

Optimality and Element Theory: The case of initial fricative voicing in Southern Old and Middle English

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Choi, Jaehyeok. 2016. Optimality and Element Theory: The case of initial fricative voicing in Southern Old and Middle English. *Studies in Phonetics, Phonology and Morphology* 22.1. 77-103. This study examines the nature of consonant weakening processes (i.e. lenition) within the framework of Optimality Theory. In order to delve into the current topic more deeply, the voicing of initial fricatives particularly in the southern and south-western dialects of Old and Middle English is investigated. I argue that the *COMPLEX[Element] constraint, where ‘element’ refers to one of the primitives of Element Theory, plays a central role in analysing weakening processes within this theoretical framework. In addition, it is demonstrated that lenition processes such as the voicing of consonants can be accounted for within the constraint interaction between positional faithfulness constraints such as IDENT[element] and the integrated constraint *COMPLEX[Element] which I propose.
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1. Introduction

This study investigates a phonological weakening process of consonants in the history of English and provides a theoretical account of the voicing of initial fricatives particularly in the Old and Middle English period. This phenomenon has been called “Old English Fricative Voicing” (Lass 1994), “Voicing of initial fricatives in Middle English” (Fisiak 1984), and “Southern English Fricative Weakening” (Honeybone 2012). The voicing of initial fricatives in the history of English is well known among English historical phonologists and philologists, and has long been discussed in both historical and theoretical phonology (Mossé 1952, Bennet 1955, Luick 1964, Fisiak 1984, Lass 1991/1993, Hogg 1992, Nielsen 1994, Honeybone 2001). This phenomenon has been observed in the Southern and South-western dialects of Old and Middle English and it has generally been regarded as a

phonological progression in those regions between two periods (Nielsen 1994: 19).

The key questions to be investigated in the current study are as follows: 1) How do we analyse lenition phenomena in terms of segmental representation? 2) How can segmental features and elements be integrated into the constraint ranking and evaluation mechanisms in Optimality Theory? 3) Do the data of the voicing of initial fricatives in the southern Old English give us any insight in this regard?

I suggest a theoretic account of the voicing of initial fricatives in the southern Old and Middle English by combining Element Theory (Harris 1994, Backley 2011) and Optimality Theory (Prince and Smolensky 1993, henceforth OT). The combination of the two theories differentiates this account from previous analyses. I argue that the *COMPLEX[Element] constraint, where ‘element’ refers to one of the primitives of ET, plays a central role in analysing the weakening processes discussed in this study. In addition, it is shown the lenition processes, that is, the voicing of initial fricatives can be accounted for using the interaction between a positional faithfulness constraint IDENT[Element], and the markedness constraint *COMPLEX[Element], which I propose in this research.

2. Data

2.1 When did voiced fricatives develop phonemic status?

Nearly all OE handbooks (Mossé 1952, Bennet 1955, Dobson 1968, Hogg 1992, Lass 1992,) have dealt with voicing (and devoicing) of fricatives in a way that the voiced segments [v], [ð], and [z] were analysed not as separate phonemes, but rather as allophones of phonemes /f/, /θ/, and /s/ since the voiced fricatives only occurred between voiced sounds¹.

¹ However, there is a more specific environment regarding this process. Voiced fricatives did not occur between voiced sounds when the immediately preceding syllable was unstressed. For example, words such as *befaran* ‘go round’, *gēþanc* ‘mind’, and *asendan* ‘send forth’ indicate that fricatives *f*, *þ*, and *s* were voiceless respectively (Hogg 2011: §7.54). See Table 1 for the detailed description.

Table 1. The distribution of fricatives in OE
(Laker 2009: 214, Hogg 2011: §7.54)²

<f, þ, s> = [f, θ, s]				
#_	_#	V_Ṽ	C _[-VOICE] _V	V_ C _[-VOICE]
<i>fōt</i> 'foot'	<i>Wulf</i> 'wolf'	<i>Befaran</i> 'go round'	<i>(scip-fyrd)</i> 'fleet'	<i>Sōfte</i> 'soft'
<i>þorn</i> 'thorn'	<i>bæþ</i> 'bath'	<i>gēþanc</i> 'mind'	<i>strengþu</i> 'strength'	<i>snīþst</i> 'cut 2.Sg.'
<i>sumu</i> 'son'	<i>hūs</i> 'house'	<i>asendan</i> 'send forth'	<i>miltian</i> 'pity'	<i>cyste</i> 'kissed'
<f, þ, s> = [v, ð, z]				
Ṽ_V	C _[+VOICE] _V	V_C _[+VOICE]		
<i>gērēfa</i> 'reeve'	<i>þurfan</i> 'need'	<i>swefn</i> 'dream'		
<i>snīþan</i> 'cut'	<i>furþor</i> 'further'	<i>fæþm</i> 'embrace'		
<i>çēosan</i> 'choose'	<i>clānsian</i> 'cleanse'	<i>bōsm</i> 'bosom'		

As shown in Table 1 above, voiceless [f, θ, s] occurred initially, finally and medially while voiced [v, ð, z] occurred only between voiced sounds when a preceding vowel was stressed in OE.

A phonemicisation of voiced fricatives in OE and ME (henceforth, ME) have been a common topic to historical phonologists (Kurath 1956, Sledd 1958, Lass 1992: 57-61; 2006: 62, Trnka 1982: 224-231, Laker 2009, Minkova 2011). It is generally agreed among historical linguists that French loanwords was a major factor in the phonemicisation of the voiced fricatives in ME because in OE, voiced fricatives occurred only between voiced sounds as the allophones of the voiceless fricatives. Therefore, we can infer these sounds attained the phonemic status in ME period.³

² As Laker puts it in footnote 4 (Laker 2009: 214), there is no simplex word which contains [f] in the environment C_[-voice]_V. *Scip-fyrd* is a compound word of two words such as *scip* 'ship' and *fyrd* 'army'.

