation depends on the data but the question of how these three tendencies can be described is beyond the scope of this thesis. Since my data consist only of certain subjects' speeches and TV recordings, I am not able to determine the dialectal differences in the absence of statistical information.

Secondly, in this thesis, it has been argued that with respect to vowel-zero alternation, there is no lexical difference between words. However, insofar as I was able to observe, there is a clear frequency difference between the pronunciations of certain words. The dative form of the word *koyun* "bosom", for instance, is mostly

pronounced as *koyna* “to the bosom” rather than as *koyuna*, whereas the dative form of its phonetically identical counterpart *koyun* “sheep” is generally preferred to be pronounced as *koyuna* “to the sheep” rather than as *koyna*. Such frequency differences in different pronunciations of the same lexical items might be related to several reasons such as the semantics of the words (as Foster (1969) claims), word frequency and the educational background of the speakers, or the answer might be totally different.

The third issue which was not addressed in this study is about the vowel-zero alternations across word boundaries. This study has only investigated vowel-zero alternations within grammatical words. However, the phenomenon is more complex as can be inferred from the examples in (3):

(3)	*adam-ın araba-sı → adamnarabası* (man-Gen.3.Sg. car-Poss.3.Sg.)	‘man’s car’
	karar anı → karranı (decision moment-Poss.3.Sg.)	‘decision moment’
	keyif için → keyfiçin (exhilaration for)	‘for exhilaration’
	söz-üm on-a → sözmona (word-Poss.1.Sg.-3. Pronoun-Dat.)	‘as though’

As seen in the above examples, in the absence of a proper governor in the grammatical words at issue, vowel-zero alternation can still apply. However, satisfying the phonological conditions for vowel-zero alternation in grammatical words might not be sufficient for vowel-zero alternation to be realized across word boundaries. The phonological conditions seem to be more restricted for such vowel-zero alternations. Also, the conditions for vowel-zero alternation in different syntactic categories (e.g. across an adverb and a verb) must be explored, particularly

since different syntactic categories may behave differently as regards vowel-zero alternation (Inkelas and Zec 1995: 535-539, Charette, Göksel and Şener 2007). More data are needed to answer these questions, for sure.

It is clear that there are more possible questions on the topic than have been raised in this thesis. These and probably some other issues related to vowel-zero alternation remain open for further research because they exceed the scope of this study. It is hoped that this thesis will give a perspective for further studies.

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APPENDICES

Appendix A

Words That Undergo Vowel-zero Alternation According to Dictionaries[135]

Nominative	Accusative	
aciz	*aczi*	'helplessness'
adil	*adli*	'justice'
ağız	*ağzı*	'mouth'
ahit	*ahdi*	'oath'
ahiz	*ahzi*	'acceptance'
akıl	*aklı*	'intelligence'
akis	*aksi*	'opposite'
akit	*akdi*	'treaty'
alın	*alnı*	'forehead'
asıl	*aslı*	'origin'
asır	*asrı*	'century'
aşir	*aşri*	'ten verses in the Quran'

[135] This list includes only orthographical forms. There are also recent borrowings like *komünizm* "communism" and *guatr "goiter" which are written as if there are domain-final clusters but always pronounced with an intervening vowel as in komünizim and guatır*. These words are also accepted to undergo vowel-zero alternation.

atıf	*atfı*	‘reference’
avuç	*avcu*	‘hollow of the hand’
ayıp	*aybı*	‘shame’
azil	*azli*	‘dismissal’
azim	*azmi*	‘determination’
bağır	*bağrı*	‘breast’
bahir	*bahri*	‘sea’
bahis	*bahsi*	‘wager’
bahiş	*bahşi*	‘grant’
batın	*batnı*	‘abdominal region’
bedir	*bedri*	‘full moon’
beniz	*benzi*	‘color of face’
bevil	*bevli*	‘urine’
beyin	*beyni*	‘brain’
beyit	*beyti*	‘couplet’
bezir	*bezri*	‘seed’
boyun	*boynu*	‘neck’
böğür	*böğrü*	‘flank’
burun	*burnu*	‘nose’
cebir	*cebri*	‘force’
cehil	*cehli*	‘ignorance’
cehir	*cehri*	‘loud’
cehit	*cehdi*	‘effort’
cevir	*cevri*	‘oppression’
cisim	*cismi*	‘substance’

cürüm	*cürmü*	‘crime’
çiğin	*çiğni*	‘the upper part of the shoulder’
dahil	*dahli*	‘connection’
defin	*defni*	‘burial’
devir	*devri*	‘epoch’
ecir	*ecri*	‘recompense’
eğin	*eğni*	‘dorsal side’
ehil	*ehli*	‘qualified’
emir	*emri*	‘order’
fasıl	*faslı*	‘phase’
fecir	*fecri*	‘dawn’
fehim	*fehmi*	‘grasp’
fesih	*feshi*	‘annulment’
fetih	*fethi*	‘conquest’
fevir	*fevri*	‘hurry’
feyiz	*feyzi*	‘abundance’
fıkıh	*fıkhı*	‘Muslim jurisprudence’
fikir	*fikri*	‘idea’
firavun	*firavnu*	‘pharaoh’
fuhuş	*fuhşu*	‘prostitution’
gadir	*gadri*	‘wrong’
gasil	*gasli*	‘washing of the dead’
geniz	*genzi*	‘nasal fossa’
göğüs	*göğsü*	‘chest’
gönül	*gönlü*	‘heart’

gusül	*guslü*	‘ablution’
hacim	*hacmi*	‘volume’
hacir	*hacri*	‘putting under restraint’
haciz	*haczi*	‘distraint’
hamil	*hamli*	‘load’
hapis	*hapsi*	‘prison’
hasım	*hasmı*	‘adversary’
hasir	*hasri*	‘restriction’
haşir	*haşri*	‘Resurrection Day’
hatır	*hatrı*	‘sake’
hatim	*hatmi*	‘recitation of the whole Quran’
havuz	*havzu*	‘pool’
hayıf	*hayfı*	‘pity’
hayır	*hayrı*	‘goodness’
hazıf	*hazfı*	‘elision’
hazım	*hazmı*	‘digestion’
hezil	*hezli*	‘jest’
hıfız	*hıfzı*	‘protection’
hısım	*hısmı*	‘kin’
hışım	*hışmı*	‘rage’
hiciv	*hicvi*	‘satirizing’
hilim	*hilmi*	‘docility’
hizip	*hizbi*	‘clique’
humus	*humsu*	‘a meal with chickpea’
hüküm	*hükmü*	‘sentence in law’

hüsün	*hüsnü*	‘beauty’
hüzün	*hüznü*	‘melancholy’
ıtır	*ıtrı*	‘perfume’
ilim	*ilmi*	‘knowledge’
isim	*ismi*	‘name’
izin	*izni*	‘permission’
kabız	*kabzı*	‘constipation’
kabir	*kabri*	‘grave’
kadir	*kadri*	‘value’
kahır	*kahrı*	‘distress’
karın	*karnı*	‘abdomen’
kasır	*kasrı*	‘mansion’
kasıt	*kasdı*	‘intention’
katil	*katli*	‘killing’
kavil	*kavli*	‘accord’
kavim	*kavmi*	‘tribe’
kavis	*kavsi*	‘bend’
kayın	*kaynı*	‘brother-in-law’
kayıp	*kaybı*	‘loss’
kayıt	*kaydı*	‘registration’
keşif	*keşfi*	‘discovery’
keyif	*keyfi*	‘exhilaration’
kısım	*kısmı*	‘section’
kibir	*kibri*	‘pride’
koyun	*koynu*	‘bosom’

