Palatalization in Romance:

An Investigation of the Sound Change in French and Spanish

By Steven Fielding

A dissertation submitted to the faculty of Humanities, University of the Witwatersrand, Johannesburg, for the fulfillment of the requirements for the degree of Master of Arts.

Johannesburg, 2010.

Abstract

This thesis discusses and compares the change of velar stops into palatoalveolar affricates, a process termed velar palatalization, in the Romance languages French and Spanish. Firstly, velar palatalization will be defined and several explanations offered by other theorists will be examined. Evidence taken from these two languages, as well as their ancestor Proto-Romance, will be used to illustrate the process of velar palatalization. The question of how the process took place in both these languages will then be discussed. The voiceless velars will be examined first, followed by the voiced velars in Spanish and French, respectively. The voicing asymmetry noted will be discussed, with an explanation offered. Finally the unusual case of the velars palatalizing before the /a/ in French, which is normally dealt with as a separate change will be discussed and shown to be a case of velar palatalization.

I declare that this thesis is my own unaided work. It is submitted for the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.

Steven Fielding

Signature:

27 May 2010

Acknowledgments

Table of Contents.

Chapter One

Introduction

Language variation and historical change are not new phenomena. The fact that speech sounds undergo change has been noted since ancient times (Campbell, 2001) and was the main area of concern for linguists up until the nineteenth and early twentieth centuries (Campbell, 2001).

It is also not a new observation that many changes seem to be repeated across languages (McMahon, 2000). It is one such change, that of velar palatalization, that will be the focus of this paper. This is a change that occurs repeatedly in the worlds' languages.

For this work basic background knowledge of historical linguistics in general and the principles of sound change in particular is assumed. Working within the framework of phonetically-based sound change and constraint-based phonology, some knowledge of these fields is necessarily required.

It is the aim of this paper to examine velar palatalization as a phenomenon, looking at the processes behind it and at what it might involve. It is also the aim of this paper to explore and discuss velar palatalization as it occurred in two separate, yet related languages in the Romance family: Spanish and French. Here it is the aim to present what has usually been dealt with as separate cases, in a united way as a single type of change, namely that of velar palatalization.

I will compare the processes as they occurred in these two languages in turn and discuss important points such as the ability to trace various outcomes of velars in these languages.

Spanish and French have been chosen due to the fact that they are related languages, both forming part of the Western Romance family. Both languages underwent the same process of velar palatalization and they both manifest the most typical changes of this process - that of the voiceless velar, as well as asymmetry in the voiced velar. French has since undergone a second period of velar palatalization that is atypical of the phenomenon of velar palatalization, while Spanish has not.

In section 2.1 the general process of velar palatalization will be defined and explained. Section 2.2 will look at several theorists who have studied velar palatalization, whose work will be successively introduced and explained. Section 2.3 gives a brief introduction to the Romance languages and to Proto-Romance.

Chapter Three will discuss and compare velar palatalization in Spanish and French. Section 3.1 will focus on Spanish, with the voiceless velar and the voiced velar being discussed in succession. 3.1.1 discusses the voiceless velars and the process of velar palatalization is illustrated at its most typical. In section 3.1.2 voiced velars are addressed. Variations in the data are explained and the changes the voiced velar undergoes are shown to be velar palatalization.

Section 3.2 will move the discussion to velar palatalization in French and the same general structure will be observed discussing first the voiceless velar and then the voiced velar. As with Spanish, the voiceless velars are shown first in section 3.2.1. Comparison is made and here again the most typical velar palatalization is shown. Section 3.2.2 discusses voiced velars and here the process is developed and expanded. An explanation for voicing asymmetry is offered.

The final section, 3.2.3, will deal with a discussion of one particular occurrence of velar palatalization in French that is considered unusual, that of the palatalization of the velars before /a/. This case is discussed and the process shown to be velar palatalization. The reasons for the spread of this change across such an unusual environment are then discussed and appeal is made to the historical linguistic theories of analogical extension and lexical diffusion.

Chapter Two

<u>Velar palatalization.</u>

Palatalization is one of the most common sound changes (Bhat, 1974). It involves either, the changing of a consonants' place of articulation to a palatal position (Bhat, 1974) or, the consonant gains a secondary palatal articulation (Bhat, 1974). The environment triggering palatalization is usually a neighboring front vowel, a palatal semi-vowel or a palatal consonant (Bhat, 1974). Palatalization involves three processes (Bhat, 1974). These are tongue fronting, tongue raising and spirantization (Bhat, 1974). Different types of palatalization involve different processes or a combination of them (Bhat, 1974). The palatalization of velars is usually seen as tongue fronting, but can also involve tongue raising and spirantization (Bhat, 1974). Velar palatalization is usually seen as unique type of palatalization and it will be discussed in greater detail in this chapter.

<u>2.1. Introduction to velar palatalization</u>

Velar palatalization is the term used to describe the process where a velar stop changes its place of articulation and becomes a palatoalveolar affricate before a front vowel, or the palatal glide (Bhat, 1974; Guion, 1998; Buckley, 2003; Halle, 2005; Telfer, 2006). Some examples of this can be seen in the example below taken from Telfer (2006). Relevant segments are underlined.

1. Examples of velar palatalization in different languages:

<u>Proto-Athapascan</u>	<u>Navajo.</u>	
$*\underline{k}^{jh}$a:n	$\underline{ts}^{h}$ã́	"rain"
<u>Proto-Slavic</u>	Czech	
$*\underline{k}^{j}$elə	$\underline{ts}^{j}$eli:	"whole"
<u>Romanian</u>		
ra<u>k</u> ra<u>k</u>^{j}	ra<u>t͡ʃ</u>^{j}	"crabs"

The most common type of velar palatalization is that of voiceless velar stops before a high front vowel (Guion 1998, Halle 2005). This particular sound change is quite a common one throughout the languages of the world (Bhat, 1974; Guion, 1998; Buckley, 2003; Halle, 2005; Telfer, 2006). It is found in Kirundi, Slavic, Old English, Faroese, Navajo, Spanish, Italian, Romanian (Telfer, 2006), Texan English (Guion, 1998; Halle, 2005) and French (Price, 1971), to name a few.

The process of velar palatalization is only ever triggered by a front vowel or a glide, and in the majority of the cases the triggers follow the velar (Bhat, 1974; Telfer, 2006). Most of the cases of velar palatalization occur before a high front vowel but low front vowels can also act as triggers, as in French (Telfer, 2006). The outcome of this process is a strident coronal affricate or fricative (Telfer, 2006), usually a palatoalveolar (Bhat, 1974; Guion, 1998; Halle, 2005; Telfer, 2006).

There is, in many cases, a voicing asymmetry in velar palatalization (Guion, 1998), where the voiceless velars undergo a change while the voiced ones do not (Guion, 1998). There do, however, appear to be quite a few cases where this type of voicing asymmetry is apparent (Telfer, 2006). There are also cases where the voiced velar has a different outcome than expected. There are certain differences in the behaviour of voiced and voiceless velars to be observed: firstly, if voiced velars undergo velar palatalization then the voiceless ones will also do so but the reverse is not necessarily true. If the voiceless velars palatalize the voiced velars will not do so automatically. Secondly, voiced velars tend to become palatoalveolar; thirdly, voiced velars tend to become fricatives while voiceless ones tend to become affricates (Telfer, 2006). Finally, voiceless velars tend to become palatal glides or to be deleted all together (Telfer, 2006).

2.2. Previous accounts of velar palatalization

Recent accounts and explanations of velar palatalization view the process as one of assimilation. Most theorists who study it see the phenomenon as the result of the tongue anticipating the front vowel, as a result altering the place of articulation of the stop from the velum to the palate or alveolar palate border (Buckley, 2003; Halle, 2005; Telfer, 2006).

There have been several studies that have attempted to explain why or how this might happen. The general idea among early accounts was that a certain feature has spread over from the vowel to the consonant causing the consonant to change.
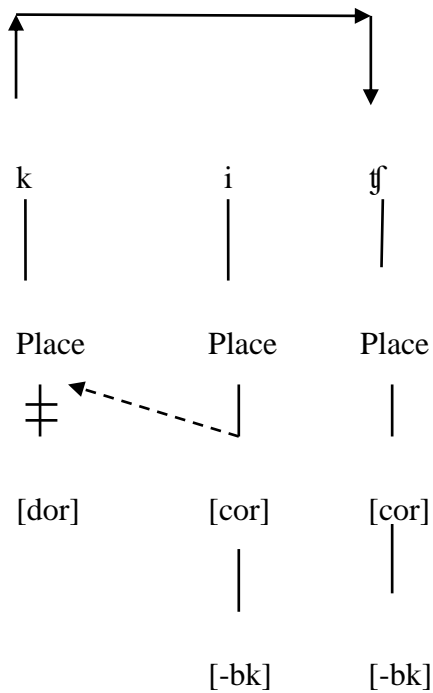
All sounds are said to be divisible into sets of features (Spencer, 1996). Features are used to describe a sound in terms of its place and manner of articulation (Spencer, 1996). Features are usually seen as binary, that is to say a particular feature is either present (+) or not (-) (Spencer, 1996). In this system a particular sound is viewed as being a collection of these features, which are what gives each sound its distinctiveness.

Hall (1997) uses the feature [−back] as the feature responsible for velar palatalization. In his work the feature [−back] is seen to spread to the dorsal sound, causing it to become a coronal sound (Hall, 1997). It is important to note that Hall (1997) makes an important modification to the feature [−back], which is to allow it to act as a tongue blade feature as well as a tongue body feature (Telfer, 2006). Normally the feature [-back] relates to vowels and thus is associated with the tongue body but Hall's modification allows him to use this feature to account for the shift in place of articulation in both dorsal and coronal sounds (Telfer, 2006). The shift in velar sounds will be focused on in the following paragraphs.

In Hall's account of the shift in velars (Hall, 1997) it is theorised that the change of a velar to a palatoalveolar occurs when the front vowel (called a coronal vowel) spreads its feature [−back] to the dorsal sound, making the dorsal sound [−back] as well (Hall, 1997). The dorsal sound becomes a coronal sound. This process can be seen in Figure 1, taken from Telfer (2006, p.35), adapted from Hall (1997).

In Figure 1 it can be observed that each sound is given a place feature node. This is a node associated with each sound to which features (in this case place features) attach (Hall, 1997; Telfer, 2006).

