THE DEVELOPMENT OF LATIN POST-TONIC /Cr/ CLUSTERS IN SELECT NORTHERN ITALIAN DIALECTS

by

JEFF KILPATRICK

(Under the Direction of Jared Klein)

ABSTRACT

This study looks at the disparate developments of Latin post-tonic /Cr/ clusters within several Northern-Italian dialects. Specifically, the five dialects (Piemontese, Piacentino, Genovese, Milanese, and Bolognese) show four separate outcomes: deletion, epenthesis, metathesis, and no change at all. This paper utilizes an Optimality approach, predominantly drawn from Webb and Bradley 2009, Hume 2004, and Wilson 2001, to describe the changes but also incorporates word-frequency (cf. Bybee 2000, 2001; Phillips 2006) to account for the separate outcomes. The results show a distinct pattern of phonological process according to word frequency. High-frequency words favor deletion, mid-frequency words show metathesis, and low-frequency words remain unchanged. Epenthesis, on the other hand, operates as a default change at all frequencies.

INDEX WORDS: Italian, Dialects, Language change, Optimality theory, Frequency, Deletion, Metathesis, Epenthesis

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

In select Northern Italian Dialects (specifically, Piemontese, Piacentino, Genovese, Milanese, and Bolognese) post-tonic /Cr/ clusters yield four separate outcomes: metathesis, epenthesis, deletion, and no change. While these developments are by no means new discoveries (cf. Rohlfs 1966-9, Maiden & Parry 1997, Devoto 1978), they have gone relatively unnoticed in relationship to each other. Some changes have been dealt with individually (cf. Bortolin 1998 for word-initial consonant deletion in Italian, Repetti 1997 for an epenthesis related sandhi phenomenon in Piacentino; Jacobs 2004 for vowel syncope in Latin) or mentioned, but quickly discarded as "peripheral changes" or "anomalies" (cf. Zörner 1989, for metathesis). This study aims to classify these changes not as single developments, isolated from each other, but rather as an interrelated group whose outcomes are determined by a combination of perceptual, suprasegmental (i.e. prosodic), and frequency effects.

1.1 PROJECT SUMMARY

Chapter One of this study will offer brief phonological summaries of each dialect, focusing mainly on historical developments and typological factors, thereby providing an overall linguistic picture of the dialects in question. All examples of the sound

change phenomena in question will be gathered from the most current dialectal dictionaries and grammars available.

Chapter Two focuses on the cases of metathesis beginning with an application of Hume's Indeterminacy/Attestation Model of metathesis (2004), rooted in Phonotactic Optimization and Optimality theories, in an attempt to account for the cause of the metathesis. This approach requires two conditions for metathesis: the first is indeterminacy in the signal (which relies on the listener's experience and the quality of information in the signal) and the second is an attested output form which means that the metathesis of the input segments must yield a preexisting sequence in the language. Specifically, Hume notes that "the order inferred from the signal is consistent with that which occurs most frequently in the language" (210). So, assuming that the outcome of the metathesis is either more convenient or easier for the speaker (Phonotactic Optimization) or results in a phonotactically "better" form (Optimality Theory), the outcomes of the /Cr/ metatheses will be compared to other possible metatheses to determine their "convenience." If the output is more convenient than the input, it should occur more frequently within that language. Furthermore, this approach asserts that, in theory, any attested sequence of two segments is a potential output of metathesis and perhaps more importantly, at least with regard to rule ordering and relative chronology, it therefore suggests that the result of a metathesis will not be a previously unattested sequence. So, any new sequence will have to result from some other change, be it internal or external, before a metathesis can produce an output of the same sequence.

The study will next approach the same question, the cause of the metathesis, from the Perceptual/Compensatory Theory brought forth by Blevins and Garrett

(1998). This assumes that metathesis is a regular and phonetically natural process that can be analyzed as one of two general types: perceptual or compensatory. According to this study, long-distance metathesis, such as the type present in the Northern Italian dialects, "seems to involve the same set of segments and features as perceptual CV metathesis" (527). Admittedly, Blevins and Garrett cannot fully explain the patterns associated with long-distance metathesis, but they do point out their similarities to other cases of perceptual reinterpretation where features are drawn to prominent prosodic positions. A key difference between this theory and the previous Phonotactic/Optimality approaches lies in the explanation. Both theories point to "perceptual optimization", but Perceptual metathesis claims that the change results from a misinterpretation due to perceptual similarity, which is then phonologically internalized. The Phonotactic/Optimality theories, however, contend that the goal of the metathesis is perceptual clarity/ease, which indicates some form of speaker knowledge of sound patterns and perceptibility. Blevins and Garrett argue that their approach is more economical in that "it invokes perceptual ease only once, whereas the optimization approach assumes that perceptual ease plays a role not only in perception … but also in grammatical knowledge" (551).

Chapter Three will focus on epenthesis, providing a brief summary of past research into this phenomenon. From there, it will attempt to account for these changes via an extension of the theories put forth in Chapter Two, since this would entail a unified theory accounting for both changes. The analysis of CV metathesis in French and Spanish by Webb & Bradley (2009) paves the way for an extension of their theory to include epenthesis. Similar to Hume's metathesis argument, this theory

hinges on indeterminacy in the input signal which is resolved by selection of the optimal form depending on language specific rankings of "universal" constraints.

Chapter Four examines the cases of deletion, again utilizing Optimality Theory as its basis, specifically by altering the constraints of the existing theory put forth in Chapters Two and Three. Wilson (2001) proposes a simplified Optimality Theory approach to explain "cluster simplification" relying on more general constraints (MAX, DEP) which require less of an analysis on the part of the hearer. In other words, the hearer relies on gross auditory details (i.e. MAX/DEP - does the OUTPUT form maintain the same number of segments as the INPUT form) rather than fine-grained acoustic details.

Chapter Five will incorporate word frequency and lexical diffusion into the working theory of the changes. It appears that not all words, even when meeting the necessary phonetic conditions, undergo metathesis, but rather undergo one of the other two changes (epenthesis or deletion) or simply remain unchanged. A study of the frequency of these words reveals that high-frequency words tend to undergo deletion and low-frequency words do not change at all (in regard to the /Cr/ cluster). However, medium-frequency words will either metathesize or undergo epenthesis depending on phonotactic constraints. As Phillips (2006) notes, Optimality Theory has failed to incorporate frequency convincingly into any of its models, so a usage-based approach (cf. Bybee 2001) would be better suited to incorporate frequency effects, both type and token. A usage-based theory, though, where speakers encode detailed phonetic information of words with the most frequent form being the "exemplar" cannot, according to Booij (2004: 227), "be the whole story: there must be

a more abstract speaker-independent phonetic representation of a word, for the purpose of perception."

Chapter Six will offer the conclusion that these instances of apparently irregular changes are indeed regular and explainable. All changes occur only in post-tonic /(C)Cr/ clusters (predominantly /tr/clusters and some /pr/, /br/, and /ntr/ clusters) and are dependent on frequency effects. Epenthesis appears to be the "default" change, as it occurs at all frequency levels while deletion occurs in high-frequency words and no change is seen in low-frequency words. Metathesis occurs in mid-frequency words and only where the output does not result in a phonotactically undesirable sequence (i.e. word-initial /lr/ or any /sr/ cluster), otherwise epenthesis takes places (another reason to consider it a "default" change). It also seems that some form of perceptual misinterpretation is the cause of such changes. This confusion is created in the production grammar and perpetuated in the perception grammar. In addition, the frequency of the word determines the level of analysis undergone by the word. This tripartite distinction of grammars allows us to combine Optimality Theory and frequency effects in a way that utilizes the strengths of both approaches. It is a concise formal representation of a usage-based theory, and perhaps a step in the right direction of understanding language change

CHAPTER 2

THE DEVELOPMENT OF LATIN /Cr/ CLUSTERS IN SELECT NORTHERN ITALIAN DIALECTS

2.0 THE NORTHERN DIALECTS

The Northern Italian dialects (dialetti settentrionali) are recognized as being those dialects found to the north of the "La Spezia – Rimini" line, a bundle of isoglosses roughly located between those two cities (see: Jaberg & Jud 1928-40, Wartburg 1950, and Rohlfs 1966-69). They are further divided into the Gallo-Italic (western), Veneti (veneto region), and Istriano (eastern) dialects. Also located north of the "La Spezia – Rimini" line are the Friulian dialects, though classified as separate from the other Northern Italian dialects. All of the dialects in this study are considered Gallo-Italic[1] dialects.

Characteristics shared by all northern dialects (with the exception of Friuliano, which, from this point forward will be considered a separate classification, as is the general practice in Italian dialectology) include:

(a) simplification of geminates, or degemination, (cf. Pm. *caval*, Vn. *cavalo*, It. *cavallo* < CABĂLLUM 'horse');
(b) lenition, or deletion by means of lenition, of voiceless consonants found in intervocalic positions (cf. Lo. *marido*, Vn. *marío*, It. *marito* < MARĪTU (M) 'husband')
(c) development of velar stops into alveolar sibilants before front vowels (cf. Pm. *sira*, Pc./Vn. *sera*, It. *cera* [tʃera] < CERA(M) [kera] 'wax'; Pm./Bo. *sente* [zɛnte], It. *gente* [dʒɛnte] <GENTE(M) [gɛnte] 'people').

[1] However, this is perhaps now a term which refers more to the previous existence of Celtic tribes north of the Po river and less to the possible linguistic influences imposed on Italian by those speakers, since evidence for such influences (cf. front rounded vowels) are dubious at best (cf. Cravens and Gianelli 1997).

The Gallo-Italic dialects distinguish themselves from the other northern Italian dialects with regard to:

(d) the loss of unaccented vowels, except [a] (pre-tonic: cf. Pm. *smana* [smaŋa][2], It. *settimana* < SEPTIMANA(M) 'week', post-tonic: cf. Em. *frasne*, It. *frassino* < FRĂXINUM 'ash tree', and word-final: cf. Pm./Lo. *nef* , It. *neve* < NĬVE(M) 'snow');

(e) palatalization of -CL- and -GL- word-initial clusters (cf. Gn./Pm. *ćama* [tʃama], Ml. *ćamá*, It. *chiama* [kjama]< CLAMAT 'he calls'; Gn. *giæa* [dʒea], Pm./Lo./Bo. *gèra* [dʒera], It. *ghiaia* < GLAREA(M) 'gravel');

(f) the development of the Latin cluster /kt/ into [jt] or [tʃ] (cf. Pm. *fait* [fɛjt], Ml. *fać* [fatʃ], It. *fatto* < FĂCTU(M);

(g) front rounded vowels (cf. Pm. *lüna* [lyŋa], Lo./Gn. *lüna* [lyna], It. *luna* < LUNA(M) 'moon');

(h) falling diphthongization of [e] in open syllables (cf. Pm. *pèil* [pɛjl], It. *pelo* < *pelo 'hair, fur');

2.1 PIEMONTESE

The Piedmont region of Italy is located in the northwest area of the country, bordered linguistically in the north and west by Gallo-Romance dialects (Occitan, Franco-Provençal, and French), in the northeast by Lombard dialects, and in the south by transitional Ligurian/Lombardian dialects. The term Piemontese is generally used to refer to those dialects spoken in central Piedmont as well as the koine developed from Turinese in the late seventeeth century (Parry 1997). However, there are pockets of Piemontese dialects also found in Savona (Liguria) and Sicily. The Piemontese dialects can be divided into Upper Piemontese (UPm) which includes the cities of Cuneo and Torino and Lower Piemontese (LPm) which includes Vercelli and Allissandria. This distinction is made primarily on the basis of final /i/ in UPm and final /e/ in LPm (cf. *gambi* ~ *gambe*, It. *gambe* 'legs') as well as the split between Upm. /kt/ > [jt] (cf. *noit* [nøjt] < NOCTEM 'night') and LPm. [kt] > [tʃ] (cf. *noć* [nøtʃ]).

[2] Cf. 2.1.a for explanation of [ŋ].

Despite the relative disparity in the region, however, most Piemontese dialects show the following developments:

(a) velarization of final [n] (cf. *man* [maŋ], It. *mano* < MANUS);
(b) voicing of intervocalic [p] and [s] (cf. *kavej* [kavɛj], It. *capelli* 'hair'; *rosa* [røza], It. *rosa* [roza] < ROSA [rosa] 'rose');
(c) lenition of intervocalic [b] (cf. *kaval*, It. *cavallo* < CABALLUM 'horse');
(d) deletion, by means of lenition, of intervocalic [t], [d], [k], and [g] (cf. *frel*, It. *fratello* < **fratello* 'brother'; *kua*, It. *coda* < CODA 'tail'; *fürmia*, It. *formica* < FORMICA 'ant'; *frola* [frola], It. *fragola* < FRAGOLA(M) 'strawberry').

For a more detailed classification of the Piemontese dialects see Berruto (1974) and a critical review by Telmon (1988).

2.2 PIACENTINO

The Piacentino dialect, from the city of Piacenza, is part of the northern Emiliano-Romagnolo dialects, together with the province of Ferrara, northern Modena, Reggio Emilia and Parma. The rest of Emiliano-Romagnolo can be broken into the central dialects from the Apennine foothills of Emilia to Bologna and much of Romagna, and finally the southern dialects from the middle and upper Apennines. This division (see: Hajek 1997) is primarily based on the following isoglosses:

(a) Southern: preservation of rounded front vowels ([y] and [ø]);
(b) Central: fronting and raising of */a/ in open syllables (cf. Bo. *ćär* [ʧɛ:r], Pc. *ciära* [ʧɛrə], It.*chiaro* < CLARU(M) 'clear').

The northern dialects, including Piacentino, along with the southern, are most open to influences of surrounding dialects (cf. Hajek 1997). Hence, we find the frequent use of the past participle *est* in Ferrarese, borrowed from the Veneto dialects (cf. Fe. *vlest*, Vn. *volesto* 'wanted'), and many Tuscan borrowings in the southern dialects (cf. Lz. *cavallo*, It. *cavallo* 'horse').

Piacentino, along with other northern Emiliano dialects, shows the following characteristics:

(c) word initial [j] > [ʒ]/[z] (cf. Pc. *zök* [ʒøk], Bo. *zuk*, It. *gioco*);
(d) diphthongization of <Ē> and <Ĭ> into ei (cf. Pc. *peil*, Bo. *pail* [pajl], It. *pelo* < PĒLUM 'hair, fur');
(e) raising of Ō(and proto-romance */o/ < ŭ) to /u/ (cf. Pc. *fiur*, It. *fiore* < FLORE(M) 'flower')

2.3 GENOVESE

Located to the south of Piemontese and Lombard dialects and to the west of Emiliano-Romagnolo, Genovese, the most prominent member of the Ligurian dialects, is also classified as a Gallo-Italic dialect. Together with western Ligurian (from Savona almost to San Remo) and coastal Intemelian (including San Remo until the French border and beyond, with pockets in Monaco), Genovese is traditionally identified as a Central Ligurian dialect. The dialects found in western Liguria and along the coast are considered to be more conservative than Genovese, but, as noted in Forner (1997), "there is a clear systematic and implicational relationship between [Genoese] and the western Ligurian and coastal Intemelian." In addition, Ligurian also shows distinct "Cinque Terre-type" dialects (in the east at Cinque Terre and around Porto Venere) and some Alpine Intemelian dialects (north of the coastal varieties). Some pan-Ligurian features include:

(a) palatalization of /bl/ and /pl/ clusters word-initially (cf. Lg. *ganku* [dʒaŋku], It. *bianco* [bjaŋko] <BLANCO 'white'; Lg. *cen* [tʃeŋ], It. *pieno* [pjeno] < PLENUS 'full');
(b) spirantization of word-initial /fl/ clusters (Lg. *sua* [ʃua], It. *fiore* [fjore] < FLOREM 'flower');
(c) Conservation of atonic final vowels (as opposed to other Gallo-Italic dialects, where they are deleted) (cf. Lg. *galu*, Pm. *gal*, It. *gallo* < GALLUS 'rooster'; Lg. *neive*, Pm./Lo. *nef*, It. *neve* < NIVE(M) 'snow');

(d) rhotacism of intervocalic /l/ (cf. OGn. *vorer*, It. *volere* < VOLO, VELLE 'to want, to wish') *N.B. this /r/ is maintained only in the alpine dialects, elsewhere it has been deleted (Rohlfs 1966-69, I, § 221).

