UNIVERSITY
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Agnieszka Kocel-Duraj
🆔 https://orcid.org/ 0000-003-1482-1777
University of Bielsko-Biala

Palatalization as a Non-uniform Phonological Process: A Diachronic Analysis

Abstract

The aim of this study is to analyse a non-uniform process of palatalization in the Middle English Northern dialect, with the main focus on the range of operation of the process, its conditioning environment and the direction of the change in the four lemmas: EACH, MUCH, SUCH, and WHICH. The fact that palatalization was an active process in the North has been proved by 47% of the Northern texts from the *Innsbruck Corpus of Middle English Prose*, which have demonstrated cases of palatalization in the forms of the lemmas. Referring to the studies of a perceptually motivated sound change and observing certain correlations between the palatalization processes occurring now and in the past, one may infer that the scope of palatalization in the North might have been even wider.

Keywords: palatalization, corpus study, Northern texts, hyper-to-hypoarticulated continuum, undercorrection, overcorrection

1. Palatalization as a sound change

Palatalization has always attracted considerable interest of linguists and as a result it has received much attention in literature providing various references to this process with varied definitions and terminology. The main mechanism of the change is an interaction between two elements: a consonant and usually one of the two sonorants, a (high) front vowel or a palatal glide, and as such it is frequently paired up with other assimilatory processes, e.g. affrication, i.e. a change resulting in an affricate. According to Bateman, "while velars (dorsal) and alveolars (coronal) consonants are predicted to fully palatalize, as they are articulated with the tongue – the same articulator used to produce the vowel *i*, labial consonants are predicted not to fully palatalize, as they are articulated with the lips – a different articulator than that used to produce the vowel *i*" (Bateman 2007, 7). While the front vowel [i] seems the "prototypical palatalizing vowel", which results in the naturalness of the interaction between the target, trigger and the outcome, it is claimed that

front vowels in general appear "the strongest environment for the palatalisation of velars" (Bhat 1978, 52) together with a palatal glide which, as mentioned before, also constitutes the "palatalizing environment" (Bhat 1978, 49).

Palatalization is based on feature-sharing between the segments, which was conceptualized and presented in different models of interpretation in the general framework of Feature Geometry (Sagey 1986; Clements and Hume 1995). The term itself may refer to the place-changing palatalization whereby "the consonant shifts its primary place and often its manner of articulation while moving toward the palatal region of the vocal tract", e.g. [k → tʃ], also sometimes known as 'full palatalization', or 'secondary palatalization' involving the co-articulation "with a following palatal offglide", e.g. [k → kʲ] (Bateman 2007, 2). Bhat distinguishes three processes involved in palatalization: (1) 'tongue-raising' involving apical and labial sounds (secondary palatalization), (2) 'tongue-fronting' involving velar sounds [k → c], and (3) 'spirantization' involving the palatal glide and the trill [r], or occurring together with the other two processes. The palatalization of velars in particular ([k → tʃ]) may be the result of the simultaneous operation of all three processes (Bhat 1978, 51). This confusion in terminology derives mostly from the apparent overlap of definitions as well as different understanding of the outcome of the process, which may relate to either fronting ([c]), the acquisition of the secondary palatal articulation ([kʲ]), or the complete change of the place of articulation ([tʃ]), which will be analysed further in this study.

What is interesting in these processes is that while fronting of the tongue body and the secondary palatalization in [kʲ] seem justified from the point of view of CV co-articulation, the full palatalization of [k] into [tʃ], involving the change from the body to the blade of the articulator, appears more difficult to explain by means of articulatory factors only (Blevins 2004, 138). The articulatory explanation of palatalization is also questioned by Ohala (1992, 320), who instead advocates a perceptual motivation of the change of [k] into [tʃ]. This has been confirmed by Guion (1998), who has shown that velar palatalization depends on acoustic and perceptual factors as well as the acoustic similarity between sounds, which is why in the context of front vowels, velar stops are often misheard by listeners as palatoalveolar affricates. Guion carried out a series of experiments in which "velar stops before front vowels and palatoalveolar affricates were shown to be acoustically similar in terms of peak spectral frequency and second format transitions" and "[f]aster speech tokens of fronted velars were also shown to be more acoustically similar to palatoalveolars than citation speech tokens in terms of peak spectral frequency" (Guion 1998, 45). This listener-oriented sound change is firmly rooted in Ohala's non-teleological approach, where "the main source of sound change is the misapprehension of the signal by the (possibly inexperienced) listener" (Chitoran 2012, 312). If the listener fails to process the signal intended by the speaker, a new form is produced, which, in Ohala's terms, results in a listener's undercorrection, that is 'hypocorrection'. In his

approach, Ohala also distinguishes an opposite process, which is a listener's overcorrection, the so-called 'hypercorrection', as well as a process involving a listener's 'confusion of acoustically similar sounds' (Ohala 1993, in Garrett and Johnson 2013, 55-56).

Palatalization as a sound change can also be interpreted according to Lindblom's model of hyper-to-hypoarticulated speech continuum, referring "to change stemming from synchronic variation along a continuum of careful to casual speech (hyper- to hypoarticulation)" (Chitoran 2012, 313). In other words, the variation in speech can occur along a hyper-to-hypoarticulated (H&H) continuum, depending on the situation of speakers and their communication needs (Lindblom 1990).