³ See Laker (2009) for an alternative view.

Now, we need to answer two questions shown below in order to understand the process of the phonemicisation of voiced fricatives in the history of English more specifically: 1) When and how initial and final voiced fricatives are introduced in the history of English? 2) When and how a medial voiceless fricative was established in the history of English?

As for the first question shown above, it can be seen that French loanwords brought voiced fricatives in English phonemic system during ME. For instance, Old French vocabularies beginning with [v] and [z] such as *vertu* 'virtue', *vileynye* 'villainy', *zēle* 'zeal', and *zodiac* 'zodiac' (Fisiak 1984: 60) were adopted in ME. This influenced ME speakers' pronunciation quite seriously in such a way that voiced fricatives were articulated in the initial position in ME. Voiced fricatives also appeared in final position due to the loss of unstressed vowels. Some relevant examples are *liven* 'live', *bāthen* 'bathe', and *risen* 'rise'.⁴

Voiceless fricatives started to be pronounced in the medial position by ME speakers. In OE, voiceless fricatives could only occur medially in intervocalic positions when they were geminate consonants. However, these geminate fricatives were shortened to singletons in ME by the process of degemination. For instance, in a word like *Offa* [ɔf:a] 'someone's name', a geminate fricative /ff/ was shortened to /f/ in medial position, and then pronounced not as [ɔva] but as [ɔfɑ]. Thus it can be seen that, after simplification of geminate sounds, a voiceless fricative appeared in the medial position.

2.2 Initial fricative voicing in Old and Middle English

2.2.1 Previous explanations

2.2.1.1 Geographical differences of a voice contrast of initial fricatives in ME

It has been very well-known among historical phonologists that the voicing of initial fricatives occurred in the southern English between Old and Middle English periods. Unlike other regions in England at those times, southern dialects underwent a unique development of fricatives especially in initial position. Fisiak (1984) describes some contrasting development of voiceless / voiced fricatives in Old and Middle English in

⁴ Concurrently with the deletion of unstressed vowels, the final *-n* in these words were deleted. In the end, voiced fricatives were pronounced in the final position in ME.

accordance with regional divisions in England. In addition, he explains both phonologically quantitative and qualitative modifications which can be seen as one of diachronic mechanisms in order to capture a phonemic status of fricatives. The latter is represented first. According to Fisiak (1984: 57-61), it has been observed that both quantitative and qualitative changes to phonological segments tend to happen through the history of English. More importantly, they interact with each other and it usually results in bringing something new into the phonemic system in the language. As for a quantitative changes first, geminate fricatives [ff, þþ, ss] occurred in an intervocalic environment in OE, and these long (geminate) consonants contrasted with short (single) ones. When the elimination of geminate consonants occurs intervocalically, a qualitative innovation could follow. In fact, these simplified fricatives [f, þ, s] appeared between voiced sounds where previously only voiced fricatives [v, ð, z] could turn up. Consequently, it resulted in the emergence of new phoneme such as /v, ð, z/ in that voiceless and voiced fricatives did not show complementary distribution relation any more⁵.

Turning to the main point, geographical distributions of initial fricatives in ME are presented here. Following Fisiak's (1984: 59-60) classification, three areas are considered here. First of all, in the North and Midlands dialects, the intervocalic /v, z, ð/ appeared to be the separate phonemes first around 12th century, and then the initial /v, z/ showed a phonemic status after the arrival of French loanwords (e.g., *vertu* 'virtue', *vileynye* 'villainy', *zēle* 'zeal', *zodiac* 'zodiac'). Secondly, the contrasts between /f, s/ and /v, z/ first appeared in initial position in the South and West midlands and in London about 13th century when French loanwords were brought into these regions. After that, intervocalic /v/ and /z/ were found about 14th century. Thirdly and finally, the southern dialects showed a somewhat different picture from other areas regarding initial voiceless / voiced fricatives. In fact, voiced fricatives such as [v, z] appeared in the initial position in the OE period. Therefore, in the Southern dialect, the influence of French loanwords did not affect the distribution of voiceless and voiced fricatives, especially in the initial position.

2.2.1.2 Endogenous innovation vs. exogenous innovation

To explain the initial fricative voicing occurred in the Southern dialects, two hypothesis were proposed. The first one is that the initial fricative voicing in English

⁵ See Kurath (1956) for a full explanation of this issue.

took place independently in OE and ME. In other words, it is treated as an endogenous change. This view has been proposed by some traditional historical grammarians such as Jespersen 1891, Campbell 1959, and Brunner 1965. For example, Jespersen (1891) claims that the initial fricative voicing in Southern dialects should occur when the preceding sound was a vowel; *ilke uondunges* and *one ureond* vs. *þeos fondunges* and *mot fleon*⁶ (Jespersen 1891: 173-76). According to their theories, an initial voicing phenomenon can be regarded as one of the independent phonological processes which took place in some dialects of Old and Middle English. That is, they do not see any external pressure (e.g. foreign language contact) for this development.

The other hypothesis is 'the Continental hypothesis,' (Fisiak 1984: 5) which treats this voicing as the Germanic innovations before they come to England (Sweet 1888: 139, Bennet 1955). For instance, Bennet (1955) argues that the initial voicing of fricatives was a "Low Franconian process acquired by the Jutes and Saxons, who later settled in Kent and the South-West and brought to England (Bennet 1955: 368-369)". According to this hypothesis, the initial fricative voicing could occur before OE period, which means that it could be treated as the Germanic process rather than English innovation. Bennet's explanation of this phonological process has, however, some drawbacks. For example, there appear little orthographic evidence with respect to this phenomenon.

