A Case of Absolute Neutralization in Turkish: T-Palatalization and its Predictability*

Türkçede Bir Mutlak Yansızlaşma Vakası: T-Damaksıllaşması ve Tahmin Edilebilirliği

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Abstract: This study examines t-palatalization as an example of absolute neutralization in modern Standard Turkish within the framework of Government Phonology (GP), and attempts to present a theoretical and empirical account of t-palatalization in Turkish. The study claims that the process is not lexical but structurally conditioned and shows that the distribution of the palatalized *t* is predictable by the structural and phonological environment. This conclusion is drawn by two constraints that regulate the process of t-palatalization: (i) the elemental content of the relevant sounds and (ii) the syllable structure of words. By analyzing these constraints in detail, I demonstrate how t-palatalization operates by placing it within the theoretical context of GP.
Keywords: t-palatalization, vowel disharmony, absolute neutralization, lexicalization

Özet: Bu çalışma çağdaş Ölçünlü Türkçede bir mutlak yansızlaşma örneği olarak ele alınabileceğini düşündüğümüz t-damaksıllaşmasını Yönetim Sesbilimi bünyesinde incelemektedir. Çalışmada, Türkçedeki t-damaksıllaşmasının hem tanımlayıcı hem de kuramsal bir tahlili sunulmaya çalışılmıştır. Çalışmanın temel iddiası, mezkûr sürecin mevcut kanaatin aksine sözlüksel bir süreç olmadığı, tersine belli koşullar bilindiği takdirde tahmin edilebilir olduğudur. Sürecin izahı (i) ilgili seslerin element içeriği ve (ii) söz konusu kelimelerin hece yapısı ile doğrudan ilintilidir. T-damaksıllaşmasının Türkçede nasıl işlediği meselesi bu iki vakanın ayrıntılı tedkiki ile Yönetim Sesbiliminin kuramsal çerçevesinde konumlandırılarak açıklığa kavuşturulmaya çalışılmıştır.
Anahtar Kelimeler: t-damaksıllaşması, ünlü uyumsuzluğu, mutlak yansızlaşma, sözlükselleşme

In Turkish, some words ending in *t* unpredictably disobey vowel harmony in that, despite the presence of a back vowel in the stem, the following suffix involves a front vowel:

(1)	a. *kat*	'floor'	*katlar*	'floors'
	b. *bulut*	'cloud'	*bulutlu*	'cloudy'
(2)	a. *saat*	'hour'	*saatler*	'hours'
	b. *sürat*	'speed'	*süratli*	'speedy'

As seen, the same suffixes, *-lAr* and *-lI* are pronounced differently in (1) and (2), although in all the examples they are preceded by back vowels. The unexpected forms with front vowels in (2) are problematic for vowel harmony. Since the problematic environment involves a *t* sound, which some scholars argue is palatalized, the issue has come to be called t-palatalization. The relevant literature has more or less agreed on the conclusion that t-palatalization is a lexical phenomenon,[1] occurring in certain loanwords. In fact, the palatalized *t* itself is considered to be a loan sound, and thus its distribution should come from the donor languages, meaning the distribution is lexical.

Palatalization is a phonetic phenomenon in which a segment is pronounced with the raising of the front of the tongue towards the palate.[2] Palatalization has varying significance in different languages. In some languages like English, it has an allophonic effect. Certain consonants alter into their palatalized versions when a front vowel follows, putting the two variants in complementary distribution. In others like Russian, however, palatalized and unpalatalized consonants can appear in the same phonological environment and distinguish words. Obviously, this is not a complementary but a contrastive distribution. In this latter case, palatalization is considered phonemic.[3]

In Turkish, it is generally agreed that t-palatalization makes no phonemic difference. This conclusion is primarily based on the lack of minimal pairs that

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1 Robert B. Lees, *The Phonology of Modern Standard Turkish*, Uralic and Altaic Series 6 (Bloomington, Indiana: Indiana University Publications, 1961), 53.

2 R. Larry Trask, *Dictionary of Phonetics and Phonology* (New York: Routledge, 1996), 254.

3 Jaye Padgett, "The Emergence of Contrastive Palatalization in Russian," in *Optimality Theory and Language Change*, ed. David Eric Holt, Studies in Natural Language and Linguistic Theory 56 (Dordrecht: Kluwer Academic Publishers, 2003), 309.

would settle the issue. In the absence of minimal pairs, the postulation of a possible phonemic relation loses much of its power.[4] Nevertheless, whether the palatalized *t* is still preserved as a phonetic segment in modern Standard Turkish is open to debate. Some elderly speakers, and perhaps some bilingual speakers, too, might be still using it. For the vast majority, however, the purported palatal(ized) *t* cannot be detected. Some works consider the possibility for a phonetically realized palatalized consonant.[5] Based on experimental data, Canalis and Dikmen (2021) reiterate this consideration. According to them, if vowel disharmony occurs with unexpected frontness, the only explanation is the phonetic presence of or motivation for a neighboring palatal consonant, which simply implies that like the palatal consonants */l/* and */c/*, the palatal *t* is also a phoneme in Turkish.[6]

In classical phonological terms, if there is a detectable sound, it can either be a phoneme or an allophone. In the linguistics literature, very few other than Canalis and Dikmen (2021) maintain that the palatalized *t* is a distinct phoneme in Turkish. If it is an allophone, there are two possibilities: It can either be a complementary allophone, which implies that its distribution is conditioned and predictable, or it can be a free-variant allophone which implies that its distribution is not regular but lexical. No one argues for the former; anyone who identifies it as an allophone in Turkish agrees on the latter. This, however, goes against the prevailing sense of the term in the literature which states that allophones must not be in contrastive distribution even though free-variant allophones are detected in some languages.[7] The majority of recent work, on the other hand, does not mention the palatalized *t* as a synchronic sound in Turkish.[8] I assume accordingly that unlike */l/* and */c/*, no phonetic realization of t-palatalization

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4 A. Sumru Özsoy, *Türkçenin Yapısı I: Sesbilim* (İstanbul: Boğaziçi Üniversitesi, 2004), 13; Aslı Göksel and Celia Kerslake, *Turkish: A Comprehensive Grammar* (London: Routledge, 2005), 3.

5 George N. Clements and Engin Sezer, "Vowel and Consonant Disharmony in Turkish," in *The Structure of Phonological Representations*, ed. Harry van der Hulst and Norval Smith, Linguistic Models 2–3 (Dordrecht, Cinnaminson: Foris publications, 1982), 242.

6 Stefano Canalis and Furkan Dikmen, "Turkish Palatalized Consonants and Vowel Harmony," *Proceedings of the Workshop on Turkic and Languages in Contact with Turkic*, no. 5 (2021): 54.

7 Trask, *Dictionary of Phonetics and Phonology*, 16.

8 Özsoy, *Türkçenin Yapısı I: Sesbilim*, 15.

occurs in the idiolect of any native speaker of Standard Turkish. In fact, neither the notions of phoneme and allophone nor the exact phonetic realization of phonological segments have any theoretical significance in GP. I therefore do not pursue that discussion any further.

In order to locate this issue in a theoretical perspective, I borrow the term "absolute neutralization" from classical generative phonology. Absolute neutralization posits a phonological contrast which is not realized phonetically.[9] A good example of this is the Turkish *ğ* (called *soft g*). The letter was once used to represent a consonant which has no phonetic content today but is still preserved in orthography due to its ongoing phonological effects.[10] A similar phenomenon can be observed in t-palatalization: As far as I can observe, no phonetic content exists anymore, but we can infer its underlying presence from its obvious effect in phonological processes.