Ohala's and Lindblom's theories are to an extent reflected in Blevins' (2004, 32-33) division of sources of the sound change into CHANGE, when "[t]he phonetic signal is *misheard* by the listener due to perceptual similarities of the actual utterance with the perceived utterance", CHANCE, where "[t]he phonetic signal is accurately perceived by the listener but is intrinsically phonologically ambiguous, and the listener associates a phonological form with the utterance which differs from the phonological form in the speaker's grammar", and CHOICE (CCC), where

> [m]ultiple phonetic signals representing variants of a single phonological form are accurately perceived by the listener, and due to this variation, the listener (a) acquires a prototype or best exemplar of a phonetic category which differs from that of the speaker; and/or (b) associates a phonological form with the set of variants which differs from the phonological form in the speaker's grammar.

In this classification, CHANGE and CHANCE correspond to Ohala's listener-oriented approach, while CHOICE is associated more with Lindblom's H&H and speech variation observed along the H&H speech continuum (Blevins 2004, 82).

The theory of the sound change presented above serves as a background for this study whose main aim is to analyse the scope, direction and conditioning of palatalization of the velar [k] in the Middle English Northern dialect, focusing both on the complete shift in the place of articulation [k] → [tʃ] as well as on the potential intermediary stage involving velar fronting [k → c] and secondary palatalization [k] → [kʲ]. The last two do not exert such an immense influence on the target, with the consonant maintaining its primary place of articulation and only the tongue being slightly raised towards the palatal region.

2. Palatalization pattern in English

Historically, palatalization in English has been considered a long and complex process which took place in the neighbourhood of a front vowel, semivowel, or sometimes even a diphthong, which could precede or follow the target, sometimes

also with intervening liquids or nasals (Wełna 1978, 53; Hogg 1992, 253–256). In general, it is assumed that the change could only occur initially when [k] preceded a front vowel or any diphthong; medially when [k] occurred between front vowels or was followed by [i] or [j], or else when [k] was preceded by [i] and not directly followed by a back vowel; and finally when [k] appeared after an original/primary front vowel or [i]/[j] and was preceded by a nasal. Palatalization was also claimed to be contingent upon the syllable structure since it occurred only if a velar consonant "was in the same syllable as the palatalizing segment" (Hogg 1992, 254).

In contemporary English, palatalization seems to be triggered exclusively by the palatal glide (Bateman 2007, 63), which affects preceding alveolar obstruents and triggers their change into palatoalveolars. According to Zsiga, who carried out extensive research on Modern American English, while palatalization seems obligatory at the lexical level, e.g. in the word *habitual* (from *habit* [t → tʃ]), it occurs optionally at the post-lexical level, e.g. in the phrase *I miss you* (with [s] or [ʃ]), and the two processes differ acoustically, the former being more categorical and the latter more gradient (Zsiga 1994, 67, 71). In the light of the theory of sound change, introduced in section 1, the post-lexical palatalization, as in *miss you*, provides thus an example of variation, with hyperarticulated speech forms preserving [s] and hypoarticulated/casual speech forms exhibiting palatalization of [s] into [ʃ]. "This variation on the part of the speaker defines CHOICE for the listener" (Blevins 2004, 142).

The comparison of the contemporary and Old/Middle English phonological patterns shows certain differences in terms of the type of trigger, target, direction and maybe even the character of the process. In order to examine how the conditioning of palatalization has changed, the analysis will focus on the data from Northern Middle English, collected from the electronic *Innsbruck Corpus of Middle English Prose*. The data in question refer to the previous analysis of palatalization in the four lemmas of EACH, MUCH, SUCH, WHICH in the Middle English dialects, whose aim was to prove the nonhomogeneous character of palatalization (see Kocel 2016). This lack of homogeneity has been confirmed by the fact that 30% of all the texts in the *Innsbruck Corpus of Middle English Prose* demonstrated deviations from the standard forms associated with particular regions, thus emphasizing the impossibility to define the process of palatalization by means of direct isoglosses corresponding to specific dialects or dialectal areas. The purpose of this study is to concentrate only on the data from fifteen Northern and Scottish texts, presented in Table 1 below, which will be analysed with respect to the type of vowels triggering the sound change as well as the direction in which palatalization was likely to operate.

Table 1. Textual material from the Northern area

Religious texts (mysticism, homilies, sermons, treatises)
Hilton, *Angels' Song*, in *Two Minor Works of Walter Hilton* (MS Add. 27592) (1400+)
Dan Jon Gaytryge, *Sermon*, in *Religious Pieces* (MS Cath. Libr. 91, Thornton) (1400+)
Methodius*, The Bygynnyng of the World* (MS Add. 37049) (1400+)
Richard Rolle of Hampole and his Followers, vol. 2, Part One, *Yorkshire Writers*, pp. 45–366 (variable MSS: MS Cambr. Univ. Libr. Dd.5.64; MS Rawl. C 285; MS Arundel 507) (c1450)
Richard Rolle of Hampole and his Followers, vol. 2, Part Two, *Yorkshire Writers*, pp. 367–455 (variable MSS: MS Cambr. Univ. Libr. Dd.5 64; MS Rawl. C.285; MS Arundel 507) (c1450)
Richard Rolle of Hampole, Yorkshire Writers*, An English Father of the Church and his Followers* (variable MSS: MS Cambr. Univ. Libr. Dd.5.64; MS Rawl. C.285; MS Arundel 507)) (c1450)
The Abbey of the Holy Ghost (MS Cath. Libr. 91, Thornton) (1400+)
The Mirror of St. Edmund, in *Religious Pieces in Prose and Verse* (MS Cath. Libr. 91, Thornton) (c1440)
Wisdom of Solomon, in *Ratis Raving, and Other Moral and Religious Pieces, in Prose and Verse* (ed. Lumby; MS Cambr. Univ. Libr. Kk.1.3) (1450+)
The second and third sermon of *Three Middle English Sermons* from the Worcester Chapter Manuscript (MS Worcester F. 10) (1400+)