Some Central Ligurian features:

(e) No diphthongization of <ĕ> (cf. Gn. *pe* [pɛ], Rv. (AI dialect) *pie*, It. *piede* < PĔDE(M) 'foot');
(f) spirantization of [dj], as opposed to affrication (cf. Gn. *meśu* [mɛzu]; AI. *mezu* [mɛdzu], It. *mezzo* [mɛtso] < MEDIUS 'middle');
(g) spirantization of initial [j] (cf. Gn. *śögu*, AI *zögu*, It. *gioco* < IOCUS 'game, joke').

Some Genovese features:

(h) Diphthongization of <ē> (cf. Gn. *peive*, Wl/Cl. *peve*, It. *pepe* < PĒPE(M) 'pepper');
(i) [r]-deletion intervocalically (cf. Gn. *ua*, WL/CI *ura*, It. *ora* < HORA(M) 'hour').

2.4 MILANESE

The Lombard dialects, of which Milanese is a member, can be broken into three groups: Common, Western, and Eastern (which is further divided into Northern and Southern varieties). The Common Lombard group has at its roots an older, essentially Milanese-type dialect, which historically extended from Novara to Trento to Verona and serves as a common base for the unity of the Lombard group. However, as noted in Sanga (1997), this Lombard unity is unjustified today, as the differences between Eastern and Western Lombard, as well as the transitional areas (Pavia, Cremona, and Mantua) and peripheral upper Valtellina area, are too pronounced to be considered a single dialect. Still, there are common Lombard features, usually also typical of other Gallo-Italian dialects (see. 2.0 above), but there are some worth mentioning here:

(a) palatalization of root-final /l/ in M.Pl. (cf. Lo. *gal~gai* [gal] ~ [gaj], It. *gallo* ~ *galli* < GALLUS ~ GALLI 'rooster, -s');

(b) Intervocalic /kl/ > [dʒ] (cf. Lo. *maža* [madʒa], It. *macchia* < MAC(U)LA(M) 'stain').

Eastern Lombard has diverged from the Western Lombard dialects (and the so-called Northern Italian koine), particularly with regard to its vernacular, since the thirteenth century (Sanga 1997). As such, there are certain characteristics of the dialects in this group:

(c) generalization of /al/ + C > /ol/ > /o/ (cf. ELo. *oter*, Ml. *olter*, It. *altro* < *olter- < ALT(E)RU(M) 'other');
(d) palatalization of final [t] and [n] before [i] (cf. ELo. *gaċ* [gatʃ], It. *gatti* [gat:i] < CATTI 'cats'; ELo. *aẓen* [azeɲ], It. *asini* [asini] < ASINI 'donkeys, asses');
(e) loss of post-tonic nasal and subsequent loss of nasalization of preceding vowel (cf. ELo. *pa*, Ml. *pan* [pã:], It. *pane* < PANE(M) 'bread');
(f) word-initial [j] > [ʒ] or [ð] (cf. Bm. *zügà* [ʒyga], It. *giocare* < IOCO, IOCARE 'to play'; *śök* [ðøk], It. *gioco* < IOCUS 'game, joke').

Milanese and the other Western Lombard dialects, show the following developments:

(g) word-initial [j] > [dʒ]/[z] (cf. WLo. *ǵök* [dʒøk]/*śök* [zøk], It. *gioco* < IOCUS 'game, joke');
(h) rhotacism of intervocalic /l/ (cf. Ml. *püres*, It. *pulce* < **pulce* < PULICE(M) 'flea');
(i) deletion of final /l/and /r/ (cf. Ml. *sa*, It. *sale* < SAL 'salt'; Ml. *sure* (< *soler), It. *solaio* < SOLARIU(M) 'attic').

And finally, some characteristics specific to Milanese:

(j) merger of dental and alveolar sibilants [ts], [s] > [s] (cf. [kasa] 'ladle and chest', It. [katsa] 'ladle', [kasa] 'chest' < CATTIA(M) 'ladle' and CAPSA(M) 'chest' (respectively);
(k) use of [ɛl] for M.Sg. definite article (cf. It. [il] < ILLU(M) 'that one').

2.5 BOLOGNESE

As mentioned in 2.2 above, Bolognese is classified as a Central Emilian dialect. However, given its geographical position, it also serves as a type of transitional dialect

between Emilian and Romagnolo, exhibiting characteristics of both areas. For example:

(a) (Ro.) no traces of [y] and [ø] (cf. Bo. *luna* [luna], Pc. *lüna* [lyŋa], It. *luna* 'moon; Bo. *nof [*nof], Pc. *nöf* [nøf], It. *nove* 'nine');
(b) (Ro.) metaphony (cf. Bo. *fiòr:fiur*, It. *fiore:fiori*, 'flower:flowers');
(c) (Em.) no [l]-gliding (cf. Bo. *vaulp* [vawlp], Ro. *voipa* [vojpa], It. *volpe* 'wolf'); with some sporadic exceptions;
(d) (Em.) offglided nasalized vowels (with subsequent strengthening) (cf. Bo. *pant* [paŋt] < [põwt], Ro. *pont* [põ:t], It. *ponte* < PONTE(M) 'bridge').

Bolognese also exhibits characteristics of its own:

(e) diphthongization of <ē> and <ĭ> into [ai] (cf. 2.2 (b) above);
(f) diphthongization of <ō> and <ŭ> into [au] (cf. Bo. *fiaur*, Pc. *fiur*, It. *fiore* < FLŌRE(M) 'flower');
(g) conservation of final /r/in the infinitive (cf. Bo. *cantar*, Pc. *cante*, It. *cantare* < CANTO, CANTARE 'to sing').

2.6 STANDARD ITALIAN

Italian, a direct descendant of Latin, is a member of the Romance Language branch of the Indo-European language family. Essentially, standard Italian represents a transition area between the Eastern Romance languages (Romanian, Dalmatian, Sardinian, and Central/Southern Italian dialects) and the Western Romance languages (French, Provençal, Catalan, Spanish, Portuguese and Northern Italian dialects), exhibiting characteristics of both.

On the whole, the Eastern Romance languages tend to be more conservative than the West (however, note (b) below where the eastern Romance languages show a change unseen in the western languages):

(a) Conservation of [k] before front vowels, except Romanian (cf. Sa. *cerbu* [kerbu], Rm. *cerb* [tʃɛrb], It. *cervo* [tʃɛrvo], Fr. *cerf* [sɛrf] < CERVUS 'deer, stag');

(b) retention of final unstressed /u/ (cf. Sd. *oju*, *ogu*, Rm. *ochiu*, It. *occhio* < OCULUS 'eye'); N.B. this change, or lack thereof, is sporadic in Romanian (cf. Rm. *corp*, Sd. *corpus*, It. *corpo* < CORPUS 'body');
(c) retention of final unstressed /e/ and /i/ (cf. Rm. *vale*, Sd. *badde*, It. *valle*, Fr. *val* < VALLE 'valley'; Rm. *ier ĭ*, It. *ieri,* Fr. *hier,* Sp. *ayer* < HERI 'yesterday').

However, Eastern Romance also shows changes unseen in Western Romance, some of which Italian shares and others which it does not:

(d) lenition/palatalization of dental/alveolars before <ī > and <ĕ> (cf. Rm. *ţară* [tsarə], Fr. *terre*, Sp. *tierra*, It. *terra* [tɛrra] < TĔRRA 'ground, land'; Rm. *zice* [zitʃe], It. *dice* [ditʃe] < DĪCIT 'he says'; Rm. *şapte* [ʃapte], It. *sette* [sɛtte] < SĔPTEM 'seven');
(e) loss of word-final [s] (cf. It. *amici*, Fr. *amis*, Sp. *amigos* < AMICOS, Acc. of AMICUS).

In Western Romance, we see the following innovations:

(f) deletion of unstressed penultimate syllable (cf. Fr. *douze*, Sp. *doce*, It. *dodici* < DUODECIM 'twelve'; Sp. *fresno*, Pg. *freix*, It. *frassino*, Rm. frasine < FRAXINU 'ash tree');
(g) lenition of intervocalic voiceless stops /p, t, k/ (cf. Sp./Pg. *pagar*, It. *pagare* (most likely a northern dialect borrowing), Rm. *împăca* < PACARE 'pay'; Sp./Pg. *mudar*, Fr. *muer*, It. *mutare* < MUTARE 'to mutate, change'; Sp. *riba*, Pg. *riba(mar),* Fr. *rive,* It. *riva* < RIPA 'riverbank');
(h) palatalization of medial /k/before /t/ (cf. Sp. *leche*, Pg. *leite*, Fr. *lait*, Rm. *lapte* < LACTE(M) 'milk').

Standard Italian is generally accepted to be rooted in the 13th century Tuscan dialect, at least in its literary form. Though there are still significant differences between modern standard Italian and Tuscan or Florentine, the majority of linguists agree upon this heritage.

(i) total assimilation of /kt/ clusters (cf. *fatto* < FACTUM 'done', *otto* < OCTUM 'eight');
(j) conservation of intervocalic voiceless stops[3] (cf. *fuoco* < FŏCU(M) 'fire, *ape* < APE(M) 'bee', *rete* < RĒTE(M) 'net');

[3]Though many tokens show voicing/lenition in these same positions (cf. luogo < LŏCU(M) 'place', stiva < STIPA(M) 'a hold (nautical term)', scudo < SCUTU(M) 'shield'), these are commonly accepted as borrowings

(k) diphthongization of tonic <ĕ> and <ŏ> in open syllables (cf. *piede* < PĔDE(M) 'foot', *buono* < BŎNU(M) 'good');

(l) anaphonesis of Proto-Romance *[e] and *[o] (from <ĭ/Ē> and <ŭ/Ō> respectively) to [i] and [u] before /ni/, /li/, and [n] + velar (cf. *tigna* [tiɲa] < **tegna* [tenja] < TĬNEA 'tinea, ringworm').

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from Northern Italian dialects and not normal developments in Italian (cf. Rohlfs 1966-69, Devoto 1985).

CHAPTER 3

METATHESIS

3.0 METATHESIS

Compared to the other developments seen in the northern dialects, metathesis is perhaps the most striking of the possible outcomes of Latin post-tonic /Cr/ clusters. Among the first to notice this was Rohlfs (1966-69) who devotes an entire section to the metathesis of /r/ under the heading: *fenomeni generali*. Rohlfs successfully narrows the phonetic environment of this change as follows:

> "Il caso piú frequente di metatesi è riconoscibile da questo fatto: che la *r* postconsonantica della seconda sillaba di una data parola va ad unirsi alla consonante ovvero al gruppo consonantico iniziale, o alla prima consonante della parola" (p.454).

Unfortunately Rohlfs does not go beyond identifying the environment and does little to account for why the change occurs, or what a possible catalyst may be. Metathesis has a long history of marginalization in the fields of phonology and phonetics. However, recent work in Phonotactic Optimization (Hume 2004) and Perceptual Metathesis theory (Blevins and Garrett 1998) has led to a new treatment of metathesis as perhaps a more natural change than previously thought. This chapter discusses the different environments of metathesis cases in northern Italian dialects and seeks to explain them through application of the theories of Hume and Blevins and Garrett. However,

what will become apparent is that though these theories are successful in describing the reasons for metathesis itself, they cannot explain why metathesis occurs rather than one of the other three possible outcomes: epenthesis, deletion, or no change. Due to the different outcomes of /Cr/ clusters and /CCr/ clusters, these will be summarized in separate sections (cf. 3.1 and 3.2 respectively).

3.1 BACKGROUND OF RELATED STUDIES IN METATHESIS

Metathesis is described as a linguistic phenomenon whereby a sequence of sounds is altered (Crystal 2003). Whether or not this change is phonological or phonetic, however, is a much debated question. In order to be phonological, these changes would need to be demonstrably systematic and applicable to a language's entire grammar; otherwise, they would be sporadic, lexical changes resulting from speakers' performance. Due to the similarities between metathesis and "speech errors," including both "slips of the tongue" and "Spoonerisms" (cf. 'the town drain' > 'the down train'), which are generally accepted as non-systematic phenomena, metatheses have often been pushed to the margins of linguistic studies. The difficulty of analysis and classification arises from the seemingly erratic occurrences of the changes. Studies in the typology of the different types of metathesis have led to a better understanding of the subtle variations of superficially similar changes (cf. Ultan 1978, Hock 1985, and Tuttle 1996). However, as noted by Hume (2004) many linguists still marginalize metathesis as irregular and non-systematic (i.e. a performance phenomenon) despite evidence to the contrary (cf. TorT sequences in South and West Slavic languages - i.e. *gardъ> gradъ in Old Church Slavic).

In several Northern Italian Dialects there exist a handful of seemingly sporadic cases of metathesis involving Latin /Cr/ clusters. In particular, Piemontese, Piacentino, Genovese, Milanese and Bolognese show metathesis of post-tonic /tr/ clusters (1a).

1a.	Lat. PETRA >	It.	pietra
		Pm.	preja
		Pc.	preda
		Gn.	pria
		Ml.	prèia
		Bo.	prêda

In addition, Piemontese, Piacentino, and Genovese show the same change with /pr/ and /br/ clusters, although this is absent in Milanese and Bolognese (2a and 2b).

2a.	Lat. CAPRA >	It.	capra
		Pm.	crava
		Pc.	cräva
		Gn.	crava
		*Ml.	càvra
		*Bo.	chèvra
2b.	Lat. FEBRIS >	It.	febbre
		Pm.	frev
		Pc.	freva
		Gn.	freve
		*Ml.	féver
		*Bo.	fîvra

A cursory study of dialectal dictionaries yields at least twelve cases of these metatheses. At first glance, these changes, due to the limited number of examples, appear to be sporadic anomalies within the grammars of each dialect. That is to say, they seem to be lexical changes, not systematic phonological developments. However, further investigation reveals probable explanations for the low number of tokens. The changes only occur in post-tonic /Cr/ clusters, the input (i.e. Latin) forms of which are surprisingly few in number. Furthermore, the addition of a third member of the cluster, be it sibilant or nasal, yields a separate outcome (save for /ntr/ clusters in

Piemontese and Genovese, where metathesis still occurs), namely epenthesis (cf. Lat. DE INTRO > It. *dentro*; Pc. *deintar*; Pm. (*a*)*drinta*; Gn. *drento*; Bo. *däntar*; Ml. *dénter*).