Kudüs	*Kudsü*	‘Jerusalem’
kutup	*kutbu*	‘pole’
küfür	*küfrü*	‘swearword’
küfüv	*küfvü*	‘equal’
lafız	*lafzı*	‘utterance’
lağıv	*lağvı*	‘abrogation’
lahit	*lahdi*	‘sarcophagus’
lutuf	*lutfu*	‘favour’
mahıv	*mahvı*	‘destroying’
medih	*medhi*	‘eulogy’
mehil	*mehli*	‘permitted delay’
metin	*metni*	‘text’
meyil	*meyli*	‘inclination’
Mısır	*Mısrı*	‘Egypt’
misil	*misli*	‘equal’
mühür	*mührü*	‘seal’
nabız	*nabzı*	‘pulse’
nakış	*nakşı*	‘embroidery’
nakız	*nakzı*	‘annulment’
nakil	*nakli*	‘transfer’
nakit	*nakdi*	‘cash’
nazım	*nazmı*	‘verse in literature’
necis	*necsi*	‘nasty’
nefih	*nefhi*	‘blowing’
nefis	*nefsi*	‘one's bodily appetites’

nefiy	*nefyi*	‘exile’
nehir	*nehri*	‘river’
nehiy	*nehyi*	‘prohibition’
nesih	*neshi*	‘abolishment’
nesil	*nesli*	‘generation’
nesir	*nesri*	‘prose’
neşir	*neşri*	‘scattering’
nevir	*nevri*	‘brightness’
nezir	*nezri*	‘vow’
nısıf	*nısfı*	‘half’
nutuk	*nutku*	‘speech’
nüküs	*nüksü*	‘relapse’
oğul	*oğlu*	‘son’
omuz	*omzu*	‘shoulder’
oyun	*oynu*	‘game’
ömür	*ömrü*	‘lifetime’
öşür	*öşrü*	‘tithe’
özür	*özrü*	‘excuse’
rahım	*rahmı*	‘compassion’
rahim	*rahmi*	‘uterus’
recim	*recmi*	‘stoning to death’
rekiz	*rekzi*	‘setting up’
remiz	*remzi*	‘symbol’
resim	*resmi*	‘picture’
ritim	*ritmi*	‘rhythm’

rükün	*rüknü*	‘indispensable part’
sabır	*sabrı*	‘patience’
sahıv	*sahvı*	‘recovering from drunkenness’
satıh	*sathı*	‘surface’
satır	*satrı*	‘line’
sehiv	*sehvi*	‘mistake’
sekir	*sekri*	‘drunkenness’
setir	*setri*	‘covering’
seyir	*seyri*	‘moving in a course’
sıdık	*sıdkı*	‘sincerity’
sıfır	*sıfrı*	‘zero’
sınıf	*sınfı*	‘class’
sihir	*sihri*	‘magic’
şahıs	*şahsı*	‘person’
şehir	*şehri*	‘city’
şekil	*şekli*	‘shape’
şetim	*şetmi*	‘abuse’
şükür	*şükrü*	‘gratitude’
tavır	*tavrı*	‘manner’
tıfıl	*tıflı*	‘infant’
ufuk	*ufku*	‘horizon’
uğur	*uğru*	‘good luck’
uzuv	*uzvu*	‘organ’
vahiy	*vahyi*	‘divine inspiration’
vakıf	*vakfı*	‘charitable foundation’

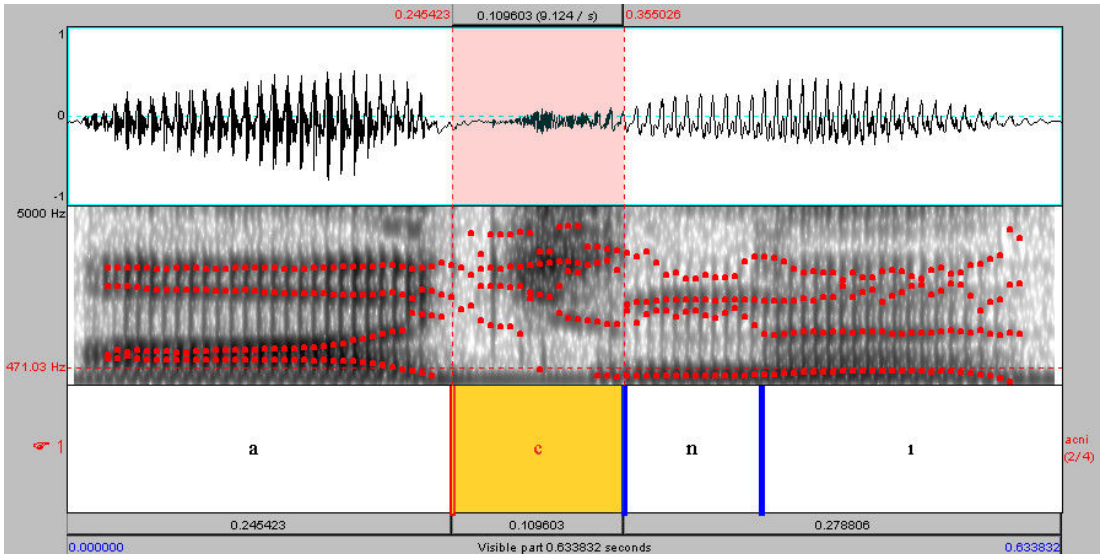
vakit	*vakti*	‘appointed time’
vasıf	*vasfı*	‘quality’
vecih	*vechi*	‘manner’
vecit	*vecdi*	‘ecstasy’
vehim	*vehmi*	‘foreboding’
vezin	*vezni*	‘meter in poetry’
vitir	*vitri*	‘a service of worship’
zabıt	*zabtı*	‘minutes’
zehir	*zehri*	‘poison’
zihin	*zihni*	‘mind’
zikir	*zikri*	‘remembrance’
zulüm	*zulmü*	‘cruelty’
zülüf	*zülfü*	‘side lock of hair’