Handbooks (craft of dying, medicine)
Craft of Dying, in *Ratis Raving, and Other Moral and Religious Pieces, in Prose and Verse* (ed. Lumby, MS Cambr. Univ. Libr. Kk. 1.3) (1450+)
Fistula in ano (MS Sloane 6) (c 1425)
Liber de Diversis Medicinis (MS Cath. Libr. 91, Thornton) (1400+)

Narratives/Fiction
Alphabet of Tales, Part One, pp. 1–260 (MS Add. 25719) (1450+)
Alphabet of Tales, Part Two, pp. 261–532 (MS Add. 25719) (1400+)

Out of all the texts presented above, only eight (marked in the table) show no evidence of palatalization, accounting for the mere 53% of the material under scrutiny, while the remaining seven demonstrate palatalization in all or at least some forms of the lemmas (Kocel 2016, 64), proving that the process was quite active in the North. The change seems to have been provoked by a set of triggers, potentially involving vocoids. They are represented graphically as <i>, <e>, <y>, <o>, <u>, for the purpose of this paper represented allophonically as [i], [e], [y],

[o], [u], which in Middle English could also correspond to different phonemes, e.g. <y> could sometimes be a spelling variant of front /i/, while <o> could be a spelling variant of back /u/, not affecting, however, the front-back distinction. The analysis of the forms will be carried out with respect to three main groups: Group A with tokens from the texts exhibiting only palatalized forms (Table 2), Group B with tokens from the texts exhibiting both palatalized and non-palatalized forms (Table 3), which has been further subdivided into Group B[1] with exclusively palatalized forms and Group B[2] with exclusively non-palatalized forms, and Group C with tokens from the texts exhibiting only non-palatalized forms (Table 5). All the forms will be examined with respect to the place of palatalization and the types of vowels occurring both before and after the (non-)palatalized [k] in order to verify the range and direction of the process. The total of the tokens will be presented in the following tables: the selection of the vowels in the palatalized forms from Group A and B[1] will be demonstrated in Table 4, while the selection of the vowels in the non-palatalized forms from Group B[2] and C will be demonstrated in Table 6. Tables 7 and 8 will include the summary of the total of the vowel tokens for all four groups. The aim of such an analysis is to verify the conditioning of palatalization presented at the beginning of this section and in the previous one, and to account for the variation by means of the theories of sound change presented in section 1 above.

3. Analysis of the vowels in the palatalized and non-palatalized forms

The *Innsbruck Corpus of Middle English Prose* contains two texts with only palatalized forms, and these are the second and third part of *Three Middle English Sermons* and *Fistula in ano*. The tokens of palatalized forms of the four lemmas (Kocel 2016, 42-43) and their quantities have been presented in the table below, with the total numbers of tokens at the bottom of each column:

Table 2. List of the palatalized forms in Group A

MUCH		SUCH		EACH		WHICH	
Three Middle English Sermons							
miche	57	swich	30	eche	4	þe whiche	25
meche	3	swiche	5	eueriche	2	whiche	2
myche	3	swwch	1	echone	1	þe which	1
mych	1			ech	1		
				echon	1		
				euche	1		
	64		36		10		28

MUCH		SUCH		EACH		WHICH	
Fistula in ano							
mych	44	sich	50	ich	16	whiche	91
mich	33	suche	18	ych	3	which	80
moche	14	siche	3	eche	2	þe which	20
myche	8	such	2	eueriche	1	þe whiche	8
miche	5	soche	1			the whiche	1
in-als-mych	2	syche	1				
for-als-miche	1	sych	1				
for-alsmich	1						
als-mich	1						
in-so-mych	1						
ouermych	1						
for-als-mych	1						
myceh	1						
113		76		22		200	

As can be observed in the data in Group A, the palatalized velar appears medially and finally in the environment which seems consistent with the analysis of the palatalizing context carried out in sections 1 and 2. The intervocalic palatalization is observed in 257 tokens of MUCH, SUCH, EACH, WHICH (e.g. *miche, meche, myche, moche, myceh, swiche, suche, siche, soche, syche, eche, eueriche, euche, whiche*), while the final palatalization is present in 292 tokens of the same lemmas (e.g. *mych, mich, swich, swwch, sich, such, sych, ech, ich, ych, which*). The lack of the final vowel in these examples could be perceived as a sequential application of two processes: palatalization and vowel loss. The final vowel could have triggered palatalization of the preceding consonant and when the context of the vowel was no longer needed, the vowel was lost. The analysis has also included the forms of *echon*(*e*) (*ech + on*(*e*)) as the examples of final palatalization in *ech*, as well as compounds, like *in-als-mych*, (*for*)-*als*(-)*mich*(*e*), *in-so-mych, ouermych, for-als-mych, eueriche*, with the focus on the second element only. It can be easily noticed that while in the case of intervocalic palatalization there is always the vowel [e] after [tʃ] (in 257 tokens), which, considering the weakening process of unstressed final vowels, could represent either [e] or [ə], a weak form of some (probably front) vowel, the vowel before the palatalized velar changes, with the most popular [i] appearing in 433 tokens, followed by [y] in 67 tokens, [u] in 20 tokens, [o] in 15 tokens, [e] in 12 tokens, and the diphthong [eu] in 1 token. The quantitative analysis has excluded the form of *swwch* due to its obscure spelling.