Figure 1. Velar Palatalization by Hall (1997).

```
         ┌──────────────┐
         │              ▼
         │
  k             i             ʧ
  │             │             │
  │             │             │
  │             │             │

Place         Place         Place
  ╪ ◄╌╌╌╌╌╌╌╌┘               │

[dor]         [cor]         [cor]
                │             │

              [-bk]         [-bk]
```

In the case of velar palatalization, the place feature of the vowel spreads from its node to the node of the neighbouring consonant. This causes the consonant to dissociate from its original place of articulation feature- in this case a dorsal feature (indicated by the two slashes through the line connecting the place node to the dorsal feature) and become the coronal sound that is [−back] (Hall, 1997).

Hall does not, however, account for all aspects of velar palatalization, for example he does not suggest how the voicing asymmetry would be accounted for, nor does he offer an explanation as to why the velar stop not only changes its place of articulation, but also its manner.

There is also the question of whether it is possible for a vowel place feature to spread to a consonant. It is known that it is possible for features to spread from consonants to vowels, as in the homorganic nasal rule, where vowels become nasalized before nasals (Spencer, 1996; Fromkin, Rodman & Hyams, 2003). It is also observed that features can spread from vowels to consonants for example voicing assimilation, where voiceless consonants become voiced before or between vowels (Spencer, 1996; Fromkin, Rodman & Hyams, 2003; Campbell, 2004).

Bearing these cases in mind, it could be argued that there is nothing stopping the spreading of a place feature from vowel to consonant. In response to such a claim it is argued that the feature [–back] refers to the position of tongue without restriction of airflow (after all that is why vowels are given separate features from consonants) (Telfer, 2006). Hall escapes this by arguing that [–back] can be a feature associated with both tongue body and tip (Hall, 1997) as was previously discussed in relation to work done by Hall. This would allow the tongue to use [–back] to produce coronal sounds.

Hall's assumption that [-back] can be a tongue body and blade feature is motivated by the premises of Vowel-Place Theory, which Hall works within. Vowel-Place Theory is based on the assumption that consonants and vowels share a set of features (Telfer, 2006) as opposed to the usual approach, in which vowels and consonants have different features (Spencer, 1996). In Vowel-Place Theory the vowel features are replaced by the related consonant features (Telfer, 2006), e.g. [+/- high] [+/- back] are replaced with [dorsal] and [coronal] (Telfer, 2006). This was an attempt to account for the interactions between vowels and consonants (Telfer, 2006).

In Halle (2005) a slightly different explanation for velar palatalization is offered. Halle views segments as feature complexes - in other words as being able to have two place features and this is the key to his theory of how features spread. In his work Halle proposes that front vowels have two DA's (designated articulation) features; one [coronal] and the other [dorsal]. A designated articulator is the place of articulation that is specified for each sound.

According to Halle (2005) DAs refer to the part of the tongue responsible for articulation. Halle finds therefore that [coronal] sounds are articulated with the tongue blade while [dorsal] ones are articulated with the tongue body, and that if the front vowels have both a [coronal] and a [dorsal] feature, then the front vowels are articulated with both tongue blade and tongue body.

In this explanation, during palatalization the front vowel's [DA Coronal] feature spreads to the neighbouring consonant causing it to change from [DA Dorsal] to [DA Coronal]. In practice this would allow the velar stops to become palatoalveolar affricates. A basic view of this process can be seen in Figure 2 below (adapted from Halle, 2005).

In Figure 2 it is shown that the front vowel's [coronal] feature spreads to the preceding velar consonant, which causes the velar to dissociate from the [dorsal] DA designated for it and to become a coronal sound (Halle, 2005).

This is different from Hall (1997) in that the feature being spread here is not the [-back] feature of the vowel but its [coronal] DA. [-/+back] is the vowel feature that determines the frontness of the vowel. Therefore even a front can have both the [dorsal] and [coronal] features required by the theory. Any concerns about [+/- anterior] (i.e. whether /ʦ/ or /ʧ/ will be the resultant sound) are dealt with by a rule that applies after the spreading due to the fact that these features are seen as independent from DA features (Halle, 2005).

Figure 2 Velar palatalization according to Halle 2005.
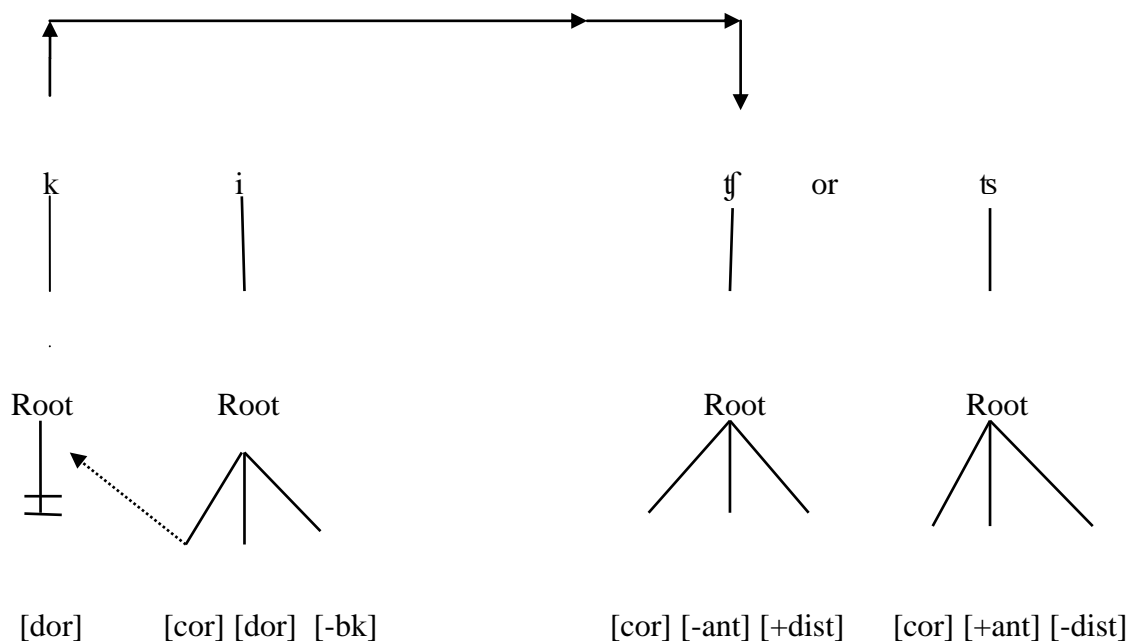
Halle's theory has several useful additions that allow difficult examples to be addressed. By viewing the vowels as complex (i.e. as both [dorsal] and [coronal]), he can account for some difficult data, e.g. in Kiowa where velar stops become coronal before mid vowels and coronal stops become velar before high vowels (Halle, 2005; Telfer, 2006). He can do this because of the vowel's two DAs. In each case a different one of the vowel's features spreads to the consonant.

Halle does, however, encounter some of the same issues that Hall does. For instance, voicing asymmetry is still not really addressed. The second problem that arises is that Halle does point out that consonants may not have more than one DA (Halle, 2005) but no independent motivation is given for why vowels should have two DAs (Telfer, 2006). Halle also repeats Halls omission of why there is also a change in manner of articulation.

Telfer (2006) too gives an account of velar palatalization (which he terms coronalization). The primary goal of Telfer's study is to compare two processes, namely velar palatalization and assibilation (the change of a coronal stop into an affricate) (Telfer, 2006), and show that the phonological and phonetic processes behind the one are likewise responsible for the other (Telfer, 2006). Here, his results regarding velar palatalization will be looked at. Telfer claims to primarily work within the framework of Revised Articulator Theory (Telfer, 2006), but also makes use of Optimality Theory (Telfer, 2006).

Telfer's paper appears to be as much a summary of the processes involved as it is an analysis; he provides much of the information given at the start of this chapter. An important point that Telfer makes is that he views velar palatalization as primarily acoustic in nature, but articulatory factors need to be taken into account in an explanation (Telfer, 2006). It is important to note that Telfer attempts here an integrated approach to explaining velar palatalization.

In his analysis Telfer proposes that there is an increase in stop release turbulence when it occurs before a high front vowel. This turbulence could then be interpreted as stridency - in other words the stop is interpreted as being [+strident] (Telfer, 2006). This then causes the sound to assibilate (become a sibilant).

Telfer claims that the velar before the high front vowel is the ideal situation for such an occurrence of this process (Telfer, 2006). To explain this, Telfer makes use of a constraint-based model (Optimality Theory), as this is the most mainstream of the phonological theories.

Optimality Theory (henceforth abbreviated to OT) was introduced by Prince and Smolensky in 1993 (Archangeli, 1997; Kager, 1999; Boersma, Dekker & Weijer, 2000) as an alternative to the traditional rule-based accounts in phonology. Prior to this, the usual way for

phonological phenomenon to be captured was to write a set of language-specific phonological rules (Archangeli, 1997; Kager, 1999; Boersma, Dekker & Weijer, 2000). The main critique of this approach was that it failed to capture phonological conspiracies (Boersma, Dekker & Weijer, 2000). These are tendencies that seem to crop up in languages again and again (Kager, 1999; Boersma, Dekker & Weijer, 2000). OT arose as an attempt to capture and explain these tendencies (Kager, 1999; Boersma, Dekker & Weijer, 2000).

OT views grammar as a conflict between two tendencies; namely faithfulness and markedness (Kager, 1999). Faithfulness is defined as the force that requires the speaker to be completely faithful to the underlying representation in their minds (Kager, 1999). Markedness is defined as the force that seeks to level the language (in a sense) - in other words to not have structures that are in some way marked (Kager, 1999). Language is seen as the result of the interaction of these two forces. It is important to note that OT is an output-based approach (Boersma, Dekker & Weijer, 2000) - that is to say it is focused on what is actually produced phonologically.

An OT grammar comprises the input, which is the underlying representation of the word that comes from the lexicon (Archangeli, 1997; Kager, 1999; Boersma, Dekker & Weijer, 2000). There is also the Generator, whose function it is to create a set of candidates, from the input for the output (Kager, 1999; Boersma, Dekker & Weijer, 2000). These candidates are all the forms of the input logically possible (Kager, 1999). These candidates are then evaluated, called Eval, against a set of hierarchically arranged constraints (Kager, 1999; Boersma, Dekker & Weijer, 2000).

The crucial element of OT is the constraints. The constraints are defined simply as a set of structural requirements (Kager, 1999). There are several important points about constraints that should be noted: Firstly, those constraints are universal, which is to say that all the constraints occur in all languages (Archangeli, 1997; Kager, 1999 Boersma, Dekker & Weijer, 2000). The second important point is that the constraints are violable - in other words, structural requirements do not have to be met (Archangeli, 1997; Kager, 1999 Boersma, Dekker & Weijer, 2000).