The assumption of this study is that these changes in the Northern Italian dialects, though few, are not irregular and instead can be explained through the application of recent phonological theories dealing with metathesis, epenthesis, and deletion. In particular, Optimality Theory (mainly Hume 2004 and Webb and Bradly 2009) and the Perceptual Theory of Metathesis (Blevins and Garrett 1998) seem to offer the most promising avenues of exploration. Specifically, the resultant clusters are more grammatically or phonologically desirable than the input word-medial Cr clusters. Also, restrictions in the grammars prevent outcomes of unfavorable clusters, such as initial /mr/, leading instead to a different repair strategy such as epenthesis (cf. Lat. METRU(M): It. *metro*; Pm. *méter*; Pc. *metar*; Gn. *metro*; Bo. *meter*; Ml. *meter)*. However, it should be noted that phonetically abrupt, lexically gradual changes such as deletion, metathesis, and epenthesis can be governed by word frequency and that while Hume acknowledges the effect of type frequency on metathesis outcomes, she fails to incorporate word frequency as well. Also, Blevins and Garrett propose perceptual ease/phonetic optimization as the impetus behind metathesis but do not consider word frequency effects. So, a complete analysis of these phenomena needs to include not only a Phonetic Optimization/Perceptual Metathesis approach as the possible cause of the changes, but also must include word frequencies to account for the apparent sporadic nature of the outcomes.

The existence of these changes is not new to the field of Romance linguistics, having been noted by Rohlfs (1967-69), who cites occurrences in Liguriano: *crava* 'goat', *prea* 'rock' (It. *capra, pietra*); Padovano: *pria* 'rock'; Milanese *crompa* 'to buy'

(It. *comprare*); and Bolognese: *adrova* 'makes use of' (It. *adopera* < *adoperare* 'to make use of'). He also notes similar examples from Toscano, Napolitano, Calabrese, Siciliano and the dialects of Le Marche and Puglia. Rohlfs, however, fails to offer an explanation as to why this change occurs, and instead limits his discussion to a description of the environment in which it seems to occur: "la [r] postconsonantica della seconda sillaba di una data parola va ad unirsi alla consonante ovvero al gruppo consonantico iniziale, o alla prima consonante della parola." The seminal work by Jaberg and Jud (1928-1940), often referred to simply as AIS, also notes numerous examples of metathesis, but as their project involved the gathering of information into a representative atlas of different linguistic phenomena and lexical occurrences, they do not posit any explanations for any changes.

Grammont (1905-6) offers an early attempt at explanation of metathesis in Romance languages where he explains the phenomena as a matter of "anticipation". While this certainly seems to be a possible explanation for some changes, Tuttle (1996) notes that this is "scarcely half the story" of metathesis. Tuttle goes on to discuss briefly various forms of metathesis (coda to onset, onset complexity shifted to main-stressed syllable, pseudo-metathesis, countercurrent metathesis, compound metathesis and preventive metathesis) and offers a glimpse of metathesis as it operates within the realm of morphophonology. In summarizing the different changes, he concludes that "most early Italo-Romance metatheses were motivated by syllabic preferences." However, he also proposes that "far from being a grab-bag of phonetic slips, metathesis can attain to true phonologic status, even operating in morpho-phonology." That is to say, he also attempts to "demarginalize" metathesis and bring it into equal status with other accepted phonological processes.

Hock (1985) proposes criteria for determining regular metathesis. He states simply that "metathesis can become regular only when it serves a specific structural purpose … most commonly [this] lies in converting phonologically or perceptually 'marked' structures into more acceptable ones" (Hock 1985). He goes on to discuss various 'motivated' metatheses which meet these criteria as well as 'unmotivated' changes which mirror preexisting motivated equivalents in that language (cf. Hock 1985, 536-538). That is to say, an unmotivated metathesis happens only when a similar, motivated metathesis already exists to which it is analogous. This echoes Hume's thoughts on the necessary conditions for metathesis in her Indeterminacy/Attestation Model of Metathesis (see Project Summary ch.4 and Hume 2004) in the sense that metathesis is limited to a kind of secondary process, and occurs only when some other change has happened or condition has been met.

Alexander, in his discussion of r-metathesis in English (Alexander 1985) acknowledges the unpredictability of "type 3 metathesis" (i.e. CV metathesis) but also asserts that such a change is still governed by rules. This would suggest a phonological process at work, and not a mere "slip of the tongue" or "speech error" or even a phonetic process. On the other hand, Wanner (1989) concludes that both contiguous metathesis and long-distance metathesis fall into the domain of performance and therefore should not be considered purely phonological phenomena. However, he also notes that this line between performance and truly phonologically oriented phenomena is not always clear, with the exception of the "mutation-like distance metathesis" which is impervious to the phonological principles in a language (Wanner 1989). Essentially, he relegates cases such as those in the northern Italian dialects to the margins of linguistic structure, dismissing them as unsystematic changes.

Lyche (1995) utilizes a prosodic analysis rather than a transformational one and concludes that what was previously viewed as schwa-metathesis in Cajun French should be treated as a simple case of epenthesis, utilized here as a repair strategy. While this strategy may well be utilized in some cases, the metatheses in this study are not readily explained as epenthesis, or as a possible multi-step, deletion + epenthesis combination. That being said, Webb and Bradley (2009) provide a convincing argument for possible CV metathesis as being the optimal choice among possible output forms, based on output (i.e. speaker's pronunciation) and input (i.e. listener's perception) in Spanish and French. Essentially, the input form results in perceived vocoids (including intrusive and full vowels) on both sides of the consonant at which point the optimal sequence is chosen based on specific constraint rankings. The obvious difference here is that Webb and Bradley are dealing with local CV metathesis, not long-distance, CC metathesis. It is possible that two separate metatheses are occurring, as in Hume (2001) where two constraints are required to account for the metathesis, despite the double violation of the LINEARITY constraint, where LINEARITY is defined as when S_1 is consistent with the precedence structure of S_2, and vice versa[4] (McCarthy & Prince, 1999). However, if this violation is of a constraint ranked lower than one resulting in metathesis (say some sort of constraint against /Cr/ clusters – due to low identification factors[5] or indeterminacy levels[6]), then the violation does not factor into the change. Furthermore, this analysis provides a starting point for

[4] Here, S_1 is defined as the input sequence and S_2 as the output sequence. So, metathesis always shows a violation of the LINEARITY constraint because S_1 (the input sequence CV) does not match S_2 (the output sequence VC).
[5] Such as poor phonotactic cues - i.e. unreleased stop, post-consonantal positioning of the rhotic, etc.
[6] Such as poor perceptual cues (rhotic spreading, vocoid intrusion, etc) which leads to confusion.

understanding and accounting for long-distance metathesis and the metathesis process in general.

3.2 METATHESIS IN /Cr/ CLUSTERS

Despite the relatively wide range of cases of metathesis encountered in this study, there are some generalizations that can be made. All cases occur when the rhotic consonant cluster is found in a post-tonic position; specifically, immediately following the stress (cf. PETRA and CAPRA from 1a and 2a above). Also, the cluster must be of the shape /Cr/ (where C= stop) and not the reverse. So, the basic environment of the metathesis is /Cr/, with some minor variations. In most cases long-distance metathesis occurs where the rhotic aligns itself with the initial consonant (cf. CAPRA > Pm./Gn. *crava*; It. *capra* 'goat'); however, in other cases, the rhotic undergoes local metathesis, merely switching places with the preceding consonant (cf. SOPRA > Gn. *sorve*; It. *sopra* 'over'). In all cases, however, the rhotic moves from a post-tonic syllable to a tonic syllable, which is generally considered to be an advantageous phonotactic position (cf. Hume 1998, Blevins and Garrett 2001). Also, given the changes present in these dialects (including epenthesis and deletion) it seems that a consonant cluster following a stressed vowel is in a weak position, and therefore often disfavored and frequently changed.

3.2.1 CASES OF /Cr/ METATHESIS

The cluster showing the most widespread metathesis, appearing in all five of the dialects investigated, is /tr/: Lat. PETRA> Pc. *preda*, Pm. *preja*, Gn. *pria*, Ml. *prèia*, Bo.

prêda. Piacentino and Bologna show voicing of [t] > [d], while the rest (Piemontese, Genovese, and Milanese) further lenite the [d] to the point of deletion.

Only three of the five dialects (Piemontese, Piacentino, and Genovese) metathesize /pr/ clusters. Thus, Lat. CAPRA > Pm. *crava*, Pc. *crävа*, Gn. *crava*; whereas Milanese and Bolognese reflect no change, aside from the lenition of the voiceless stop: Ml. *càvra*, Bo. *chèvra*. From Latin SUPRA we also see local metathesis of the type: SUPRA > Gn. *sorve*. Genovese and Piemontese also show an interesting metathesis with the verb COOPERO/COOPERIRE > *crovî* and *cheurve* respectively with an assumed medial stage of *copro/coprire. Genovese also shows *creuviletto* for It. *copriletto*, most likely a late development, but does show the metathesis of /pr/ from a post-tonic position (albeit a secondary stress) to pre-tonic position.

As with the /pr/ cases, the /br/ metathesis occurs only in Piemontese, Piacentino, and Genovese (cf. FEBRIS > Pm. *frev*, Pc. *freva*, Gn. *freve*) while Milanese shows epenthesis (cf. *fever*) and Bolognese shows no change (cf. *fivra*), just as in standard Italian (cf. *febbre*). There are no known cases of any other consonant/rhotic clusters that undergo metathesis. So, /dr/, /gr/, and /kr/ clusters do not appear to be affected by the metathesis. However, they do show other changes, such as epenthesis and deletion.

3.3 METATHESIS IN /CCr/ CLUSTERS

When a third consonant is introduced into the cluster, the effects vary from dialect to dialect, and depend heavily on the type of consonant. When the initial consonant is a stop, we see no metathesis; when it is a fricative there is the possibility of metathesis, depending on the sound and the dialect. The most common occurrence of this type

involves /s/. In Genovese, we see long distance metathesis (cf. *crastâ*, It. *castrare* < CASTRŌ, CASTRĀRE 'to castrate') and in Piacentino we see a variation of metathesis (*crastä*) and no change (*casträ*) which goes along with Piacentino's role as a transition dialect. In fact, the dialects to the north, Piemontese and Milanese reflect no changes in the /sCr/ clusters (cf. Pm. *castré*; Ml. *castrà*), while to the south, Bolognese shows either no change or epenthesis (Bo. *castrèr*, a *câster*). What is interesting to note here is that in the cases where there is no change, i.e. in Piemontese, Milanese, and Bolognese, the /sCr/ cluster is pre-tonic, not post-tonic. Bolognese offers perhaps the best example since we see that the post-tonic cluster shows epenthesis (cf. *a câster*) while the pre-tonic shows no change (cf. *castrèr*). This falls in line with the initial assumption that prosody plays a major role in determining the outcome of the /Cr/ cluster, in that the post-tonic clusters are more susceptible to change due to their weakened phonetic cues caused by their positioning in the word.

Nasals seem to be more straightforward in their outcomes as the initial member of /CCr/ clusters in that they operate much like occlusives, essentially preventing any metathesis. There does however seem to be some intradialectal variation between epenthesis and no change in Piemontese, Piacentino, and Milanese (cf. Lat. CENTRU(M) > It. *centro*; Pm. *sènter*, *centro*; Pc. *centar, seintar, centro*; Ml. *cénter, céntro*), while Bolognese shows only epenthesis (cf. *zäntar*) and Genovese only no change (cf. *çentro*). In this case the appearance of the -nCr- cluster in Piemontese, Piacentino, and Milanese is most likely a direct borrowing from standard Italian given the existence of the initial palatal affricate [tʃ] in place of the expected fricative [s] in Piemontese and Piacentino. Milanese offers no evidence for or against this analysis, since the normal development of the Latin [k] before a front vowel is the palatal

affricate, as in standard Italian. However, this same pattern of alternating distribution between epenthesis and no change, apparently at random, holds true for these three dialects with other nasal clusters, while Bolognese (epenthesis only) and Genovese (no change only) are much more stable:

3a. Lat. MEMBRU(M) >	It.	membro	3b. Lat. CANCRU(M) >	It.	cancro
	Pm.	mèmber		Pm.	càncher
	Pc.	----------[7]		Pc.	càncar
	Ml.	mémber, mémbro		Ml.	cáncher
	Bo.	----------[8]		Bo.	cancher
	Gn.	membro		*Gn.	càncro
3c. Lat. SEMP(E)R >	It.	sempre	3d. Lat. CONTRO >	It.	contro
	Pm.	sèmper		Pm.	contra
	Pc.	seimpar		Pc.	contra
	Ml.	sémper		Ml.	contra
	Bo.	sänper		Bo.	cånter
	Gn.	sempre		Gn.	contra

3.4 *DENTRO* AND *DESTRA*

The dialectal outcomes of what in Italian are the words *dentro* 'in, inside' and *destra* 'right', appear at first glance to upset the patterns seen in the prior section. The first, despite exhibiting an /NCr/ cluster, shows metathesis in both Piemontese and Genovese (cf. Pm. *drinta, andrinta, drint*; Gn. *drento*), which goes against the normal outcomes of these clusters in these dialects, which should be epenthesis and no change respectively. The other dialects all show epenthesis (cf. Pc. *deintar*, Ml. *dénter*, Bo. *däntер*), which corresponds to their expected outcome. So, how do we explain not only the unexpected results in Piemontese and Genovese, but more importantly how do we explain the metathesis, since the rule seems to be that aside from /sCr/ clusters, no /CCr/ cluster exhibits metathesis in any of the languages? A similar inquiry must

[7] Piacentino shows *bígul* for It. *membro virile* 'virile member.'
[8] Bolognese shows *cunpunänt* for It. *membro*, and *usèl* for It. *membro virile*.

be made of the outcomes of DEXTRA, It. *destra* 'right', in the various dialects where again there is unexpected metathesis in Milanese (*drìtta, drìzza*), Piemontese (*drita*), and Bolognese (*drétta*). Since Piacentino and Genovese are the only two dialects to have shown metathesis with /sCr/ clusters (which we do find here, cf. Pc. *dritta*, Gn. *drïta*) we must explain the changes in the other three dialects. The answers to both questions lie in the history of the words.

Beginning with the simpler of the two, It. *destra*, we notice immediately that the dialectal forms have all seemingly deleted the [s] or undergone total assimilation to a [tt], all the while metathesizing the rhotic to the initial syllable. Since this combination of changes is not prevalent in any of the dialects it is logical to look for some other explanation first before writing these changes off as anomalous. In fact, if we take a look at the dialectal variants of It. *diritto* 'straight' (cf. Pm. *drit*; Pc. *dritt*; Ml. *drìtt, drìzz*; Bo. *drétt*; Gn. *drïto*) and *destro* (m.sg.Adj.) we can't help but immediately notice the striking similarities:

4a.	It.	destra	destro	diritto
	Pm.	drita	drit	drit
	Pc.	dritta	destar	dritt
	Ml.	drìtta	drìtt	drìtt
	Bo.	drétta	drétt	drétt
	Gn.	drïta	drïto	drïto

What appears to have happened is that the two words have fallen together in favor of the adverb, *diritto* < DIRECTUM (Devoto 1985); and instead of being a case of long-distance metathesis from DEXTRA/DEXTER > *drita*, *drit*, etc, the sound change is simply a case of deletion of an unaccented vowel, [i] from DIRECTUM > **drectum*, or the like. In fact, Piacentino is the only dialect to maintain a three-part distinction between the words, and coincidently maintaining any semblance to DEXTER. As for the

epenthesis in Pc. *destar*, this change remains in-line with the comingling of metathesis and epenthesis with /sCr/ clusters in that one form shows epenthesis and the other what looks to be metathesis on a synchronic level.