2.2.2 Data from the southern dialects of OE

There is some difficulty in collecting some data which reveal the initial voicing of fricatives in the southern dialects. For instance, dialects from these regions were usually not involved in the process of standardisation in English. Therefore, there is little orthographic evidence which show this phonological innovation (Honeybone 2002: 71-72). Nevertheless, there are some English spellings recorded to indicate the initial fricative voicing.

The evidence of fricative voicing in ME is given from handbooks. Hogg (1992: 283) and Bennet (1955: 367) indicate that the earliest examples of the change are <uif> 'five' in the Guild Statute of Bedwyn (Wiltshire c.925-50) and <uilmenum> 'film dat. pl.' (c.950). More frequent examples start occurring in the mid-11th century.

⁶ The bold symbols are the affected sounds.

Luick notes that evidence for the change is also found in misspellings, e.g., <finter> for <winter> and <fivel> for <wivel> 'beetle' in the Kentish Coloured Glosses of the 11th century. Luick (1964: 934) points out that the process is very clearly shown for /f/ to /v/ in two 13th century West-Midland manuscripts: Ancren Riwle and the Cathrine Group. In these texts <v> occurs in sentence initial and after vowels and voiced consonants. Luick (1964: 933) argues that the change first took place in these positions. Voiceless fricatives were retained when voiceless sounds preceded them. Jespersen gives us example pairs such as <Ʒeos fondunges> ~ <ilke uondunges>; <scheawēð forð> ~ <sceau uorð>; <Ʒe ueorðe> ~ <Ʒet feorðe>; <Ʒevifte> ~ <Ʒet fifte>; <mine uaon> ~ <his faon>.

In fact, the orthographic evidence of voicing of initial fricative was uncommonly found in English since only southern dialects of English were affected by this process, and these southern dialects contributed little to developing standard Modern English. However, although it seems that this process is unimpressive in terms of linguistic development in English, this phenomenon is worth investigating in that some notable data which have been affected by this process can still be seen in southern dialects of Present-day English in the UK.

3. Theoretical background

There have been discussions which deal with the origin and the date of the initial fricative voicing in the southern Old and Middle English (Bennet 1955, Wakelin and Barry 1968, Fisiak 1984, Lass 1991-1993, Nielsen 1994). However, there have been very few theoretical analyses of this phenomenon (Honeybone 2002, 2012). In other words, previous literatures which dealt with the voicing of initial fricatives have centred not on the process itself but on the non-(purely) phonological conditions such as geographical distribution and language contact. Therefore, due to the absence of theoretical discussion on this process, this paper is intended to provide theoretical analysis of the voicing of initial fricative in OE and ME and make a contribution to our understanding of 'lenition'. Before a theoretical analysis of this lenition process is considered, some general aspects of lenition site and theoretical backgrounds are illustrated first.

3.1 The voicing of initial fricatives in the southern OE and its phonological environment

When the voicing of initial fricatives in the southern OE is considered, the first thing to look at is its phonological environment. Reflected in its name, this phenomenon occurs in initial position in the word. However, this may yield some undesirable consequences in that initial position is not usually treated as lenition site.

Escure (1977) points out that the strength and weakness of a consonant is quite closely connected to its environment. To make it clearer, she offers a set of environments which is likely to show how a segment is weakened by virtue of its environment. In Table 2, glides represent the weakest segment, and voiceless stops the strongest one respectively.

Table 2. Hierarchy of major-class and manner feature (Escure 1977:60)

1	2	3	4	5	6
Glides	Liquids	Nasals	voiced fricatives	voiced stops / voiceless fricatives	voiceless stops

From this hierarchy, we can see that how consonants are reduced (or strengthened) according to their strength value. In addition, Escure provides the environmental hierarchy for consonant strength below in (1).

(1) Positional hierarchy for consonant strength (Escure 1977: 58)

- Final position - a) V__C## or VC__##
 - b) V__C#
 - c) V__#C
 - d) V__##
 - Intervocalic - e) V__V
 - f) V__#V
 - g) V#__V
 - Initial - h) ##__V
- (# = word boundary, c = any consonant, v = any vowel, and ´ = any stressed vowel)

According to the hierarchy shown in (1) above, hierarchical strong/weak positions are arranged in terms of consonant deletion. Escure (1977: 58) claims that an initial position is the least likely to hold this kind of weakening phenomenon (i.e. deletion in this context) whereas a weakening process usually occurs in weak positions such as intervocalic or word-final positions. In other words, there is a clear positional preference for weakening process. She argues that consonantal strength can be defined as “a function of its position in the utterance (Escure 1977: 57-58)” since weakening in intervocalic position assumes weakening in final position, and weakening in initial position indicates weakening in both intervocalic and final positions. In line with this thinking, a consonant weakening or deletion can also be defined as a methodical reduction process, depending on their position in the word.

However, the application of this hierarchy to the initial fricative voicing in the southern OE is problematic. According to Escure’s assumption, when a voicing occurs in initial position, all other positions such as intervocalic and final must also show voicing phenomenon. In other words, there should be only voiced fricatives in the southern dialects after the voicing of initial fricative is innovated, but there is no clear evidence that voiced fricatives only remain in these regions.