The next two points have to do with the universality of the constraints (Kager, 1999) and deal with the nature of constraints generally. First constraints must have a typological basis

(Kager, 1999) meaning that the structure being requested by the constraint must occur somewhere within world languages and second, the constraints must be phonetically grounded, which means that the constraint must have some basis in acoustic/perceptual or articulatory phonetics (Kager, 1999).

The most important feature of these constraints is that they are ranked with respect to one another (Archangeli, 1997; Kager, 1999; Boersma, Dekker & Weijer, 2000). As all the constraints occur in all languages, the differences between languages are caused by the differences in the order of the constraints within the Eval (Archangeli, 1997; Kager, 1999 Boersma, Dekker & Weijer, 2000).

There are essentially two kinds of constraints, faithfulness and markedness (Archangeli, 1997; Kager, 1999; Boersma, Dekker & Weijer, 2000). Faithfulness constraints require that the structure of the candidates and the output should not differ (i.e. stay faithful) from that of the underlying form (the input) (Archangeli, 1997 Kager, 1999 Boersma, Dekker & Weijer, 2000).

Markedness constraints are those that express the structural requirements (Kager, 1999). They are usually coached in terms of avoidance (i.e. do not have a particular structure) and are there to attempt avoidance of marked structures (Archangeli, 1997; Kager, 1999; Boersma, Dekker & Weijer, 2000). It is the interaction of these two kinds of constraints that creates the final output. Constraints can interact in different ways but the most important of these is domination (Kager, 1999). Domination means that the higher in a pair of crucially ranked constraints takes precedence over the lower of the two constraints (Kager, 1999).

The final component of the OT grammar is the output. The output is the actual spoken/produced form (Archangeli, 1997 Kager, 1999 Boersma, Dekker & Weijer, 2000). The output is the candidate that violates the fewest and lowest constraints (of a domination relationship) (Archangeli, 1997; Kager, 1999; Boersma, Dekker & Weijer, 2000).

Returning to Telfer's argument, he proposes a constraint, *ki, which states that you may not have a velar before a front vowel (Telfer, 2006). A similar constraint is given in Morris (2005), who uses it to explain the velar changes that took place in Spanish. The resultants

hypothesized by Telfer are the strident velar affricates /k͡s/ and /k͡ʃ/. These sounds are very rare in the world's languages, which leads Telfer to believe they are extremely marked (Telfer, 2006).

Telfer proposes that there is a constraint active in most of the world's languages (Telfer, 2006) prohibiting the aforementioned segments. The below constraints are taken from Telfer (2006):

* k͡s

*[dorsal, +strident]

Strident velars are prohibited.

These constraints mean that /k͡s/ and /k͡ʃ/ are disfavoured. Instead, some other segment would be used. Telfer argues that languages would prefer to keep the [+strident] feature and so the [dorsal] feature would be lost and replaced by a [coronal] feature (Telfer, 2006). In effect this means that segments like /k͡s/ and /k͡ʃ/ would become /t͡s/ and /t͡ʃ/.

Telfer uses articulatory and auditory phonetics as well as phonological processes and features to explain why and how velar palatalization takes place. The theory of stop turbulence before that of high front vowels as the cause of velar palatalization (discussed at the start of the section on Telfer), is seen as the initiator of the change. Feature-based theories and even the OT analyses proposed by Telfer are seen as explanatory models of the change (Telfer, 2006).

Telfer has the advantage of being able to explain some of the issues not approached by the previous theorists discussed. Telfer is able to account for the change not only in place of articulation but also in the manner of articulation that occurs in velar palatalization. This is something that Hall and Halle did not do. In this case the explanation is that the increased turbulence that occurs when the stop occurs before the front vowel is reinterpreted as stridency and that languages prefer to preserve the stridency that causes the shift in manner (Telfer, 2006).

It is believed by some modern historical linguists that all sound change should have a phonetic basis (Ohala, 2003; Blevins, 2004). There should, according to these theorists, be

certain articulatory factors that cause the sound to change, or some auditory factor that causes a mishearing (Ohala, 2003; Blevins, 2004). It was mentioned in the preceding discussion on Telfer, how some phonetic factors may influence the process of velar palatalization. Guion (1998) provides some independent evidence for pursuing phonetic factors in velar palatalization.

Guion (1998) regards velar palatalization as a result of acoustic and perceptual factors. Guion argues velar palatalization to be the result of the listener's re-analysis of the speech signal. Guion's hypothesis is that the voiceless velar stops before high front vowels become acoustically similar to the palatoalveolar affricates (Guion, 1998).

Three experiments were conducted to test this hypothesis (Guion, 1998). The first experiment tested whether velar stops and the palatoalveolar affricates were acoustically similar before the high front vowels. This involved recording speakers uttering velar stops and palatoalveolar affricates in initial position before a set of vowels, including both high and low as well as front and back. The speech signal was then analyzed (Guion, 1998). The assumption was that the spectral peak of the /k/ preceding the front vowel would be more similar to the /ʧ/ than in other environments (Guion, 1998).

In measuring the highest amplitude of a made spectrum of the burst point of each stop (Guion, 1998) it was found to be the case that the average spectral peak of /k/ preceding a front vowel was almost identical to that of /ʧ/ (it should be noted that the experiment did show that the voiced counterparts of these two, namely /g/ and /ʤ/, had a similar result, however not to the same extent as the voiceless ones) (Guion, 1998).

In the second experiment Guion tried to determine if the voiceless velar stops and the palatoalveolar affricates were perceptually similar before high front vowels. In order to test this, Guion played a set of tokens of /k/ and /ʧ/ as they occurred before certain vowels to a group of listeners (Guion, 1998). The tokens were digitally modified and divided into two sets. The first set's tokens had the voicing of the vowel deleted so that only the qualities of the stops and affricates remained. In the second set all but the first 30ms of the consonant was deleted. Listeners were then asked to determine whether the sound was a /k/ or a /ʧ/. The underlying assumption of these experiments was a) that listeners would confuse /k/ and /ʧ/

when the former was before a high front vowel and b) that there is a perceptually noticeable change in the quality of the /k/ when it occurred before the high front vowel (Guion, 1998).

It is important to note that the subjects were presented with a forced choice (Guion, 1998), that is - they could only choose between the two options. The idea was to see whether and how often listeners confused /k/ and /ʧ/. Guion found that listeners had difficulty identifying /k/ when it occurred before the high front vowel /i/, confusing it with /ʧ/. Guion also found that the reverse was not true, that subjects did not confuse /ʧ/ with /k/ (Guion, 1998).

Guion notes herself that the results of the experiment could be misleading as it is possible that having only two options, subjects simply guessed. In order to overcome this, Guion designed experiment three. Here listeners were presented with four options to choose from, including the voiced counterparts of /k/ and /ʧ/, namely /g/ and /ʤ/. In addition, masking was used to obscure the tokens and all tokens were made 100ms long. The general pattern that was noted in experiment two was continued here in that /k/ was misidentified as /ʧ/ before /i/ (Guion, 1998). The final results of Guion's study showed that perceptually and acoustically /k/ and /g/ before a high front vowel are similar to /ʧ/ and /ʤ/ respectively (Guion, 1998).

There are some flawed areas in Guion's experiments. For instance she does not address certain points, such as the occurrence of palatalization before other front vowels besides just the high ones. On page 20 of Guion, 1998, a list is given of languages in which palatalization occurs before other front vowels, but this topic is not addressed in the work. Nor is voicing asymmetry which, constituting a significant part of the phenomenon, deserves mention. A final point to note is that Guion does not consider why, in certain instances, the result of the palatalization is in fact a /ʦ/. These points are, however, ones that Guion herself acknowledges as shortcomings (Guion, 1998) and whilst not diminishing the results of her study, they nonetheless leave open areas of question.

The assumption in this paper is that velar palatalization is the result of both phonetic and phonological processes. In line with current views that sound change should have its roots in a phonetic process, I assume a phonetic cause of velar palatalization. The cause is seen here as most likely a combination of the stop-vowel turbulence mentioned by Telfer (2006) and the auditory factors espoused by Guion (1998).

The variation then becomes a change through phonological processes. This study rests on the constraint-based model as the best illustrator of the process of velar palatalization. The constraints given by Morris (2005) and Telfer (2006) form a suitable point of reference.

2.3. Proto-Romance and the Romance languages: An Introduction
2.3.1. The Romance Languages

The Romance languages are a branch of Indo-European languages spoken through much of Southern Europe, in parts of Western Europe as well as many other parts of the world where they arrived via colonisation (Posner, 1966). They consist of such languages as French, Spanish, Italian, Catalan, Occitan, Sardinian, Portuguese, Romanian and Friulano among others (Posner, 1966; Hall, 1974; Campbell, 2004). It has long been widely held that the Romance languages originally descended from Latin, the language of the Roman Empire (Posner, 1966).

It is, however, now generally acknowledged that Romance did not descend from the Classical Latin, but rather from what is termed Vulgar Latin (Posner, 2006). Vulgar Latin is considered to be the actual spoken Latin of the Romans, as opposed to Classical Latin, which is believed to have always been purely a literary language (Boyd-Bowman, 1954; Posner, 1966; Vincent, 1988). It is from the varieties of Vulgar Latin spoken in various parts of the Roman Empire that the different Romance languages subsequently evolved (Posner, 1966; Vincent, 1988).

2.3.2. Proto-Romance and the classification of Romance

In working with the common ancestor of the Romance languages it is possible to use the texts available in Classical Latin, but it is also possible to use a different form of the Romance progenitor, that of Proto-Romance.

Simply put, Proto-Romance is the reconstructed ancestor of the Romance languages (Hall, 1976; Campbell, 2004). This reconstruction is achieved through a standard technique – the comparative method, used in historical linguistics (Hall, 1976; Campbell, 2004). Through this method the segments of several related languages are systematically compared and an

ancestor form is hypothesized (Hall, 1976; Campbell, 2004). An illustration of this process is given in Figure 3 (Adapted from Campbell, 2004 p 138).