The aim of this study is to offer a unified account of the so-called t-palatalization process in Turkish within the classical GP framework. In contrast to the prevailing view in the literature, I claim that it is not the lexicon but the structural and phonological environment that governs the emergence of t-palatalization in Turkish. Its distribution is demonstrated to be nativized, to have no relation to the donor language, and to be directly related to the syllable structure of words. In particular, I demonstrate that t-palatalization emerges when the root-final *t* is preceded by a short *a* and that this *a* is preceded by (i) a long vowel, or (ii) a geminate, or (iii) a front vowel. The conditions (i) and (ii), i.e. a long vowel and a geminate, share the property of constituting closed domains, which is shown to trigger disharmony across the board. The data discussed in this work comes from Redhouse and TELL dictionaries as well as recordings of native speakers' utterances.[11]

This study is organized as follows: Section 1 presents all the relevant tenets of the GP framework and gives a theoretical background as a basis for the subsequent sections. Section 2 discusses palatal consonants and cases of t-palatalization

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9 Trask, *Dictionary of Phonetics and Phonology*, 2.

10 Göksel and Kerslake, *Turkish: A Comprehensive Grammar*, 7.

11 James Redhouse, *Redhouse Türkçe-Osmanlıca-İngilizce Sözlük*, ed. Sofi Huri et al. (İstanbul: Redhouse, 2000); Sharon Inkelas et al., *Turkish Electronic Living Lexicon (TELL)*, 2009, http://linguistics.berkeley.edu/TELL/cgi-bin/TELLsearch.cgi.

in Turkish. Section 3 describes the conditions for obligatory t-palatalization. Section 4 constitutes the bulk of the paper in offering a theoretical account for t-palatalization in Turkish, and Section 5 gives some concluding remarks.

1. Internal Structure of Sounds and Vowel (Dis)harmony

One aim of this study is to indicate that, in contrast to what has been assumed in the literature, t-palatalization in Turkish is not lexically but structurally conditioned. These conditions are independent of the donor language(s), systematic, and therefore render t-palatalization predictable. In order to explain phonological processes, GP relies on certain universal principles and language-specific parameters. In GP, arbitrariness is not accepted in phonological phenomena. That is to say, there must always be a causal relationship between the phonological context and the phonological process that is taking place in it. It is the licensing relations which set the limits for phonological facts. I begin in what follows by explaining how phonological expressions are defined and represented in GP.

1.1. Phonological Expressions

Speech sounds or phonological expressions are assumed to be made of elements, which are primitives of phonological systems that function as autonomous and independently pronounceable units.[12] Elements, which are identified in terms of their articulatory properties, are argued to be the simplest and fundamental units that generate a phonological expression. Put simply, the internal structure of segments is based on phonetic realization. Each element is pronounceable at all levels of derivation from the lexicon to surface form, by itself or in combination with other elements.[13] There are six basic elements used in the representation of phonological expressions. The set of elements is presented as in (3), where E is a shorthand for *element*:[14]

(3) E={A, I, U, H, L, ʔ}

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12 Jonathan Kaye, Jean Lowenstamm, and Roger Vergnaud, "The Internal Structure of Phonological Elements: A Theory of Charm and Government," *Phonology Yearbook* 2, no. 1 (1985): 306.

13 Wiebke Brockhaus, "Skeletal and Suprasegmental Structure within Government Phonology," in *Frontiers of Phonology: Atoms, Structures, Derivations*, ed. Jacques Durand and Francis Katamba, Longman Linguistics Library (London and New York: Longman, 1995), 195.

14 Jonathan Kaye, "'A Users' Guide to Government Phonology (GP)" (University of Ulster, 2000).

One of the challenging assertions of GP is that vowels and consonants share the same elements to represent the place of articulation. The three elements A, I and U can combine with both vowel and consonants while the other three, H, L and ʔ, can only be contained in consonants. Among vowels, A represents lowness, I represents frontness and U represents roundness. The three basic elements yield the vowels *a*, *i* and *u* by themselves (i.e., when they occur independently as a phonological expression). When they are combined with each other, they can generate all the possible complex vowel combinations in a language.[15] With respect to mainstream analysis, the A, I and U elements of GP roughly correspond to coronality, palatality and labiality respectively.

1.2. Vowel (Dis)harmony in Turkish

As Clements and Sezer (1982) state, Turkish is a symmetrical vowel harmony language. That is to say, unlike asymmetrical vowel harmony languages like Somali, Turkish does not allow root vowels to be alternated. It is only vowels within the suffixes that alternate according to the quality of the nearest, that is, of the preceding rightmost root vowel.[16] The vowels preceding the rightmost one have no influence on the suffix vowels. There are two types of vowel harmony in Turkish: I harmony (palatal or frontness harmony) and U harmony (labial or roundness harmony).

(4)	*/insan-a/*	*[insana],*[insane]*	'to the person'
	/muhit-øn/	*[muhitin],*[muhitun]*	'of the environment'

As seen in (4), the words *insan* "person" and *muhit* "environment" lack root harmony: The elements I and U in the leftmost nuclei do not spread into the following nuclei. Importantly, if suffixes are added to these roots, the harmonic head will be the rightmost nuclei of the root (*a* in *insan* and *i* in *muhit*), which determine the shape of the vowel in the following suffix. Hence, the forms **insane* and **muhitun*, which do not harmonize in frontness and roundness with

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15 Note that in the earlier versions of GP, other elements like N for nasality, rather than these six, were employed to generate segments. On the other hand, there are also analysts who claim that there are other extra elements whilst some claim that there are fewer than six elements (five, four or even three). Since I am only interested in certain elements who constitute the vowels in the classical GP framework, these discussions are not presented.

16 Clements and Sezer, "Vowel and Consonant Disharmony in Turkish," 215–16.

the preceding vowels, are ungrammatical. Due to limitation of space, only I harmony will be considered in this study.

Clements and Sezer (1982) also make a distinction between root-internal vs root-external vowel harmony, which is a process between the root and the suffixes.[17] Since there are innumerable disharmonic roots in Turkish, some of which are even of Turkic origin, it is very difficult to claim that Turkish phonology involves root-internal vowel harmony at all, in contrast to root-external harmony, which seems to work perfectly within the suffixation process. Given that this paper is concerned with t-palatalization that seemingly triggers I disharmony in the following suffixes, I also disregard root-internal harmony.

2. Palatal Consonants and T-palatalization

This section investigates the workings of palatalization in Turkish, with the aim of setting the stage for t-palatalization, a special case of palatalization.

The quality of root-final consonants may influence vowel harmony. Nevertheless, there are cases where back vowels in the suffix (i.e., vowels that do not contain a lexical I element) can end up with I even in the lack of an I element to spread from the root vowels.

(5)	a. *kat*	'floor'	*katlar*	'floors'
	b. *saat*	'hour'	*saatler*	'hours'

Here, (5a) is predictably harmonic in that the vowel in the suffix agrees with the root-final *a* in *kat* 'floor'. In the disharmonic (5b), however, the suffix involves the sound *e* (which itself contains an I element), which seems to have come out of nowhere, particularly not from the root-final vowel. The question is, then, where does this I element come from? According to grammarians, the I element is argued to come not from the root-final vowel but from the root-final consonant. This means practically that the root-final *t* must involve an I element, i.e., it must be a palatal version of the sound *t*, represented in the literature as *[t^{j}]*. Next, I discuss cases of palatalization that have been argued as I-sharing with root final consonants.

There are palatal *l* (*ļ*) and palatal *k* (*c*) which are phonemically different from velar *l* (*ɬ*) and velar *k* (*k*), which is not reflected in modern Turkish orthography.[18]

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17 Clements and Sezer, "Vowel and Consonant," 227.

18 The same problem is valid for the consonants *g* and *ɟ* as they are represented with the same letter g but since no words (with certain exceptions) end in with these consonants in Turkish and there is no way to observe the disharmonic cases in the suffixation, I disregard it.

(6)	a.	*kar*	*/kar/* (velar)	‘snow’
		kâr	*/car/* (palatal)	‘profit’
	b.	*sol*	*/soɬ/* (velar)	‘left’
		sol	*/sol/* (palatal)	‘sol in music’

In the case of a root-final palatal consonant, the vowel(s) of the suffix involve(s) I, even if the root-final vowel does not have an I element.