It has been suggested that the voicing of initial fricative in the southern OE takes place intervocalic positions at a word level or a sentence level. In other words, this is based on the assumption that this initial fricative voicing in the southern OE is motivated by intervocalic voicing between two words or sentences. In fact, in terms of the scales illustrated in (1) above, the primary environment for the voicing of initial fricative in the southern OE might be g) in (1). For example, Nielsen (1994: 21) refers to Jespersen’s (1891: 173-176) argument that the voicing of initial [f] > [v] occurred intervocalic positions between two words such as ‘*ilke uondunges*’. In this case, initial fricative /f/ in a word like ‘*uondunges*’ was voiced when the former word (i.e. *ilke*) terminated in a vowel. Therefore, the initial <u> in ‘*uondunges*’ indicates the change from voiceless fricative [f] to voiced [v]. Consequently, this voicing process took place between vowels across word boundary.⁷

⁷ The example of *ilke uondunges* is taken from Jespersen. As for the environment of initial fricative voicing in ME, Luick argues that the change took place in sentence initial position and after vowels and voiced consonants. In line with this, Jespersen gives the examples such as <Þeos fondunges> ~ <ilke uondunges>; <scheaweð forð> ~ <sceau uorð>; <Þe ueorðe> ~ <Þet feorðe>; <Þe vifte> ~ <Þet fifte>; <mine uaon> ~ <his faon>. These orthographic evidence for the process is found in ME manuscripts such as ‘Ancren Riwle’

In a similar way, Wakelin and Barry (1968) indicates that initial voicing in the southern OE probably ‘originated in the sentence in intervocalic positions (Wakelin and Barry 1968: 59)’. Here, it is worth noting in full Wakelin’s statement below.

“Common sense suggests that a compromise solution is necessary here. I suspect that initial voicing became a feature of South-Western English, from whatever sources, during the Old English period, that its initial impetus was being lost during the Middle English period, but that some early French loans got it and came down through the ensuing centuries in this traditional form, while others adopted it by analogy to a lesser extent even after the Middle English period. The dialect writers are ambiguous, since on some occasions they may be transcribing genuine traditional forms which had been passed down in the writer’s place of origin or habitation for centuries, while on others they may be indicating voicing indiscriminately.”

Wakelin and Barry (1968: 63)

The point to note about Wakelin and Barry’s statement addressed above is that they use the expression such as ‘from whatever sources’, which means that the voicing of initial fricative in the southern OE is driven by very equivocal sources⁸.

Taking those opinions described above together, it is very difficult to determine how a voicing process appears in initial position in the southern OE. After all, the focus of this current study lay on how to treat a ‘voicing’ phenomenon in theoretical phonology, and its environmental condition does not play a crucial role in analysing this particular phenomenon. In line with this thinking, we mainly focus on a ‘voicing’ process from the next section.

and ‘the Cathrine Group’ even though data provided by Jespersen are given with no glosses. *ilke uondunges* is clearly ME data, so it can be argued that the final ‘e’ in *ilke* has already been deleted (apocope). However, I argue that the voicing of initial fricatives occurred between voiced segments before the apocope of schwa in ME, and this can be supported by a number of spelling evidence.

⁸ As discussed before, it is still debated among scholars whether the voicing of the initial fricative in the southern Old English resulted from the influence of the continent (e.g. a feature of the Anglo-Saxon) on the one hand, or was an independent process of Old English on the other (e.g. intervocalic voicing between words).

3.2 What is 'voicing'?

It has been observed that a 'voicing' phenomenon is typically regarded as one of the lenition processes, especially as a sonorisation type in diachronic phonology (see Lass 1984: 178)⁹. In addition, a process of fricative voicing has also been a common phenomenon in the phonology of OE and ME. A number of handbooks covering English language and phonology hold at least one small section for this fricative voicing (Campbell 1959: 444-451¹⁰, Lass and Anderson 1975: 174-183). In this section, relatively recent theories regarding the status of 'voicing' are discussed.

3.2.1 Laryngeal contrast in single-valued feature theory

In comparison to traditional approaches, a 'voicing' phenomenon has been interpreted in a quite different way within the framework of a single-valued feature theory. In a traditional generative approach, consonantal voicing has been represented by a binary feature such as [+voice] or [-voice]. For instance, the segments /b, d, g, v, ð, z, ʒ/ are represented by [+voice] and /p, t, k, f, θ, s, ʃ/ are [-voice] in terms of their laryngeal state. On the other hand, a single-valued feature system comes into the picture when it was revealed that a traditional binary feature system in itself has some drawbacks to the classification of laryngeal contrasts.

There have been several proposals which handle laryngeal contrasts within the framework of ET. In this subsection, two well-known works such as Harris (1994) and Brockhaus (1995) are mainly considered, and then the concept of 'laryngeal realism' is also introduced below. According to Harris (1994), laryngeal elements are represented by the element H and L. The former element can be described as stiff vocal cords and the latter one as slack vocal cords. These two elements basically create four different laryngeal states such as L (voiced), H (voiceless aspirated), None (Neutral), and L & H (Breathy). These laryngeal elements work well when dealing with the voicing contrast in various languages. Now, before I go further on

⁹ Lass (1984) divides a consonant lenition process into two types; an opening type and a sonorisation type. However, a voicing process which can be described as a sonorisation type lenition has been treated with completely different mechanisms in Element-based approaches.

¹⁰ These sections also include devoicing of spirants in Old English (Campbell 1959: 446-451).

this issue, the phonetic aspect of the element H and L needs to be dealt with in order to help us understand the attributes of them more deeply.

3.2.1.1 Phonetic grounding for the element H and L

In traditional phonological theories (e.g. SPE), ‘voicing’ has been treated as a relatively simple process. In fact, it is always represented from a binary feature point of view. However, the voicing of consonants has been based on somewhat complicated phonetic components in different versions of ET. For instance, Brockhaus (1995) considers several acoustic cues for the voicing in terms of physical phenomena. These phonetic cues are ‘vocal fold vibration’, ‘voice onset time’, ‘spectral properties’, and ‘properties of the release burst’¹¹. In this way, the elements H and L can also be defined in terms of phonetic cues (Harris 1994: 133).