Italian *dentro* and its dialectal equivalents, on the other hand, prove to be much more difficult to explain. In fact, as of yet, there seems to be no apparent reason for the metathesis to have occurred in Piemontese and Genovese. The terms come from the Latin phrase DE INTRO, which was reanalyzed as a single word of the sort *deintro. Here we cannot rely on a phonotactic constraint to explain this change. For example, if we take metathesis as the expected outcome then we need to explain the lack of change in words such as CENTRU(M), CANCRU(M), MEMBRU(M), and CONTRO (respectively: Pm. *sènter, càncher, mèmber*, and *contra*; Gn. *çentro, càncro, membro*, and *contra*). While we can claim that CENTRU and MEMBRU do not undergo metathesis because the resulting cluster would be [sr] or [mr], both unacceptable and unattested word-initial clusters, the other two become slightly more difficult. Latin CANCRU, because it involves the velar rather than the alveolar nasal may be put aside and treated separately, but there seems to be no strong evidence as to why a cluster involving the alveolar nasal would be more susceptible to metathesis. Finally, the issue of CONTRO proves to be the most damning evidence against metathesis as the prevalent change since it involves the same sounds, [ntr], as DE INTRO, [ntr], and there are no evident phonotactic constraints preventing the metathesis. That is to say, if the word were to undergo metathesis, the resulting cluster would be cr-, a perfectly acceptable and well-attested word-initial cluster in both dialects. Essentially, we are left with three possible solutions: (1) the metathesis of DE INTRO in Piemontese and Genovese is simply an anomaly, either developing simultaneously in both dialects or having been

borrowed from one to the other; (2) the metathesis of /nCr/ clusters was occurring as a lexical diffusion change (cf. Wang 1969) which died out before spreading any further; or (3) the frequency of the words played a major role in determining which words underwent metathesis, epenthesis, deletion, and no change at all. For now we will treat DE INTRO > Pm. *drinta, andrinta, drint*, Gn. *drento* as an anomalous change that occurred for reasons that escape explanation.

3.5 PHONOTACTIC OPTIMIZATION AND OPTIMALITY THEORY

With Phonotactic Optimization Theory, and more specifically the Indeterminacy/Attestation model (Hume 2004), we would expect to see two distinct conditions for metathesis to occur: indeterminacy in the signal and a previously attested outcome form. The former serves as the impetus for the metathesis since the sounds in question are in a favorable environment for the change to take place, while the latter provides support for the output in that it is a recognizable cluster that is created, not a completely new one. The cases of metathesis seen in the Northern Italian dialects exhibit exactly these traits.

Because the sounds involved are rhotics, it is reasonable to assume some degree of perceptual confusion given the phonetic qualities of the rhotic. In fact there is an established precedent for the "spread" of rhotic features across syllables (cf. West 1999, 2000; Kelly and Local 1986). Therefore I propose that an utterance such as PETRA would register as any of the following: *petra, perta, preta* (and possibly *petar*), where the rhotic, or semblances of the rhotic, are perceived throughout the word. That is to say, the listener may identify the rhotic in various positions based on the phonetic

residue[9] created in the production. It is then up to the listener to determine where exactly that rhotic should be placed. Based on Hume's second requirement, attestation, the speaker selects an output that already exists within the grammar. The speaker will not select a sound or combination of sounds which does not already exist in the language. For example, one of the reasons that Latin SUPER/SUPRA does not yield a dialectal **sruva* or the like is that an initial /sr/ cluster does not exist in any of the dialects. However, this does not help in all cases, such as PETRA above, since any of the possible outcomes are attested as sound combinations. Hume, though, also claims that the order of sounds inferred from the signal must be consistent with the most frequently occuring sequences in the language. In other words, to resolve the indeterminacy, the listener will select the combination of sounds which has the higher frequency of occurrence in the language. Returning to the case of PETRA, we must assume then that an initial /Cr/ cluster is more prevalent than a medial one and therefore is the listener's selection.[10] Furthermore, of the three choices: *petra, perta,* and *preta*, two feature a rhotic in a post-consonantal position and the other in a pre-consonantal position. Based on phonetic principles of coarticulation, the post-consonantal rhotics would have more in common with each other than the pre-consonantal rhotic.

What Hume fails to deliver is a formal description of this model, since, in her words, this study is concerned with "the factors underlying why and how metathesis

[9] Phonetic residue can be defined as the appearance of phonetic characteristics of a particular sound outside of its original position in the word. These characteristics are usually the product of production (cf. Webb & Bradley's 'vocoid intrusion'), but can be the result of perceptual confusion as well (cf. West and Kelly & Local for rhotic spreading).

[10] This assumption, of course, needs substantial empirical evidence to be taken as a fact. However, in a brief study conducted on Latin Cr clusters, Kilpatrick (2009) found that Latin Cr clusters are 50% more likely to be found word-initially than word-medially -- a promising finding that needs further study, but offers some support for the above assumption.

occurs," and not with the formalization of the theory. For a formal description, we must turn to Webb and Bradley (2009) and their Optimality Theory account of Consonant/Vowel metathesis where they successfully account for the Indeterminacy of Hume's hypothesis and add a formal description of a Perception Grammar which falls in line with Hume's Attestation requirement in that it demonstrates how the listener analyzes the sounds based on an existing personal grammar. Though their work concerns CV metathesis in French and Spanish, the theories put forth are still applicable here, with slight alterations.

Webb and Bradley propose a dual-grammar model of language (Production and Perception) where the Production Grammar "pairs a gestural representation with its corresponding auditory form" which the Perception Grammar then formalizes into "discrete phonological elements in the underlying form" through an analysis of the listener's "mapping of continuous cues." In other words, a speaker "chooses" a particular gestural sequence to produce the desired auditory outcome which can create auditory confusion due to gestural constraints. In the case of metathesis, the gestural timing results in a complete overlapping of the consonant by the vowel so that from an auditory perspective a CV or VC sequence appears to be a VCV sequence. This conclusion is based on the ranking of two main constraints:

(1) C//V-OVERLAP: The optimal position for a consonant gesture in an intervocalic -VC- or -CV- sequence is to be centered on the adjacent vowel

(2) GESTURE$_X$ IN GESTURE$_Y$: A gesture of type *y* does not fully surround a gesture of type *x*[11]

[11] In the case of Spanish GESTURE$_X$ = tap, and in French [R]; whereas GESTURE$_Y$ = Vowel.

In any given language, if (1) is ranked higher than (2), there is variation in the position of the vowel in regard to the consonant. If (2) is ranked higher, there is no confusion and the original location of the vowel is maintained. According to Webb and Bradley, both non-standard Spanish and French dialects[12] rank C//V-OVERLAP higher than GESTURE$_X$INGESTURE$_Y$ and therefore have auditory forms with perceptual confusion[13]:

Table 1: Spanish: (Standard) *p**er**fecto*; (Dialectal) *p**re**fecto*

	perfecto	C//V-OVERLAP	TAPINV
☞	$p^{E}r^{E}fecto_{AUDF}$		*
	$perfecto_{AUDF}$	*!	

Table 2: French: (Standard) ***pr**emier;* (Dialectal) p**er**mier

	premier	C//V-OVERLAP	[R]INV
☞	$p^{E}r^{E}mier_{AUDF}$		*
	$premier_{AUDF}$	*!	

So, the production grammars of non-standard Spanish and French speakers produce auditory outputs which are unclear as to the position of the vowel and the rhotic. In fact, there is acoustic evidence from peninsular Spanish, which suggests that there are

[12] The French dialects include: Normand French, Desgrippes (1982:55), Grammont (1905, 1933:239-248); for varieties spoken in Saint Pol sur Ternoise/Pas de Calais and St. Pierre-Port/Guernsey, *Atlas Linguistique de France* [Gilliéron & Edmont 1968] n. 284, 399. For popular Spanish dialects, Lipski (1990), based on his own field research.

[13] All OT charts in this dissertation utilize the standard symbols and positioning: the upper left corner features the input form (either underlying or auditory. The left-most column shows the possible output forms (either auditory or underlying) with the optimal form indicated by the symbol <☞>. The top row displays the constraints as applicable to the change in question -- higher-ranked constraints are the left-most constraints. An asterisk (*) represents a form that is in violation of a constraint. An exclamation mark (!) represents a fatal violation of a constraint, meaning that because of this violation the form in question cannot be selected. An optimal form may be in violation of a constraint, but only if there are no competing forms that only violate a lower-ranked constraint or if it has fewer violations of the same constraint (i.e. fewer asterisks than the other form). Shaded areas (if any) represent unecessary constraint interaction for the forms in question -- this is due to a form having a fatal violation of a higher-ranked constraint.

vowels, or as Webb and Bradley call them: vocoids, on both sides of the rhotic (Webb and Bradley 2009, Blecua 2001). This vowel intrusion, though not specifically attested in French, does play a role in rhotic lenition. Since there is an allophonic distribution of the fricative [R] (after obstruents and word-initially) and the approximant [R] (intervocalic and word finally) both an underlying /CRVC/ and /CVRC/ would be realized as a /$C^{V}R^{V}C$/ sequence. The surrounding vocoids would lenite an underlying fricative and therefore obscure the original sound.

The perception grammars, according to Webb and Bradley, are rooted in faithfulness constraints, which regulate correspondence between underlying forms and auditory forms, and markedness constraints, which judge the well-formedness of output forms. The perception grammar, in essence, presents a formal representation of speakers' knowledge of a language's phonotactic patterns, or "perceptual habituation" (Webb & Bradley 2009, Hume 2004, Kuhl & Iverson 1995, Peperkamp & Dupoux 2003). Perceptual habituation states that a speaker is more habituated to frequent or typical patterns and less habituated to novel patterns. The formalization of this idea and therefore the main constraints of the perception grammar are:

(1) PARSE (x) - Surface item *x* appears in the underlying form (Faithfulness)

(2) CATEG (x,y) - Surface item *x* is not recognized as the value of *y*. (i.e. the value *y* is not a categorization of *x* (Markedness)

Specifically for French and Spanish, Webb and Bradley utilize the following constraints[14]:

[14] Although Webb and Bradley are the first to formalize these constraints for Spanish and French, they cite Boersma (2007) for independent use of CATEG constraints within the perception grammar. In addition, they cite Blecua (2001), Colantoni & Steele (2005, 2007), along with previous works by Bradley (2005, 2007) for evidence of the intrusive vowels in Spanish and Tranel (1987), Walker (2001), along with a previous study by Webb (2002) for evidence in favor of rhotic lenition (brought on by vowel intrusion) in French.

(1) PARSE(vocoid) - A vocoid in the auditory form appears in the underlying form.

(2) CATEG(C, peak) - A consonant is not recognized as a syllable peak.

(3) CATEG(^{V}tap, Vtap) - A sequence [vocoid/tap] is not recognized as the sequence /vowel/tap/.

(4) CATEG(R^{V}, RV) - A sequence [R^{V}] is not recognized as the sequence /RV/.

So, for Spanish, Webb & Bradley propose the following perception grammar:

Table 3: /perfecto/ Perception Grammar

[$p^{E}r^{E}$fecto]$_{AUDF}$	CATEG(C, peak)	CATEG(^{V}tap, Vtap)	PARSE(vocoid)
/perefecto/$_{UF}$		*!	
/prfecto/$_{UF}$	*!		**
/perfecto/$_{UF}$		*!	*
☞/prefecto/$_{UF}$			*

Since the constraint PARSE(vocoid) is ranked lower than the other two constraints, the ambiguous auditory form, [$p^{E}r^{E}$fecto], is analyzed as being the underlying form /prefecto/. The other possibilities all violate a higher ranked constraint (/perfecto/ and /perefecto/ violate CATEG(^{V}tap, Vtap) and /prfecto/ violates CATEG(C, peak). The other three possible interpretations are eliminated by the higher ranking constraints. Even though the selection, /prefecto/, does violate the PARSE(vocoid) restraint, in that the two vocoids are not analyzed as being in the underlying form, it is still the optimal choice since it violates the lowest ranked constraint. Webb & Bradley do note that in some instances the vocoids have developed into full vowels (cf. *crónica* > *corónica* 'chronicle'; *chacra* > *chácara* 'farm') and have explained this as a reordering of the constraints, specifically a re-ranking of PARSE(vocoid) above CATEG(^{V}tap, Vtap). Though this is mentioned in passing, the idea

of a reordering or re-ranking of constraints will play a significant role in explaining epenthesis in chapter 3. So the ranking of constraints for *corónica* is as follows:

Table 4: /koronika/ Perception Grammar.

	$[k^{O}ronika]_{AUDF}$	PARSE(vocoid)	CATEG(^{V}tap, Vtap)
☞	/koronika/$_{UF}$		*
	/kronika/$_{UF}$	*!	

In French we see a similar development, however this time the Spanish-specific constraint, CATEG(^{V}tap, Vtap) has been replace by the French-specific constraint, CATEG(R^{V}, RV):

Table 5: /permier/ Perception Grammar

	$[p^{E}r^{E}mier]_{AUDF}$	CATEG(C,peak)	CATEG(R^{V}, RV)	PARSE(vocoid)
	/peremier/$_{UF}$		*!	
	/prmier/$_{UF}$	*!		**
☞	/permier/$_{UF}$			*
	/premier/$_{UF}$		*!	*

Before we can take the constraints and findings of Webb & Bradley and apply them to the case of Lat. CAPRA > dialectal *crava*, etc., we must first expand upon the principal constraints of the perception grammar. First, since Webb & Bradley were concerned with CV metathesis (as was Hume), we must find a constraint that is rooted in CC metathesis, and of the long-distance variety as well. For this we turn to the findings of Kelly and Local (1986) who investigated the acoustic reality of liquids. In their study, they found that the 'domain of resonance' of liquids is measurable in all subsequent unaccented syllables. In other words, a liquid is perceived to some degree in all following unaccented syllables (cf. also Blevins & Garrett 1998, West 1999). So, a

liquid that originates in such a syllable, as is the case in CAPRA, may be misconstrued as being nothing more than acoustic residue from the accented syllable. A formal representation of this spread would be something like: /$c_{R}a_{R}$pra/ where the rhotic is evident is some way in all preceding syllables[15]. So, combined with the production ambiguity of the vowel/vocoid, [kap^{A}r^{A}], we end up with a final auditory form of [$k_{R}a_{R}p^{A}{}_{R}{}^{A}$] where the rhotic is perceived in three separate positions, and the vowel is perceived as a vocoid either preceding or following a consonant.[16] A principal constraint that we can call on to help solve this confusion is the Faithfulness constraint known as IDENT (cf. McCarthy and Prince 2004 for a discussion of the IDENT constraints):

(1) IDENT-IO(x) - The input *x* must be preserved as the output *x*.

Since rhotics, and other sounds, which occupy a pre-vocalic position have separate acoustic properties than ones occupying a pre-consonantal position (cf. Hume 2004), I propose the following constraint based on the phonetic properties of pre-vocalic and pre-consonantal rhotics:

(1) IDENT-IO(xV) - If the input segment *x* is pre-vocalic, then its output must also be pre-vocalic.