(7)	*idra:k-in,*	**idrak:ın*	‘of the comprehension’
	makbu:l-ün,	**makbu:lun*	‘of the acceptable (one)’

In (7), both of the roots *idrak* “comprehension” and *makbul* “acceptable” end in a palatal consonant. The reason why the expected forms **idrakın* and **makbulun* are inadmissible is directly related to the content of root-final palatal consonants. The palatality of the consonants is defined by the presence of the element I.[19] In their elemental composition, both */c/* and */l/* are assumed to have the element I, which is somehow shared with the following nuclear position. The harmonic head in */idracin/* is the rightmost *i* sound, and if more suffixes are added to the stem, all of the following nuclei get their I element from this position by I-spreading.

(8)	*/idrac-øn-da-ɣsa-lar/*	*[idracindeyseler]*	‘if they are aware of it’

In such cases, the source of I is thought to be the previous segments */l/* and */c/* since the preceding nuclear positions do not have an I element. The palatal consonants */c/* and */l/* can surface in various positions of a word and they are highly common in Turkish. Since their palatality is phonetically detectable, there is no complicated problem. These segments, as palatal consonants, include the element I in their internal structure and this element is the source of vowel disharmony.[20] In loanword phonology terms, it can be said that these words

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19 John Harris, “Segmental Complexity and Phonological Government,” *Phonology*, no. 7 (1990): 263.

20 There are words ending with *r*, *d(d)*, *b, rf, rp,* and *t* which disobey I harmony when added by suffix with a back vowel. Because of the disharmony, it is accepted that they are being palatalized when a suffix is added. Note that most of these disharmonic cases in Turkish include the consonant *t*. The other samples are very restricted. Since these examples are very rare and mostly obsolete, it does not look plausible to talk about their properties within a phonological perspective. Those ending in *t*, on the other hand, are common enough and are still in use.

have not been adapted to Turkish. On the contrary, these are good examples of adoption as they are borrowed from the donor language probably with very small changes. These diachronic elite adoptions have been accepted by the Turkish speech community in several centuries.[21] Such cases are successfully analyzed in the literature as cases of vowel disharmony induced by palatal consonants.

The question is whether (9) can also be analyzed in a similar way.

(9) *saat* 'hour' *saatler* 'hours'

Indeed, some have argued that *t* in *saat* "hour" is a palatal sound just like *l* in *sol* and *c* in *idrac* (comprehension) and that it can be analyzed similarly. In the literature, the disharmonic cases ending in *t* are assumed to include a palatal *t* lexically only in root-final positions. In other words, it is just another case of loanword adoption.[22] Since, it has already been well-documented in numerous genetically unrelated languages that the consonant *t* is palatalized (becomes *[tʲ]*) after or before front vowels,[23] and the environment is identical in the aforementioned disharmonic cases, this argument, from a phonetic point of view, is not totally unprecedented.

Nevertheless, I demonstrate in what follows that this position is mistaken for several reasons. First, the purported palatal *t* has no phonetic realization. The Praat analysis[24] that I personally performed detected no noticeable phonetic difference between final consonants of harmonic and disharmonic roots like *kat* "floor" and *saat* "hour". This observation is supported by the literature in that neither traditional Turkish grammars nor those written in linguistic circles make any mention of a palatal *t* as a sound of Turkish. Second, there are no minimal pairs that can be constituted out of palatal vs. non-palatal *t*. In other words, unlike minimal pairs like *kar (kar)* "snow" and *kâr (car)* "profit" the purported palatal *t* can only occur word-finally, which would not be the case if it were a lexical sound of Turkish on par with */c/* and */l/*. Worse yet, as I demonstrate in the next section, the so-called

21 Memet Aktürk-Drake, "Phonological and Sociolinguistic Factors in the Integration of /l/ in Turkish in Borrowings from Arabic and Swedish," *Turkic Languages*, no. 14 (2010): 172.

22 Lees, *The Phonology of Modern Standard Turkish*; Clements and Sezer, "Vowel and Consonant Disharmony in Turkish".

23 D. N. Shankara Bhat, "A General Study of Palatalization," in *Universals of Human Language*, ed. Joseph. H. Greenberg (Stanford University Press, 1978), 53.

24 Paul Boersma and David Weenink, "Praat: Doing Phonetics by Computer [Computer Program]," 2020, Version 6.1.37, https://www.fon.hum.uva.nl/praat/.

palatal *t* only emerges under well-defined conditions. Thus, the argument that a lexical palatal *t* exists misses an apparent generalization. Third, palatalization before back vowels asymmetrically implies palatalization before front vowels.[25] For example, if a language palatalizes *k* before the back vowel like in */car/* "profit" it is also expected to palatalize *k* before the front vowels like in */cel/* "bald" but not necessarily vice versa. This however is not the case for t-palatalization in Turkish, as the presence of the purported palatal *t* is accepted only in certain words with back vowels, which is not compatible with data from any other languages. I therefore conclude that the proposal that the disharmony is triggered by a phonetically realized lexical consonant, that is by the palatal *t*, has a weak basis.

3. The Analysis

Although I describe the process as a case of absolute neutralization, whether or not a phonetic content occurs does not change the analysis; This root-final segment triggers the same phonological event. Although there is no detectable phonetic content for t-palatalization, since the root-final *t* shows its distinct phonological properties, I prefer to use the term "t-palatalization". However, this naming has no theoretical bearing on the issue. This is also compatible with the GP framework, which argues for an independence of phonology from phonetics. If phonology is autonomous from phonetics and the source for phonology is not phonetics but the phonological facts that we observe, then we can call the process t-palatalization.

3.1. Some notes on origins

All disharmonic words ending in *t* are loanwords, but how many among innumerable harmonic loanwords ending in *t* are palatalized in the donor language(s) remains unclear. According to my observations, there are only forty-six disharmonic roots with root-final *t* in Turkish and all except one are from Arabic, mostly borrowed via Persian. All the others (hundreds of them) are harmonic. As shown below, firstly, it can only occur root-finally and, secondly, it needs a following vowel to be activated. Even so, few roots ending in *t* can preserve their disharmonic behavior in Turkish.[26]

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25 Colin Wilson, "Learning Phonology with Substantive Bias: An Experimental and Computational Study of Velar Palatalization," *Cognitive Science* 30, no. 5 (2006): 950.

26 This study is about the current language in use. From 1950's movies and radio programs, it is possible to find disharmonic examples like **sanate* "to the art" instead of *sanata*. Apparently,

Arabic loanwords with a feminine ending are mostly pronounced as */at/* in Turkish as well as in Persian, instead of the native Arabic */a/*.[27] This is why, it is widely accepted that most if not all of these words are borrowed via Persian.[28] As modern Arabic[29] has no palatalized *t*, and even if it did, as some dialects of Arabic do,[30] no original *t* sound occurs in these borrowed words. Thus, from both diachronic and synchronic points of view, it is not plausible to claim that the source of t-palatalization is Arabic. The vowel in */at/* is velar (i.e., back) in nature in Turkish.[31] And the following consonant is not palatal in most of the cases. When t-palatalization occurs, the only diachronic source for this so-called lexical process might then be Persian.

Tietze (1992) raises the possibility that some of these t-ending words might have been borrowed directly from Arabic and some via Persian.[32] This would mean that the palatalized cases are via Persian and the rest are not. However, in Arabic, phonetically realized *t* in feminine endings do not exist at all. Therefore, it is not possible to account for the realization of unpalatalized *t*. On the other hand, in modern Persian, it is not easy to propose the presence of a palatalized *t* either.[33] Coming to Old Persian, the presence of t-palatalization is still debatable

disharmony after palatalized *t* was much more common then. In that sense, Lees' (1961) distinction between emphatic and non-emphatic *t* (see Section 3.2) might be a convincing explanation for t-palatalization in his time. This kind of diachronic data is beyond the scope of this paper.