In Harris’s term, the element H is described as ‘stiff vocal folds’, and is connected to voiceless (fortis) obstruents. On the other hand, the element L is described as ‘slack vocal folds’, and is also associated with voiced series of obstruents. In fact, both ‘stiff vocal folds’ and ‘slack vocal folds’ inherently emerge from acoustic phonetics. For instance, the feature [+stiff vocal folds] induces a high fundamental frequency, and [+slack vocal folds], on the contrary, gives rise to a low fundamental frequency. In addition, these features reveal existence and nonexistence of vocal fold vibration. In other words, voiced sounds hold a feature [+slack vocal folds], voiceless sounds [+stiff vocal folds]. Neutral (lenis) sounds have neither of these elements.

Another interesting point to be considered regarding the elements H and L is that these features are said to be related to tone systems in vowels. For example, [+stiff vocal folds] is equivalent to high tone, and [+slack vocal folds] to low tone. Furthermore, a mid tone corresponds to a voiceless unaspirated (lenis) consonant which is assumed to possess neither of these two elements. According to Harris (1994), there is a phonologically close association between a fully voiced consonant and a low tone in vowels, and also between an aspirated consonant and a high tone.

3.2.1.2 Laryngeal contrast in ET

There are some reasons why a monovalent feature theory is preferable for analysing laryngeal contrasts over a binary one in the phonological system. First of all, as Ewen and van der Hulst (2001: 110) state, a feature [voice] cannot fully describe the

¹¹ There is a general description of these acoustic cues in Brockhaus (1995: 116-18).

laryngeal contrasts of an obstruent system. In other words, the two-way expression (i.e. voiced vs voiceless) for laryngeal contrasts of consonants can only show a restricted power when it attempts to represent them. For example, a language like Thai requires three types of laryngeal specifications. Some examples from this language are given in Table 3 below.

Table 3. Laryngeal contrasts in Thai (Harris 1994: 135)

	Element	Thai
Voiced	L	<i>báa</i> 'shoulder'
Neutral	-	<i>páa</i> 'forest'
Voiceless aspirated	H	<i>p^háa</i> 'split'

In addition, Harris (1994) observes that the two-way expression for laryngeal contrasts is also inadequate for the exhaustive categorization of laryngeal contrasts in English and French. Some examples are illustrated in Table 4.

Table 4. Laryngeal contrasts in English and French (Harris 1994: 135)

	Element	English	French
Voiced	L	-	<i>beau</i> 'beautiful'
Neutral	-	<i>Bay</i>	<i>peau</i> 'skin'
Voiceless aspirated	H	<i>Pay</i>	-

According to Harris's observation represented in Table 4, the voiceless stops such as /p, t, k/ in English are truly voiceless and aspirated in initial position. However, the voiced ones such as /b, d, g/ is not truly voiced, but phonetically voiceless. On the other hand, the /b, d, g/ is fully voiced in French, and the /p, t, k/ is voiceless unaspirated sounds.

Honeybone (2002: 127) gives a further indication that a voicing contrast of stop series is expressed in a different way between two language groups; one for Romance and Slavic languages such as Spanish and Russian and the other for Germanic languages such as English and German. For example, the former group shows that the /b, d, g/ series appear with vocal fold vibration (i.e. fully voiced) in most phonological environments, and the /p, t, k/ series with neither vocal fold vibration nor aspiration. On the other hand, in Germanic languages, the /b, d, g/ series do not

appear with fully voiced, and the /p, t, k/ series show a voiceless aspirated in most phonological environments. Taken as a whole, it is suggested that the /b, d, g/ in Germanic languages (e.g. English) and /p, t, k/ in Romance and Slavic languages (e.g. French) are regarded as the same category as the example of neutral illustrates in Table 4.

Let me now summarise what Harris and Honeybone argue for three types of laryngeal contrasts of stops in three different languages.

Table 5. Three types of laryngeal states

	English	French	Thai
Fully voiced (L)		/b, d, g/	/b, d/
Neutral (voiceless unaspirated)	/b, d, g/	/p, t, k/	/p, t, k/
Voiceless aspirated (H)	/p, t, k/		/p ^h , t ^h , k ^h /

If this laryngeal contrast system is applied to other languages, it can be argued that languages are divided into two groups which can be referred to as H-language and L-language. In H languages such as English and German, the element H is active in its phonological system, while the element L is phonologically active in L languages such as French and Spanish.

Honeybone (2002) calls this approach ‘laryngeal realism’¹². In addition, he proposes a set of segmental symbols which reinforce the classification of laryngeal contrasts in the system of ‘laryngeal realism’. It is shown in Table 6 below.

Table 6. Symbols for segments (Honeybone 2002: 138)

Neutral	Voiceless aspirated	Voiced
/p ^o , t ^o , k ^o : no H or L	/p ^h , t ^h , k ^h : H	/b, d, g/: L
/p [̰] , t [̰] , k [̰] : no H or L	/f ^h , θ ^h , x ^h : H	/v, z, ʃ/: L

According to Table 6, the letters <p, t, k> in English correspond to /p^h, t^h, k^h/, and <b, d, g> to /p^o, t^o, k^o/ respectively. In French, the letters <p, t, k> are equivalent to /p^o, t^o, k^o/, and <b, d, g> to /b, d, g/ respectively. Voicing of stop series in English is

¹² As for the elements H and L, Honeybone (2002) uses a different expression for them. For example, the element H corresponds to |spread|, and the element L to |voice|.

now described as the change from /p^h, t^h, k^h/ to /p^o, t^o, k^o/, and this contains the loss of laryngeal articulation (i.e. it actually refer to the loss of laryngeal element in an element-based approach). Honeybone labels it as ‘delaryngealisation’, and states that “Delaryngealisation is, in fact, the obvious companion that we might expect to contrast with debuccalization because the former involves loss of constriction in the larynx but retention of constriction in the oral cavity and the latter involves loss of constriction in the oral cavity but retention of constriction in the larynx (Honeybone 2002: 140).