Appendix B

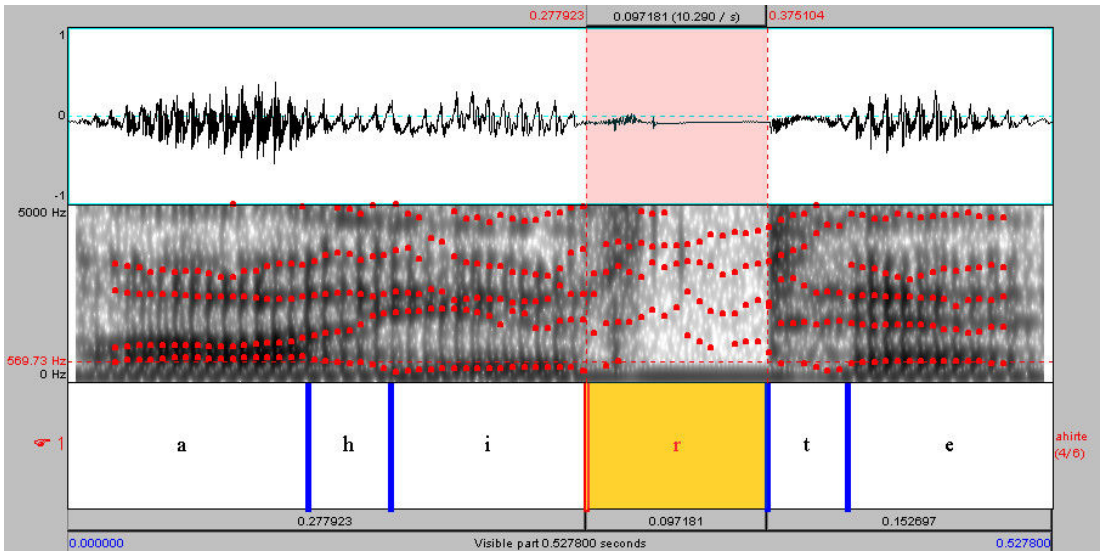
Visual Representations

Figure 1: Examples of Optional Non-vocalizations

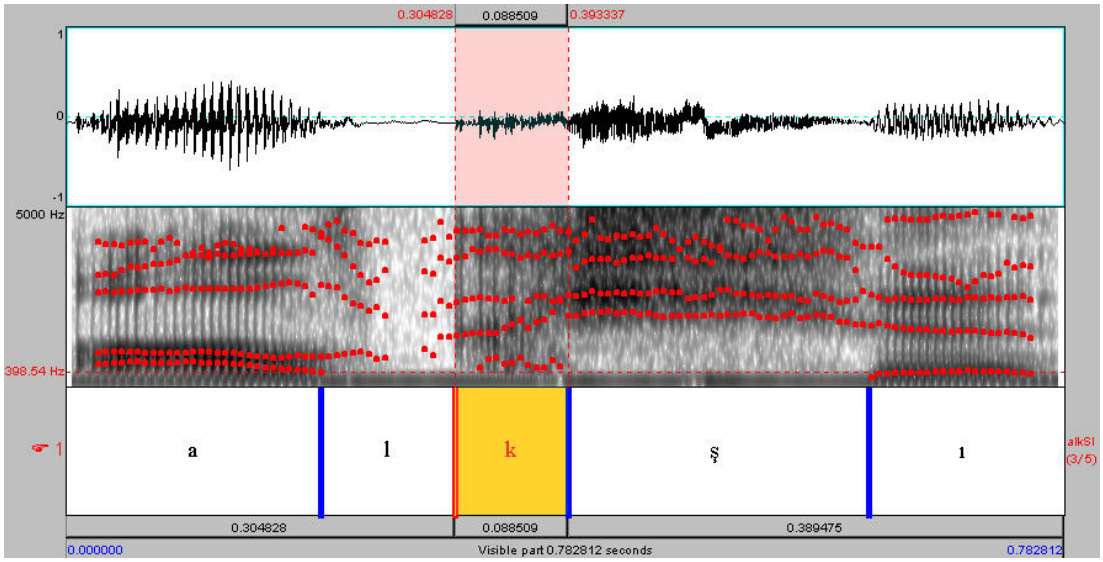
ağaç-ın-ı → a:cnı ‘his/ her tree (Acc.)’



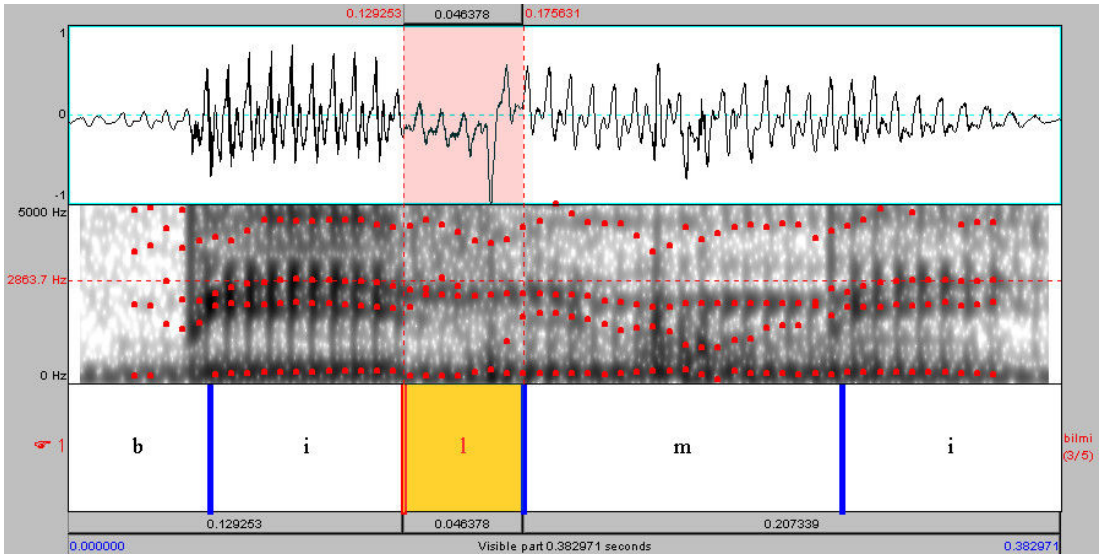
a:hiret-e → a:hirte ‘the future life (Dat.)’