Apart from the texts with palatalized forms only in Group A, the *Innsbruck Corpus* also includes five Northern texts with both palatalized and non-palatalized forms of the four lemmas, used alongside each other, which have been analysed in Group B below. These are: *Alphabet of Tales* (Part One and Two), the collection

(Compilation) by Richard Rolle of Hampole and his Followers, Vol. 2 (Part One and Two), and Richard Rolle's *An English Father of the Church* (Kocel 2016, 46-47, 53–56); see Table 3 below:

Table 3. List of the palatalized and non-palatalized forms in Group B

Much		Such		Each		Which	
Alphabet of Tales (Part One)							
mekull	106	**suche**	**31**	euer-ilk	27	whilk	29
mekle	11	**such**	**25**	ilk	21	þe whilk	12
mekill	8	swilk	4	ilkone	12		
mekyll	4			evur-ilk	9		
muche	**4**			euerilk	8		
mykill	2			[evur]-ilk	1		
mekur	2			evurilk	1		
mekil	1			ilka	1		
mikell	1			ilk-one	1		
mykull	1						
mykell	1						
[m]ykill	1						
	142		60		81		41
Alphabet of Tales (Part Two)							
mekull	92	**suche**	**37**	evur-ilk	13	whilk	41
muche	**8**	**such**	**10**	ilkone	13	þe whilk	12
mekyll	6	swilk	10	ilk	12	þe whilke	1
mekill	6	swylk	3	euer-ilk	9		
much	**4**	sike	2	euerilk	9		
mykyll	4	syke	1	evurilk	5		
mekle	2			ilka	3		
mek[ill]	1			**ichone**	**1**		
mych	**1**						
mykill	1						
mykell	1						
mykull	1						
	127		63		65		54
An English Father of the Church							
mykel	62	slike	26	ilk	42	þe whilk	38
mekill	61	swylke	22	**ech**	**23**	þe whilke	32
mikil	27	swilk	21	ilke	19	whilke	28
muche	**27**	**such**	**14**	ylke	9	þe wilk	26
mochel	**18**	**swyche**	**10**	**eche**	**6**	**wȝuch**	**14**
mekyll	15	**sich**	**6**	**vche**	**5**	whilk	11
mikel	14	swylk	6	**iche**	**5**	**þe wȝuche**	**10**
mykell	11	**suche**	**3**	**euerichon**	**3**	**þe whiche**	**9**

Much		Such		Each		Which	
myche	**10**	sclyk	2	ylkone	3	**whiche**	**8**
mychel	**5**	**siche**	**2**	ylkane	2	qwilke	7
ouer-mykel	5	slik	2	**eueryche**	**2**	the whilke	7
ouer-mikil	5	slyke	2	ilkane	2	þe whylke	6
mikell	4	sclik	1	ilkan	2	**þe whyche**	**5**
ouer-muche	**3**	swilke	1	ylka	2	þe wilke	4
mykyl	3	swilkan	1	ylk	2	the wilke	4
mykele	3	**swych**	**1**	euer-ilk	2	þo qwilk	3
ouermekill	3			euerylkone	1	wilk	3
ouer-mekill	3			**euerychone**	**1**	**whyche**	**3**
mekil	2			**eueriche**	**1**	the whylke	3
miche	**2**			**euerychon**	**1**	wilke	2
moche	**2**			**euerichone**	**1**	**þe whuche**	**2**
ouur-muche	**2**			euerylke	1	qwilk	2
ouer-mykell	2			euer-ylke	1	wylke	2
oure-mykel	2			euer-ylk	1	**þe wylke**	**2**
oure-mikel	2			hilke	1	**whuch**	**1**
mekel	1			ilkone	1	þe qwilk	1
mekyl	1			**vch**	**1**	þe qwilke	1
mekell	1			**yche**	**1**	þe qwylke	1
ouere-mekill	1			ilke-day	1	qwylke	1
me_kill	1					þe wylk	1
ouer-mekyll	1					the wylke	1
oure_mikell	1					**which**	**1**
ouer_mikil	1					whylk	1
mychil	**1**					whylke	1
owre-mykel	1					**wȝuche**	**1**
mykyll	1					**þe wȝuch**	**1**
mekelnes	1						
mekillnes	1						
mekylnes	1						
307		120		142		243	

Richard Rolle of Hampole and his Followers Vol. 2 (Part One)

Much		Such		Each		Which	
moche	**81**	**suche**	**121**	**eche**	**13**	**whiche**	**144**
muchel	**27**	**such**	**11**	**vche**	**9**	þo whilk	48
mykel	26	**soche**	**6**	ilk	3	**the whiche**	**14**
muche	**12**	**siche**	**1**	**vch**	**3**	whilk	11
muchele	**9**			**vchon**	**2**	**þo whiche**	**10**
mikel	5			**iche**	**1**	þo whilke	6
ouer-mykel	1					**whuche**	**5**
mykelnesse	1					**þo whoche**	**4**
						whoche	**3**
						þe wȝuche	**2**
						þe whuche	**2**

Much		**Such**		**Each**		**Which**	
						whyche	2
						þe whiche	1
						the which	1
						ewhiche	1
						whilke	1
						wȝuche	1
162		139		31		256	

Richard Rolle of Hampole and his Followers Vol. 2 (Part Two)

moche	30	such	38	eche	6	which	40
much	24	suche	25	ecch	1	whyche	31
muche	20			ech	1	þe whiche	30
myche	10			eueryche	1	the which	27
moch	7			euer-[ich]	1	the whyche	20
muchel	4			eueriche	1	þe which	16
ouer-much	2			euerich	1	the whiche	15
mekelheede	2			yche	1	whiche	15
ouermeche	1					the whych	3
meche	1					whychen	1
miche	1					wiche	1
ouer-moche	1					þe whyche	1
tomoche	1					whych	1
ouer_moche	1						
mochylle	1						
ouermoche	1						
mochemore	1						
asmuch	1						
mych	1						
michellnes	1						
mykylnesse	1						
112		63		13		201	

As can be noticed, the texts in Group B contain a varied collection of palatalized and non-palatalized forms, which will be analysed separately in two groups – the palatalized forms in Group B¹ and the non-palatalized forms in Group B² respectively.