4. Theoretical analyses

It has been presented in previous sections that ET (Harris 1990, 1994, Brockhaus 1995) claims to advocate a single-valued feature system which differs from traditional rule-based theories in order for a proper theoretical analysis of laryngeal contrasts in languages. What is needed to develop an integrated theoretical mechanism for those weakening processes is to find how these privative features (i.e. elements) are employed when computation in OT is carried out through constraint interaction.

4.1 Previous OT approaches on ‘voicing’ processes

4.1.1 Smith (2008)

Smith (2008) divides lenition into two different categories. One is referred to ‘the neutralisation to the unmarked’ lenition, and the other to ‘sonority-increasing’ lenition. It has been argued (Lavoie 2001, Cser 2003) that the former is connected to coda or word-final positions where neutralisation often takes place while the latter is usually linked to intervocalic positions. In addition, these two lenition patterns clearly show the opposite direction in terms of ‘markedness’. For example, when debuccalisation which is one example of ‘the neutralisation to the unmarked’ is considered, a glottal sound is chosen because this sound is typically regarded as an unmarked sound (de Lacy 2006). On the other hand, it is generally suggested that voiced obstruents are more marked than voiceless ones.¹³ Therefore, ‘sonority-

¹³ It is supported by the language typology, for instance, that some languages (e.g. English)

increasing' lenition such as voicing and spirantisation¹⁴ results in more marked sounds.

As mentioned before, debuccalisation is a good example to elucidate some characteristics of 'the neutralisation to the unmarked' lenition pattern in that it certainly exhibits a neutralisation process in coda position. It is shown in (2).

(2) The neutralisation to the unmarked lenition (Smith 2008: 529) - a case of debuccalisation in coda¹⁵

/kap/	*PLACE(coda)	IDPlace]	*PLACE
a. kap	*!		**
b. kaʔ		*	*
c. ʔaʔ		**!	

In this tableau, the constraint ranking can be described as Positional markedness » Faithfulness » Context-free markedness in respect of the discussion regarding the interaction between positional and contextual constraints. In addition, sonority-increasing lenition can be exemplified with intervocalic voicing lenition. The pivotal constraint which is associated with this weakening phenomenon is described below in (3).

have both voiced and voiceless obstruents while others (e.g. Finnish) have voiceless members only. There are no languages which have voiced obstruents only (Zsiga 2013: 41).

¹⁴ When this process is considered, lenition is defined as a kind of phonological process where a segment becomes more sonorous, for instance, voiceless sounds to voiced one (Voicing) and stops to fricatives (spirantisation). According to the concept of 'markedness', voiceless stops are the least marked sound, and fricatives are somewhat more marked one than stops in terms of 'markedness'. What Smith wanted to show is that lenition takes two opposite directions; one for the neutralisation to the unmarked, and the other for sonority-increasing (here, more marked sounds). Finally, the markedness among consonants is irrelevant to vowels in that consonants and vowels are completely different categories in terms of their properties in phonology.

¹⁵ In this constraint ranking, the faithfulness constraint is positional (i.e. ID[Place](ons)).

(3) INTER-V-VOICE (Kager 1999: 325)¹⁶

Intervocalic consonants are voiced.

This constraint can be defined as contextual markedness constraint and this can be conflicted with context-free markedness constraint such as *OBSVOI and faithfulness constraint such as IDENT[voi]. The relevant constraint ranking is as follows.

(4) Intervocalic voicing:

INTERVVOI » IDENT[voi] » *OBSVOI

On the whole, Smith's argumentation for lenition has a persuasive power. She represents a detailed analysis of lenition while classifying two different lenition categories such as 'neutralisation to the unmarked' lenition and 'sonority-increasing' lenition. However, there are some drawbacks of Smith's claim in terms of a consolidated explanation of different types of lenition because lenition phenomena should be divided into two groups with respect to their environments. A proposed theoretical mechanism in this study can give a partial answer for this analytic weakness by providing the constraint such as *COMPLEX[Element] that can be applied to all types of lenitions. In line with this thinking, it seems that Kirchner (1998, 2004)'s argument (e.g., the LAZY constraint) also give us a similar idea in terms of the unification of lenition processes. Therefore, this is briefly discussed before my analysis is illustrated.

4.1.2 Kirchner (1998, 2004)

Unlike Smith's analysis of voicing phenomenon, Kirchner (1998, 2001, 2004) argues that a unified manner can be applied to various types of lenition processes. In order to satisfy this goal, he claims that the constraint such as LAZY covers a wide range of lenition phenomena. This, then, raises the question 'what is the LAZY constraint?'

Kirchner (1998, 2004) argues that the notion of 'reduction of articulatory effort' is crucial for accounting for lenition phenomena and this is supported by phonetic and

¹⁶ Hayes (1999) shows the same constraint like INTERVVOI: Assign one violation mark to each output segment that is [-son, -voi] in the context V_V.

physiological evidence.¹⁷ In this regard, the effort minimization constraint which is called ‘LAZY’ is developed in this model. It is shown in (5) below.