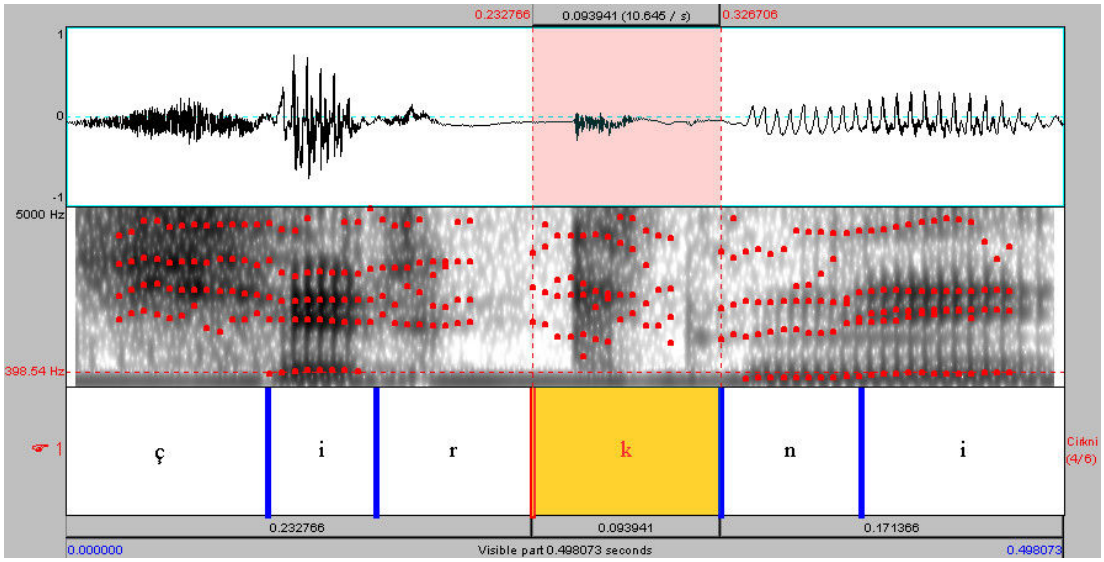
alkış-ı → alkşı ‘the clapping (Acc.)’



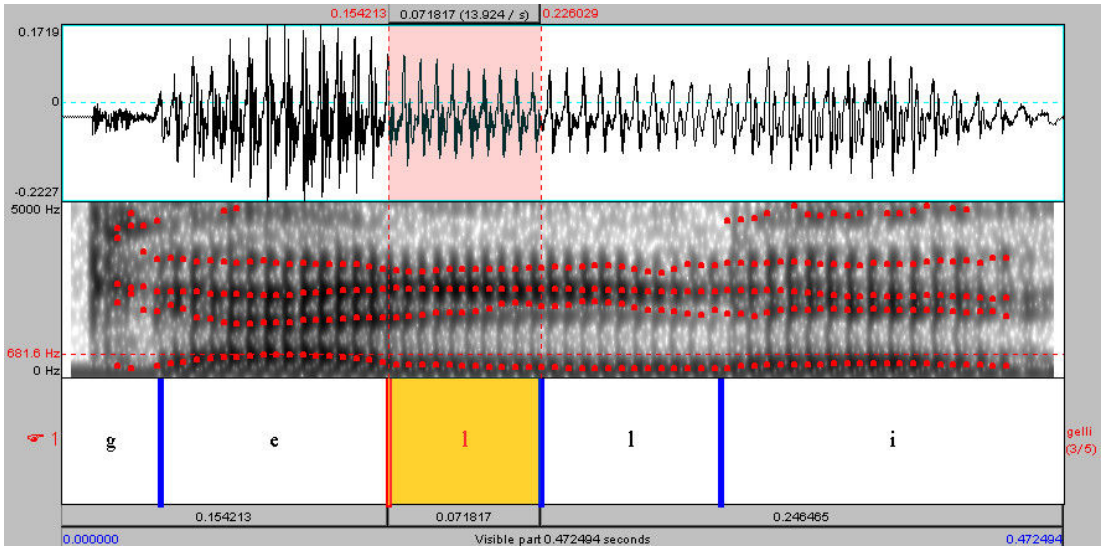
bilim-i → bilmi ‘the science (Acc.)’



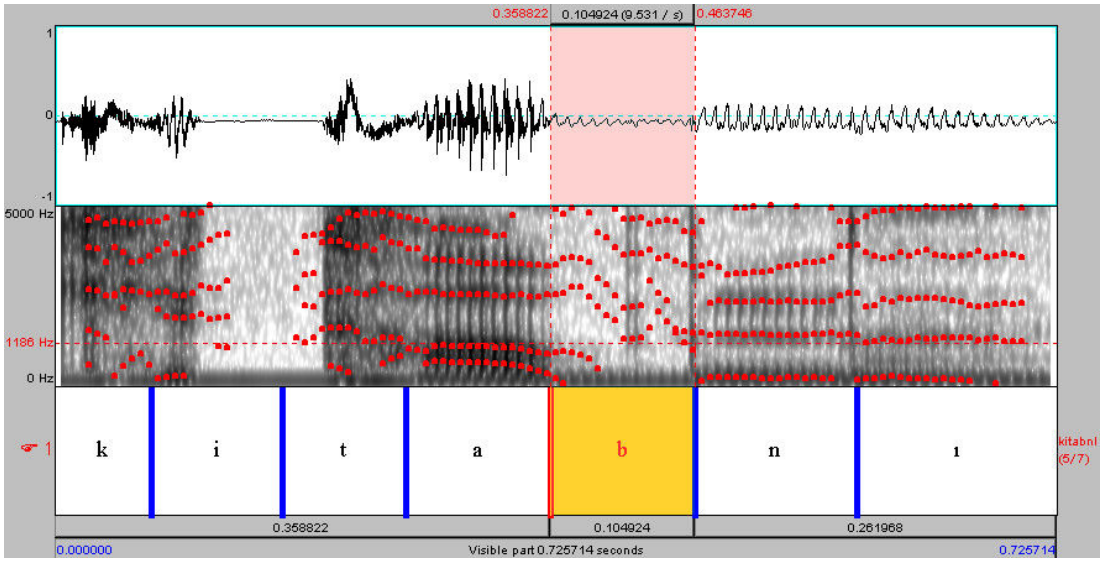
çirkin-i → çirkni ‘the ugly (Acc.)’