In other words, a rhotic that is pre-vocalic in the input, must also be pre-vocalic in the output. Since certain perceptual cues will alert the listener to the rhotics phonetic environment, it stands to reason that an output which reflects these properties would be more favorable or optimal to the listener, and therefore to the perception grammar.

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[15] This is not to say that numerous rhotics are perceived, but rather that there are numerous possible positions for the single rhotic to occur. So, CAPRA could be perceived as [kapra], [karpa], [krapa], or possibly even [kapar] with the rhotic being interpreted as originating in one of four possible positions.
[16] N.B. The consonant at this point is ambiguous since it is unclear where the rhotic is in the word. However, even if the rhotic "moves" position, the vocoid will still be adjacent to a consonant, [p].

So, based on Webb and Bradley's model of the production grammar, Latin CAPRA would produce the following:

Table 6: /kapra/ Production Grammar

/kapra/	C//V-OVERLAP	R in V
$[kap^{V}ra]_{AUDF}$	*!	
☞ $[kap^{V}r^{V}]_{AUDF}$		*

The auditory form then would be: $[kap^{\Lambda}r^{\Lambda}]$ which serves as the input for the perception grammar. Keep in mind, the spread of the rhotic feature is a perceptual factor, not a production factor, so it does not play a role until the perception grammar. Next, from an input (auditory form) of $[kap^{\Lambda}r^{\Lambda}]$ we see the following development in the perception grammar:

Table 7: /kapra/ Perception Grammar

$[kap^{\Lambda}r^{\Lambda}]_{AUDF}$	CATEG(C,peak)	IDENT(xV)	CATEG(r^{V},rV)	PARSE(voc)
$/kapra/_{UF}$			*!	
$/kapar/_{UF}$		*!		
$/kapr/_{UF}$	*!			
$/karpa/_{UF}$		*!		
☞$/krapa/_{UF}$				*

Again, although the optimal choice, /krapa/, does violate the PARSE(vocoid) constraint, the relatively low ranking of this constraint means that/krapa/ still emerges as the underlying form.[17] So, in cases of metathesis, this analysis seems to work. A production grammar produces an ambiguous vocoid/consonant relationship and the perception grammar, after taking into account the additional ambiguity of the position

[17] N.B. As stated in chapter 1, the lenition of [p] to [v] is a well-documented change in all five of the dialects, thus we see *crava* from /krapa/, etc.

of the rhotic, then determines the optimal underlying form based on the listener's prior knowledge of the phonotactic patterns of the dialect. This accounts for Hume's first criterion: Indeterminacy. Frequency, as it turns out, plays a vital role in the second condition of her Indeterminacy/Attestation model of metathesis and is discussed in the following section.

3.5.1 FREQUENCY

Though the overall frequency of words plays a major role in determining the outcomes, it is the frequency of clusters and individual segments which concerns us here. Since the Indeterminacy/Attestation model relies on the hypothesis that the resulting sounds/clusters of metathesis are previously attested and more frequently occurring, we must look at actual clusters to determine whether this is indeed the case. In the cases of metathesis we would expect to find more /Cr/clusters word-initially than word-medially. This would lend credence to the idea that speakers were more familiar with word-initial rhotic clusters than word-medial ones, and therefore, when presented with an ambiguous input signal (the AUDF Tables 1 and 2 above) the listener would select the higher frequency cluster: i.e. the word-initial cluster. To quantify the clusters I examined both word-initial and word-medial /Cr/ clusters in Julius Caesar's *De Bello Gallico*. Regardless of the stress of the word, words were tallied in two separate categories, word-initial and word-medial. If a word presented both, it was counted in each column. Utilizing Perl programming software, I scanned each of the eight books and over 64,000 words for word-initial and word-medial /Cr/ clusters. In the end there was an overwhelming two-to-one ratio of word-initial rhotic clusters. Words with an initial rhotic cluster made up just over four percent (4%) of the total

words, while words with medial rhotic clusters made up just under two percent (2%) overall. These findings fall in line with Hume's assertion that the resulting output of a metathesis will be (a) attested, and (b) in cases of competition, the more frequently attested output. In other words, if we consider the metathesized output (Pm/Gn. *crava*) to be a possible outcome alongside a possible original, no change output (**capra*) we can see that both outcomes are attested. A medial /pr/ cluster certainly exists, as does an initial /cr/ cluster. So, in this case, since attestation alone cannot determine the result, we must look to the more frequently attested outcome. Since word-initial /Cr/ clusters, regardless of the obstruent involved, show up twice as often as word-medial clusters, the metathesized outcome is "selected" and we see the diachronic change of CAPRA > Pm/Gn. *crava*, Pc. *crävа*, etc. Obviously what is lacking here is a comprehensive look at the individual dialects and cluster frequencies within each. However, since no known database of any of the dialects is currently available, looking to the source language does provide at least some insight into the frequency of the words and clusters. Since, in the end these changes appear to have taken place relatively early, looking at the frequency of clusters in Latin does seem a valid option at this time.

3.6 PERCEPTUAL METATHESIS

In their study of metathesis, Blevins and Garrett (1998) note that long-distance metathesis shares similarities with other examples of perceptual reinterpretation where features are drawn to more prominent prosodic positions. For example, the feature in question, in this case a rhotic, should move from a weak prosodic position (post-tonic, second member of a cluster, etc.) to a strong prosodic position (pre-tonic,

initial consonant, etc.). This does not mean that a sound will move to the *strongest* possible position, but rather to a *stronger* position. So, a change like CAPRA > *crava* shows a strengthening as far as prosody (post > pre-tonic) but not in cluster postion (second > second). Likewise, other cases such as *coprire > *cheurve* in Piemontese show a strengthening in cluster position (second > initial) rather than in prosody.[18] In addition, for cases like the latter where we encounter local metathesis and not long-distance metathesis, we can look to phonotactic constraints for the cause. In other words, Piemontese does not allow initial *chr*, [ʃr], clusters and therefore an output such as **chreuve* is not possible. Given that *cheurve* places the rhotic in an advantageous position relative to its initial CA**PR**A position, this becomes the secondary selection over no change at all.

While the prosodic positioning and cluster positioning give some insight into the end results of the metathesis, they offer little to no help as to the cause of the change. For this, Blevins and Garrett propose a perceptual metathesis theory which, much like the Indeterminacy/Attestation model of Hume, relies on some sort of perceptual reinterpretation of a speaker's output. For Blevins and Garrett, the metathesis of rhotics boils down to the tendency of liquids, rhotics included, to spread their features throughout a word. As they note, however, laterals do not generally fit into the category of "stretched out" features, since laterality does not easily spread to other feature. But, Ohala (1993) does propose that since laterals, and by extension other liquids, do have "cues that require a long time-window for their perception" it is not surprising that they are included in such sound changes as dissimilation, and

[18] N.B. This would be pronounced as one single syllable and therefore the -rv- sequence in the coda would need to be treated as a cluster rather than a coda + onset.

metathesis. That is to say, that the "perception window" of these segments is rather large and therefore succeptable to infiltration by other sounds, thus leading to sound change. Therefore, if metathesis involves a "feature-spreading" sound, or a sound segment with an elongated time-window, it is likely that the listener, upon hearing the ambiguous output would select the input that is most salient. In other words, given a choice between a rhotic in a weak phonotactic position and one in a strong phonotactic position, the stronger one will win out.

Blevins and Garrett also note that the spread of features, and therefore any subsequent metathesis, can be blocked by an intervening "gesturally incompatible segment." In the case of the northern Italian dialects, this appears to be any additional consonant, with the exception of [s] in Piemontese and Piacentino. Though these intervening consonants do not necessarily appear to be "gesturally incompatible" they do seem to play a role in preventing long-distance metathesis in /CCr/ clusters.[19] In other words, the additional consonant seems to disrupt the spread of the rhotic feature, thereby eliminating the possible indeterminacy in the auditory form which subsequently limits the possible outcomes.

3.7 CONCLUSION

Hume's Indeterminacy/Attestation model of metathesis serves as an excellent theory for the metathesis phenomenon found in the northern Italian dialects. However, since she fails to produce a formal model of this theory, we are forced to look elsewhere for validation. Webb and Bradley (2009) in their exploration of CV metathesis in French

[19] Blevins and Garrett do cite several examples of Greek dialects in southern Italy which undergo metathesis even in /CCr/ clusters: gambrós > grambó 'son-in-law'; khondrós > xrondó 'thick.' However, these examples show an original pre-tonic cluster unlike the northern Italian examples.

and Spanish provide the groundwork for a formal model of the indeterminacy aspect of metathesis. Their theory of two separate yet interdependent grammars, production and perception, follow in a long line of similar proposals, but also go further by successfully formalizing both grammars. Applying this approach to the instances of metathesis in the northern Italian dialects yields promising results. In addition, looking at the frequency of consonant cluster occurrences and relative word position yields results in line with Hume's attestation requirement. Word-initial consonant clusters in Latin outnumber their word-medial counterparts by a two-to-one margin. Since these word-initial rhotic clusters appear twice as frequently, it stands to reason that faced with the ambiguous perceptual position of a rhotic within a word, the listener would select that position most frequently observed, i.e. word-initial position. In addition, based on the studies performed by Blevins and Garrett it appears that when metathesis occurs the output form represents a stronger prosodic positioning of the metathesized segment. Once again, the metathesis cases in the northern Italian dialects meet this criterion as well. Without fail the rhotic moves from a post-tonic syllable to a tonic syllable. Additionally, even when long-distance metathesis does not occur (cf. *cheurve* < COPRIRE) the resulting form is still in a "stronger" phonotactic position, as it is now in the coda position of the initial syllable -- where its perceptual cues are more readily perceived -- rather than the second member of a complex onset sequence. Unfortunately however, metathesis of /Cr/ clusters does not occur in every dialect in every instance. Sometimes there is epenthesis, other times deletion, and still other times simply no change at all. So, while the Indeterminacy/Attestation model (reinforced by the Perceptual metathesis findings) seems to explain cases of

metathesis, it fails to explain why it doesn't occur in other instances with the same phonotactic constraints.

CHAPTER 4

EPENTHESIS

4.0 BACKGROUND OF RELATED STUDIES OF EPENTHESIS

If metathesis is the most striking of the changes that occur, epenthesis is the most common. Epenthesis is by far the most prevalent change among all five of the dialects. In addition, it affects the widest range of words in terms of frequency (see Ch. 5). In the northern Italian dialects, we find numerous occurrences of epenthesis in Latin post-tonic /Cr/ clusters:

5a.	Lat. QUADRUM >	It.	quadro	5b.	Lat. LIBER >	It.	libro
		Pm.	quàder			Pm.	lìber
		Pc.	quädar			Pc.	libar
		*Gn.	quaddro			*Gn.	libbro
		Ml.	quàder			Ml.	lìber
		Bo.	quèder			Bo.	lîber
5c.	Lat. METRUM >	It.	metro	5d.	Lat. ALACER >	It.	allegro
		Pm.	meter			Pm.	alégher
		Pc.	metar			Pc.	allegar
		*Gn.	metro			*Gn.	allegro
		Ml.	méter			Ml.	allégher
		Bo.	mêter			Bo.	alîgher
5e.	Lat. JUNIPERUS >	It.	ginepro	5f.	Lat. NIGER >	It.	negro
		Pm.	zenèiver			Pm.	négher
		Pc.	znevar			Pc.	negar
		Gn.	zeneivio			*Gn.	neigro
		Ml.	zenéver			Ml.	négher
		Bo.	żanavver			Bo.	naigher

It is of course interesting that many of the Latin forms do not contain a /Cr/ combination,[20] but as is well known in dialectal studies of Italian, the Northern Italian dialects undergo deletion of atonic vowels, therefore the examples in 3b., 3d, 3e, and 3f above would have been *LIBRU(M), *ALACRU(M), *JUNIPRU(M), and *NIGRU(M) respectively during the "Vulgar Latin" period (cf. Grandgent 1907). One possible alternative explanation is that the dialects continued the Nominative forms of the Latin nouns instead of the Accusative, as is the general consensus in Romance linguistics. However, there is no conclusive evidence to date that would support such a claim, and a substantial amount of data to the contrary (i.e. vowel deletion followed by epenthesis) including current changes occurring in some Northern Dialects where the future and conditional stems vacillate between /Cr/ clusters and -CVr- clusters (cf. Pm. *but(e)rai*, It. *buterò* 'I will throw,' (Ricca 2009).

The cases of epenthesis in the Northern Italian dialects well outnumber the metatheses and seem to represent a more systematic, that is regular, change. All five of the dialects show the change, but not every dialect in every instance (cf. Gen. in 1b, 1e, and 1f above), and therefore warrant separate and detailed analyses. In Russell Webb and Bradley (2009) we find a possible link between metathesis and epenthesis. Essentially, at a certain level, both metathesis and epenthesis appear to be viable options for the output. This competition stems from perceptual confusion in two ways, the inability of the hearer to determine rhotic placement (Hume's "indeterminacy") and intrusive vowels as a result of a "vowel gesture being heard between two adjacent

[20] It is also immediately noticeable that all epenthesis examples in 5a. - 5f. show no final vowel, while the metathesis examples (1a., 2a. - 2b. in ch. 3) and deletion examples (17a. - 17b., 18a. - 18b. in ch. 5) do show a final vowel. This most assuredly plays a role in determining which process is applied to which word, however it is not the full story. Since we see competing forms both interdialectally and intradialectally, we must look to additional possible causes for these changes - i.e. frequency effects (chapter 6).

consonant gestures which are minimally overlapped" (Russell Webb & Bradley 2009; 5). The confusion at the "output level" (production) and the "input level" (perception) combine to present alternative "choices" for the hearer (see 6a and 6b, below) who, based on the dialect-specific hierarchy of constraints (universal in nature, but ranked differently according to language/dialect), chooses the optimal form which in these cases results in either metathesis or epenthesis.

6a. CAPRA > /kap^{v}ra/[21] (output) + /k^{r}a^{r}pra/ (input) =

i. /kapra/
ii. /kapara/
iii. /kapar/
iv. /karpa/
☞v. /krapa/

6b. LIBRU(M) > /lib^{v}ru/ (output) + /l^{r}i^{r}bru/ (input) =

i. /libru/
ii. /liburu/
☞iii. /libVr/
iv. /lirbu/
v. /lribu/

But why one or the other? What are the factors underlying the "choice" of epenthesis or metathesis? Briefly, one can see that phonotactic constraints play a major role. For instance, in 6b, metathesis would have resulted in a "disfavored" and non-existant initial cluster of /lr/ (cf. 6b.v) and therefore we see epenthesis (cf. 6b.iii). In 4a though, there are no such restrictions and the end result is metathesis (cf. 6a.v).

The other interesting concept brought forth here is the idea of two separate grammars: output (production) and input (perception). Though not an entirely new notion, Webb & Bradley do a good job of formalizing the grammars thereby making the theory more accessible. Essentially, this boils sound change down to a two-step process: initially there is confusion at the output level which leads to confusion at the

[21] I use 'V' here as a general 'vocoid' whose phonetic realization is dialect specific (cf. 1a.-1f. above).

input level, which generates a situation in which a new form may be selected and then stored in the grammar. The idea of there being various choices presented to the hearer (input grammar) however, lends itself nicely to a Connectionist approach (i.e. Bybee or Phillips). If the process does involve the selection of an optimal form from among a variety of candidates this would lead one to believe that all separate forms should be stored in some manner alongside the eventual choice, with the more frequent selection having the stronger ties.