27 John R. Perry, "Arabic Elements in Persian," in *Encyclopaedia Iranica*, 2002, 230–32.

28 John R. Perry, "-At and -a: Arabic Loanwords with the Feminine Ending in Turkish," *Turkish Studies Association Bulletin* 8, no. 2 (1984): 20; Yasin Yayla, "Güncel Türkçe Sözlüklerde Arapça Asıllı Kelimeler İçin Kaynak Dil Olarak Farsça," *Zemin*, no. 1 (2021): 185.

29 Eiman Mustafawi, "Arabic Phonology," in *The Routledge Handbook of Arabic Linguistics*, ed. Elabbas Benmamoun and Reem Bassiouney, Routledge Handbooks (London and New York: Routledge, 2018).

30 Janet C. E Watson, *The Phonology and Morphology of Arabic* (Oxford: Oxford University Press, 2002), 258.

31 Shadiya Al-Hashmi, "The Phonetics and Phonology of Arabic Loanwords in Turkish: Residual Effects of Gutturals" (PhD thesis, University of York, 2016), 25.

32 Andreas Tietze, "Überlegungen über die Lautliche Form der Arabischen und Persischen Lehnwörter im älteren Osmanischen," *Wiener Zeitschrift für die Kunde des Morgenlandes*, no. 82 (1992): 353.

33 Elham R. Rahbar, "Aspects of Persian Phonology and Morpho-Phonology" (PhD thesis, University of Toronto, 2012).

and it is never a credible approach to make phonetic statements based on written texts. So, we cannot find the sound at issue in these languages. Furthermore, to determine the source is a very complex issue. Stachowski (2021), for instance, uses Bayes method to classify the source and bridge languages for these loanwords by evaluating diachronic data.[34] Explaining t-palatalization by assuming different sources is putative and diachronically unprovable.

Another problem with the account that relates the palatalized *t* to a donor language is that the process is productive and not limited to Arabic origin words. See the following:

(10) */barikat-a/* *[barikat-e]* 'to the barricade'

This word is of French origin, with no relation to Arabic or Persian, but we still observe the disharmony at least among the younger generation. Still, one might argue that there does not necessarily have to be a direct parallelism with the original forms in the donor language for these cases to be lexical in Turkish. This is one of the possibilities but there is another one that I believe is quite strong: The disharmonic cases with root-final *t* have some very clear patterns which make the process regular and predictable. The next subsection provides a new observation on whether t-palatalization is lexical and unpredictable or whether it is subject to certain conditions and is predictable. It shows that the former assertion, which is generally accepted in the literature on this subject, is a fallacy caused by lack of data.

3.2. Conditions

Among grammarians, the only observation about the regularity of the distribution of palatalized *t* is made by Lees (1961). Although there is no phonetic difference in Turkish and Persian, the Arabic-origin emphatic *t* and the non-emphatic *t* seem to preserve some of its phonological properties in the recipient languages.[35] According to Lees (1961), palatalization in Turkish is subject to the existence of these two different segments in Arabic: the emphatic *t* which is written with the letter ط and the non-emphatic *t* which is written with the

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34 Kamil Stachowski, "Detecting Persian Mediation in Arabisms in Turkish," *Studia Linguistica Universitatis Lagellonicae Cracoviensis*, no. 138 (2021): 50.

35 Kamil Stachowski, "Phonetic Renderings in Turkish Arabisms and Farsisms," *Türkbilig*, no. 40 (2020): 14.

letter ت. To reiterate, no phonetic difference exists between these two segments, i.e., they are pronounced the same way in Turkish. Lees (1961) observes that although the emphatic *t* is not available phonetically in Turkish, it does not lose all of its properties (we can call it another case of absolute neutralization). Being emphatic, ط can never be palatalized, in contrast to the non-emphatic counterpart ت.

(11)	*/fakat-a/*	*[fakat-a]*	'to the but'
	/sakat-a/	*[sakat-a]*	'to the injured'
	/sukut-a/	*[sukut-a]*	'to the degradation'
	/tabut-a/	*[tabut-a]*	'to the coffin'
	/tavassut-a/	*[tavassut-a]*	'to the mediation'

All roots in (11) originally end in emphatic *t* and they are never changed into a palatalized *t*. His observation is actually true up to a point because we do not have even one disharmonic example with a word ending in an emphatic *t*. However, it certainly needs amendment because there are few challenging examples with an emphatic *t* that this proposal cannot explain. These include the de-palatalization of root-final non-emphatic *t*.

(12)	*/ruhsat-a/*	*[ruhsat-a]*	'to the license'

Although the root *ruhsat* "license" ends in a non-emphatic *t*, no disharmony occurs. Lees (1961) says nothing about such cases which are very common in Turkish. I demonstrate that these cases are also perfectly predictable. In my proposal, we do not need to know if the segment at stake is originally an emphatic *t* or a non-emphatic *t*. The phonological structure of the roots can explain all the data including the ones in (11). Here is my observation:

(13) If: a. a root-final */t/* is preceded by a short *a* and
b. this short *a* is preceded by
i. a long vowel, or
ii. a geminate, or
iii. a vowel including I (a front vowel),

then it can easily be predicted that the root-final */t/* can share the element I, causing vowel disharmony, unless it is not followed by a parametrically p-licensed empty nucleus (i.e., unless no suffix comes after it).

The following exemplifies (i), (ii), (iii), respectively:

(14) */ta:kat/* 'endurance'
/sıhhat/ 'health'
/sürat/ 'speed'

All of the examples above include a short *a* before the final consonant */t/*. The first example */ta:kat/* "endurance" includes a long vowel in the position in question. The second example */sıhhat/* "health" includes a geminate just before *a* and the last one */sürat/* "speed" includes *ü* followed by *a*. The segment *ü* (U.I) contains the element I. Predictably, all of the root-final segments disobey I harmony whenever a suffix is added.

(15) *[ta:kat-in], *[ta:kat-ın]* 'of the endurance'
*[sıhhat-e], *[sıhhat-a]* 'to the health'
*[sürat-i], *[sürat-ı]* 'the speed (Acc.)'

The accusative, dative and genitive suffixes do not include a lexical I element. Since no nuclear source for I-spreading occurs, the forms **ta:kat-ın*, **sıhhat-a* and **sürat-ı,* are the expected forms. Nevertheless, these forms are not attested. Apparently, the root-final *t* has to be followed by a vowel including I. In other words, it has to share I with the following vowel. We can now look at some other loanwords ending in *t* but do not cause vowel disharmony in Turkish:

(16) */bera:t-a/* *[bera:t-a]* 'to the title of privil,ege'
/edebiya:t-a/ *[edebiya:t-a]* 'to the literature'
/ma:lu:ma:t-a/ *[ma:lu:ma:t-a]* 'to the information'
/müka:fa:t-a/ *[müka:fa:t-a]* 'to the reward'
/müla:ka:t-a/ *[müla:ka:t-a]* 'to the interview'
/neşa:t-a/ *[neşa:t-a]* 'to the elation'
/tahki:ka:t-a/ *[tahki:ka:t-a]* 'to the inquiry'

All of the words in the above example have long *a* originally. Since all of the examples in (16) contain a long vowel, the root-final *t* cannot share I regardless of whether or not the other three conditions in (13b) above exist. In other words, the condition in (13a) is not met, hence no disharmony is predicted to occur. Below are listed examples of some words which end with a short *a* before *t* but which do not satisfy the conditions given in (13b).

(17)	*/fırsat-a/*	*[fırsat-a]*	'to the opportunity'
	/fıtrat-a/	*[fıtrat-a]*	'to the disposition'
	/maslahat-a/	*[maslahat-a]*	'to the affair'
	/rahat-a/	*[rahat-a]*	'to the comfortable'
	/ruhsat-a/	*[ruhsat-a]*	'to the license'
	/saltanat-a/	*[saltanat-a]*	'to the reign'
	/sanat-a/	*[sanat-a]*	'to the art'
	/sıfat-a/	*[sıfat-a]*	'to the adjective'
	/vuslat-a/	*[vuslat-a]*	'to the reunion'

This time, the segment *t* is preceded by a short *a*. The first condition in (13a) that there must only be a short *a* before *t* is met. The reason for the lack of disharmony, then, is that this short *a* is not preceded by a long vowel, or a geminate, or a vowel including I, as per (13b).