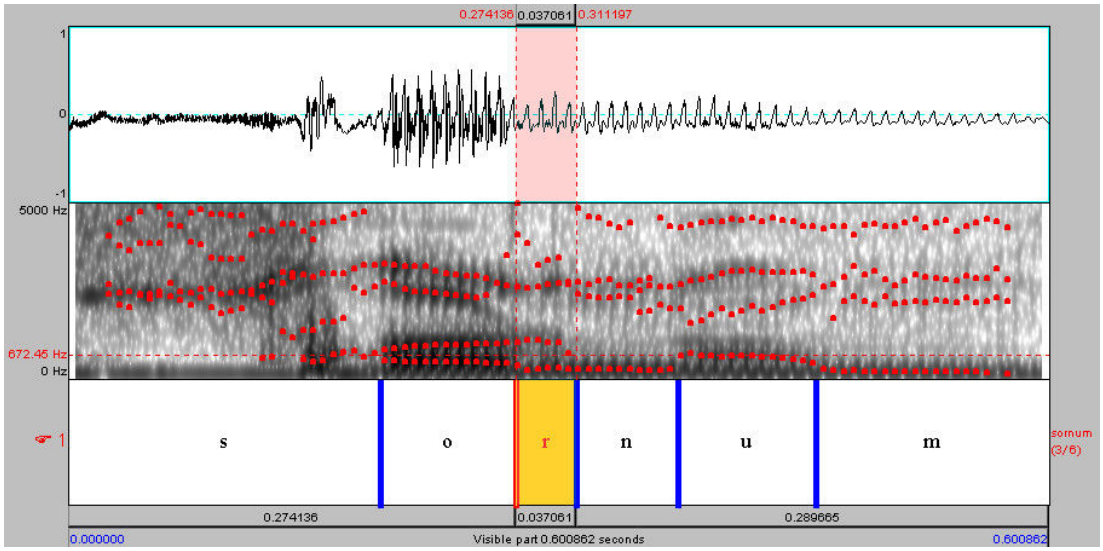
gel-eli → gelli ‘since coming’



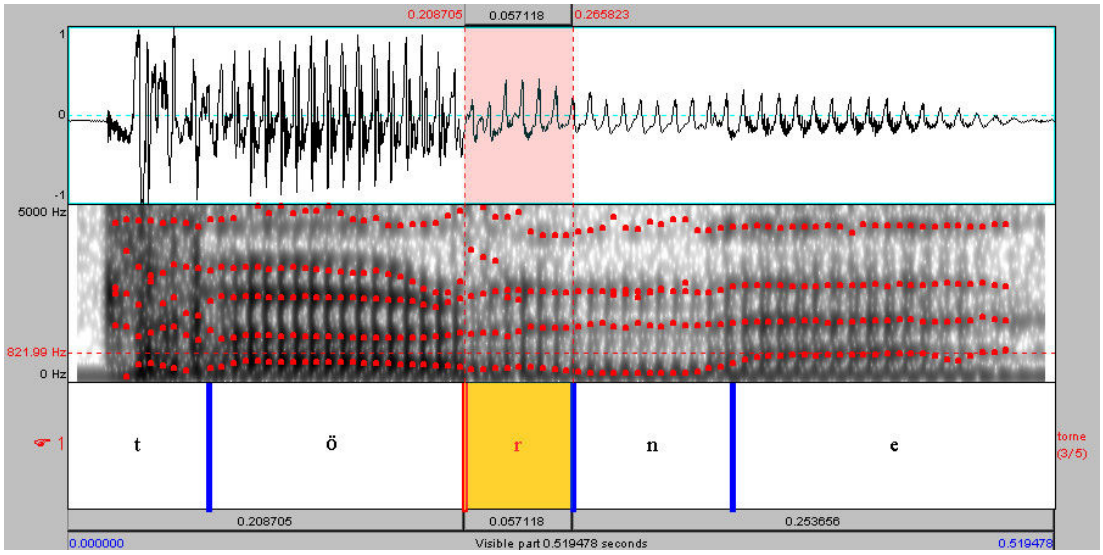
kitab-ın-ı → kitabnı ‘his/ her book (Acc.)’



sorun-um → sornum ‘my problem’



tören-e → törne ‘to the ceremony’



ver-ír-im → vérrim ‘I give’