The stance taken in this paper is that epenthesis can be explained as a reordering or re-ranking of constraints, specifically those constraints we encountered in formalizing the metathesis from the previous chapter. Using Webb & Bradley's production and perception grammars it is possible to see how "intrusive" vowels arise and subsequently cause an ambiguous input to be received by the listener's perception grammar. This ambiguity is then analyzed and, based on a different ranking of constraints, is realized as epenthesis.

4.1 EPENTHESIS IN OPTIMALITY THEORY

Before delving into the treatment of epenthesis as seen in this study, it is worth taking a brief look at how the syllable is analyzed within Optimality Theory and consequently how epenthesis may arise in such a system. In traditional OT approaches syllable structure is explained through the interaction of the following constraints:[22]

(1) ONS A syllable must have an onset

(2) *COD A syllable must *not* have a coda.

[22] Cf. Prince & Smolensky 1993. ONS and *COD both represent structural constraints while MAX and DEP represent faithfulness constraints governing input and output segments.

(3) MAX A segment in the input must have a correspondent in the output.

(4) DEP A segment in the output must have a correspondent in the input.

The relative ranking of these families of constraints determines the syllable structure of individual languages. For example, if the faithfulness constraints (MAX and DEP) dominate both structural constraints (ONS and *COD) then the importance will be placed on maintaining the input forms even at the expense of violating the subordinate structural constraints[23]. For example, given a segment /V/ as an input, a language with MAX and DEP ranked higher would parse it as an onsetless syllable, thus violating ONS. If the same language also parses the sequence /CVC/, it would do so as a closed syllable, thus violating *COD. The final result is a language with the syllable structure (C)V(C). When the opposite holds true and the faithfulness constraints are dominated by the structural ones, the results lead to structural changes such as deletion and epenthesis. For example, that same segment /V/ would be parsed as /□V/, where '□' represents an empty structural position, thus violating DEP. This empty position can then be filled by an epenthetic segment. This interaction works well for epenthetic consonants, but does not account for epenthetic vowels, such as those seen in this study. For vowels, it is necessary to look to a few more constraints:

NUC - Syllables must have nuclei.

*P/C - C may not associate to Peak (NUC) nodes.[24]

[23] N.B. All constraints in OT are violable and therefore even the optimal selection can be in violation of a constraint, so long as it is the lowest ranked constraint (relative to other violated constraints) and/or is in violation fewer times than another candidate. For example the segment /VC/ would be in violation of both ONS and -COD. However, if the language has these constraints ranked lower than PARSE, the optimal selection will still be /VC/ since an alternative selection such as /V/ would violate the higher ranked, PARSE, constraint.

[24] That is to say, a consonant cannot serve as the nucleus of a syllable (cf. again Prince & Smolensky 1993).

With these two constraints, we can say that every syllable must have a nucleus and furthermore, that nucleus must be a vowel (or possibly a vocoid). These general constraints provide a general treatment of vowel epenthesis. Faced with a /CVC/ sequence, a language that favors CV syllables (i.e. one that features a high-ranked *CODA constraint) would parse the input as /CV.C□/. This empty node would need to be filled based on the NUC constraint. The selection of what type of sound to use (consonant or vowel) would be based on the *P/C constraint, which would disallow a consonant as the nucleus, thus resulting in an epenthetic vowel.

However, to provide a clearer picture of epenthesis of the type seen in Latin Post-tonic/Cr/ clusters, we must also deal with additional onset and coda restrictions. To do so, the following constraint is necessary:

*COMPLEX - No more than one C or V may associate to any syllable position (i.e. no complex onsets or codas)

As always, this constraint can be violated and therfore we do see complex onsets and codas in languages. However, if the constraint is ranked higher than MAX, it would be necessary to attach the underlying segment to some syllabic position, even if that position must be created (i.e. epenthesis). An example from Latin would be METRU, which would be syllabified, ME.TRU, with a complex onset in the second syllable. Since Latin shows this syllabification, we must assume that MAX outranks *COMPLEX[25] (MAX >> *COMPLEX). However, in the Northern Italian dialects we see epenthesis, which tells us that *COMPLEX must be ranked higher than DEP[26] (*COMPLEX >> DEP) and that therfore a complex onset, /tr/, must be broken up to satisfy the higher-ranked *COMPLEX constraint. This would yield a parsing such as, /me.t□.ru/, since the /t/ and

[25] More specifically, this would need to be *Complex-Ons or the like, to prevent complex onsets.
[26] MAX is still satisfied here since both members of the cluster, /tr/, are still retained.

/r/ would need to associate with two separate onset positions rather than one. The empty structural position would then need to be filled by a vowel according to NUC and *P/C. We would then need to account for the loss of the final /u/, which could be either post-epenthesis or pre-epenthesis,[27] since the modern outcomes show no final vowel.

Admittedly, this is a simplified version of epenthesis, but does serve to give an overview of epenthesis in Optimality Theory. However, given a language's individual phonotactic constraints on onsets, codas, syllabification and prosody it is necessary to apply more specific constraints which exemplify the actual patterns in that language. For the Northern Italian dialects, this is best examined through the approach of Webb & Bradley (2009), since the general approach above and the Prosodic Theory seen in the next section do not capture the typological characteristics of the dialects in this dissertation.

4.1.1 EPENTHESIS IN THE NORTHERN ITALIAN DIALECTS

A better suited account of the changes can be found in the OT account of metathesis provided by Webb & Bradley (2009). Their account of metathesis discussed in the previous chapter also proves to be quite useful in the treatment of epenthesis. Since their theory deals with a "natural" development of an epenthetic vocoid in the production of a /Cr/ cluster, it requires only a small step to realize epenthesis rather than metathesis. Even if we assume a previous syncope of atonic vowels except for /a/, we are still relying on the same principles of production. Whether the /Cr/ cluster is located word-finally or followed by a vowel, it still must be realized regardless of its

[27] Most likely the latter. Cf. 4.1.2 below.

syllabic parsing. So, for example, assuming METRU(M) underwent initial apocope to *METR, we would see the following inputs[28]:

Table 8: /metar/ Perceptual Grammar

$[met^{V}r]_{AUDF}$	CATEG(C,peak)	CATEG(r^{V},rV)	CATEG(^{V}r, Vr)	PARSE(vocoid)
$/metr/_{UF}$	*!			
☞$/metar/_{UF}$			*	

Essentially, there is a choice between maintaining the word-final /tr/ cluster or inserting a vowel (or vocoid) to break it up. Now, assuming the apocope did not occur first, or simply analyzing any word with a final retained /a/, we see the following:

Table 9: /supar/ Perceptual Grammar

$[sup^{A}r^{A}]_{AUDF}$	CATEG(C,peak)	CATEG(r^{V},rV)	CATEG(^{V}r, Vr)	PARSE(vocoid)
$/supra/_{UF}$		*!		
☞$/supar/_{UF}$			*	
$/supr/_{UF}$	*!			
$/supera/_{UF}$		*!		

This analysis eliminates the need to determine whether or not the dialects lost all atonic vowels or just certain ones, since in both cases the results are the same: epenthesis. One interesting development worth noting is that the "optimal" choice, *supar*, is seen only once in the dialects (cf. Pc. *suvar*). However, the next available selections, *supera* and *supra*, are also seen while the least optimal choice, *supr*, is nowhere to be found. So, in this sense, the analysis does seem to hold with what is found in the languages. However, it has a hard time accounting for the other discrepancies, notably the local metathesis outcome seen in Genovese (*sorve*); the

[28] With the noted exception of Genovese, which of course shows no epenthesis.

deletion outcomes in Piemontese (*dzora*), Milanese (*sóra)*, and Bolognese (*såura)*; and the combination of the two in Piacentino (*suravia*). Despite these few difficulties, Webb and Bradley's approach manages to deal quite well with the majority of epenthesis/metathesis cases and will be the theory utilized in this study, since it successfully links the two changes to a Production confusion, the epenthetic vocoid. To deal with the few exceptions, we can turn to phonotactic constraints (see section 4.2 below) and frequency effects (ch. 5).

4.2 EPENTHESIS OR RETENTION

As mentioned briefly in the introduction, many of the changes which show epenthesis involve words which originally had a vowel in that same position in the nominative form: cf. Lat. LIBER: It. *libro,* dialectal *liber*. So, it might appear that there has been no change at all and the dialects that exhibit a vowel have simply preserved the shape of the original Latin nominative form. However, as is the general consensus among Romance scholars, the Romance languages, and therefore presumably also their dialects, derive their nouns from the accusative form of the Latin noun.[29] When dealing with standard languages, this is readily apparent:

12a. Lat. LIBER (Nom)	>	It.	libro
LIBRUM (Acc)		Fr.	livre
		Sp.	libro
		Pg.	livro
		Rm.	livresc

12b. Lat. ACER (Nom)	>	It.	acre
ACREM (Acc)		Fr.	âcre
		Sp.	acre
		Pg.	acre
		Rm.	acru

[29] Cf. Rohlfs (1969) and Elcock (1975).

12c. Lat. STATIO (Nom) >	It.	stazione
STATIONEM (Acc)	Fr.	station
	Sp.	estacion
	Pg.	estação
	Rm.	statie

While most of the dialectal forms shed no light on this question (cf. LIBRUM above and also ACER/ACREM > It. *agro* 'bitter, sour', Pm. *agherdoss* (It. *agrodolce* 'bittersweet'), Pc. ägar, Bo. *èghe*r) some forms without the /Cr/ cluster do still show the Accusative connection:

13a. Lat. STATIO (Nom) >	It.	stazione
STATIONEM (Acc)	Pm.	stassion
	Pc.	stazion
	Gn.	--------
	Ml.	stazión
	Bo.	staziån

In addition, there is current evidence of epenthesis rather than retention in some conjugations of the future tense in Piemontese, Milanese, and Bolognese. For example, in standard Italian the formation of the future for some irregular verbs results in a /(C)Cr/ sequence (cf. *andare : andrò* 'I will go'; *avere : avrò* 'I will have'). However, the northern dialects show an intermediary vowel (cf. Pm. *andarai,* Bo. *andarò* 'I will go'; Ml. *avaroo* 'I will have'). Again, the question arises whether or not this is epenthesis or retention.[30] Evidence in support of epenthesis can be found in two places. In general, the northern Italian dialects delete atonic vowels (cf. again section 2.0.d) which would have resulted in a /(C)Cr/ sequence like that which we find in standard Italian, i.e. *andrò* or *avrò*. These outcomes show that there was either a particular effect on these words which resulted in deletion in Italian or perhaps they

[30] General consensus (cf. Rohlfs 1966-69, Elcock 1975) is that the formation of the future in the Romance Languages is the infinitive plus some form of HABERE, conjugated for person and number. So, in this case it would be AM(BI)TARE HABEO and HABERE HABEO.

are dialectal borrowings from a period before epenthesis had occurred. The second form of evidence, and perhaps the more convincing, comes from modern day Piemontese where /Cr/ clusters in the future formation are still currently undergoing epenthesis. In many instances, the future conjugation of the verb is listed with an epenthetic *e* in parentheses (cf. *but(e)rai*, It. *buterò* 'I will throw out'; *vend(ë)rai/vendreu*, It. *venderò* 'I will sell'). However, not all entries are listed with the parentheses (cf. *parlërai, parlereu*, It. *parlerò* 'I will talk'). According to Ricca (2009), the reason for the parentheses is that the formation is in a transition stage. Those forms with the epenthetic vowel in parentheses have started to exhibit the epenthetic vowel in recent years. In other words, the vowel is appearing, not disappearing. Epenthesis, at least in Piemontese, still appears to be a productive change. More telling for this study, though, is the fact that the vowel is indeed emerging, not simply being retained, between /Cr/ clusters.

4.3 EPENTHESIS IN /Cr/ CLUSTERS

As mentioned above, the norther Italian dialects often avoid the /Cr/ cluster by inserting a vowel between the two sounds. For example, in Piacentino we find *suvar* < SUPRA (cf. It. *sopra*), alongside *sö, suar, sura, suvra.* The multitude of forms indicates a general confusion over how to approach the Latin /Cr/ cluster, however, deletion seems to be the main operation, cf. *sö, suar,* and *sura*, where the [p] has been eliminated and in one case also the [r]. The cause of this confusion may very well be the fact that a long-distance metathesis would have resulted in an initial *[sr] cluster, which is not allowable in any of the dialects. Therefore, since the initial repair strategy to the undesirable /Cr/ cluster, i.e. metathesis, is unavailable, the language develops

some other means of eliminating the cluster. Other examples of epenthesis, however, might not be as straightforward; for instance, Lat. OCTOBER/OCTOBRIS > Pm. otober, Ml. ottober, Pc. utubar, Bo. utåber. In these cases metathesis would have resulted in a -tr- cluster in the second syllable (*octrobe, or the like).[31] Initially this seems to be a fairly standard case of phonotactic constraints determining which sound change takes place. All things being equal, the /Cr/ cluster will undergo metathesis; however, in instances where the resulting sequence would be disfavored in the language, epenthesis occurs. Unfortunately, as is usually the case with linguistic processes, the answer is not so simple. For example, Latin PATER/PATREM shows no metathesis in any of the dialects, while PETRA/PETRAM, a similarly structured word does in every single dialect.

14a. Lat. PATREM >			14b. Lat. PETRAM >		
	It.	padre		It.	pietra
	Pm.	pare		Pm.	preja
	Pc.	pädar		Pc.	preda
	Gn.	poæ		Gn.	pria
	Ml.	pàder		Ml.	prèia
	Bo.	pèder		Bo.	prêda

Unless we want to claim that the tonic [a] in PATER causes a different effect than the tonic [e] in PETRA, i.e. it causes deletion or epenthesis rather than metathesis, which would be a highly subjective and relatively weak claim, we are forced to find some reason beyond phonotactic constraints and production phenomena to explain the differences.

[31] This analysis assumes that metathesis occurs before the degemination of the cluster (and possibly even precedes total assimilation from -CT- > -TT-, as seen in Milanese and Standard Italian).

4.4 EPENTHESIS IN /CCr/ CLUSTERS

Unlike with metathesis, adding another consonant to the sequence does not drastically alter the outcomes; in fact, all of the dialects, save Genovese, show epenthesis:

15a. Lat. CENTRUM >			15b. Lat. MEMBRUM >		
	It.	centro		It.	membro
	Pm.	sènter		Pm.	mèmber
	Pc.	centar, seintar		Pc.	----------[32]
	Gn.	çentro		Gn.	membro
	Ml.	cénter		Ml.	mémber
	Bo.	zänter		Bo.	----------[33]

What is noteworthy here is that unlike metathesis, the addition of another consonant does not impede the epenthesis. In fact, it may well be the case that the extra consonant actually limits the possible outcomes to only epenthesis. In fact, the onset of the second syllable has no difficulty being accepted since the cluster [tr] or [br] (or any other resulting /Cr/ cluster) is perfectly permissible. However, with the loss of the atonic vowel, this onset becomes either a very complex coda (/mbr/) or a syllable void of a nucleus (/mem.br/). Neither case is acceptable, and therefore is resolved via epenthesis. Within Optimality Theory, the explanation relies on straightforward phonotactic constraints disallowing certain initial consonant clusters. In this case a simple Onset Sonority constraint can be used to eliminate undesirable initial clusters:

ONSET(SONx < SONy) : In any given onset sequence *x,y*; *x* must be lower on the sonority scale than *y*.