The distribution of t-palatalization presented in this subsection illustrates clearly that its environment is absolutely rule-conditioned and predictable. In the next subsection, I give responses to some criticisms raised against the validity of my proposal.

3.3. Responses to Canalis and Dikmen (2021)

A recent, and perhaps the most detailed, account of palatalization in Turkish has been proposed by Canalis and Dikmen (2021). Unlike former studies, their study depends on experimental data. They raise three main objections to my data and analysis in my PhD thesis on which this paper is based.[36] They investigate the palatal *t* issue which was mentioned in various former works but not analyzed in detail in the literature in an organized way.[37] Since they claim that palatal *t*

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36 Halil I. Iskender, "The Phonology of Arabic Loanwords in Turkish: The Case of T- Palatalisation" (PhD thesis, SOAS, University of London, 2015).

37 For disputed cases like Turkish t-palatalization, it would be more appropriate to rely on corpora rather than control pronunciation. As has been observed, control pronunciation comes with the potential danger of misleading the experimenter in priming the subject into producing what the experimenter intends to get. Indeed, the contrastive pairs of words like *dikkat* "attention" and *kat* "floor", which Canalis and Dikmen (2021) ask the subject to pronounce, can be pronounced differently in isolation especially if the subject is an educated or a bilingual person. However, in daily speech data from different age groups, no phonetic distinction is found in my study. The computer program Praat also confirms my auditory judgements.

is a lexical and phonetically realized member of Turkish phonemic inventory,[38] their proposal contradicts my analysis in several ways. The drawbacks of such an analysis has already been revealed in Section 2. Below, I address their counterarguments.

The first problem they see in my analysis is that the conditions are too complicated because there are gemination, length and frontness at hand. Such a palatalization rule, they claim, does not have counterparts in any other language. The second problem, which is closely related to the first one, is that most of the words are from Arabic, which has only *a* and *u* as back vowels and is rich in terms of geminates and length. So, such an environment is not dependable to claim that Turkish speakers have a synchronic rule for t-palatalization. Even if they have one, according to them, one can reverse the inference and say that irregular root vowels are expected to be long and consonants to be geminate.[39]

I address these criticisms in turn. Firstly, consonant gemination and vowel length are not very distant concepts from a structure-based point of view. As will be discussed in Section 4, they both create closed domains. Thus, it is highly expectable in the theory that they behave similarly.

Secondly, it is true that most of the words are originally from Arabic but Turkish speakers are not aware of it. There are tens of examples with root-final *t* without any gemination or length in the penultimate syllable and those are perfectly harmonic. We are not talking about several words but hundreds of words. If there were an observably consistent pattern, it should tell us something.

Lastly, as far as I know, no framework in today's phonology proposes that a phonetic realization of a segment is capable of changing the metric or syllabic structure of a word. Even the strictest GP analysists admit that syllable structure is always primary and never derived from any aspect of phonological structure.[40] The introduction of syllabic structures into phonological patterns is not something recent or eccentric. There is a large body of literature in Autosegmental and

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38 Canalis and Dikmen, "Turkish Palatalized Consonants," 47.

39 Canalis and Dikmen, "Turkish Palatalized Consonants," 46.

40 Jonathan Kaye, "The Ins and Outs of Phonology," in *The Form of Structure, the Structure of Form: Essays in Honor of Jean Lowenstamm*, ed. Noam Faust et al., Language Faculty and Beyond. Internal and External Variation in Linguistics, Volume 12 (Amsterdam and Philadelphia: John Benjamins Publishing Company, 2014), 255–56.

Metrical Phonology that clearly demonstrates the explanatory power of syllabic structures in phonological processes. Intonation, stress, devoicing, lengthening, vowel-zero alternation and even acquisition related topics in genetically unrelated languages can be explained by the heaviness of syllables.[41] Besides, there have already been studies underlining the significance of syllable structure in phonological processes of Turkish. Sezer's (1981) famous explanation for Turkish irregular stress depends solely on syllable structure.[42] Word-final devoicing is also related to syllable structure. Then, what makes palatalization so different?

Finally, their third, and according to them the strongest, counterargument -which is indeed the weakest one- is that there is at least one disharmonic word which cannot be explained by the conditions in (13). At issue is the word *kabahat* "fault". According to Canalis and Dikmen (2021), the penultimate syllable does not contain a long vowel and therefore the word should not be disharmonic even though it is, contra my account.[43] First of all, the proper pronunciation of this word in Standard Turkish is with a long vowel. This is confirmed by the Redhouse dictionary,[44] which is the most reliable and noncontradictory source for pronunciation among Turkologists. In any case, it is clear that a considerable number of speakers of Standard Turkish (especially younger generations) do not utter such words with a distinctive long vowel anymore. The authors are certainly right here and it is not just one word unlike what they claim but sixteen of thirty-one words in Appendix (Table 1) are actually pronounced with a shorter vowel in the penultimate syllable by many speakers. What Canalis and Dikmen (2021) overlook is that the word *kabahat* is never pronounced with *h* if the penultimate vowel is short.

(18) a. Dialect A:	*/kaba:hat-a/*	*[kaba:hate]*	'to the fault'
b. Dialect B:	*/kaba:hat-a/*	*[kabaate]*	'to the fault'

It is a clear case of h-deletion which is very commonly observed when the consonant at issue is between two vowels. When h-deletion occurs between two

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41 Paul Newman, "Syllable Weight as a Phonological Variable: The Nature and Function of the Contrast between 'Heavy' and 'Light' Syllables," *Studies in African Linguistics* 3, no. 3 (1972): 302–3.

42 Engin Sezer, "On Non-Final Stress in Turkish," *Journal of Turkish Studies* 5 (1981).

43 Canalis and Dikmen, "Turkish Palatalized Consonants and Vowel Harmony," 46.

44 Redhouse, *Redhouse Türkçe-Osmanlıca-İngilizce Sözlük*, 572.

identical vowels, the long vowel before *h* comes to be pronounced as a short vowel. We observe the same process in certain words that have an intervocalic glottal stop in the original form of the word in the donor *language*.

(19) */sa:at-a/* *[saate]* *'to the hour'*

The absence or exact degree of length in such words where two identical vowels become phonetically adjacent because of an intervocalic *h* or glottal stop is not a structural issue. As Pöchtrager (2006) explains in detail, vowel length is not a simple notion as it is not a dichotomy. The melodic content of a vowel and its structure are different things. In (19), an empty onset position after the long *a* is present. Phonetically, it is not easy to describe which of these vowels sounds shorter or longer as they are adjacent but this does not affect the phonological representation. The interpretation of the melody can differ from one listener to another. One may say there are two short vowels or just one long vowel or one long and one short vowel. Words like *saat* "hour" with two adjacent identical vowels had been uttered with a more distinguishable long vowel and a following short vowel in the 19th century[45] but very few among the old generation still keep an obvious length in such words. Nonetheless, melody and structure are expected to be independent of each other.[46] This is an acoustic issue. Therefore, these examples do not create a problem for the analysis of t-palatalization. If one brings a disharmonic example that (i) has no h- or glottal stop-deletion, (i.e., a context where identical vowels are not adjacent), or that (ii) the penultimate vowel is still short, it would indeed pose a strong challenge for the analysis developed in this study. Potential examples of such cases include *sakat* 'crippled' and *sanat* 'art', which are predictably harmonic. To the best of my knowledge, there are no disharmonic examples of the type described above, and my experiment with such words confirms the reliability of the condition in (13):

(20) a. Dialect A: */liya:kat/,* *[liya:katsiz]* 'qualification, unworthy'
Dialect B: */liyakat/,* *[liyakatsız]* 'qualification, unworthy'
b. Dialact A: */refa:kat/,* *[refa:katçi]* 'escort, companion'
Dialect B: */refakat/,* *[refakatçı]* 'escort, companion'

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45 James Redhouse, *Turkish and English Lexicon* (Istanbul: A. H. Boyajian, 1890).