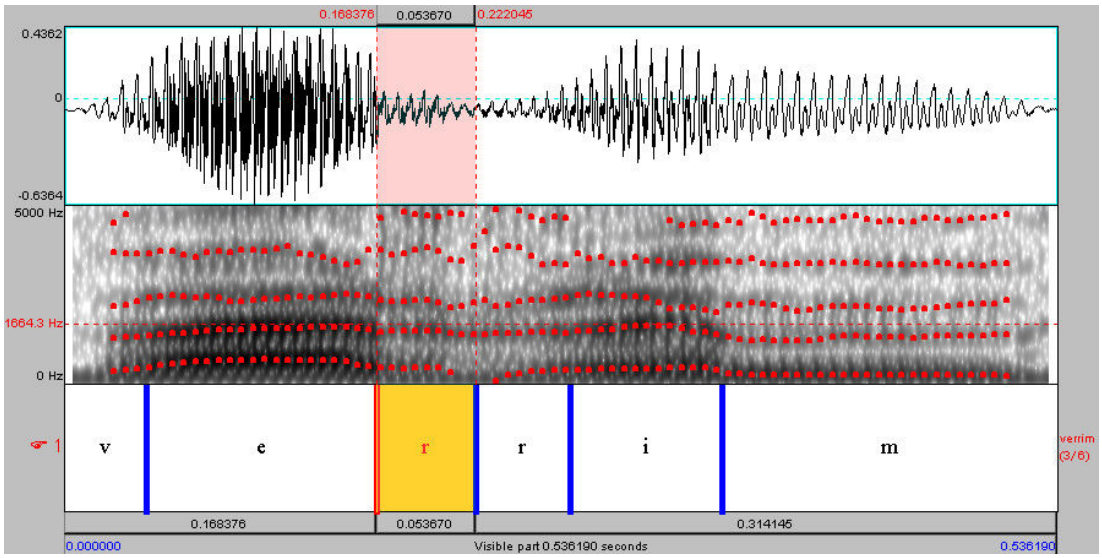
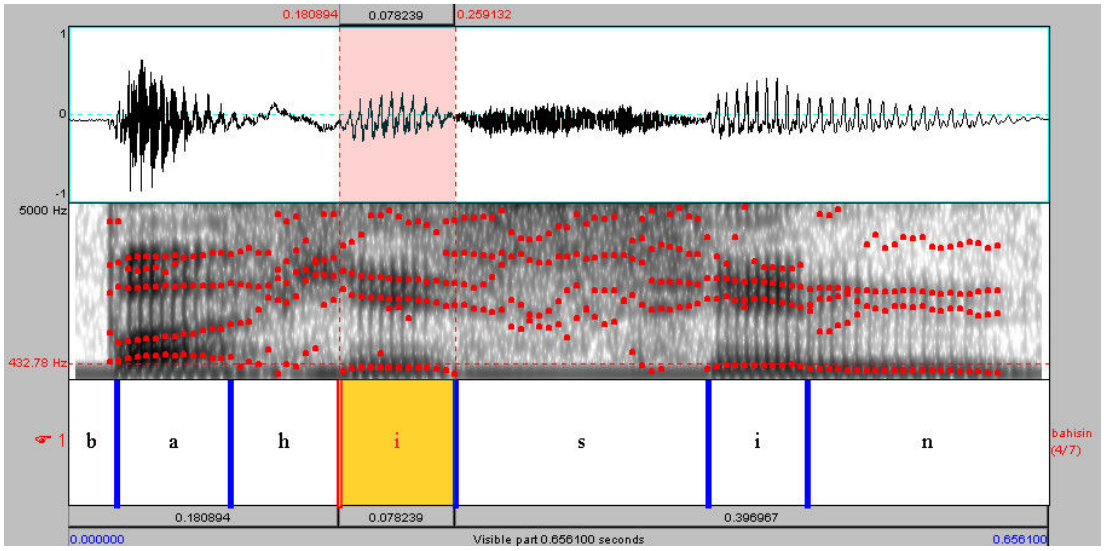
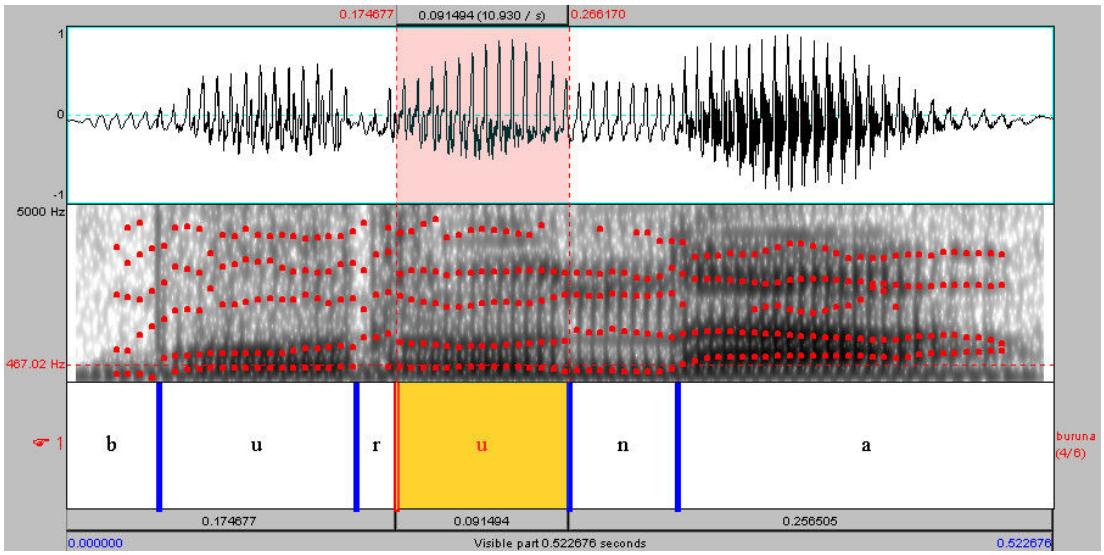


Figure 2: Examples of Optional Vocalizations

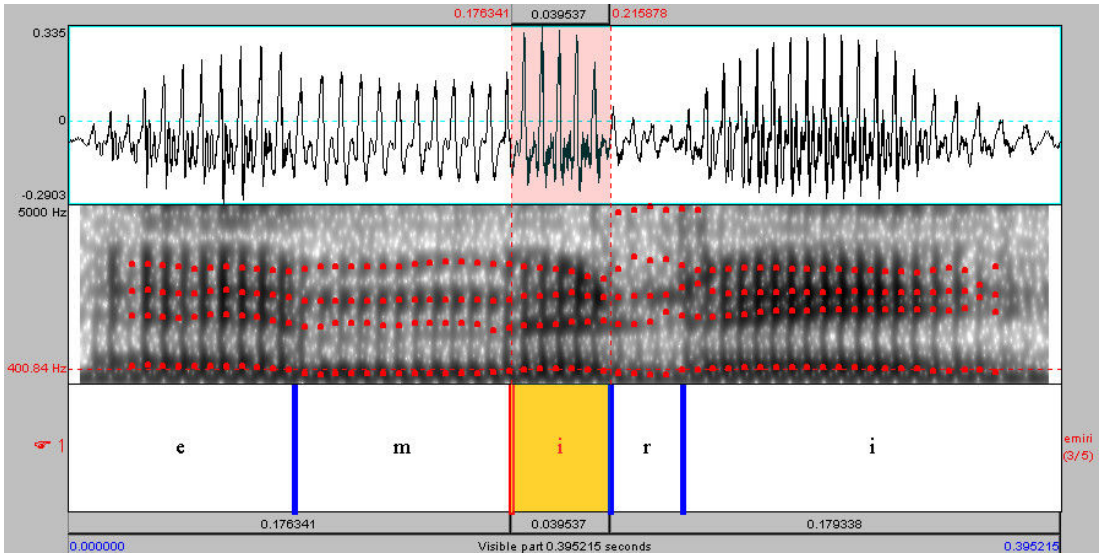
bahis-in → *bahisin* ‘of wager’



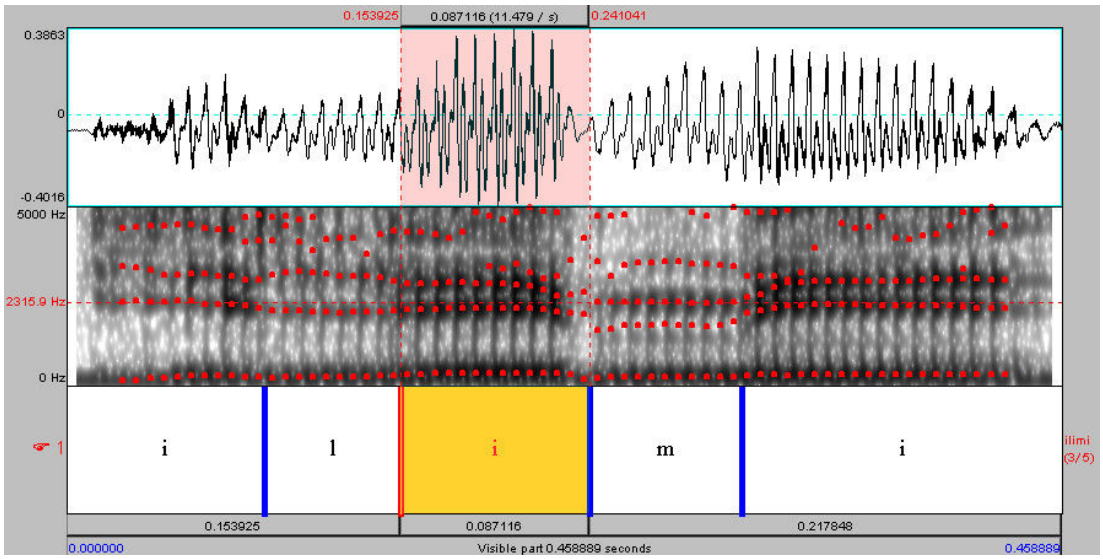
burun-a → *buruna* ‘to the nose’