However, in the examples here, this constraint would need to be altered to a language specific constraint:

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[32] Both Piacentino and Bolognese show no direct descedant of MEMBRUM, however, from French *timbre* (which shows the same /mbr/ cluster) we see Pc. *timbar* and Bo. *ténber*, i.e. epenthesis. (Cf. also Pm. *timber*, Ml. *tímber*).

[33] See note 35.

ONSET(SONx <3 SONy): In any given onset sequence *x,y*; *x* must be at least three steps lower on the sonority scale than *y*[34].

Table 10: /member/ Perception Grammar

[mem.b^{A}r^{A}]$_{AUDF}$	ONSET(*x* <3*y*)	CATEG(C,peak)	CATEG(r^{V},rV)	CATEG(^{V}r, Vr)
/mem.bro/$_{UF}$			*!	
☞/mem.bar/$_{UF}$				*
/mem.br/$_{UF}$		*!		
/mem.be.ra/$_{UF}$			*!	
/mrem.bo/$_{UF}$	*!			

Since the rise in sonority from [m] to [r] is only one step, it is not a permissible onset cluster, which here would be a relatively highly ranked constraint. As noted by Krämer (2009) however, this limitation of a minimum of three steps on the sonority scale for onsets does pose its own problems: notably, the need to also eliminate the possibility of voiceless stop nasal onsets (four steps). In the end, whether it is a four-step or three-step minimum, the resulting sequence would still not be allowable.[35]

For other onsets, such as that which would result from metathesis of 20a above /kr/, we must look to another explanation since this would be a perfectly allowable onset.[36] What appears to be happening is that the extra consonant, except in certain cases with [s], "blocks" the spread of the rhotic during the production phase, thereby limiting its possible input forms into the perception grammar. This in turn limits the

[34] Utilizing the general Sonority Scale (Davis 1990) and Sonority Sequencing Principle (Krämer 2009): Voiceless Stops (1) > Voiced Stops (2) > Non-Coronal Fricatives (3) > Coronal Fricatives (4) > [n] (5) > [m] (6) > Liquids (7) > Vowels (8).

[35] This minimum requirement does pose other problems in words such as It. *sfortuna*, Pc. *sfurtöina*, Ml. *sfortùna*, where the minimum distance is not met. However, despite this, the fact remains that an initial mr- sequence is not permissible in any of the dialects (or Standard Italian) as evidence by their absence.

[36] Even if we assume that the palatalization of velars before front vowels occurs before the metathesis (i.e. [k] > [s]) this statement would still hold true in Milanese, and Bolognese since an initial sr-sequence is permissible (cf. Ml. *sregolaa* 'deregulated', *srarì* 'to prune'; Bo. *srèr* 'to close', *srän* 'serene'). N.B. An initial sr- sequence is also permissible in Standard Italian (cf. *sregolato* 'deregulated', *sragionare* 'to be incoherent' -- though these are rare and highly marked cases.

possible output forms. However, since the original /Cr/ cluster is still there, epenthesis will still be an option in the production grammar and therefore also in the perception grammar.

4.5 CONCLUSION

As seen above, the epenthesis model put forth by Webb and Bradley seems to be the most adept at dealing with the different cases of epenthesis seen in the northern Italian dialects. The reason for this is clear -- their treatment of vocoid intrusion as a simple articulatory phonetic fact accounts for the possibility and subsequent realization of epenthesis on such a grand scale. Since the northern Italian dialects all show epenthesis, and in such a wide range of words, an adequate theory needs to deal with the pervasive nature of this change. Since the change in question deals with /Cr/ clusters, vowel intrusion is indeed a frequent, if not universal occurrence. In fact, it is vocoid intrusion which forms the cornerstone of the four changes seen in this study. As we will see in Chapter Six, epenthesis shows up in words with high, medium, and low frequencies. In addition, numerous dialects show both epenthesis and another change in competition with each other.[37] This suggests that the production grammar is consitently producing an epenthetic vowel to interrupt the /Cr/ cluster. Whether or not this vowel shows up in the perception grammar is due to the listener's analysis of the input form, which in turn depends on the frequency of the word. So, what appears to be happening is that epenthesis, or at least some form of vocoid intrusion, is the default production (input) form of any /Cr/ cluster in the northern Italian dialects.

[37] Occasionally this is due to phonotactic constraints. Cf. Piacentino masculine/feminine distribution of word-final vowels and sandhi in Ripetti (1997).

Since Webb and Bradley's approach is able to present this phenomenon in a straightforward and succinct way, while also allowing for slight modifications to deal with the other changes seen (metathesis and deletion), it is better equipped than other competing theories to explain these phenomena as they appear in the northern Italian dialects. However, as this theory has its shortcomings, it is necessary to combine the Optimality approach with a Lexical Diffusion/Frequency approach in order to arrive at a better understanding of the entire set of data.

CHAPTER 5

DELETION

5.0 DELETION

As mentioned above, Piacentino shows deletion in certain clusters (cf. *sö, suar*, and *sura* < SUPRA) where we might expect metathesis or epenthesis. Also, Piemontese (cf. *dzora*), Milanese (cf. *sóra*), and Bolognese (cf. *såura*) all show the same process. Interestingly, all these dialects delete the obstruent in favor of the rhotic, a trend which presents itself over and over in cases of deletion. This "rhotic salience" perhaps leads to its retention since losing the rhotic from a word may in fact more drastically affect the word than losing another consonant. Wilson (2001) however, offers a slightly different viewpoint. He claims that it is the preconsonantal positioning of the initial segment of an intervocalic biconsonantal cluster which leads to the deletion, not the segment's individual characteristics. He also claims that the preconsonantal position is an inherently weak phonotactic position, and therefore is targeted by contextual neutralization constraints. While he is dealing specifically with obstruent-obstruent clusters, his approach can be applied to obstruent-sonorant clusters as well - based on the fact that pre-consonantal stops are "weaker" phonotactically, and therefore produce poor phonetic cues. Admittedly though, Wilson's generalization that it is always the initial segment which is deleted does not always hold true, cf. for example intervocalic clusters in Pali (Hankamer & Aissen 1974). Within the northern

Italian dialects however, it is always the consonant in initial position which is deleted. While these cases all deal with obstruent-rhotic clusters, and therefore may in fact be the result of sonority constraints, utilizing Wilson's analysis of CC clusters in general proves to be sufficient in explaining these changes, thereby grouping these changes together with the widespread phenomenon of deleting the initial segment of intervocalic biconsonantal clusters.

Something that is important to keep in mind about Wilson's argument as it pertains to this study is that he relies on broad constraints which require less analysis on behalf of the listener for selecting the optimal form. This falls in line with the frequency effects to be discussed in the following chapter. Those words which show deletion are also those most frequently encountered, thereby requiring a lower degree of analysis. A broad approach such as Wilson's, therefore is well-suited for its overall role in the listener's Perception Grammar. The level of analysis required for the metathesis/epenthesis of Webb and Bradley is not necessary for the deletion/epenthesis changes, since it is their frequency that determines their level of analysis. However, as mentioned before, the Webb and Bradley approach does play a role, since we must assume some sort of vocoid insertion in the production grammar and therefore must include these possibilities in the input forms. In fact, the Webb and Bradley theory of production grammar and their analysis is necessary to provide the input forms for the perception grammar. Wilson's approach takes this into consideration as he also examines cases of syncope followed by consonant deletion, which would be the process occurring in the perception grammar after the introduction of the vocoid according to Webb and Bradley (2009). Wilson's Cluster Neutralization theory then plays a larger role in the phonological analysis performed by the hearer at this stage-- the perception

grammar. In fact, Wilson, much like Webb & Bradley, focuses on the output (grammar) in his selection process and not just the input. What this means is that for this study, the inputs generated by the Webb & Bradley model can be successfully applied to Wilson's theory with little hesitation. The combination of these two "grammars" is necessary to describe the changes. Wilson asserts that, "no analysis based solely on input properties can give a satisfactory account of [consonant cluster neutralization]." I would also argue here that no account of any historical change (and perhaps synchronic either) can be argued successfully without including both input and output properties. Therefore, even though this study considers there to be an epenthetic vocoid in every instance (input), the advantage of Wilson's theory is that with or without the vocoid, the same processes will be in play (output). In addition, the theory as applied in this study requires little more than a simplification of the constraints put forth by Webb and Bradley and therefore can be tied directly to the same theory, thus unifying the two.

5.1 BACKGROUND OF RELATED STUDIES IN DELETION

Defined simply, deletion entails the loss of a member of a segment string. So from a segment string like PATRE(M) we get Pc. *pär* (with deletion of *t* and *e*, but the focus of this study is the reduction of -TR- > *r*). Deletion, much like metathesis, appears to be quite random within the northern Italian dialects:

17a. Lat. PATREM >	It.	*padre*	17b. Lat. MATREM >	It.	*madre*
	Pm.	*pare*		Pm.	*mare*
	Pc.	*pär*		Pc.	*mär*
	Gn.	*poæ*		Gn.	*moæ*
	*Ml.	*pàder*		*Ml.	*màder*
	*Bo.	*pèder*		*Bo.	*mèder*

18a. Lat. LIBRUM >	It.	*libro*	18b. Lat. LIBRAM >	It.	*libbra*
	Pm.	*lìber*		Pm.	*livra*
	Pc.	*libar*		Pc.	*lira*

There is no phonological/phonetic reason in and of itself which can account for why some words change and others don't in such phonetically similar environments as 6a and 6b. Also, the Piacentino examples in 17a and 17b are cited alongside *padar* and *madar* which, by strict phonological rules cannot be explained. Why do we see epenthesis in one outcome and deletion in another? Much like the cases of metathesis, there is a pattern to be detected, though not one that is readily explainable through existing theories. Instead, we need to turn to frequency effects as the impetus behind the changes (Ch. 5).

Wilson (2001) explains deletion via Optimality Theory, which puts his approach in line with that of Webb & Bradley (2009). However, Wilson, through a ranking of the relatively broad constraints known as MAX (no deletion), DEP (no insertion/epenthesis), and NoWeakCons (a consonant not released by a vowel is weak or less harmonic), accounts for deletion through a much simpler process. By ranking NoWeakCons above MAX, the result is deletion. Wilson defends this ranking on the basis of the phonetic qualities of unreleased consonants, which are phonetically weaker than their released counterparts. His analysis also makes the basic assumption that while IDENTITY constraints (MAX and DEP) are certainly universal and necessary to the explanation of language change, the introduction and ranking of further constraints based on FAITHFULNESS and harmonic ordering are needed to help further explain the changes.

Jacobs (2004) deals specifically with Latin syncope using an OT approach, but does not address consonant deletion. What is to be taken from this study though is the conclusion that vowel syncope in Latin occurs when the vowel is found in a "weak" position. For Jacobs, this refers to the weak position of a foot, which can be taken to mean a light, unstressed syllable immediately following a primary or secondary stressed syllable within the same foot (H = Heavy Syllable; L=Light Syllable; Underscore = Stress):[38]

19a. ARIDUS [(H̲L) H] > ARDUS [H̲ H]

19b. SOLIDUS [(L̲L) H] > SOLDUS [H̲ H]

19c. LĀMINA [(H̲L) L] > LAMNA [H̲ L]

While Jacobs is concerned only with vowel deletion, the importance of stress and "weak" versus "strong" positions plays a vital role in determining which segment, if any, gets deleted.

Côté (2004) investigated the role of distinctness in adjacent consonants in determining which one, if any, is deleted. One significant conclusion she arrives at is the unique status of stops as being particularly susceptible to deletion in poor contextual positions (i.e. within consonant clusters). In addition, she draws a much needed distinction between "absolute" and "contextual" similarity. In essence, what this means is that sound segments are dependent on surrounding sounds which may alter their "absolute" characteristics. In other words, sounds may be less similar in certain contexts and therefore undergo change (here, deletion) which would not happen in an "absolute" context. Much like Hume and her metathesis analysis, Côté

[38] Jacobs also accounts for such troublesome occurrences as BALINEUM > BALNEUM by considering the stress pattern of Plautinian Latin as opposed to Classical Latin (see Jacobs 2004, §3.3).

perceives the lack of good strong perceptual cues from vowels (and other neighboring sounds) as the driving force behind phonological change, though in her case she is dealing with synchronic change/alteration not diachronic. However, if the phonetic analysis is correct, and it is indeed perceptual cues which lend strength or weakness to consonants, then the same principles would hold true for diachronic change as well.

5.2 DELETION IN /Cr/ CLUSTERS

Though not nearly as frequently attested as epenthesis, deletion plays a role in all of the dialects in this study. For example:

20a. Lat. LIBRA >	It. *libbra,*[39] *lira*	20b. Lat. PATER >	It. *padre*
	Pm. *lira*		Pm. *pare*
	Pc. *lira*		Pc. *pär, padar*
	Gn. *lïa*		Gn. *poæ*
	Ml. *lìra*		Ml. **pàder*
	Bo. *franc*[40]		Bo. **pèder*

20c. Lat. SUPRA > It. *sopra*
Pm. *dzora*
Pc. *sö, suar, suvar, sura, suvra*
Gn. *sorve, sorvia*
Ml. *sóra*
Bo. *såura*

What is immediately noticeable is the lack of consistency among the dialects. Latin LIBRA comes the closest to showing uniform deletion, but Bolognese is unclear, since it has selected a French borrowing in place of the Latin term. Piacentino, as mentioned earlier, yields deletion, epenthesis, metathesis, and no change (aside from lenition of [p] > [v] in *suvra)*. Additionally, both Bolognese and Milanese fail to show deletion in Latin PATER (acc. PATRE) and instead show epenthesis. Based on the assumptions and

[39] Standard Italian *libbra* 'balance', *libra* 'Libra' (astrological sign) both represent normal development of Lat. post-tonic -BR- clusters. However, It. *lira* 'former monetary unit of Italy' also represents Lat. LIBRA -- via northern Italian dialectal *lib(i)ra (Devoto 1985).*
[40] Cf. Fr. *franc* < FRANC(ORUM) REX. (Devoto 1985).

findings from the previous chapter, this is not entirely unexpected, since any deviation from the anticipated outcome (i.e. deletion) is most likely to result in the "default" change (i.e. epenthesis). What may be surprising are the metathesized forms found in Piacentino and Genovese (20c.). First, they have undergone metathesis and not deletion, though this may be explainable through frequency effects. Second, they have undergone local metathesis and not long-distance metathesis. Again, the reason for the local metathesis can be explained through phonotactic constraints. Neither dialect, Piacentino or Genovese, allows word-initial *[sr] clusters and therefore cannot allow the long-distance metathesis which would have resulted in such a change. However, this does not explain why the default change, epenthesis, is not utilized instead of metathesis. The only other occurrence of local metathesis can be found in Piemontese *cheurve* from Latin COOP(E)RIRE:

21a. Lat. COOPRIRE[41] > It. coprire
Pm. cheurve
Pc. cuarciä[42]
Gn. crovî
Ml. quercìa[4]
Bo. crûver

In Piemontese, the development of Latin COOP(E)RIRE yields *cheurve* which shows the same local metathesis from /pr/ to [rv]. Again, what may be at work here is the prevention of long-distance metathesis due to phonotactic constraints. An initial [ʃr] cluster is not permissible in Piemontese and therefore blocks the metathesis. Since both Genovese and Bolognese also show metathesis (long-distance), it is reasonable to assume this is the expected change. The other constant in the two examples is the

[41] This assumes a stage in development where the atonic vowel has already been lost through syncope.
[42] Both Piacentino and Milanese exhibit words from a separate stem, which given their central location relative to the three other dialects would suggest that the innovation occurred in one of the two dialects (or both) as a replacement of COOPERIRE.

change from Lat /p/ to Genovese /v/. It is possible that the lenition of the stop, preceding the metathesis, allows such a change to take place, where a previous stop would not. In fact, the only difference between the *cheurve* and *sorve* examples and the previously mentioned *crava* (< Lat. CAPRA) is that in the latter the change yields a permissible word-initial cluster, */kr/*. What appears to be the case, in Genovese at least, is that long-distance metathesis, when blocked by phonotactic constraints, defaults to local metathesis and not epenthesis. However, one must keep in mind that frequency effects also play a substantial role in determining whether metathesis is even an option at all.