In Group B¹, like in Group A, the palatalized velar appears medially and finally in the environment which is again consistent with the analysis of the palatalizing context carried out in sections 1 and 2. The medial palatalization is observed in 914 tokens (e.g. *muche*(*l*)(*e*), *moche*(*l*), *myche*(*l*), *miche*(*ll*), *mychil*, *meche*, *mochylle*, *suche*, *swyche*, *siche*, *soche*, *eche*, *vche*, *iche*, *yche*, *wȝuche*, (*e*)*w*(*h*)*iche*, *whyche*(*n*), *whuche*, *whoche*), while the final palatalization is reflected in 290 tokens (e.g. *much*, *mych*, *moch*, *such*, *sich*, *swych*, *ich*, *e*(*c*)*ch*, *ych*, *vch*, *wȝuch*, *whuch*, *which*, *whych*). Again, the 'final' palatalization must have occurred

before the loss of the final vowel which provided the phonological context for the process to take place. The analysis has also included forms such as *ichone*, *echon*(*e*), *vchon* (*ich/ech/vch* + *on*(*e*)) as the examples of final palatalization in *ich/ ech/vch*, compounds, like *ouer-much*(*e*), *everiche*, *tomuche*, *asmuch*, *mochemore*, as well as nouns, e.g. *michellnes*, concentrating only on the variant of the lemma. It can be easily noticed that in the context of intervocalic palatalization, except for one token of *mochylle* with the following vowel [y] and one token of *mychil* with the following vowel [i], there is always the vowel [e] after [tʃ] (in 912 tokens), which, considering the weakening process, could have represented either [e] or [ə], whereas the segment before the palatalized velar changes, with the most popular [u] appearing in 521 tokens, followed by [i] in 361 tokens, [o] in 157 tokens, [y] in 113 tokens, and [e] in 52 tokens. The quantitative analysis has included the forms of *vch*(*e*) as graphically representing the forms with [u] spelt with <v>.

Comparing the results in the two groups with the palatalized forms, one may observe that the types of vowels with the highest number of tokens vary, particularly in terms of frontness; see Table 4 below:

Table 4. Distribution of the vowels preceding and following the palatalized velar in Group A and B[1]

GROUP A		GROUP B[1]	
Vowel preceding the palatalized velar	**Vowel following the palatalized velar**	**Vowel preceding the palatalized velar**	**Vowel following the palatalized velar**
[i] 433	Ø 292	[u] 521	[e] 912
[y] 67	[e] 257	[i] 361	Ø 290
[u] 20		[o] 157	[i] 1
[o] 15		[y] 113	[y] 1
[e] 12		[e] 52	
[eu] 1			

While in Group A the most popular vowel preceding [tʃ] proves to be close front unrounded [i], the most popular in Group B[1] is close back rounded [u], i.e. vowels which share only one common feature of closeness (height). Surprisingly, in Group A, the number of tokens exhibiting the following vowel [e] (sometimes also [ə]) and of those with the final vowel lost is similar, whereas in Group B[1], most tokens still have the final vowel, with only 24% of the tokens exhibiting its loss. Despite the big variety within the palatalizing environment in the palatalized forms, it seems consistent with the palatalizing context specified in sections 1 and 2.

Examining the non-palatalized forms in Group B[2], one can come across such variants as: *mekull, mekle, mekil*(*l*), *mekyl*(*l*), *mykill, mekur, mikel*(*l*), *mykull*,

mykel(l)(e), *mykyl(l)*, *mikil*, *mekel(l)*, *swilk(e)*, *swylk(e)*, *s(l)ik(e)*, *s(l)yke*, *sclyk*, *sclik*, *ilk(e)*, *ylk(e)*, *hilke*, *whilk(e)*, *wilk(e)*, *qwilk(e)*, *whylk(e)*, *wylk(e)*, *qwylke*, appearing also in combinations, like *swilkan*, *ilkone*, compounds, like *ouermikil*, *ouremikel*, *euerilk*, or as nouns, e.g. *mekillnes*, *mykylnesse*, where only the variant of the lemma has been taken into account. Interestingly, the analysis of the non-palatalized forms in Group B² shows that only three vowels [i, e, y] appear before the velar, with [i] being the most popular and present in 676 tokens, followed by [e] in 334 tokens and [y] in 208 tokens. All of these vowels are front and close or mid-close sounds. The non-palatalized velar [k] is present medially in 721 tokens and finally in 497 tokens, with the lemmas of MUCH exhibiting [k] only medially. There are also 6 forms with final [a] as in *ilka*, *ylka*, which is probably the remnant of *ane* 'one' and as such they demonstrate final non-palatalized [k]. Contrary to the palatalized forms with medial palatalization mostly before [e] ([ə]), the non-palatalized forms demonstrate a wider variety of vowels after [k], ranging from the most popular [e] (possibly also [ə]) present in 357 tokens, followed by [u] in 202 tokens, [i] in 125 tokens and [y] in 37 tokens, with [u, i, y] being present after non-palatalized [k] only in the tokens of MUCH.