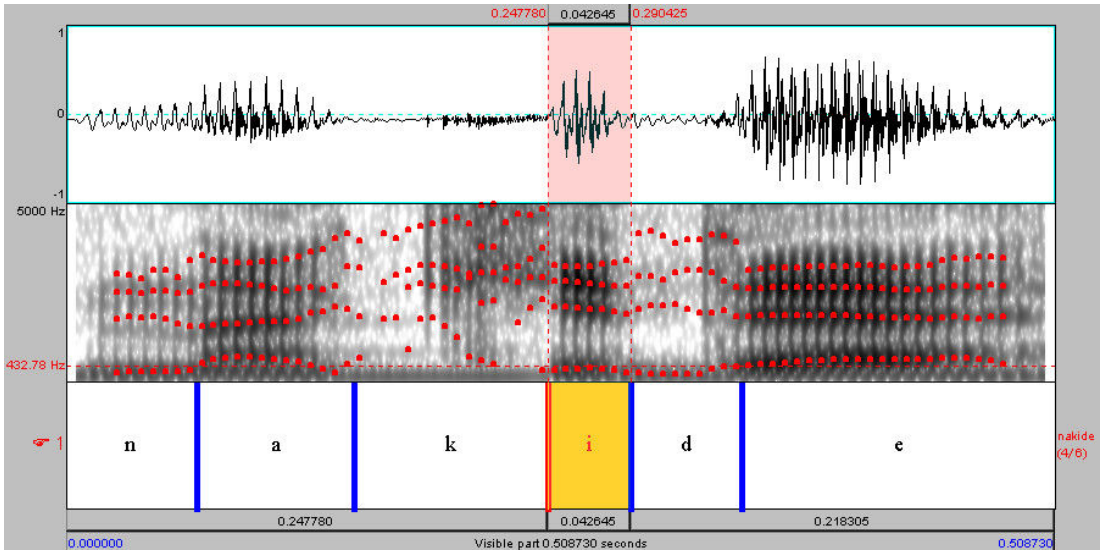
emir-i → emiri ‘the order (Acc.)’



ilim-i → ilimi ‘the theoretical knowledge (Acc.)’



nakit-e → *nakide* ‘to the cash’



omuz-um → *omuzum* ‘my shoulder’

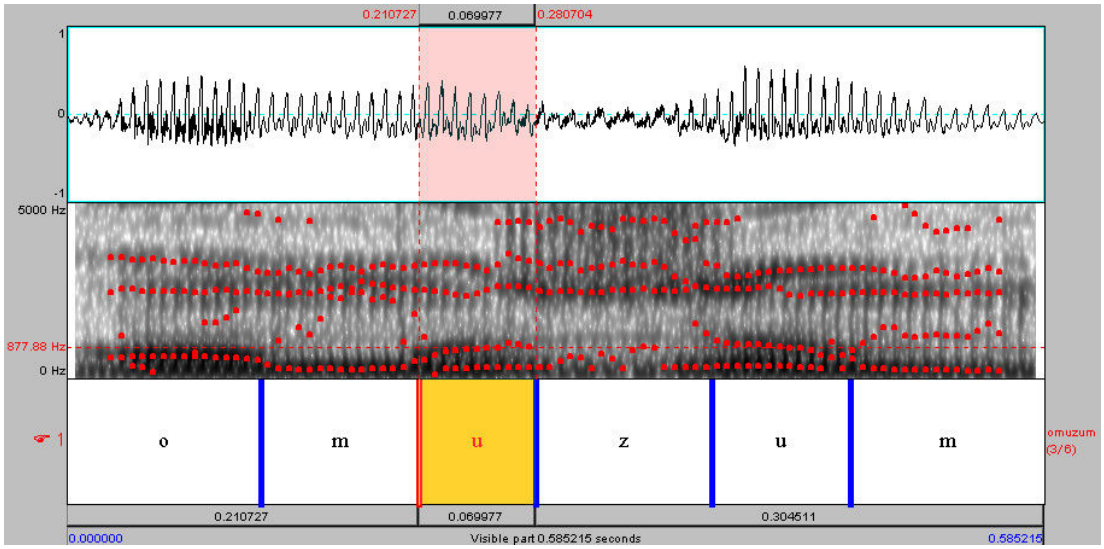
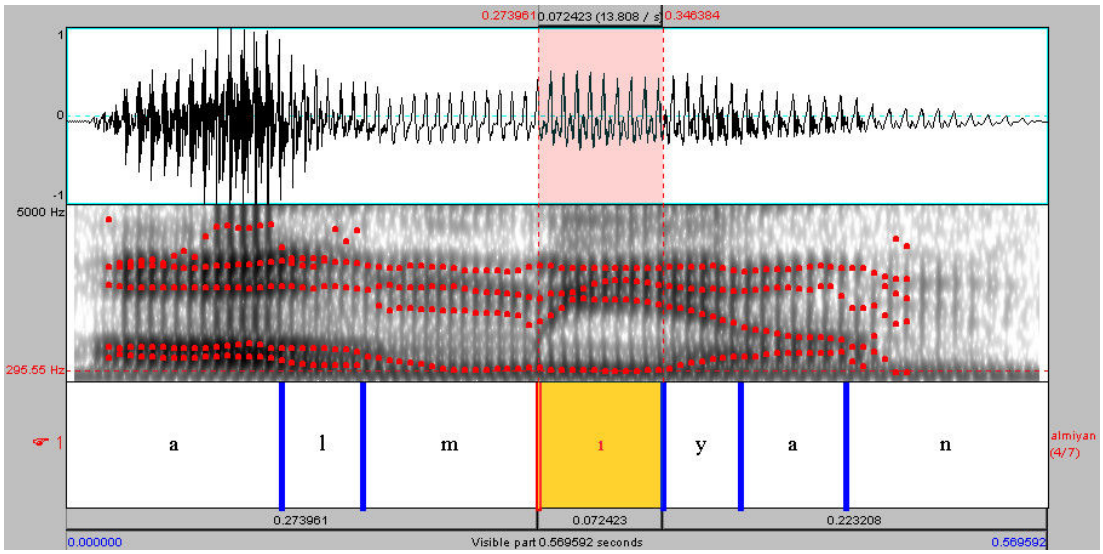
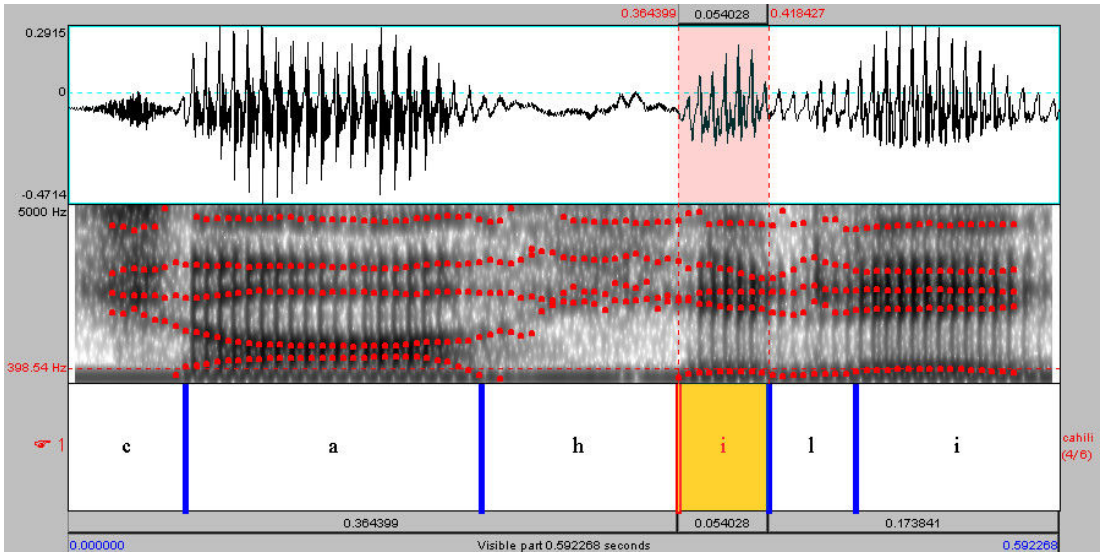