Figure 3. Example of Comparative reconstruction:

	Italian	Spanish	Portuguese	French	
i.	/venire/	/benir/	/vir/	/vənir/	"to come"
ii.	/valle/	/belʲe/	/vale/	/val/	"vally"
iii.	/vestire/	/bestir/	/vestir/	/vetir/	"to dress"
iv.	/bolla/	/bola/	/bola/	/bul/	"ball"
v.	/bonta/	/bondad/	/bõdadʒi/	/bõte/	"goodness"
vi.	/bev-/	/beber/	/beber/	/beivre/	"to drink"

From the data in figure 3, two sets of correspondences are observable. Firstly, in the initial position we have a /b/ in all languages as can be seen in numbers (iv) to (vi). From this it is possible to reconstruct a /b/ in the original language.

The second set of correspondences (i-iii) shows an initial /v/ in all languages except Spanish, which has an initial /b/ in the same position that all the other languages show /v/. In this case it is possible to do two things; either reconstruct a /b/ that then became a /v/ in all the other languages or reconstruct a /v/ that became a /b/ in Spanish (Campbell, 2004). It is ultimately not possible to justify the first option (Campbell, 2004) because that would mean that a change occurred in all cases except one. This is not ideal and it is preferable to assume as few changes as possible, so the reconstructed sound must be a /v/ (Campbell, 2004).

From the correspondence set in figure 3 it is therefore possible to hypothesize two sounds for the ancestor language: namely *b and *v.

It is argued that this method is the most scientific way of determining a language group's ancestor (Campbell, 2004). The comparative method is quite thorough in its methodology and is generally considered to bring quite accurate results (Campbell, 2004). It is even possible for two different researchers to work on the same data with the comparative method and arrive at the same results. (Fox, 1995; Campbell, 2004). The various proposed reconstructions

of Proto-Romance are usually quite close, not only to each other, but also to the texts of Latin (which validates to their use) (Fox, 1995).

Due to the scientific nature and standard application arising from these reconstruction methods, in this paper the common ancestor of Romance will be taken as Proto-Romance. The actual reconstruction work that will be used is going to be that of Hall (1976) although it must be said that this work seems to be quite widely accepted and is closely followed by other reconstructions (Fox, 1995).

To complete the discussion on Proto-Romance the reconstructed sound system of Proto-Romance will be studied. Figure 3 looks at the vowel system while Figure 4 shows the consonants (taken from Hall, 1976 p18 and 61). It is important to note that the asterisk (*) next to each sound is a historical-linguistic convention and indicates a reconstructed sound or word.

Figure 4. Vowel inventory for Proto-Romance.

	Front	*central*	*back*
High	*î *i		*û *u
Mid	*ê *e		*ô *o
Low		*a	

Figure 5. Consonant inventory for Proto-Romance.

	Labial/labiodentals	*dental*	*alveolar*	*velar*
Stop	*p *b	*t *d		*k *g
Fricative	*f		*s	
Nasal	*m		*n	
Lateral			*l	
Flap			*r	

The vowel chart shows that there were five basic vowels; the vowels with the diacritic indicate a tense version of the vowel. Here we can see that there were two high, two mid and

one low. Likewise there are two front, two back and one central. All vowels with the exception of the low vowel can occur as tense.

In Figure 4 it can be noted that there are three voiced stops and three voiceless stops (the second in the pair is the voiced one). There are only voiceless fricatives although there is evidence to suggest that between vowels the fricatives became voiced (Boyd-Bowman, 1954; Vincent, 1988). There are two nasals, one lateral and one approximant. Finally, it should be noted that there were believed to be two glides [j] and [w], but these were allophones of the high vowels /i/ and /u/.

In the classification and sub-grouping of the Romance languages the main branch that will be examined is the Western Romance grouping. This grouping contains two main branches; the Gallo-Romance, which gave rise to the French and Rhaeto-Romance languages and Ibero-Romance, which gave rise to Spanish, Catalan and Portuguese (Hall, 1976). In the next section the instances of velar palatalization that occurred in these two branches will be looked at in detail.

Chapter Three

Velar Palatalization in Romance

It has often been noticed that palatalization has taken place throughout Romance, with the exception of Sardinian (Pope, 1934; Hall, 1976; Vincent, 1988). The change is particularly noticeable in the Western Romance group (Hall, 1976 Vincent, 1988). It is two of the languages of the Western Romance group that the remainder of the chapter will be devoted to. These languages will be Spanish and French.

In this chapter I will compare the two languages and the same process that occurred in both of them (namely velar palatalization). I will look at the asymmetries in voicing and the interesting variations, ultimately showing that there are more similarities than differences.

3.1. Velar Palatalization in Spanish

A process like the ones described above in section 2.1 occurred in Spanish as it evolved from Proto-Romance. The velar stops became palataoalveolar affricates when followed by the front vowels /i/ and /e/ or by the yod [j] (Penny, 1991; Telfer, 2006), which is not only a trigger for velar palatalization itself (Telfer, 2006) but in Proto-Romance was an allophone of /i/ (Hall, 1976). In the discussion that follows the different cases of velar palatalization in Spanish are examined.

3.1.1. Velar palatalization of voiceless velars

The first case that will be examined is the palatalization of the voiceless velar /k/. In Spanish when /k/ occurred in initial position followed by the front vowels /i/ and /e/ and the palatal glide yod [j] the result was /ts/ (Penny, 1991). Examples of this can be seen in number (2) (taken from Hall (1976), with the exception of the second example, which is taken from Penny (1991)). It should be noted that Proto-Romance is abbreviated here to PRm and Old Spanish to OS.

(2). The voiceless velar initial before front vowel.

	PRm	OS	
i.	*kera	ʦera	"wax"
ii.	*kista	ʦesta	—
iii.	*kentu	ʦiento	"100"
iv.	*kimike	ʦime	"bed-bug"

As can be seen this change was a fairly straight forward instance of velar palatalization. In order to show this to truly be the case (as opposed to all velars changing to the affricate), the fate of the velars as they occurred before the back vowels should be examined. Number (3) (Taken from Hall, 1976) demonstrates this.

(3). Voiceless velars before back vowels.

	PRm	OS	
i.	*kognate	kuɲada	"sister-in-law"
ii.	*kokere	koʤer	"to cook, boil"
iii.	*koksa	koʃa	"thigh"
iv.	*kûrare	kurar	"to care for"
v.	*kuppa	kopa	"cup"

The data in Number (3) shows that the velar stops did not palatalize before the front vowels, so it is determined that the change of /k/ is a case of velar palatalization. The symbol ɲ is the palatal nasal. In number (4) (taken from Hall, 1976) the process as it occurred in intervocalic positions is shown. There is an apparent problem. The data shows /k/ becoming /ʤ/, not /ʦ/ as is expected.

(4). Voiceless velars before /i/ and /e/ preceded by a vowel.

	PRm	OS	
i.	*fakere	haʤer	"to do"

| | ii. | *lukêre | ludzer | "to shine" |
| | iii. | *kokere | kodzer | "to cook, boil" |

In section 2.1 we mentioned that voiceless consonants tend to become voiced when they occur between vowels (Spencer, 1996; Fromkin, Rodman & Hyams, 2003; Campbell, 2004). Intervocalic voicing in Romance is also discussed in Fox, 1995 and Bradley & Delforge, n.d. An example is the Proto-Romance *drakone "dragon", which in Spanish becomes *dragon* (Hall, 1976).

To determine whether or not intervocalic voicing took place from Proto-Romance to Spanish, the example in (5) (taken from Hall, 1976) is given, showing the /k/ as it occurred intervocalicaly but not in the palatalizing environment.

(5). Voiceless velars before back vowels when preceded by a vowel.

		PRm	OS	
i.		*mûkôre	mugor	"mildew"
ii.		*sekûru	seguro	"safe, sure"
iii.		*loku	luego	"place"
iv.		*drakône	dragon	"dragon"
v.		*i̯oku	dzuego	"play"

What is observed is that the /k/ does in fact change to a voiced /g/. According to Penny (1991), this is what happened to the /k/ when it occurred in the environment shown in (4) - that is, occurring intervocalicaly with the second vowel being a front vowel; the /ts/ becoming a /dz/.

The next environment in which the velar could occur is when it is preceded by a consonant. This is demonstrated in number (6) below (taken from Hall, 1976).

(6). Voiceless velars before front vowels when preceded by a consonant.

	PRm	OS	
i.	*dulke	dultse	"sweet"
ii.	*falke	hots	"scythe"
iii.	*kalke	kots	"heel, foot"
iv.	*faske	hats	"bundle"
v.	*kreskere	kretser	"to grow"

Here it can be observed that the velar becomes the palatoalveolar affricate /ts/. It is interesting to note that the velar palatalization was not restricted to morpheme internal environments but occurred across morpheme boundaries. This is shown by the data in number (7), which comes from Morris (p. 1, 2005) and shows the various derivations of the verb *vençer*, "to win" (notation Morris').

(7). Different forms of the verb vençer showing the palatalization of the velar.

i.	ven[ts]er
ii.	ven[k]o
iii.	ven[ts]es
iv.	ven[ts]e
v.	ven[ts]emos
vi.	ven[ts]edes
vii.	ven[ts]en

The data presented here shows the phenomenon of velar palatalization in its most typical example; that of the voiceless velar. It can be seen clearly in the Spanish data given in this section.

3.1.2. Velar palatalization of the voiced velars

In this section attention will be turned to the velar palatalization of the voiced velar /g/. In number (8) and (9) given below, the /g/ in word initial environment is shown. Number (8) (taken from Hall, 1976) shows /g/ in its initial position, before a front vowel.

(8). Velar palatalization of the voiced velar initial before front vowel.

	PRm	OS	
i.	*giŋɡi̯ua	entsia	"gum"
ii.	*gelare	ʤelar	"to freeze"
iii.	*gelu	hielo	"frost"
iv.	*generu	jerno	"son-in-law"
v.	*genulku	hinoʒo	"knee"

The data shows in only one of the examples that palatalization occurs, with the /g/ becoming a /ʤ/ that is in (8ii). In the other instances, /g/ seems to become /h/ (8iii and v), or /j/ (8iv) or to disappear altogether (8i). In number (9) (taken from Hall, 1976) the /g/ as it occurs before the back vowels shows exactly what might be expected, namely the /g/ remains as a /g/.

(9). Velar palatalization of the voiced velar initial before back vowel.

	PRm	OS	
i.	*gula	gola	"throat"
ii.	*gulôsa	goloza	"greed f. sg."
iii.	*gustare	gostar	"to taste"
iv.	*gutta	gota	"drop"

Number (10) (taken from Hall, 1976) illustrates what happens to /g/ when it occurs intervocalicaly and before a front vowel.

(10). Velar palatalization of the voiced velar intervocalically before front vowel.