Finally, the *Innsbruck Corpus* also includes eight texts with no examples of palatalization in the four lemmas (Kocel 2016, 227-228), the forms of which have been included in Group C and are presented in Table 5 below:

Table 5. List of the non-palatalized forms in Group C

MUCH		SUCH		EACH		WHICH	
Angel's Song							
mykil	1	swilk	1	ilk	1	wilk	1
mykel	1	swylk	1			þe whilk	1
	2		2		1		2
The Abbey of the Holy Ghost							
mekill	3	swylke	4	ylkone	3	þe whilke	4
		slyke	2	ilke	2	wylke	1
				ylke	2	the whilke	1
				euerylyke	1		
	3		6		8		6
Methodius, *The Bygynnyng of the World*							
mykil	2	swilk	2	ilk	3	þe whilk	12
mykel	1						
	3		2		3		12
Liber de Diversis Medicinis							
mekill	110	no data		ilk	57	the wilk	1
mekil	6			ilkan	37	þe whilke	1
mekyll	1			ilkane	12	whilk	1

MUCH		SUCH		EACH		WHICH	
mekilnes	1			ilke	4		
				ylkan	2		
				ylke	1		
				ylk	1		
	118		0		114		3

Dan Jon Gaytryge's *Sermon*

MUCH		SUCH		EACH		WHICH	
mekill	6	swylke	2	ilke	11	þe whilke	11
mekyll	2			ilkane	1	whilke	10
ouermekill	1					the whilke	2
						þe whylke	1
	9		2		12		24

Craft of Dying

MUCH		SUCH		EACH		WHICH	
in-samekle	2	sic	2	ilk	2	the quhilk	12
mekle	1	sik	1	ilke	1	the quilk	1
mekyll	1	syk	1				
mekille	1						
mekil	1						
mekill	1						
	7		4		3		13

The Mirror of St. Edmund

MUCH		SUCH		EACH		WHICH	
mekill	13	swylke	17	ilke	22	whilke	9
		swilke	2	ylke	5	þe whilke	8
		slyke	1	ilk	5	þe wylke	1
				ilke-ane	3	whylke	1
						þe whylke	1
	13		20		35		20

Wisdom of Solomon

MUCH		SUCH		EACH		WHICH	
mekle	14	syk	7	no data		quhilk	32
mekil	2	sik	2			quhilkis	2
mekill	1					quhylk	1
						the quilk	1
						quilk	1
						the quilkis	1
	17		9		0		38

As can be observed, Group C demonstrates such non-palatalized variants as: *mykil*, *mykel*, *mekil(l)(e)*, *mekyll*, *mekle*, *swilk(e)*, *swylk(e)*, *slyke*, *sic*, *sik*, *syk*, *ilk(e)*, *ylk(e)*, *ylyke*, *wilk*, *whilk(e)*, *wylke*, *whylke*, *qu(h)ilk(is)*, *quhylk*, again appearing in combinations, like *ylkone*, *ilkan*, compounds, e.g. *ouermekill*, *in-samekle*, *euerylyke*, and as nouns, e.g. *mekilnes*, where only the basic form of the lemma has been taken into consideration. In the texts which consistently fail to show palatalization

(Group C), the non-palatalized velar [k] appears medially in 306 forms and finally in 205 forms, with the lemmas of MUCH exhibiting again only medial [k]. Similarly to the non-palatalized forms in Group B², the velar follows only three types of vowels, i.e. [y, i, e], with [i] being the most popular and present in 283 tokens, followed by [e] in 167 tokens (of MUCH only) and [y] in 61 tokens. In the case of medial non-palatalized [k], it is followed by one of the three vowels ([i, e, y]), with [i] and [e] (possibly also [ə]) being the most popular and appearing in 152 and 150 tokens respectively, and [y] present in 4 tokens (of MUCH only).

Comparing the results for the non-palatalized forms in Group B² and C, one may observe that the types of vowels with the highest number of tokens vary only slightly; see Table 6 below:

Table 6. Distribution of the vowels preceding and following the non-palatalized velar in Group B² and C

GROUP B²				GROUP C			
Vowel preceding the non-palatalized velar		Vowel following the non-palatalized velar		Vowel preceding the non-palatalized velar		Vowel following the non-palatalized velar	
[i]	676	Ø	497	[i]	283	Ø	205
[e]	334	[e]	357	[e]	167	[i]	152
[y]	208	[u]	202	[y]	61	[e]	150
		[i]	125			[y]	4
		[y]	37				

As can be inferred from the data above, both groups of the non-palatalized forms show similar results in terms of the vowels preceding non-palatalized [k], all of them being front close or mid-close vowels, with the similar frequency of use. On the other hand, while the same proportion may be observed in the vowels following [k] in Group C, in Group B², there is an extra close back vowel [u]. In both groups, many forms have already lost the final vowel. Surprisingly, apart from the forms with [u], all the other variants demonstrate the environment conducive for palatalization, which for some reason seems not to have taken place.