(5) LAZY: Minimise articulatory effort (Kirchner 2001: 87)

The LAZY constraint interacts with the faithfulness constraints in order to capture an ideal result for lenition processes. For example, all lenition processes such as spirantisation, degemination, debuccalisation, and voicing are accounted for within a unified manner. These are illustrated below in (6).

(6) Lenition in Kirchner’s model (1998: 27)

- Spirantisation: LAZY » PRESERVE (continuant)
- Degemination: LAZY » PRESERVE (length)
- Debuccalisation: LAZY » PRESERVE (place features)
- Voicing: LAZY » PRESERVE(voice)
- No Preserve constraint: no lenition occurs.

As shown in (6) above, Kirchner claims that lenition patterns can be captured on the basis of the same constraint-ranking mechanism, namely, LAZY » lenition-blocking constraints. However, there is an objection on Kirchner’s argument. For instance, Honeybone points out that if it requires too many supplementary constraints such as all general types of faithfulness constraints and relevant positional faithfulness ones (e.g. PRESERVE (continuant/#_)) in order to satisfy the correct output forms, this analysis then loses its explanatory power by those constraints by virtue of ‘Occam’s razor’¹⁸.

4.2 An alternative analysis

In this section, I propose a theoretical analysis of an intervocalic voicing process

¹⁷ In his model, the effort cost is interpreted as “a mental estimate of the biomechanical energy required for articulatory production for each candidate (Kirchner 2004: 314)”. In fact, this effort cost is calculated in terms of the violation of LAZY and faithfulness constraints.

¹⁸ It states that among competing hypotheses, the hypothesis with the fewest assumptions should be selected. In other words, the simplest explanation is usually the correct one.

within the framework of ET and OT. This idea is not entirely new. For instance, Polgárdi (2006) has presented ‘a combined theory of Government Phonology and Optimality Theory’ (this is the title of the Chapter 2 in her book in 2006). However, her approach is different from the current one of this current study in some way. To clarify the difference between two approaches, I briefly describe Polgárdi (2006)’s theoretical background here. I think that her theoretical development looks very interesting in many points. Among them, the most notable thing to look at is that Polgárdi has tried to integrate two different approaches with one theoretical system in order to examine phonological processes more effectively. For instance, it is well-known that Government Phonology (henceforth, GP) has a number of inviolable principles and language-specific parameter settings, and what Polgárdi has been trying to work is that she removes those parameters and principles by replacing them with OT constraints and constraint ranking. In Polgárdi (2006), her main concerns are vowel harmony and disharmony in languages, and she has applied those phonological processes to a combined theory of GP and OT.

For a bit more details of it, some representative constraints in Polgárdi are illustrated below. Polgárdi uses some principles from Government Phonology such as ‘Government’ and ‘Licensing’, which work in conjunction with melodic structures, in order to build a combined theoretical model.

(7) Polgárdi (2006: 31)

a. PROPER GOVERNMENT (PG)

An ungoverned nucleus properly governs a preceding empty nucleus

b. GOVERNMENT LICENSING (GL)

A governing onset must be licensed by a nucleus which is not properly governed

Polgárdi’s claim has not attracted much phonologists’ attention when she brought it to general phonological discussions. However, the primary idea that she tried to combine some aspects from both GP and OT is still worth pursuing in some ways. In this research, some of her ideas will be reflected in a different way especially when weakening phenomena are considered within the framework of an integrated theoretical model of Element and OT. The combined OT analysis that I propose in this subsection is different from Polgárdi’s one. For example, Polgárdi employs GP notions such as licensing and government as critical components of OT constraints, but in this current approach I mainly make use of ‘elements’ themselves from

Element Theory in order to devise relevant constraints which will be crucial for the analysis of lenition phenomena.

4.2.1 *COMPLEX[Element] and an alternative analysis

Before the main analysis is illustrated, let us present subsegmental representations of fricatives first.

(8) Representation of a voice contrast in English labial fricatives in ET

a. Voiceless aspirated labial fricative:

/f^h/ - [h, U, H], /s^h/ - [h, R, H], /θ^h/ - [h, R, H]

b. Voiceless unaspirated (neutral) labial fricative:

/f^o/ - [h, U], /z^o/ - [h, R], /ð^o/ - [h, R]

When ET is concerned, weakening processes such as consonant lenition and vowel reduction can be defined as element loss or decomposition of element structure, and it can be reflected in voiceless-voiced contrast in this approach. In this regard, we can see that voicing phenomenon in English can be described as loss of the element ‘H’.

To encode this weakening pattern into an optimality-theoretic analysis, we see that the following constraints are involved:

(9) Element-based constraints

a. *COMPLEX[Element]: Assign one violation mark for every element in a segment.

b. IDENT I-O[Element]: Assign one violation mark to any pair of corresponding input and output segments that do not agree with the number of ‘element’.

The constraint ranking regarding consonantal voicing in ET can be illustrated using the following tableau in (10).

(10) Consonant voicing in ET

Input	/p ^h /	*COMPLEX[Element]	IDENT I-O[Element]
a.	p ^h [U, ʔ, h, H]	!****	
b.	p ^o [U, ʔ, h]	***	*

As observed in (10), the underlying form /p^h/ surface as [p^o] by the fact that the

markedness constraint (e.g. *COMPLEX[Element]) is ranked higher than its faithfulness counterpart (e.g. IDENT I-O[Element]). This constraint, *COMPLEX[Element], needs to be revised when it is applied to real data later in this section, but at this point this shows how an integrated constraint works in this thesis.

*COMPLEX[Element] plays a critical role for deriving consonant lenition phenomena. In addition, the interaction between *COMPLEX[Element] and the faithfulness constraint (e.g. IDENT I-O) is also an important role in selecting a correct output form in relevant environments, for example intervocalic positions.