46 Markus A. Pöchtrager, "The Structure of Length" (PhD thesis, Universität Wien, 2006), 19.

Unlike (18) and (19), in (20), no phonetically uninterpretable onset positions occur after the penultimate nuclei. Thus, it should be the structure (not melody) that is responsible for the presence or absence of the length. For Dialect A speakers, *liyakat* "qualification" and *refakat* "escort" are always with a long penultimate *a* whereas for Dialect B speakers, the penultimate vowels are always short. Therefore, the phonological representations are different for the two in that the former has an extra nuclear position which creates a closed domain, while the latter has only one nuclear position and no closed domain. As we expect based on the conditions in (13), the words are disharmonic for Dialect A speakers and not harmonic for Dialect B speakers. We get similar results when the experiment is done with made-up words:

(21) a. */bira:fat/* *[bara:fate]*
/çıkkat/ *[çıkkate]*
/ükirat/ *[ükirate]*
b. */sutamat/* *[sutamata]*
/kırapat/ *[kırapata]*
/çapa:t/ *[çapa:ta]*

No words in (21) has meaning. My subjects were required to add a dative suffix to these made-up words after they learn how to pronounce them. In (21a), all words are compatible with the conditions in (13) and the subjects pronounce them as disharmonic. In (21b), however, the structures of the words disobey the conditions and the subjects pronounce them as harmonic. In the data, there is no exception. This shows that the conditions have psychological reality, are valid, non-arbitrary and applicable in wide range of environments. The following section presents a theoretical explanation for the given conditions.

4. A Theoretical Explanation

T-palatalization is assumed to apply only when the sequence *-at* is the feminine singular suffix in Arabic. For GP, it may not be implementable since it concerns the semantics of a certain suffix and not something about its structure. For the restrictive nature of the GP framework, this is not a desirable result. Fortunately, the harmonic examples with the same borrowed suffix and the novel non-Arabic examples like *barikat* "barricade" satisfy GP's concerns.

In a complex sentence, the particular meanings of constituents and the conditions for putting them together determine the meaning of the overall

structure.[47] Therefore, determining the structural organization is vital. Phonotactic judgements do not seem as reliable as semantic or syntactic judgements of native speakers. In spite of their potential lack of reliability, sometimes it is possible to find surprising consistency in the definite absence of grammatical knowledge.[48] T-palatalization in Turkish is a perfect example of this.[49] Today, we observe variations in the speech community, which are also rule-governed.

(22) a. Dialect A: */icra:a:t-a/* *[icra:a:ta]* 'to the performance'
b. Dialect B: */icra:at-a/* *[icra:ate]* 'to the performance'

The motivation for vowel length seems stronger for some members of the modern Standard Turkish speech community than others. This leads to variations amongst the speakers. The proper form in the dictionaries is with a long vowel before *t*. Dialect A speakers have this proper pronunciation (22a). Since the structure in their mind does not meet the conditions for t-palatalization, they do not have any vowel disharmony either. Dialect B speakers, on the other hand, do not have a long vowel before *t* (22b). Since their pronunciation of the word meets the conditions in (13), they are expected to have vowel disharmony, and indeed they do. So, if a long *a* (with two nuclear positions) occurs before *t* in the phonological structure, no palatalization or vowel disharmony exists and if a short *a* (with one nuclear position) occurs before *t*, palatalization and vowel disharmony exist.

In GP, phonological processes do not apply if they are not necessary and they do apply if they are necessary. In that sense, phonological processes are expected to be non-arbitrary and exceptionless. If there are exceptions, either something is missing or the process is not actually phonological but lexical. This is stated as follows:

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47 Tacettin Turgay, "Classifier Constructions of Turkish" (PhD thesis, Boğaziçi University, 2020), 11; Tacettin Turgay and Balkız Öztürk, "Structure of Plural Pronoun Constructions," in *Morphological Complexity within and across Boundaries*, ed. Aslı Gürer, Dilek Uygun-Gökmen, and Balkız Öztürk (Amsterdam: John Benjamins Publishing Company, 2020).

48 Charles Reiss, "Substance Free Phonology," in *The Routledge Handbook of Phonological Theory*, ed. Stephen J. Hannahs and Anna R. K. Bosch (London and New York, 2018), 437.

49 The phonological presence of palatalized *t* in Turkish seems to stem from diachronic changes. Some educated elites probably employed this sound first and this usage might have become stronger for the other members of the Standard Turkish community. How it synchronically works, however, is totally conditioned.

(23) Minimalist Hypothesis

"Processes apply whenever the conditions that trigger them are satisfied."[50]

According to Kaye (1995), phonology can possibly interact with morphology in two ways: (i) the morphological structure is invisible to phonology, e.g., the phonology does not recognize any internal structure of a word, or (ii) it can recognize morphologically complex structures. He concludes that morphological structures can have a little effect on phonology in certain cases.[51] I will argue that distribution of palatalized *t* is one of these certain cases where morphological structures interact with phonology. Below, I first examine how disharmonic cases can be analyzed from the GP point of view, then investigate the two types of roots where the penultimate feet include a long vowel or a geminate and create a closed domain in the phonological structure. Then I discuss the third and problematic type of cases when the element I outside the final foot can trigger I-sharing

4.1. The Sharing Condition and the Floating I

Within the GP framework, vowel disharmony after palatalized consonants can be assumed to be an outcome of the element sharing process. The relation between palatalized consonants and the flanking vowels is non-directional. Both participants equally share the element at hand.[52] In other words, elements do not spread from one position to the other but rather they are shared by the onset and nuclear positions. This is stated in the Sharing Condition:

(24) Sharing Condition

"Nuclei share the element I or U with their onsets."[53]

Let us recall *idrakin* from (7) and try to represent it with the help of the Sharing Condition:

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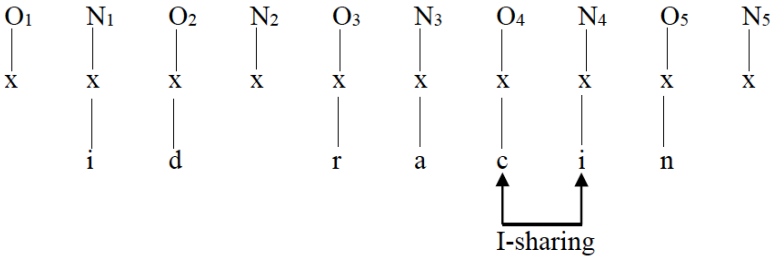
50 Jonathan Kaye, "Derivations and Interfaces," in *Frontiers of Phonology: Atoms, Structures, Derivations*, ed. Jacques Durand and Francis Katamba, Longman Linguistics Library (London and New York: Longman, 1995), 291.

51 Kaye, "Derivations and Interfaces," 301-3.

52 Edmund Gussmann and Jonathan Kaye, "Polish Notes from a Dubrovnik Café: I: The Yers," *SOAS Working Papers in Linguistics and Phonetics*, no. 3 (1993): 454–56.

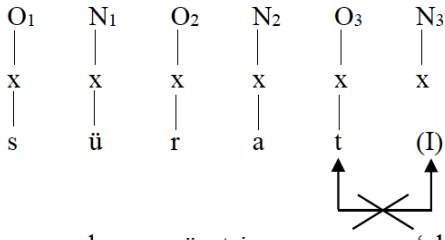
53 Eugeniusz Cyran, "Vocalic Elements in Phonology: A Study in Munster Irish" (PhD thesis, Catholic University of Lublin, 1995), 47.