	PRm	OS	
i.	* rêge	rrei	"king"
ii.	* frîgere	freir	"to fry"
iii.	* fûĝire	huir	"to flee"

23

iv. * digitu   dedo   "finger"

It can be observed that the /g/ in each of these cases falls away completely. Number (11) given below (taken from Hall, 1976) shows examples of /g/ intervocalicaly, but this time before the back vowels.

(11). Velar palatalization of the voiced velar intervocalically before back vowel.

	PRm	OS	
i.	*fagu	ho	"beech-tree"
ii.	*legûme	legumbre	"vegetable"
iii.	*ego	jo	"I"

In two of the examples the /g/ can be seen to be deleted. In the example (11ii) the /g/ remains. The data set given in number (12) (taken from Hall, 1976) shows the final environment considered. This is the /g/ when it is preceded by a consonant. Again the cedilla represents a palatal consonant, namely the nasal [ɲ] and the lateral [ḷ].

(12). Velar palatalization of the voiced velar preceded by a consonant.

	PRm	OS	
i.	*mulgere	muṇir/munθir	"to milk"
ii.	*margin	mardʒen	"edge"
iii.	*argilla	ardʒiḷa	"clay"
iv.	*i̯ungere	uṇir	"to join"
v.	*plangere	ḷaṇer	"to weep"

In number (12ii) and (iii) the /g/ becomes a /dʒ/, showing velar palatalization to have taken place. In (i), (iv) and (v) the /g/ has disappeared. This raises some difficulties in the investigation of velar palatalization. It is clear that the process occurred in some examples, for instance that of (8ii), (12ii) and (12iii). In most of the other examples there appears to be a pattern to what occurred with /g/ (or the resultant affricate /dʒ/).

It is proposed here that what is observed in numbers (8) to (12) is proof of more than one sound change applying to some of the words. The reader will first be presented with reasons for the above argument, and then be presented with a solution to the variations apparent in the data examples.

According to most sources on velar palatalization in Romance (Pope, 1934; Boyd-Bowman, 1954; Price, 1971; Hall, 1976; Green, 1988; Vincent, 1988; Telfer, 2006) the change for /g/ before /i/ or /e/ should be /ʤ/, as this change occurred throughout Western Romance languages. The question that must then be asked is what happened to the /ʤ/ and can it even be considered reasonable to assume velar palatalization took place?

The evidence of the few examples mentioned (8ii, 12ii and 12iii) and the work of other scholars (Boyd-Bowman, 1954 Hall, 1976 Green, 1988 Vincent, 1988 Penny, 1991 & Telfer, 2006) indicates that velar palatalization did indeed take place and that the outcome of /g/ before any front vowels should be /ʤ/. I will argue that the reason that /ʤ/ does not occur where it is expected, lies in the theory that in Spanish /ʒ/ seemed to be avoided (Malkiel, 1976).

The question is posed as to what the avoidance of /ʒ/ has to do with the avoidance of /ʤ/. It is theorized that the /ʒ/ in Spanish was an allophone of /ʤ/ or even descended from it (Boyd-Bowman, 1954; Lloyd, 1987; Green, 1988). This may even tie in with Penny as, in Penny (1991), the resultant of /g/ before /i/ and /e/ was not /ʤ/ as it should be, but rather /ʝ/, which Penny calls the voiced palatal fricative. Not only does this go against the widely accepted rule, but it also goes against the few instances that can be observed in the data that appears in Hall (1976). In some of the literature, e.g. Lloyd (1987), the /ʒ/ is called the palatal fricative. It is postulated that this may be the sound to which Penny refers.

To return to the discussion of the avoidance of /ʤ ~ʒ/, Malkiel, (1976) discusses how the /ʤ ~ʒ/ sound seemed to be avoided in Old Spanish. In examining Medieval documents he points out that the use of /ʤ ~ʒ/ was confined to very specific areas (Malkiel, 1976), such as learned words like biblical names or judicial terms (Malkiel, 1976) and in borrowings, mostly

from Arabic e.g. *alfaja* "clothes" (the j corresponds to /ʒ/) (Malkiel, 1976). This may go some way to explain the deletion of the palatalized velar in numbers (8), (10) and (12).

With the avoidance of these sounds in Medieval Spanish the actual occurrences of /ʤ/ would most likely be weakened or dropped.

The /h/ and /j/ are argued to be a later development in these words. They most likely arose through the weakening and loss of the affricate. Green (1988) suggests that /h/ is in fact an added aspiration to some words that began with vowels (Green, 1998). This would explain why they occur in the initial environment but not anywhere else that the affricate was deleted.

Some researchers point out (Lloyd, 1987; Penny, 1991; Fox, 1995; Morris, 2005) that the /g/ disappeared when it occurred in intervocalic position. This is also mentioned in Green, (1988) but only in passing. This was an earlier change (Lloyd, 1987; Penny, 1991; Fox, 1995; Morris, 2005). This accounts for the evidence that can be observed in number (11) and possibly in number (10) as well.

3.1.3. Internal Reconstruction of the voiced velar

The problem stands as to how to examine palatalization of the voiced velar stop in Spanish. The arguments presented in the preceding section demonstrate the data as showing several stages of change. The proposed solution here is Internal Reconstruction.

Internal Reconstruction is essentially the reconstruction of an earlier form of a language through the data available in a later stage of that language (Fox, 1995; Ringe, 2003). Both historical evidence as well as systematic comparisons are used (Fox, 1995; Ringe, 2003), although the kind of Internal Reconstruction generally used is employed when there is no historical evidence for what a language looked like in its earlier stages (Fox, 1995). The idea behind this is to determine what sound changes a particular language underwent during the course of its history. Although Internal Reconstruction is not seen as being as accurate as the comparative method (Fox, 1995), it is still a valuable tool as long as the support and data are carefully presented and motivated.

In order to provide some validity to the assumption that velar palatalization did occur for the voiced velar stop in Spanish and to investigate the process, I will be conducting a kind of Internal Reconstruction.

Before doing so the following should be noted: firstly, it is not the aim of this paper to reconstruct Proto-Spanish - the reason for my doing so in this instance is in order to investigate the velar palatalization of the voiced velars in Spanish and in order to discuss this change, I believe that some reconstructive work is necessary. Secondly, this is not an Internal Reconstruction in the strict sense of the term (Fox, 1995), as there is evidence to suggest that the proto-sound that I will be hypothesizing actually did exist and that there is record of it (Pope, 1934; Boyd-Bowman, 1954; Price, 1971; Hall, 1976; Green, 1988; Vincent, 1988; Telfer, 2006).Thirdly, it should be noted that any attempt to reconstruct the entirety of the words given in numbers (8) to (12) would be beyond the scope of this paper and as a result only the fate of the velar stop will be studied and the rest of the word left unaltered.

In looking at the data in number (12) it was noted that there was one instance of velar palatalization namely (12ii). Using this as well as two other pieces of information, I think that a reconstruction of initial /ʤ/ is possible. The first of these two pieces of information is the general principle in historical linguistics that affricates are more likely to become /h/ and /j/ or disappear, than the converse (Campbell, 2004). This is called weakening. Secondly, from information in the language as well as from researchers (Boyd-Bowman, 1954; Hall, 1976; Malkiel, 1976; Lloyd, 1987; Green, 1988; Vincent, 1988; Telfer, 2006) there was velar palatalization, but that the resultant sound seemed to be avoided in Spanish (Malkiel, 1976).

This reasoning serves as justification for the decision to reconstruct my data set in number (12) with the initial /ʤ/. The results are given in number (13) below (words that occur with an asterisk in this and other examples are reconstructed forms).

(13). Internally reconstructed voiced velar in initial position before a front vowel.

	PRm	OS	
i.	*gingiua	*ʤintsia	"gum"
ii.	*gelare	ʤelar	"to freeze"

iii.	*gelu	*dʒielo	"frost"
iv.	*generu	*dʒerno	"son-in-law"
v.	*genulku	*dʒinoʒo	"knee"

Comparing this "new" data with the data in number (9) (which was, as will be recalled, the unproblematic case in which no change occurred to the velar in initial position), it is possible to assume that velar palatalization took place in initial position.

In turning to intervocalic position there is a choice in direction. It may be recalled that numbers (10) and (11) above showed very similar results in that the intervocalic /g/ is deleted in both instances before a front vowel and before a non-front vowel. On one hand it is possible that the /g/ was deleted before velar palatalization took place, in which case no reconstruction for velar palatalization is intervocalicaly possible. On the other hand, it is possible that velar palatalization did take place, but due to the factors of avoidance already mentioned it resulted in the same case as the separate change of intervocalic /g/ loss.

Based purely on what is seen in the data, it is not really possible to decide between the two possibilities. The laws of economy would dictate the case of a single change. This would be the loss of /g/ before velar palatalization took place (as opposed to velar palatalization taking place and then both /g/ and /dʒ/ being deleted).

In the preceding section it was pointed out that the voiced velar /g/ was deleted in between vowels (Lloyd, 1987; Penny, 1991; Fox, 1995; Morris, 2005), therefore I have proposed in number (14) that the reconstruction should be of the velar stop /g/ even before front vowels.

(14). Internally reconstructed voiced velar in intervocalic position.

	PRm	OS	
i.	* rêge	*regi	"king"
ii.	* frîgere	*fregir	"to fry"
iii.	* fûgîre	*hugir	"to flee"
iv.	* dıgitu	*degido	"finger"
v.	*fagu	*hago	"beech-tree"

28

vi.	*legûme	legumbre	"vegetable"
vii.	*ego	*ego	"I"

In Lloyd (1987) however, it is shown that the loss of the intervocalic /g/ occurred at a later date to the velar palatalization, and that the intervocalic /g/ before front vowels was lost due to palatalization before the loss of the other /g/ (Lloyd, 1987). This evidence would then make the second option, the palatalization of the velar and then the loss of both /g/ and /ʤ/ more probable. If this is accepted then the reconstruction given in number (15) below is possible.

(15). Internally reconstructed voiced velar in intervocalic position showing velar palatalization.

	PRm	OS	
i.	* rêge	*reʤi	"king"
ii.	* frîgere	*freʤir	"to fry"
iii.	* fûgîre	*huʤir	"to flee"
iv.	* digitu	*deʤido	"finger"
v.	*fagu	*hago	"beech-tree"
vi.	*legûme	legumbre	"vegetable"
vii.	*ego	*ego	"I"

(15i–iv) shows in this case the /g/ becoming a /ʤ/, while the /g/ before the back vowels stays a /g/. This demonstrates the process of velar palatalization in intervocalic position.