Comparing now the vowels preceding the (non-)palatalized velar in all four groups, one may observe that while the pattern seems pretty regular in the case of the non-palatalized forms, the palatalized forms tend to demonstrate less consistency and more freedom in the context for palatalization to take place; see Table 7 below:

Table 7. Distribution of the vowels preceding the palatalized velar in Group A and B¹, and the non-palatalized velar in Group B² and C

Vowel preceding the palatalized velar		Vowel preceding the non-palatalized velar	
GROUP A	**GROUP B¹**	**GROUP B²**	**GROUP C**
[i] 433	[u] 521	[i] 676	[i] 283
[y] 67	[i] 361	[e] 334	[e] 167
[u] 20	[o] 157	[y] 208	[y] 61
[o] 15	[y] 113		
[e] 12	[e] 52		
[eu] 1			

On the other hand, comparing the vowels following the (non-)palatalized velar in all four groups, one can notice that while in all groups the final vowel is very often lost, the palatalized forms either have not retained the final vowel, which must have been lost after the palatalization took place, or exhibit mostly the final vowel [e] (or a weakened vowel [ə]). The non-palatalized forms show more variation with respect to the final segment, including both front vowels [e (possibly also ə), i, y] as well as back [u]; see Table 8 below:

Table 8. Distribution of the vowels following the palatalized velar in Group A and B¹, and the non-palatalized velar in Group B² and C

Vowel following the palatalized velar		Vowel following the non-palatalized velar	
GROUP A	**GROUP B¹**	**GROUP B²**	**GROUP C**
Ø 292	[e] 912	Ø 497	Ø 205
[e] 257	Ø 290	[e] 357	[i] 152
	[i] 1	[u] 202	[e] 150
	[y] 1	[i] 125	[y] 4
		[y] 37	

The results presented above prove that some forms show slight deviations from the context for palatalization introduced in section 1 and at the beginning of section 2, in which the change occurred medially, when [k] occurred between front vowels or was followed by [i] or [j], [k] was preceded by [i] and not directly followed by a back vowel; and finally, when [k] appeared after an original/primary front vowel or [i] / [j] and was preceded by a nasal. While the palatalizing environment in the case of the palatalized forms generally seems to be consistent with the context presented in sections 1 and 2, even despite the broader variety of vowels

in the vicinity of the palatalized velar, the non-palatalized forms sometimes exhibit the context for palatalization to take place, but for some reason do not allow the change to occur, which proves against the assumptions made in sections 1 and 2.

4. Observations

The analysis of the conditioning specified in sections 1 and 2, the vowels preceding and following the (non-)palatalized velar, as well as the fact that palatalization failed to occur in the seemingly conducive neighbourhood of front vowels in Group B[2] and C requires some more insight into the types of triggers and the direction in which the process might have operated.

According to Bateman, who carried out extensive research on the full and secondary palatalization in modern languages, each language may have its own repertoire of vowels triggering palatalization, the choice of which depends on certain implicational relationships observable among the triggers, which Bateman presents as follows:

(i)   if lower front vowels trigger palatalization, then so will higher front vowels
(ii) if high back/central vowels trigger palatalization, then so will high front vowels (Bateman 2007, 64),

with the most common triggers being the front vowels [i, e] and the palatal glide [j] (Bateman 2007, 62), which seems confirmed by the tokens with the palatalized velar in Group A and B[1], followed exclusively by front vowels. What is interesting is that while front [e] proves the most common in all groups, the instances with higher front vowels following the palatalized velar are pretty scarce. Lahiri and Evers (1991, 91) predicted that while [e], similarly to [i], is a possible trigger, palatalization, especially the secondary palatalization, might be in fact an acoustic effect of the on-glide of the following vowel being interpreted as the consonantal off-glide, whereby [e] could be represented phonetically as [je]. Thus, the semi-vowel [j] would be the direct trigger of palatalization, which could account for the palatalized forms with [e] following [tʃ] in Group A and B[1].

If one assumes that palatalization historically could have also depended on the vowels preceding the target and might have worked progressively, the hierarchy referred to by Bateman (2007, 63-64) could account for the fact that if [u] and [o] were triggers in Group A and B[1] so could all the other vowels. This, however, would go awry in the case of the non-palatalized forms in Group B[2] and C with only front, close and mid close vowels preceding [k], demonstrating thus much preferred triggers; yet, with no effect on the non-palatalized velar. Such an observation may point to a much more probable regressive direction of palatalization, caused by the vowel following the target as in Modern English, which in the case of the palatalized forms in Group A and B[1] was a front vowel, including [e], possibly represented phonetically as [je].

The regressive direction of palatalization is to some extent confirmed by Hogg, who put forward a hypothesis that apart from the context, palatalization must have also been conditioned by the syllable structure and could occur exclusively when a velar consonant "was in the same syllable as the palatalizing segment" (Hogg 1992, 254). This is particularly important in the case of medial consonants, whose palatalization depended on the vowel present in the same syllable as the consonant. The fact that either the preceding or following vowel could have become the trigger attested to a higher 'priority' of the vowel actually triggering or blocking the process. As an example, Hogg referred to non-palatalized *dīkas* 'ditches', providing thus evidence for a higher priority of the vowel in the second syllable, which did not ensure proper conditioning for palatalization to take place (Hogg 1992, 256). This might then explain the reason for palatalization in the forms with the palatalized velar preceded by [u, o] in Group A and B[1], confirming the higher priority assigned to the front vowel following the palatalized segment, such as [e], possibly represented phonetically as [je], and the regressive direction of palatalization. The same seems to be advocated by Morsbach (1889, in Björkman 1900, 148), who claimed that palatalization took place between originally front vowels only when the segments were immediately followed by the vowel [i] or the semivowel [j]. This theory could thus successfully explain the lack of palatalization in all the tokens in Group B[2], followed by close back rounded [u]. It is also confirmed by Bhat (1978, 52-53), quoting 'frontness' as substantial for palatalization of velars and by Blevins (2004, 138), claiming that "velar palatalization is more common before front high vowels/glides (...)."