Figure 3: Examples of Obligatory Vocalizations

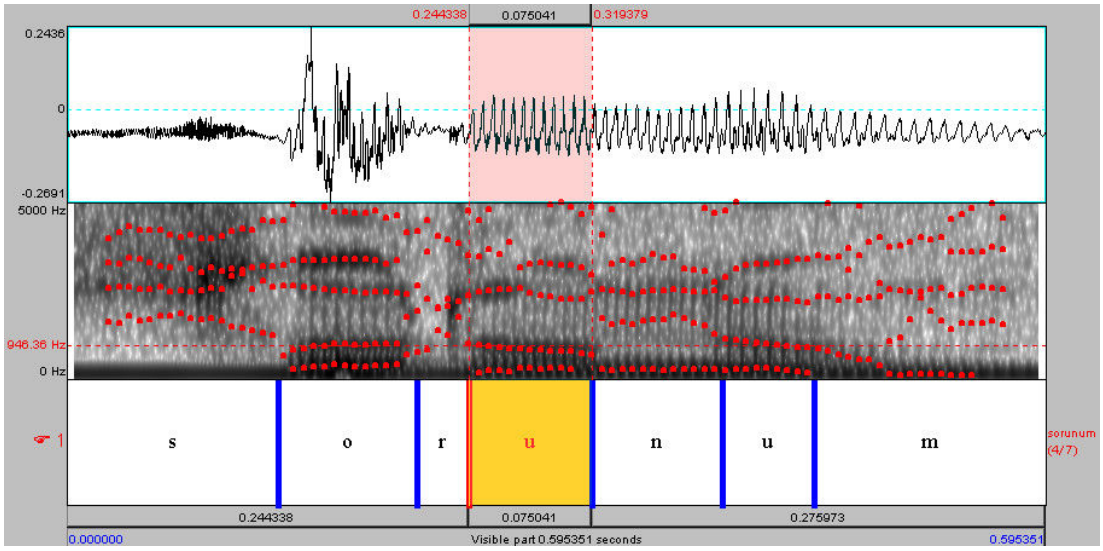
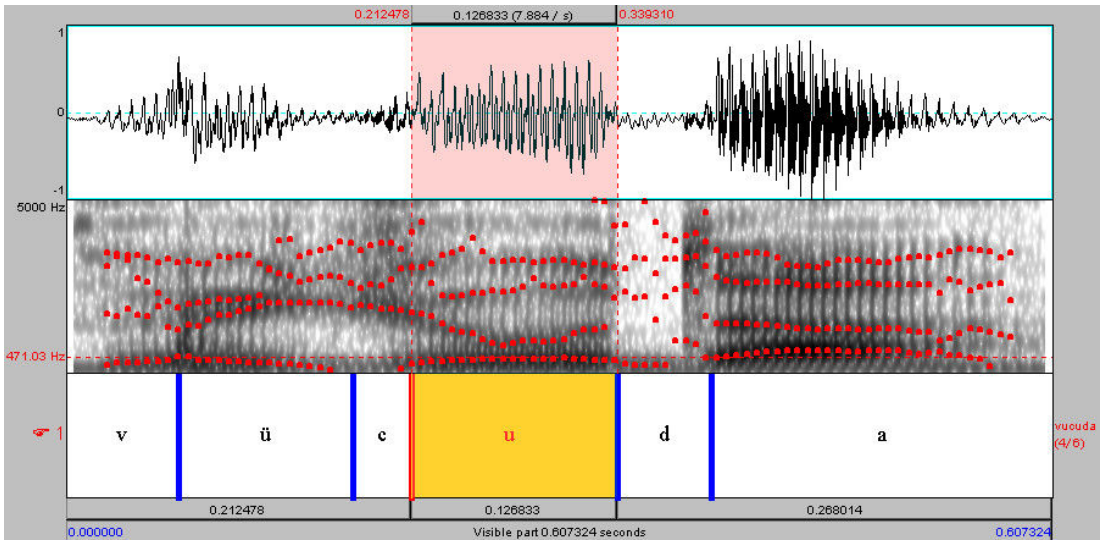
al-ma-yan → almıyan ‘the one who does not take’



ca:hili → ca:hili ‘the ignorant (Acc.)’



sorún-um → sorúnum ‘I am a problem’



vücut-a → vücu:da ‘to the body’