The final environment is the /g/ as it occurs between a consonant and a front vowel. It is once more proposed that it is possible to reconstruct the /ʤ/ in these cases too. Based on the evidence in number (12ii) and (iii) which shows velar palatalization and the basic principle of the direction these changes are likely to take, it is plausible to assume an original /ʤ/.

In addition there is the documented occurrence of velar palatalization in these cases (Boyd-Bowman, 1954; Lloyd, 1987; Green, 1988; Penny, 1991), which lend some credence to this reconstruction. The reconstruction is shown in number (16) below.

(16). Internally reconstructed voiced velar after consonant and before a front vowel.

	PRm	OS	
i.	*mulgere	*muldʒere	"to milk"
ii.	*margin	mardʒen	"edge"
iii.	*argilla	ardʒiḷa	"clay"
iv.	*i̯ungere	*undʒir	"to join"
v.	*plangere	*ḷandʒer	"to weep"

It is reasonable to assume in this case that there was indeed velar palatalization as number (16) shows the /g/ becoming a /dʒ/. What is noticeable throughout this chapter is that there is a distinct asymmetry between the voiced and voiceless velars in velar palatalization. This is not unusual as was mentioned by Guion, (1998) and Telfer, (2005). In this case the voiceless velar becomes /ts/. This may be so, but in the case of the voiced velar the resultant is not the corresponding /dz/ but instead /dʒ/. The issue of voicing asymmetry will be returned to in the related section in (3.2) below.

In this and the previous section the process of velar palatalization as it occurs in Spanish was explored. It was shown that the voiceless velar stops became palatoalveolar affricates before the front vowels, in this case the most typical, the high front vowels. The case of the voiced velar stop was also examined and the conclusion reached was that velar palatalization did take place. In the next section the process as it occurs in a related language, French, will be discussed.

3.2. Velar Palatalization in French.

Velar palatalization also occurred in the transition between Proto-Romance and Old French. The change was of a similar sort as that which occurred in Spanish. It was also the case that before the high front vowels the French velar stops /k/ and /g/ became palatoalveolar

affricates /ʦ/ and /ʤ/ (Pope, 1934; Price, 1971). There was also a second velar palatalization that took place at a later stage in French but this will be discussed in section 3.2.3.

3.2.1. Velar palatalization of the voiceless velars.

The result of the voiceless velar /k/ before the high front vowels was the affricate /ʦ/ (Pope, 1934; Boyd-Bowman, 1954; Price, 1971 Hall, 1976; Telfer, 2006). Figure (17) shows this change for /k/ in initial position. The data is taken from Hall, (1976). PRm refers to Proto-Romance and OF to Old French, respectively.

The data in number (17) clearly shows that /k/ becomes the affricate /ʦ/ before front vowels. Number (18) shows /k/ before back vowels for comparison.

(17). Velar Palatalization of voiceless velar in initial position.

	PRm	OF	
i.	*kera	ʦirə	"wax"
ii.	*kentu	ʦent	"100"
iii.	*kiliu	ʦil	"eyebrow"
iv.	*kelu	ʦiɛl	"sky"
v.	*kerbellu	ʦervel	"brain"
vi.	*kêna	ʦêna	"supper"
vii.	*kênare	ʦənær	"to sup"
viii.	*kinktura	ʦêinturə	"belt, girdle"

(18). Voiceless velars in initial position before back vowels.

	PRm	OF	
i.	*kornûtu	kornuð	"horned"
ii.	*kuppa	kôpə	"cup"
iii.	*kûrare	kurær	"to care for"

From the comparison of the two figures it can be concluded that velar palatalization at its most typical occurs here. As /k/ occurred in word medial position the resultants of that before the front vowels should also be examined. There are two particular types of word internal positions; between vowels and following a consonant (Pope, 1934 Price, 1971 & Hall, 1976).

The first one that will be examined is the occurrence of the velar between vowels. Number (19) (Taken from Hall, 1976) shows the data for the velars in intervocalic position, with the second vowel being a front vowel. What is observed is that the velar seems to disappear.

(19). Voiceless velars between vowels and before front vowels.

	PRm	OF	
i.	*fakere	fairə	"to do"
ii.	*lûkêreîre	luizir	"to shine"
iii.	*dôdiki	dôʐə	"twelve"
iv.	*kokere	kuirə	"to cook, boil"

This requires certain explanation. According to Price the velar before /i/ or /e/ followed the same pattern as the velars in initial position, which is palatalizing to become /ʦ/. Price claims this is then voiced between the vowels to become /ʤ/ (Price, 1971). The claim is that this sound is unstable (Price, 1971). The affricate then lenited into the palatal glide and subsequently disappeared (Price, 1971).

The general scheme of the change would look something like this; *fakere "to do" >> faʦere >> faʤere >>fajʤere >> fajere >> fairə. It is important to note that although this may sound plausible here, Price himself admits it as conjecture. There are some reasons for accepting the proposition, but as will be shown, there are more convincing reasons to abandon it.

As was pointed out in the section on Spanish, intervocalicaly sounds do tend to become voiced and as was shown in the same section, it can reasonably be assumed that this is the case for the palatalized velars. If Price's conjecture were correct then through Internal

Reconstruction it would be possible to argue for a reconstruction of the presence of the intervocalic affricate.

The reconstruction would look like Number (20), which shows the reconstructed forms of the intervocalic velar. This would allow us to conclude that velar palatalization took place in this instance and a later change caused the velar to disappear.

(20). Reconstructed intervocalic velar before front vowel.

	PRm	OF	
i.	*fakere	*faʥirə	"to do"
ii.	*lûkêreîre	*luʥizir	"to shine"
iii.	*dôdiki	*dôʐiʥi	"twelve"
iv.	*kokere	*kuʥirə	"to cook, boil"

As mentioned above there is one problem with Price's argument. The velars disappeared between vowels even when they were not followed by a front vowel, in other words, in an environment where velar palatalization would not take place. Number (21) below (taken from Hall, 1976) illustrates.

(21). Intervocalic velars before back vowels.

	PRm	OF	
i.	*loku	lieu	"place"
ii.	*sekûru	səur	"safe, sure"
iii.	*fagu	fou	"beech-tree"
iv.	*legûme	ləun	"vegetable"
v.	*akûta	aguðə	"sharp (f.sg.)"
vi.	*fiku	fi	"fig"
vii.	*agustu	aôst	"August"

From this we can see that it is unlikely that an internal reconstruction of the intervocalic affricate can be undertaken. From this data it must be assumed that no velar palatalization took place in intervocalic position as there were no velars to palatalize.

The next word medial environment that requires examination is the velar between a consonant and a front vowel. Number (22) below (taken from Hall, 1976) shows what happened to the velars in this position.

(22). Velars between a consonant and a front vowel.

	PRm	OF	
i.	*dulke	dôlʦ	"sweet"
ii.	*falke	falʦ	"scythe"
iii.	*kalke	ʧalʦ	"heel, foot"
iv.	*perkipere	perʦəvêir	"to perceive"
v.	*rankidu	ranʦə	"rancid"
vi.	*ankilla	anʦêlə	"maid"
vii.	*faske	fais	"bundle"
viii.	*krêskere	krêistrə	"to grow"

What is clearly observed is that the /k/ becomes /ʦ/ when occurring between a consonant and a front vowel. This shows that velar palatalization has taken place in this context.

3.2.2) Velar palatalization of the voiced velars.

In this section the velar palatalization of the voiced velar will be discussed. As can be seen from the data given in number (23) (taken from Hall, 1976) the process is what would be expected and what was found in Spanish. The /g/ becomes a /ʤ/ when it is followed by a front vowel.

(23). Voiced velars in initial position when followed by front vowel.

	PRm	OF	
i.	*gelare	ʤəlær	"to freeze"
ii.	*generu	ʤendrə	"son in law"
iii.	*gelu	ʤiəl	"frost"
iv.	*gemere	ʤiendrə	"to groan"
v.	*gingî̞u̞a	ʤentsivə	"gum"
vi.	*genuklu	ʤənôl	"knee"

We can compare this with number (24) (taken from Hall, 1976) which shows /g/ followed by a back vowel. It can be observed that in the cases shown in (24), velar palatalization does not take place.

(24). Voiced velar in initial position followed by a back vowel.

	PRm	OF	
i.	*gulôsa	golôzə	"greedy"
ii.	*gustare	gôstar	"to taste"

From the preceding two data sets (i.e. numbers (21) and (22)) it can be seen that velar palatalization follows the expected pattern as outlined in Chapter 2.1. In following with the general pattern of this work, the /g/ in different positions will also be considered.

The occurrence of /g/ intervocalically does not require in depth discussion as this was largely dealt with in section 3.2.1 above. To summarize, it appears that the velars disappeared in the intervocalic position. A further example of this is given in number (25) (taken from Hall, 1976).

(25). Voiced velar in intervocalic position.

	PRm	OF	
i.	*rêge	rêi	"king"
ii.	*frîgere	frirə	"to fry"
iii.	*fûĝire	fuir	"to flee"
iv.	*digitu	dêit	"finger"

The /g/ as it occurred between a consonant and a front vowel is shown in number (26) (taken from Hall, 1976). Here the change of /g/ to /ʤ/ is apparent.

(26). Voiced velars between a consonant and a front vowel.

	PRm	OF	
i.	*margin	marʤe	"edge"
ii.	*argilla	arʤilə	"clay"
iii.	*argentar̦iu	arʤentiær	"silver-smith"
iv.	*mulgere	molder	"to milk"
v.	*frangere	fraindrə	"to break"

This does not conclude the discussion on velar palatalization in French. It should be noted that the same voicing asymmetry that was apparent in Spanish is also apparent in French. By way of reminder, this was where the voiceless velar becomes /ts/, but the voiced velar does not become the expected corresponding /ʣ/, instead becoming /ʤ/. It is this issue that needs to be addressed at this point.

It was pointed out in Guion (1998) that the palatalization of the voiced velars was much less common than the palatalization of the voiceless velars. There are some attempts at explaining this asymmetry. One possible explanation is that French and Spanish already had the /ʣ/ through the intervocalic occurrence of the velar palatalization of /k/ as was shown in numbers (4) and (20). These languages may wish to preserve the distinctiveness of the voiced velar palatalization and so make it a /ʤ/.

Another explanation is the typological rarity of /dz/ as opposed to /dʒ/ (Telfer, 2006). If the /dz/ is more marked then the language would go for the /dʒ/ instead.