As mentioned just above, *COMPLEX[Element] has to be amended to make it relevant to OE fricative voicing processes. Namely, the voicing of fricatives in OE normally occurs in intervocalic positions. Therefore, this contextual restriction should also be encoded into the constraint itself. In line with this, an updated version of *COMPLEX[Element] is shown below.

- (11) *COMPLEX[Element](V_V): Assign one violation mark for every element in a segment iff a segment is in an intervocalic position.

Now, let us recall examples of voicing of initial fricatives in southern OE again and apply them to the ranking including the constraint shown in (12).

- (12) The initial fricative voicing in the southern ME
 - *volk* ‘folk’, *vader* ‘father’, *zenne* ‘sin’, *zwȳn* ‘swine’ (Bennet 1955: 367)

As we can see in (12), initial fricatives are voiced in OE, especially in South of England. OE fricative voicing can be captured when *COMPLEX[Element](V_V) dominates IDENT I-O[Element] within the constraint ranking.

However, one problem arises in terms of environmental aspect. As we discussed above, how can an ‘initial’ position be resolved in terms of a voicing phenomenon? As discussed above, I argue that (southern) OE initial fricative voicing is initially triggered by intervocalic environments between words or sentences. Therefore, it is possible that the constraint like *COMPLEX[Element](V_V) can be extended to word-initial fricative (which is preceded by a vowel) only in southern dialects of OE.

- (13) *COMPLEX[Element](V_V): Assign one violation mark for every complex element in a segment iff a segment is in an intervocalic position including across

word-boundary.

Therefore, this can be illustrated in (14) below.

(14) Voicing of an initial /f/ in intervocalic position across a word-boundary

V./f ^h ader/ ‘father’ ¹⁹	*COMPLEX[Element](V_V)	IDENT I-O[Element]
a. V./f ^h ader/ [U, h, H]	!***	
☞ b. V./f ^h ader/ [U, h]	**	*

(The bold letters show the affected sound by intervocalic voicing.)

Another problem however arises when the mechanism of element loss is minutely considered. For instance, when *COMPLEX[Element](V_V) dominates IDENT I-O[Element], there is no reason that the laryngeal element must be removed instead of other elements. For example, the voiceless aspirated labial fricative, /f/, consists of three elements such as U, h, and H. When this sound appears intervocalically, we expect a voicing process by deleting the laryngeal element ‘H’ through the relevant constraint ranking. This is illustrated below in (15).

(15) Voicing of /f^h/ intervocalically

V./f ^h ader/ ‘father’	*COMPLEX[Element](V_V)	IDENT I-O[Element]
a. V./f ^h ader/ [U, h, H]	!***	
☞ b. V./f ^h ader/ [U, h]	**	*
☛ c. V./h(?)ader/ [h, H]	**	*
☛ d. V./w(?)ader/ [U, H]	**	*

The three candidates such as (15b), (15c), and (15d) incur the same number of violations in the tableau (15). In order to make the correct output form to be selected, a high-ranked markedness constraint which controls the element H needs to be involved in this constraint ranking. Before we consider which type of constraint is

¹⁹ ‘.’ represents a word boundary.

needed, the internal nature of the element H is needed to be checked in order to bring a proper constraint into this situation.

According to Harris (1994: 134), in traditional rule-based approaches, ‘aspiration’ is thought of as non-contrastive and it is always added to voiceless plosives by aspiration rule in relevant environments. On the contrary, in Element Theory, the element H is interpreted as ‘aspiration’ in fortis obstruents, and this is reflected at underlying level. Therefore, a constraint like *ASPIRATE(V_V) would work well with other constraints such as *COMPLEX[Element](V_V) and IDENT I-O[Element] for choosing a correct output candidate since we do not want to have a sound which contains ‘H’ element in intervocalic positions.

(16) *ASPIRATE(V_V)

No an aspirated element is allowed in an intervocalic position.

Therefore, candidates (15c) and (15d) are ruled out due to violating the high-ranked constraint *ASPIRATE(V_V). On the other hand, the optimal candidate (15b) satisfies the high-ranked constraint *ASPIRATE(V_V). This is illustrated in (17).

(17) Voicing of /f/ intervocalically (updated)²⁰

V./f ^h ader/ ‘father’	*COMPLEX [Element](V_V)	*ASPIRATE (V_V)	IDENT I-O[Element]
a. V./f ^h ader/: [U, h,H]	!***	*	
b. b. V./f ^o ader/: [U,h]	**		*
c. V./h(?)ader/: [h, H]	**	!*	*
d. V./w(?)ader/: [U,H]	**	!*	*

²⁰ In a diachronic point of view, language change can be interpreted as reranking of constraints in the framework of OT. In line with this, the constraint ranking represented in this chapter is only relevant to a particular dialect which is Southern and South-eastern Middle English. Therefore, in these dialects, aspirated obstruents do not surface at that time.

5. Conclusion

In this study, I provided an Optimality-theoretic analysis of lenition process, focusing on voicing of initial fricatives in southern OE. In addition, I discussed the nature of elements themselves, and how they play a central role in choosing the correct form through constraint interaction.

In order to do that, preliminary elements regarding initial fricative voicing in OE were also discussed. For instance, geographical differences of a voice contrast of this phenomenon were considered. In addition, two possibilities for accounting for initial voicing in the southern OE dialect are examined as endogenous and exogenous innovations.

Finally, a combined theoretic approach to voicing of initial fricative in southern OE was presented. In order to capture this phonological process, three representative constraints were proposed such as *COMPLEX[Element](V-V), IDENT I-O[Element], and *ASPIRATE(V_V). By doing so, initial fricative voicing in OE was expressed by the interaction among those constraints.

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