The problematic examples, however, include the other forms in Group B[2] and C, which despite the context for palatalization mentioned above, do not exhibit the change into the palatalized velar before the front vowels [e, i, y]. The reasons for the lack of palatalization could have been partially captured in Clements and Hume's model (1995), according to which the change from [k] to [tʃ] might have occurred in stages, with first the secondary and then the full palatalization. The idea of the stage-like process with the intermediary secondary step may be confirmed by the existence of velar fronting in Modern English, as in the minimal pair of *keep* and *coop*, with the articulation of the first velar followed by the high front vowel being more forward than in the case of the latter velar followed by the high back vowel. As Bateman (2007, 41-42) rightly notices, "it is difficult to tell exactly what velar fronting amounts to, as it sometimes comes down to a judgement call." In other words, the transition zone between velar fronting and velar palatalization seems so blurred that it may be plausible to accept that at some point velar fronting might have been an intermediary stage leading to velar palatalization. This assumption could account for the problematic collection of the forms in Group B[2] and C, demonstrating the lack of palatalized segment before the front vowels [e, i, y] which in turn could cause actual fronting of the preceding consonant, later resulting in palatalization. As a consequence, while

the 202 forms with high back [u] in Group B² show a clear lack of palatalization of the preceding segment, in the other forms, the front vowels [i, e, y] could have triggered velar fronting of the velar [k] before them, constituting the intermediary stage of palatalization, possibly already perceived by some speakers.

This theory seems to be reflected in Ohala's view on the perceptual motivation behind velar palatalization (1992: 320), already mentioned in section 1, which has been further analysed by Guion (1998, 19), who states that "traditional explanations fail to motivate each step in the palatalization process on purely articulatory grounds due to the fact that important aspects of velar palatalization are perceptually motivated." In the series of experiments referred to in section 1, she managed to show that not only were [k] and [tʃ] similar acoustically before front vowels, but [k] was very often confused with [tʃ] in the context of high front vowels and "there was a clear vowel effect whereby [k] before [i] was heard as [tʃ] most often" (Guion 1998, 45). Following Guion's assumption (1998, 19) that "the phonetic variation found in speech production today parallels the variation in the past," one may hypothesize that apart from velar fronting in the forms with the non-palatalized velar in Group B² and C, it is possible that some people already heard a palatalized velar there and due to misapprehension of the sound, they produced a palatalized form instead, resulting in Ohala's hypocorrected variant. What is more, Guion (1998, 45) also demonstrated that "[k] was often heard as [tʃ] before both [i] and [u]", which might have been the effect of "noise masking and fronted production of [u]." Taking this observation at face value and studying the remaining non-palatalized forms with [u] following the non-palatalized velar, one may venture a hypothesis that under certain conditions speakers might have heard there, and consequently later produced, the palatalized velar [tʃ] as well.

The above discussion appears to go hand in hand with Lindblom's theory of the H&H continuum, mentioned in section 1, which accounts for variation in speech from hyper- to hypoarticulated forms, potentially also with respect to the palatalized and non-palatalized variants that could be subject to perceptual conditioning, depending on the circumstances and the speaker's needs. Both Ohala's and Lindblom's approaches have been recaptured by Blevins' CCC theory, also summarized in section 1, which in the context of our discussion could again corroborate the hypothesis of the perceptually motivated change, where the palatalized velar could have been produced, potentially in all the forms in Group B² and C exhibiting the environment conducive for palatalization, because it was "*misheard* by the listener due to perceptual similarities," the listener might have associated it "with the utterance which differs from the phonological form in the speaker's grammar," and, as a result of variation, the listener might have adopted a palatalized form "which differs from the phonological form in the speaker's grammar" (Blevins 2004: 32-33). All of these assumptions suggest that the process of palatalization in Northern Middle English might have been as much articulatorily as perceptually conditioned, with various historical and other phonological

influences leaving their mark too. Since it is plausible that fronting might have taken place in all the forms with front vowels following the velar and that in some cases the non-palatalized velar could have been perceived as palatalized ([tʃ]), it seems probable that palatalization might have been an even more productive and common process in the North than it has been previously assumed.

5. Conclusions

The aim of this study was to analyse a full selection of forms of EACH, MUCH, SUCH, and WHICH in the Northern Middle English texts, focusing predominantly on the conditioning environment of palatalization and the direction of the process. The analysis was based on the graphemic representation of the vowels in the lemmas, focusing mostly on the front-back dimension. While the palatalized forms proved to exhibit more types of vowels preceding the target than the non-palatalized ones ([i, y, u, o, e] vs. [i, e, y]), the non-palatalized forms showed more variety in terms of the vowels following the target ([i, e, y, u] vs. [e]), with final [e] also possibly standing for a weakened front vowel. These results seemed to deviate slightly from the palatalizing context introduced in sections 1 and 2, particularly in the case of the non-palatalized forms. Additionally, all the groups demonstrated many forms where the final vowel was lost; in the case of the palatalized variants, the vowel probably first triggered palatalization of the preceding velar and then was lost. Analysing the distribution and the types of the vowels preceding and following the (non-) palatalized velar, one may assume that the process of palatalization was more likely to operate in a regressive direction, where the vowel following the target triggered the change. The most probable triggers proved to be the front vowels [i] and [e], possibly represented phonetically with the glide as [je]. The lack of palatalization in the non-palatalized forms exhibiting the above triggers could be accounted for by the fact that palatalization might have occurred in stages, where the velar could have first undergone fronting, resulting later in the full palatalization of the target and in some variation in speakers' choice of forms along the H&H continuum. This can also be confirmed by referring to the perceptual analysis of the sound change, whereby the change could have been perceptually motivated, and in the conducive environment of [i], [je], and even [u], it is possible that some language users already heard and produced the palatalized sound. Assuming the possibility of similarity between the processes operating today and those occurring in the past, one may, therefore, venture an opinion that palatalization, both articulatorily and perceptually conditioned, could have been even much more widespread in the North.

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