It is also a possibility that Telfer's (2006) explanation could be relevant here. As was discussed in the section on Telfer, it is the turbulence of the stop before the front vowel that causes it to be reinterpreted as an affricate (Telfer, 2006). In the case of the voiced stop it is possible that this turbulence is reinterpreted as the less forward affricate, the /dʒ/. The turbulence could mask some of the features of the affricate and listeners, with nothing else to guide their decision, would go for the less marked option /dʒ/.

3.2.3) Velar palatalization before /a/.

There was a second wave of velar palatalization that occurred in French. This is the change of velar stops into palatoalveolar affricates before the vowel /a/. It is generally agreed that this change happened at a latter date than the phenomenon described in sections 3.2.1 and 3.2.2 above (Pope, 1934; Price, 1971; Buckley, 2003). The change is said to have happened around the 9th Century (Pope, 1934; Price, 1971; Buckley, 2003).

A simple description of the phenomenon is that before /a/ the voiceless velar stop /k/ became the voiceless palatoalveolar affricate /tʃ/, while the voiced velar stop /g/ turned into the voiced palatoalveolar affricate /dʒ/ (Pope, 1934; Price, 1971; Hall, 1976; Buckley, 2003; Telfer, 2006). In the discussion that follows the velar palatalization as it occurs in each environment will be shown.

Number (27) shows the palatalization for the voiceless velars in word initial position before the /a/ (taken from Hall, 1976 and Buckley 2003). The general observation made in the previous paragraph is borne out here. Before the vowel /a/ the /k/ becomes /tʃ/.

(27). Voiceless velars palatalizing before /a/ initial position.

	PRm	OF	
i.	*karru	tʃar	"wagon"
ii.	*kampu	tʃamp	"field"

iii.	*karbone	t͡ʃarbɔn	"coal"
iv.	*kantare	t͡ʃantær	"to sing"
v.	*kaballu	t͡ʃəval	"horse"
vi.	*kanura	t͡ʃənurə	"grey hair"
vii.	*kausa	t͡ʃozə	"thing"
viii.	*kasa	t͡ʃi̯æzə	"house"
ix.	*karu	t͡ʃi̯ær	"dear"
x.	*kane	t͡ʃi̯æn	"dog"

In number (28) (Taken from Hall, 1976 and Buckley, 2003) the palatalization of the voiced velars before /a/ is shown.

(28). Voiced velars palatalizing before /a/ in initial position.

	PRm	OF	
i.	*gamba	d͡ʒambə	"leg"
ii.	*galbina	d͡ʒalnə	"yellow"
iii.	*galina	d͡ʒəlinə	"hen"
iv.	*gaudia	d͡ʒoi̯ə	"joy"
v.	*gallu	d͡ʒal	"rooster"

It also appears that when the /k/+ /a/ combination was preceded by a consonant the same phenomenon was observed (Hall, 1976; Buckley, 2003). The voiceless velar became the palatoalveolar affricate /t͡ʃ/ while the voiced velar became /d͡ʒ/ (Hall, 1978; Buckley, 2003). Number (29) shows the data for /k/ while number (30) shows the data for /g/ (both are taken from Hall, 1976 and Buckley, 2003).

(29). Velar palatalization /k/ + /a/ preceded by consonant.

	PRm	OF	
i.	*kalkare	t͡ʃalt͡ʃi̯ær	"to step, tread on"

	ii.	*iskala	est͡ʃiaelo	"ladder"
	iii.	*luska	lost͡ʃə	"squirming f. sg."
	iv.	*arka	art͡ʃə	"chest"
	v.	*merkado	mart͡ʃiæð	"market"
	vi.	*branka	brant͡ʃə	"paw"
	vii.	*bukkata	bot͡ʃæðə	"mouthful, small roll"
	viii.	*wakka	vat͡ʃə	"cow"
	ix.	*bukka	bou̯t͡ʃə	"mouth"
	x.	*rokka	rot͡ʃə	"rock"

(30). Velar Palatalization of /g/ + /a/ preceded by a consonant.

		PRm	OF	
	i.	*larga	lard͡ʒə	"broad"
	ii.	*purgare	purd͡ʒiær	"to purge"
	iii.	*nawgare	nad͡ʒiær	"to swim"
	iv.	*wirga	vêrd͡ʒə	"rod"
	v.	*longa	lond͡ʒə	"long"

The occurrence of /k/ and /a/ when preceded by a vowel (as shown in number (31) taken from Hall, 1976) shows the same results as all intervocalic velars discussed in previous sections; that is - the velar seems to disappear. Price (1971) suggests that in this case there is also an intermediate point where there was the palatalization followed by the intervocalic voicing ending with reduction and eventual deletion (Price, 1971). Again there is no evidence to support this.

(31). Velar Palatalization of /k/ + /a/ preceded by a vowel.

		PRm	OF	
	i.	*amika	amiə	"lady-friend"

ii.	*applikare	aplêiær	"to attach, to land, to arrive"
iii.	*auka	ouə	"goose"
iv.	*au̯u̯okatu	avoaeð	"lawyer"

In number (32) (taken from Hall, 1976) the voiced velar in intervocalic position is shown. Here the velar also disappears.

(32). Velar Palatalization of /g/ + /a/ preceded by a vowel.

	PRm	OF	
i.	*doga	dôvə	"stave"
ii.	*rogare	rovær	"to ask, beg"
iii.	*negare	niær	"to deny"

There is one interesting addition to this point in Kotliarov (2007), which shows that there were Old French words that had the shifted /ʧ/ and /ʤ/ sounds in positions that were intervocalic in Proto-Romance (in Kotliarov Latin) (Kotliarov, 2007). Here there is actual evidence of the presence of the affricate in intervocalic position and it does show a voicing that would support Price's claim.

The main question that has interested theorists is as to why palatalization occurs before /a/, as this is not a common environment for such a shift (Guion, 1998; Buckley, 2003; Telfer, 2006). Buckley points out one assumption that there was one (at least) allophone of /a/ that became fronted, and that some other theorists also make this assumption, for example Posner (Buckley, 2003). It is held that without some kind of independent reason to think that the vowel has been fronted, a circular argument could easily arise; 'Why does the palatalization occur before /a/?', 'Because /a/ is a front vowel'; 'How do we know /a/ is a front vowel?', 'Because it triggers velar palatalization' and so on.

It is necessary to examine independent evidence. Buckley discusses three different positions that have been taken. The first is that which is assumed by most theorists (Buckley, 2003) -

that there is a completely faithful adherence to the central vowel of Proto-Romance i.e. no fronting. The change is simply an additional rule of palatalizing velars before /a/.

There are certain benefits to such an explanation, as the simplest explanation possible is desirable. There is an added assumption that unless there is cause to believe otherwise, the fewest possible changes in a language are assumed (Campbell, 2004).

Despite the attraction of such an approach, it is nonetheless flawed; firstly in that it lacks any kind of explanatory power for a change that is both an uncommon and a marked one (Buckley, 2003).

This is further supported by Guion (1998), who showed that velar palatalization before non-front vowels is virtually unknown, which would indicate such a change in French to be highly unusual and very marked (see section 2.1 for a fuller discussion on the general trends of velar palatalization and section 2.2 for more on Guion).

The second approach makes the assumption that considers the /a/ in French to be completely fronted (Buckley, 2003). This was the position taken by Matte (1982, cited in Buckley, 2003) Here the only change was in the vowel inventory; the /a/ becoming /æ/or /ɛ/. These theorists later assume that the front vowel reverted back to a central vowel sometime in the Seventeenth Century (Buckley, 2003).

Although this explanation has the advantage of being neat and simple in respect to explaining the palatalization of velars before /a/, it does have some problems. The first problem is that it creates a vowel system where the only low vowel is a front vowel (Buckley, 2003). This is not entirely impossible but as pointed out by Buckley (2003, p12), it is very marked.

The other problem with this form of reasoning is that the change being proposed here is highly unusual from a historical linguistics point of view.

Firstly, it is very unusual for sounds to change in one direction and then at a later stage change back in the opposite direction (Buckley, 2003; Campbell, 2004). In other words it is seen as being remarkably rare that the central vowel would front and then at a later stage

return to its original place. Most scholars would prefer to think of the central vowel as remaining unchanged, with any variation as allophonic. There is little motivation for the potentially circular argument of fronting that then returns to the original centrality.

The second problem is simply that there is evidence to suggest that the central vowel was present in the Old French period (Buckley, 2003). This evidence mostly comes from assonance in Old French poetry and forms part of the basis for Buckley to take his final position; that of allophonic fronting.

Buckley is a supporter of the idea that there was an allophonic variant of /a/ and that it was fronted, becoming /æ/ or even /ɛ/. The condition of this fronting was stressed open syllables (Buckley, 2003).

In late Old French the two became separate phonemes but at the period of the palatalization the distribution was predictable (Buckley, 2003). The main evidence presented for this is assonance in French poetry of the period, which show that in stressed, open syllables the /a/ was fronted to /æ/.

There were three assonance classes in Old French; /e/, /ɛ/ and /æ/ (Buckley, 2003). This third vowel was taken to be a low, front vowel (Pope, 1934; Price, 1971; Buckley, 2003). It later raised and merged with /ɛ/ (Pope, 1934; Price, 1971; Buckley, 2003). This /æ/ was in predictable complementary distribution with central /a/ (Buckley, 2003), which could then lead to /æ/ being seen as an allophone of /a/.

An example of this can be seen in number (33) (taken from Buckley, 2003), which shows the fate of Proto-Romance /a/. Here what is observed is that in the open syllables the /a/ in the Proto-Romance examples changes to /æ/ in the open syllables but is preserved in the closed syllables.

(33). The fate of Proto-Romance /a/ in Old French.

	PRm	OF	
i.	pa.dre	pæðrə	"father"
ii.	má.re	mær	"sea"
iii.	pas.sa.re	pasær	"to pass"
iv.	gran.de	grant	"big"

The examples in (33) lend support to the theory of allophonic fronting of /a/, which forms the crux of Buckley's argument. As there was a general velar palatalization of velars before front vowels at this time (Buckley, 2003) the velars palatalized before this fronted allophone of /a/.

One argument against this claim is that it can be observed that the change also took place before the non-fronted /a/. Examples are (27i-iv), which is repeated below for ease of reference. The explanation for this is that the rule causing palatalization before the fronted /a/ was then extended by analogy to all cases of /a/ (Buckley, 2003).

(27). Voiceless velars palatalizing before /a/ initial position.