(25) */idrac-in/* ‘of the comprehension’

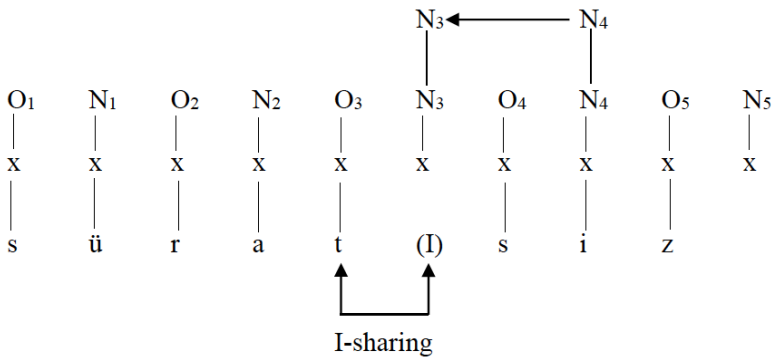


The palatal segment */c/* includes the element I. The positions O_4 and N_4 share this element. It is in this sense that the harmonic process interacts with the palatal consonants. The hypothesis here is that the element does not occupy a position and does not spread into another position. I claim that there is a floating I, which is phonetically null and shared by the palatal consonant and its following empty position.

(26) a. *sürat* ‘speed’



b. *süratsiz* ‘slow’



Although, no phonetic realization of palatalization occurs in (26), in terms of vowel disharmony, the root-final *t* segment has exactly the same properties as the palatal consonant /c/. Thus, although it is not available in the melody, the root-final *t* has its I element in the phonological structure. The derivation in (26b) is identical to that of (25). Notwithstanding a consonant-initial suffix is added to a word, I-sharing is not blocked as can be seen in *sürat-siz* "slow". It is clear that although no phonetically interpreted licensor for root-final *t* occurs, it can share its I element with a phonetically null nucleus and this pseudo empty position –as the head of the harmonic domain– spreads I into the following vowel(s).

The difference between (26a) and (26b) stems from the fact that in the former, N_3 is parametrically p-licensed, whereas in the latter it is properly governed by N_4. Licensing Inheritance states that a position can a-license more melodic material if it is directly p-licensed by the ultimate head.[54] It is well documented that parametrically p-licensed domain-final empty nuclei exhibit peculiar features in a variety of languages.[55] Here, it seems that it is in a weaker position than a properly governed position. In (26a), O_3 is licensed by the parametrically p-licensed domain-final empty nucleus N_3 and it cannot a-license the element I, while in (26b), the p-licensing potential of the properly governed empty nucleus N_3 is enough to provide O_3 with a-licensing power to host its I.

In sum, the disharmony can surface after root-final *t* followed by a nucleus position which is not parametrically p-licensed but is suppressed elsewhere. This accounts for the process but the conditions for the triggering environment in (13) are still a mystery. The presence of I-sharing in the root-final position is directly related to the structure of the root as discussed before.

4.2. The License to Share and the Phonological Feet

In order to analyze the conditions, I use the notion of "foot" from Metrical Phonology. I assert that there are two feet in the structure and I-sharing can be realized only with the help of licensing from the foot outside. The element I is needed when its nuclear position is licensed from the preceding foot. For

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54 John Harris, "Licensing Inheritance: An Integrated Theory of Neutralisation," *Phonology*, no. 14 (1997): 340.

55 Monik Charette, *Conditions on Phonological Government* (Cambridge: Cambridge University Press, 1991), 134-39.

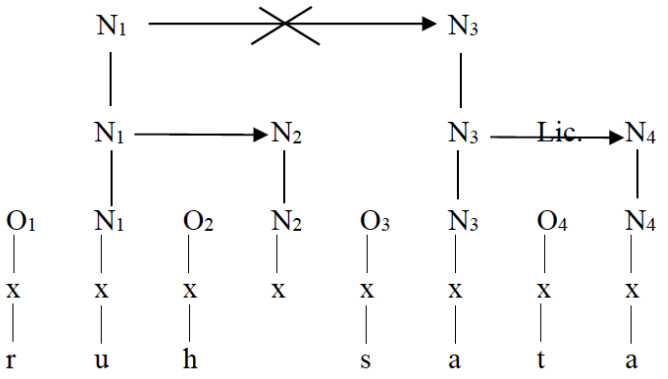
licensing to be realized, I assert that certain conditions on the nuclei of final and penultimate feet have to be met. If no foot meets these conditions, since no licensing relationship exists and the floating I does not need to be shared by *t*, then it remains phonetically null, i.e., no I disharmony occurs.

Foot is the main unit of rhythm, typically including two syllables, one of which bears the stress.[56] In GP terms, a foot is a phonological unit which contains a nuclear head and a nuclear dependent. The word *kara* "land", for example, includes one foot with two nuclear positions, whereas in a word like *karasal* "terrestrial", there are two feet with four nuclear positions, including the domain-final empty one. I propose that in order for the floating I to be active phonologically, the position hosting the element I has to be licensed from the foot outside. However, for this licensing relation to be realized, certain conditions must be met:

(27) i. The head of the final foot must contain only the element A.
ii. The penultimate foot must constitute a closed domain.

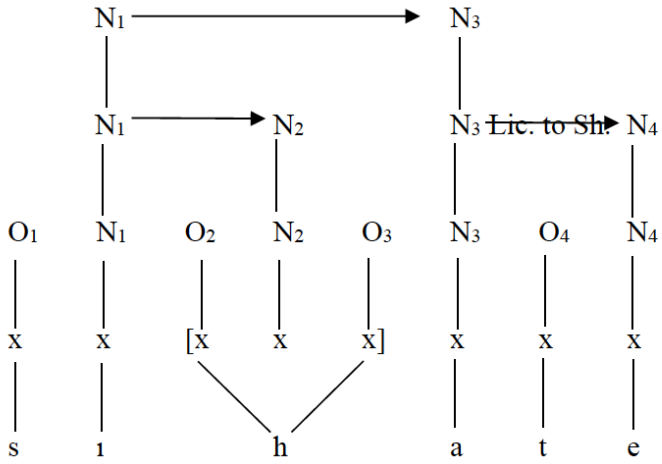
The former condition necessitates a short vowel before *t*. The latter excludes all possible roots that do not include a long vowel or a geminate in their penultimate foot.

(28) a. *ruhsat-a* 'to the license'



b. *sıhhat-e* 'to the health'

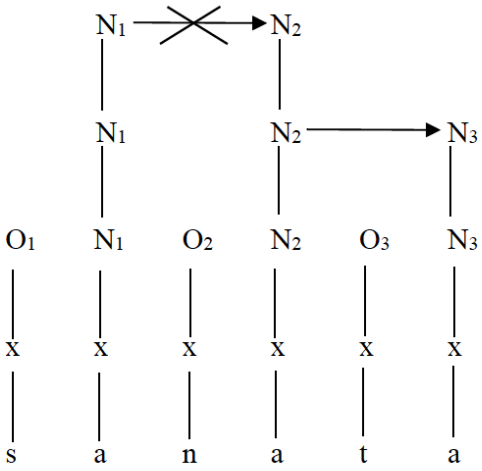
56 Trask, *Dictionary of Phonetics and Phonology*, 147.



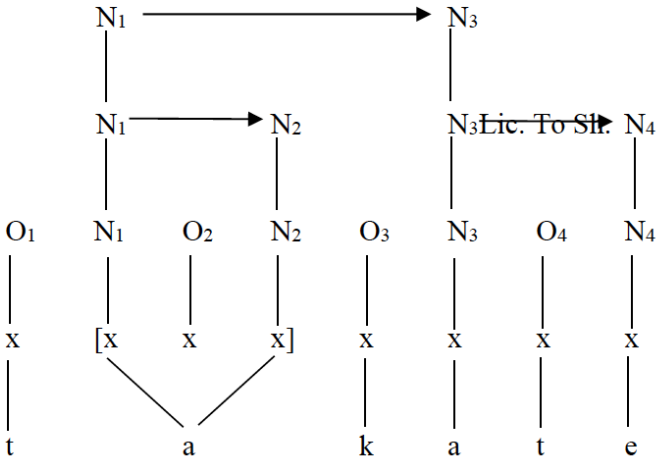
Lowenstamm (1999) discusses the concept of the closed domain with examples from various languages. According to him, a buried nucleus position in a closed domain is not able to license any positions.[57] I claim that (i) licensing to share can only be possible if the penultimate foot has a buried dependent and (ii) only geminates and long vowels can constitute a closed domain in Turkish. In (28a), since the dependent position of the penultimate foot N_2 is not buried in a closed domain, the head of the final foot N_3 cannot be licensed by the head of the penultimate foot N_1. Therefore, N_3 cannot license to share N_4. In (28b), however, the buried position N_2 renders the licensing relation between the heads of two feet possible. Thus, N_3 can license to share N_4. Now, see the following:

57 Jean Lowenstamm, "The Beginning of the Word," in *Phonologica 1996: Syllables!?*, ed. John Rennison and Klaus Kühnhammer (Hague: Thesus, 1999), 158.