	PRm	OF	
xi.	*karru	ʧar	"wagon"
xii.	*kampu	ʧamp	"field"
xiii.	*karbone	ʧarbɔn	"coal"
xiv.	*kantare	ʧantær	"to sing"

Although not dismissing Buckley's claim outright here, there is a certain necessity for a more careful explanation of analogical extension. In the discussion that immediately follows I will evaluate to determine the viability of an argument of analogy.

Analogical extension has traditionally been used, along with borrowing, to explain any irregular or problematic cases in historical linguistics (Hock, 2003; Campbell, 2004). Analogy is often used in the domain of morphology and syntax (Hock, 2003) but can also be

applied to phonology (Hock, 2003). According to this perspective, sound change has traditionally been seen as being an irregular change that produced regularity (Hock, 2003). Thus, from the perspective of the case in point, it can be seen how an irregular change moving the velar palatalization to the non-fronted /a/, produces regularity.

Although an apparently plausible explanation for this phenomenon, Buckley would seem to provide little explanation beyond the mention of analogy. There could indeed be other explanations, one of which may be the principles of lexical diffusion (McMahon, 1994).

Lexical Diffusion is a theory explaining how change spreads through a particular language. It states that a change starts slowly, occurring in only a few lexical items (or environments) (McMahon, 1994). It then spreads very quickly through the lexicon before completing itself (i.e. occurring in all lexical items or in all environments) (McMahon, 1994). It is imperative to realize that it is not necessary for the whole cycle to take place and that change can be halted at any point in this cycle (McMahon, 1994).

Here the change might be explained as starting in one particular environment - in this case before the fronted allophone of /a/. It then diffuses into other words in the lexicon that lack that environment. If we accept that this would start gradually, then the next step may be proposed the change to move into all environments of the phoneme /a/. The progress of the change is then halted at this point and does not complete itself.

What is left is what is observed in French, that /k/ and /g/ palatalize before all variations of /a/, fronted and central.

What causes the change to spread? The standard explanation offered is that the variation becomes significant (Labov, 1994; McMahon, 1994; Ohala, 2003), where it becomes associated with a particular group or with social prestige and this causes either one particular group to perpetuate the change as a means of group identification or by others to mimic a socially prestigious group (Labov, 1994; McMahon, 1994; Ohala, 2003).

Any comment on the social associations of velar palatalization is difficult to substantiate and would be fundamentally speculative. The spread through the environments is caused by those

mimics who would overextend (hypercorrect) the variation into other environments - in this case the non-fronted allophones of /a/ (Labov, 1994; McMahon, 1994; Ohala, 2003).

This explanation does not exclude the possibility of analogy but it does strengthen the explanatory power of such an approach. The possibility is also raised that there may have been no analogy.

The change described in this section can in the interim be said to be one of velar palatalization. Guion (1998) does show that velar palatalization can take place in non-high front vowels, although this is rare (Guion, 1998). Here we assume that the change did take place before the fronted allophone of /a/ and then moved through the non-fronted allophones.

Chapter Four

Conclusion

This paper discussed the phenomenon of velar palatalization and also looked at it from a language-specific point of view, with respect to the Romance languages. The start was a summary of the general approaches that have been employed in explaining velar palatalization. These explanations varied, with acoustic phonetics where the sound signal for velars before front vowels was shown to be very similar to the sound signal of the palatoalveolar affricates causing a reinterpretation of the velar as an affricate (Guion, 1998 Telfer, 2006). There were also phonological discussions explaining velar palatalization in terms of the spreading of features from the front vowel to the velar stop, causing it to palatalize into a palatoalveolar affricate (Hall, 1997; Halle, 2005). There was even an explanation using constraints that prohibited the occurrence of a velar before a front vowel, thus causing velar palatalization (Telfer, 2006).

The next section briefly introduced the Romance languages followed by a detailed description of the process of velar palatalization in two of these languages, namely French and Spanish. Data was taken from comparative word lists and the two languages were compared to their common ancestor Proto-Romance.

In Spanish it was shown that the voiceless velar /k/ from Proto-Romance became the affricate /ts/ when it occurred before the front vowels. In the case of the voiced velars some variation was seen in the outcome of the /g/ before front vowels. It was shown however, that there was velar palatalization in this case as well.

The case of velar palatalization in French was discussed and it was shown that velar palatalization did occur in French. The velar stops /k/ and /g/ became the palatoalveolar affricate /ts/ and /dʒ/ respectively.

The second velar palatalization in French was also discussed; here we saw how /k/ and/g/ became /tʃ/ and /dʒ/ before /a/. We followed this with a look at how this phenomenon could be explained. The conclusion was that the palatalization actually took place before a fronted

allophone of /a/ given as [æ] and then was extended to the rest of the occurrences of /a/ (Buckley, 2003). The explanation offered was that the velar palatalization before the [æ] was then extended by analogy to the rest of the occurrences of /a/.

Although beyond the scope of this study, more work is needed on the mechanisms of velar palatalization - especially on the voicing asymmetry. There is also room to provide an actual in-depth analysis of velar palatalization in these two languages. More understanding of the history of these languages could be obtained by similar studies into velar palatalization.

Reference List.

Aronoff, M & Rees-Miller, J. 2001. *Handbook of Linguistics.* Oxford: Blackwell Publishing.

Archangeli, D & Langendoen, D. 1997. *Optimality Theory: An Overview.* Oxford: Blackwell Publishers.

Archangeli, D. 1997. Optimality Theory: An introduction to linguistic theory in the 1990's. (Archangeli & Langendoen 1997: 1–32)

Bhat, D.N.S. 1974. A general study of palatalization. (Greenberg 1974: 47–92)

Boersma, P. Dekkers, J & Weijer, J. 2000. Optimality theory: phonology, syntax and acquisition. (Dekkers et al, 2000: 1– 44)

Boyd-Bowman, P. 1954. *From Latin to Romance in Sound Charts.* Washington DC: Georgetown University Press.

Blevins, J. 2004. *Evolutionary Phonology: The emergence of sound patterns.* Cambridge: Cambridge University Press.

Bradley, T. & Delforge, A. (n.d.) Systemic contrast and the diachrony of Spanish sibilant voicing. Taken from http://roa.rutgers.edu/files [accessed on 1 August 2008].

Buckley, E. 2003. The phonetic origin and phonological extension of Gallo-Roman palatalization. http://babel.ling.upenn.edu/~gene/papers/buckley_naphc1.pdf [Accessed on 7 December 2008].

Campbell, L. 2001. The history of linguistics. (Aronoff, M & Rees-Miller, J. 2001: 81–104).

Campbell, L. 2004. *Historical Linguistics. Second edition.* Edinburgh: Edinburgh University Press.

Dekkers, J. van der Leeuw, F. & Weijer, J. 2000 *Optimality theory: phonology, syntax and acquisition.* Oxford: Oxford University Press

Fox, A. 1995. *Linguistic Reconstruction: An Introduction to Theory and Method.* New York: Oxford University Press Inc.

Fromkin, V. Rodman, R. & Hyams, N. 2003. *An Introduction to the Structure of Language 7th Edition.* Boston: Heinle.

Green, J. 1988. Spanish. (Harris & Vincent 1988: 79–130)

Greenberg, J. 1974. *Universals of Human Language: Phonology.* Stanford: Stanford University Press.

Guion, S. 1998. The role of perception in the sound change of velar palatalization. *Phonetica the International Journal of Phonetic Science* 55: 18–52.

Hall Jr. R. 1974. *External History of the Romance Languages.* New York: American Elsevier Publishing Company.

Hall Jr. R. 1976. *Proto-Romance Phonology.* New York: American Elsevier Publishing Company.

Hall, A. 1997. *The Phonology of Coronals.* Amsterdam: John Benjamins

Halle, M. 2005. Palatalization/velar softening: what it is and what it tells us about the nature of language. *Linguistic Inquiry* 36: 23–41.

Harris, M. 1988. French. (Harris & Vincent 1988: 79–130)

Harris, M. & Vincent, N. 1988. *The Romance Languages.* London: Routledge.

Hock, H. 2003. Analogical change. (Joseph & Janda 2003: 441–460)

Joseph, B & Janda, R. 2003. *The Handbook of Historical Linguistics.* Oxford: Blackwell Publishing.

Kager, R. 1999. *Optimality Theory.* Cambridge: Cambridge University Press.

Kotliarov, I. An unknown law of elision in Western Romance Languages. http://www.letramagna.com/Unknownlaw.pdf [Accessed on the 7 December 2008].

Labov, W. 1994. *Principles of Linguistic Change Volume1: Internal Factors.* Oxford: Blackwell.

Luján, M. & Hensey, F. 1976. *Current Studies in Romance Linguistics.* Washington D.C: Georgetown University Press.

Malkiel, Y. 1976. In search of "penultimate" causes of language change: Studies in the avoidance of /ž/ in Proto-Spanish. (Luján, M. & Hensey, F. 1976: 27–36)

McMahon, A. 1994. *Understanding Language Change.* Cambridge: Cambridge University Press.

McMahon, A. 2000. *Change, Chance and Optimality.* Oxford: Oxford University Press.

Morris, R. (2005). Attraction to the unmarked in Old Spanish leveling. Taken from http://roa.rutgers.edu/files [accessed on 1 August 2008].

Ohala, J. 2003. Phonetics and historical phonology. (Joseph & Janda 2003: 244–261).

Penny, R. 1991. *A History of the Spanish Language.* Cambridge: Cambridge University Press.

Price, G. 1971. *The French Language Present and Past.* London: Edward Arnold.

Pope, M.K. 1934. *From Latin to Modern French with especial consideration of Anglo-Norman.* Manchester: Manchester University Press.

Posner, R. 1966. *The Romance Languages a Linguistic Introduction.* Garden City: Anchor Books

Posner, R. & Green, J. 1980. *Trends in Romance Linguistics and Philology Volume 1: Romance Comparative and Historical Linguistics.* The Hague: Mouton.

Purczinsky, J. 1980. Romance historical phonology. (Posner & Green 1980: 77–104).

Ringe, D. 2003. Internal Reconstruction. (Joseph & Janda 2003: 244–261).

Spencer, A. 1996. *Phonology.* Oxford: Blackwell publishing.

Telfer, C. 2006. Coronalization as Assibilation. http://roa.rutgers.edu/files [accessed on 7 December 2008].

Vincent, N. 1988. Latin. (Harris & Vincent 1988: 26–78)

Walker, D. 2005. Historical Romance linguistics: Past, Present and Potential. Taken from http://colledge.hobcros.edu [accessed on 29 June 2008].