(29) a. *sanat-a* ‘to the art’



b. *ta:kat-e* ‘to the endurance’

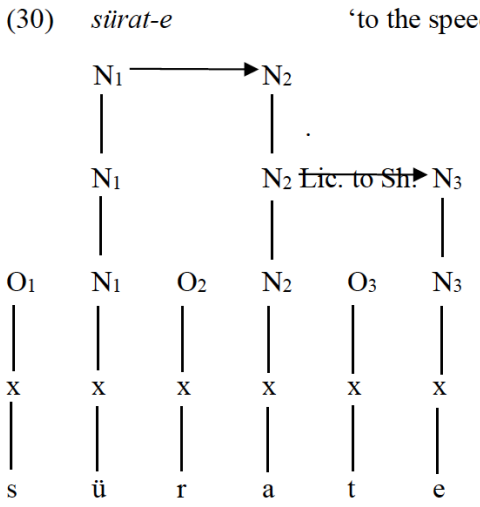


This time, in (29b), there are two nuclear positions which constitute a foot and the head of this foot can license N_4. In (29a), however, the example does not have a closed domain. In fact, it does not even have a second foot. The second projection of N_1 cannot license N_2 and N_2 cannot license to share N_3. Therefore, no I-sharing occurs. The behavior of these two types of roots is explained by

the notions of phonological foot and closed domain but the last type cannot be explained by the same approach.

4.3. Outlier Cases: The Element I outside the Final Foot

There are also roots that do not contain a geminate or a long vowel and therefore cannot constitute a closed domain but are still disharmonic. These roots include an I-containing vowel in the antepenultimate nuclear position.



The representation in (30) is out of the ordinary. It is clear that the element I in N_1 has some kind of triggering function on the palatalization process. However, it is totally unexpected from a GP point of view. Unlike the samples that have been discussed in the previous subsection, the phenomenon in question is not related to the foot structure. A penultimate foot is not needed and, more importantly, the melodic content of the position - that is, the presence of I - can affect the process. It is clear that there is an intervening position N_2. It cannot be a case of I-spreading from the leftmost vowel *ü* in a word like *süratsiz* "slow", because of the intervening back vowel.

My proposal does not straightforwardly account of cases like *sürate* "to the speed". In what follows, I hypothesize an alternative mechanism that can be explored. The possibility that the */a/* in *-at* is a transparent vowel could be

considered. A transparent vowel is one whose realization does not change but through which vowel harmony can proceed uninterruptedly. For example, in Mongolian the vowel */i/* is always a front vowel phonetically, but, if the first vowel in a word is back and the second vowel is */i/*, all subsequent vowels will be back, even though */i/* is front. Mongolian */i/* is therefore regarded as a transparent vowel.[58] This may also explain why only the vowel *a* before *t* can cause vowel disharmony but not the other back vowels *u*, *o* and *ı*. Indeed, peculiarities from various languages have been documented in the behavior of element A. Based on that data, Pöchtrager and Kaye (2013) posit that phonological expressions containing A element have more structural space in their representation.[59] This might give us new horizons for understanding both cases without a closed domain and for the special properties of *a* before *t*.

5. Concluding Remarks

This paper has been an attempt at presenting a descriptive and theoretical contribution to the study of Turkish phonology by focusing on the phenomenon of t-palatalization within the GP framework. Since t-palatalization can never surface phonetically according to my experimental data, observing root-external vowel disharmony is the only way to see whether or not a phonological effect of t-palatalization process occurs. I have brought in new observations on the distribution of purported palatalized *t* and proposed that its distribution is not lexical but rather can easily be predicted from the structural and phonological environment of the roots.

Under the assumption that phonology is not independent of phonetics, some scholars claim that there is or should be a phonetically realized palatalized *t* in Turkish in order to be able to explain certain unexpected disharmonic cases, while others do not mention the phonetic nature of this *t* at all, probably because they cannot determine any phonetic correspondence. Indeed, given my data, the claim that the *t* sound in these words is palatal is unfounded. On the other hand, since GP states that phonology is entirely distinct from phonetics

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58 John Goldsmith, "Vowel Harmony in Khalkha Mongolian, Yaka, Finnish and Hungarian," *Phonology Yearbook* 2, no. 1 (1985): 258–59.

59 Markus A. Pöchtrager and Jonathan Kaye, "GP 2.0," *SOAS Working Papers in Linguistics* 16 (2013): 58.

and that phonological phenomena are independent of pronunciation,60 saying that there is a phonological unit that has no phonetic manifestation in modern Standard Turkish is not going to be a problem for the framework. Thus, I have elaborated the issue as a clear case of absolute neutralization. However, whether palatalized *t* is phonetically silent or not does not change the gist of my analysis. If, in contrast to my findings, it is found to be available in the dialects of some Standard Turkish speakers, then the conditions could be reinterpreted as constraints governing the distribution of this sound (or allophone in generative phonology terms).

APPENDIX: Disharmonic words with root-final *t*

Table 1: Roots Containing a Penultimate Long Vowel

1.	*/bela:gat/*	'elocution'
2.	*/bela:hat/*	'imbecility'd
3.	*/bera:at/*	'dismissal'
4.	*/bi:at/*	'obeisance'
5.	*/cema:at/*	'community'
6.	*/cera:hat/*	'suppuration'
7.	*/fera:gat/*	'demise'
8.	*/haki:kat/*	'reality'
9.	*/hama:kat/*	'stupidity'
10.	*/istira:hat/*	'rest'
11.	*/ita:at/*	'obedience'
12.	*/kaba:hat/*	'fault'
13.	*/kana:at/*	'conviction'
14.	*/kera:hat/*	'aversion'
15.	*/kıra:at/*	'reading'
16.	*/liya:kat/*	'qualification'
17.	*/menfa:at/*	'benefit'
18.	*/nasi:hat/*	'advice'
19.	*/refa:kat/*	'escort'
20.	*/sa:at/*	'hour'

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60 Stefan Ploch, "Nasals on My Mind: The Phonetic and the Cognitive Approach to the Phonology of Nasality" (PhD thesis, University of London, 1999), 21-22.

21. */sada:kat/*	'loyalty'
22. */sara:hat/*	'unambiguousness'
23. */sefa:hat/*	'profligacy'
24. */seya:hat/*	'travel'
25. */şeca:at/*	'bravery'
26. */şeri:at/*	'religious law'
27. */tabi:at/*	'nature'
28. */ta:kat/*	'endurance'
29. */tari:kat/*	'religious order'
30. */zana:at/*	'craft'
31. */zira:at/*	'cultivation'

Table 2: Roots Containing a Penultimate Geminate Cluster

1. */dikkat/*	'attention'
2. */meşakkat/*	'fatigue'
3. */muvakkat/*	'temporary'
4. */rikkat/*	'delicacy'
5. */sıhhat/*	'health'

Table 3: Roots Containing a Penultimate Front Vowel

1. */barikat/*	'barrier'
2. */fırkat/*	'separation'
3. */hilat/*	'robe of honor'
4. */hilkat/*	'creation'
5. */lügat/*	'dictionary'
6. */rekat/*	'movement in praying'
7. */ricat/*	'retreat'
8. */sirkat/*	'theft'
9. */sürat/*	'speed'
10. */şefkat/*	'affection'

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