In addition, Bolognese *såura* (21c above) may be nothing more than a vocalization of Latin [p] to *[v] to [u], which would mean that the word did not undergo deletion at all. Yet another possibility is that Bolognese, Milanese (*sóra)*, and Piemontese (*dzora*) derive instead from the Latin prefix SOR-, via French, and not the free morpheme SUPRA. While this at first seems entirely plausible -- one is left with the question of the word final [a] in each case. If the dialectal outputs do in fact represent a continuation of the Latin prefix, then there should be no final [a]. If, on the other hand, they emerge from Latin SUPRA, there is no extra explanation needed. They simply show the same development of atonic [a] that they show elsewhere. In addition, there is no evidence that the development of Latin SOR- yields a free morpheme in any of its daughter languages -- even French *sur* is a development of Latin SUPER not SUR. Perhaps the only thing that is clear from the evidence is that Latin

SUPRA has a complicated history which produces variant outcomes even within the same dialect.[43]

The other noteworthy observation is the fact that in cases where there is deletion it is always the consonant preceding the rhotic which is lost. Again, this is due to its phonetic positioning and "weak" overall phonotactic cues. A consonant that releases into another consonant is phonetically weaker than that same consonant released into a vowel. Therefore, the intitial members of the Latin /Cr/clusters, since they lack the "cues [present] in the forceful burst and formant transitions that a following vowel provides" (Wilson 2001), are phonetically weaker than the rhotic, which is released into a vowel and therefore is also maximizing its possible phonetic cues.[44]

5.3 DELETION IN /CCr/ CLUSTERS

As with metathesis, the addition of another consonant prevents any deletion from occurring. In most cases, there is no change to the /Cr/ cluster, though occasionally we do see epenthesis. This "default" selection seems to be dialect-specific, as would be expected, and the only consonant with which there appears any sort of deletion is [s]; however, this is by no means uniform and any change including deletion is often rivaled by some form of epenthesis as well. In fact, the only dialect which shows any deletion is Piacentino, and this appears only in one example pair:

[43] Cf. also: *sovra* in regional Italian dialects outside of the expected area, i.e. northern Italy (Devoto 1985).
[44] Cf. also: Steriade 1997 for an account of the Licensing-by-Cue framework.

22a. Lat. NOSTRUM >	It.	*nostro*	22b. Lat. NOSTRA >	It.	*nostra*
	Pm.	*nòstr, nòst*		Pm.	*nòstra*
	Pc.	*noss*[45]*, nostar*		Pc.	*nossa*
	Gn.	*nòstro*		Gn.	*nòstra*
	Ml.	*nòst, nòster*		Ml.	*nòstra*
	Bo.	*nòster*		Bo.	*nòstra*

What may be the case here is that no actual deletion occurs in /CCr/ clusters since the intervening consonant blocks any change. The examples from Piacentino where the stop has been lost[46] are unclear, since they appear to derive from a separate root (cf. note 7 below), but it appears that at some point the -str- cluster was reduced to [s] via some means of deletion. Milanese *nòst* may give some hint at the process and a possible pre-Piacentino phase, **nost/nosta* or the like, which was then assimilated to **noss* (read: [noss]) and then simplified along with other geminates; however, there is no evidence supporting this, and such a change would negate the proposed dual-source theory of Elcock (cf. again, note 45 below). The masculine forms of Piacentino and Milanese are perhaps the most interesting forms in that they show both a deleted or simplified cluster and an epenthesized alternative. This fits in with the overall theory that epenthesis operates as a type of default change when the primary change is unavailable. In this case, the presence of the [s] creates a need for the following *[t]* due to sonority preferences. If the stop were to be deleted then that would create an [sr] cluster which, word-finally, is not a permissible cluster in any of the dialects, including Piacentino and Milanese. On the other hand, a word-final [st] cluster is

[45] Cf. Elcock (1975) for a discussion of the emergence of a rival Vulgar Latin form *NOSSU(M) primarily found on the Iberian peninsula: cf. Port. *nosso*, OSp. *nuesso*. Elcock also suggests a link between these forms and the Picard *nos* > *no* (via back formation). The OFr. *noz*, however, must be from *nostres* < NOSTROS (Elcock 1975). Even if Pm. *noss/nossa* is linked to either *NOSSU(M) or Picard *nos*, the fact remains that there would have been some form of deletion which resulted in the elimination of the Latin /Cr/ cluster.

[46] N.B. The orthographic <ss> in Piacentino represents [s], so the sound, as should be expected in a Gallo-Italic dialect, is not a geminate.

permissible and satisfies universal sonority constraints,[47] thereby making this selection optimal. In addition, both dialects show epenthesis as a competing selection, which suggests that both deletion (of the [r] in this case) and epenthesis are more favorable changes than maintaining the original [str] cluster. Of course, Piemontese presents a problem at this point since its reflex shows a word-final [str] sequence which competes with the reduced form [st]. However, Piemontese does permit final /(C)Cr/ sequences as opposed to the other dialects, which, when maintaining the original root, show epenthesis[48]:

23a. Lat. MEDIOCRIS >			23b. Lat. MINISTER >		
	It.	mediocre		It.	ministro
	Pm.	mediocr		Pm.	ministr
	Pc.	mediòcar		Pc.	minister
	*Gn.	andante		Gn.	----------
	Ml.	---------		Ml.	minister
	*Bo.	urdinèri		Bo.	minésster

So, in Piemontese, it is permissible to have a word-final /(C)Cr/ sequence and therefore it is maintained, while the other dialects, having a constraint against syllabic consonants, show another change, namely the default change: epenthesis. In Piemontese, the word-final [r] also acts as the nucleus of a syllable, so its consonant status is also changed to that of a syllabic consonant.

5.4 CONSONANT CLUSTER NEUTRALIZATION

As mentioned in the beginning of this chapter, the Consonant Cluster Neutralization theory put forth by Wilson hinges on the idea of inherent strong and weak phonetic positions for both consonants and vowels. In this case, he claims that consonants

[47] Cf. Prince & Smolensky 1993, Clements 1990, Hankamer &Aissen 1974.
[48] Of course, as mentioned before (note 15), this is most likely a syllabic [r] and therefore not technically a word final -Cr cluster.

which release into other consonants (pre-consonantal) are phonetically weaker than their pre-vocalic counterparts. This idea is not new, and in fact is supported by the findings of Hume (2004) and Blevins & Garrett (1998), already cited in this study. Due to the weak position of the initial consonant in a cluster, there is a tendency to somehow alter this segment in some way. The second segment is retained due to its relatively stronger phonetic position and also apparently to maintain some of the structure of the original form (structure preservation). In addition, according to the "licensing-by-cue" approach, Wilson's account eliminates any element which would be "poorly cued (or 'weak') in a more faithful output" (Wilson 2001). In other words, the optimal output, though not the most faithful to the input, represents the most ('relatively') harmonic [49] selection and consequently a new form. The key here is that Wilson treats this constraint as a "targeted constraint" which operates slightly differently than a standard Optimality Theory constraint. It is not a constraint that can be satisfied or violated, but rather presents a ranking of optimal (read: most harmonic) selections from which a choice is made. Wilson also notes that his approach therefore allows targeted constraints to interact alongside their untargeted, violation-based constraints because of his *order-based* approach. A traditional Optimality Theory approach would, at some point, need to refer to a MARKEDNESS constraint which in many cases simply does not yield the correct output. Wilson utilizes the following generic constraints for a hypothetical VC_1C_2V sequence to show the failure of the MARKEDNESS approach; however, one must keep in mind that even

[49] This assertion hinges on the idea of RELATIVE HARMONY, which, according to Wilson, states that: Given a candidate *x*; a targeted constraint (i.e. RELATIVE HARMONY) asserts that each member of a (possibly empty) set is more harmonic than *x*. For other uses and definitions of RELATIVE HARMONY see: Samek-Lodovici & Prince (1999) and Prince (2000). Also see: Prince & Smolensky (1993) for Harmonic Ordering in Optimality Theory.

when dealing with more specific or typological constraints, the outcome would be the same, since the generic constraints used here would also represent any such proposition:

CLUSTERCOND:	Any contextual MARKEDNESS constraint which is violated by outputs which contain the consonant cluster C_1C_2
MAX:	A segment in the input must have a correspondent in the output (no deletion).[50]
M:	Any MARKEDNESS constraint which is violated by the output VC_2V but not, or to a lesser degree, by VC_1V.

Essentially, Wilson theorizes that any MARKEDNESS constraint which favors C_1 over C_2 will automatically select the non-optimal form, i.e. delete the second member of the consonant cluster, despite the overwhelming evidence in favor of the first member of any C_1C_2 cluster being more susceptible to deletion.[51] Since it is certainly possible that any given consonant sequence may have relatively "marked" consonants in either first or second position, Wilson argues, and it is also argued here, that any MARKEDNESS constraint will fall short of accounting for all instances of deletion, especially those where the more-marked consonant does not undergo deletion. Rather than relying on hypotheses, Wilson also puts forth a concrete example, *lekuja* 'they will go,' from Diola, a Niger-Congo language spoken in Senegal, in which PL(lab, dor) and PL(cor) serve as more specific "M" constraints from above:

[50] MAX is a FAITHFULNESS constraint adopted and defined by Wilson but based on the Correspondence Theory of Faithfulness (McCarthy & Prince 1995). It plays a vital role in Wilson's theory of Cluster Simplification.
[51] Cf. Wilson 2001; 149.

PL(lab, dor) >> PL(cor) : The place feature LABIAL or DORSAL is a more universally marked feature than the Place feature CORONAL.[52]

Table 11a: /letkuja/ Perception Grammar

let+ku+ja	CLUSTERCOND	MAX	PL(lab, dor)	PL(cor)
a. letkuja	*!		*	*
☞b. lekuja		*	*!	
☜c. letuja		*		*

Here, the MARKEDNESS constraints would incorrectly select **letuja* as the optimal form, since *lekuja* violates the higher ranked PL(lab,dor) constraint -- according to the traditional universal place-markedness hierarchy. Since Diola in reality shows *lekuja* as the output form, something else must be at work. Wilson also notes that replacing CLUSTERCONDITION with a coda-restraint condition, such as the CODACOND utilized by Itô 1986 (cf. also Lombardi 1997, Prince & Smolensky 1993), does not affect the final outcome since both **le.tu.ja* and *le.ku.ja* would both satisfy this condition and therefore the final decision would still come down to the PLACE-MARKEDNESS constraint. So, Wilson turns to Targeted *Contextual* Constraints to deal with the problem. Specifically, he proposes the following constraint:

NOWEAKCONS: Let x be any candidate and α be any consonant in x which is not released by a vowel. If candidate y is exactly like x except that α has been removed, then y is more harmonic than x (i.e. $y \succ x$).

Essentially, the NOWEAKCONS constraint states that all things being equal, if a given sequence (in the output) differs from the input form simply because it has eliminated a

[52] Cf. the Universal Place-Markedness Subhierarchy (Prince & Smolensky 1993, Lombardi 1997). Cf. also: Wilson 2001 for a brief description of supporting evidence.

poorly cued consonant (one which releases into another consonant) then it is more harmonic, or more optimal than the input. So, going back to Wilson's original hypothetical sequence, VC_1C_2V (read: *x*), C_1 would be the 'weak consonant' (read: α) since it is released by C_2. Therefore, if one possible output is VC_2V (read: *y*) it would be deemed more harmonic since it is exactly like VC_1C_2V except for having eliminated C_1 (i.e. $VC_2V \succ VC_1C_2V$). Wilson also provides the following principles of *order-based* definition of harmonic ordering which plays a central role in his analysis:

> *Order-based optimization by a consonant hierarchy*
>
> a. Starting with the highest-ranked consonant and descending the hierarchy, if the current constraint asserts that $x \succ y$, then add $x \succ y$ to the cumulative harmonic ordering (provided the opposite, i.e. $y \succ x$ is not already present).
>
> b. A candidate is OPTIMAL if it is not less harmonic than any other candidate according to the final cumulative harmonic ordering.

These principles explain the process of order-based optimization. Instead of eliminating any element that violates a constraint, the order-based approach ranks the possible outcomes against each other. All else being equal, the outcomes that are ranked higher by the higher constraints are deemed more harmonic than others. However, if any subsequent ranking places a particular element above a previously ranked constraint, this must be taken into account. What this approach attempts to solve is the dilemma one faces when constraints select competing forms with no discernable favorite according to standard violation-based constraints. Now, with an ongoing ranking of constraints, relative to each other, a final selection emerges. For a concrete instance Wilson returns to the Diola example:

Table 11b: /letkuja/ Perception Grammar

let+ku+ja	⇒NoWeakCons[53]	Max	Pl(lab, dor)	Pl(cor)
a. letkuja	lekuja ≻ letkuja			
☞b. lekuja		(letkuja ≻ lekuja)	(letuja ≻ lekuja)	
c. letuja		letkuja ≻ letuja !		
Final Harmonic Ordering	lekuja ≻ letkuja	lekuja ≻letkuja ≻letuja		

What the Targeted Constraint, NoWeakCons, does is rank *lekuja* above *letkuja*, since it is identical to the input, *letkuja*, except for having eliminated the weak consonant, *t*. Therefore, *lekuja* is deemed more harmonic and, by extension, more optimal than *letkuja* which still retains the poorly-cued [t]. The next constraint, Max, would do the opposite and rank *letkuja* above *lekuja*, however, since the Final Harmonic Ordering now contains the ranking *lekuja* ≻ *letkuja*, the reverse ordering cannot be included (see the *Order-based optimization* principle). However, Max is able to rank *letkuja* above **letuja*, since an opposing order has not been realized. The interesting result, as noted by Wilson, is that this puts the final harmonic ordering as such: *lekuja* ≻ *letkuja* ≻ **letuja.* In other words, it places the fully faithful *letkuja*, complete with the weak consonant, ahead of **letuja* which contains the universally less-marked consonant. So, while neither of the two highest constraints explicitly state that *lekuja* is more harmonic than **letuja*, the transitive nature of the order-based approach allows this to be the case: i.e. since *lekuja* ≻ *letkuja* and *letkuja* ≻ **letuja* then *lekuja* ≻ **letuja*.

[53] The symbol '⇒' represents a Targeted Constraint, as opposed to the other un-targeted constraints which are unmarked.

However, there is one more issue that Wilson has to deal with, at least as it pertains to the dialects in this study: the intrusive vocoid.

Wilson presents this problem as a case of conflicting inputs. Since his original examples all dealt with consonants in pre-consonantal positions (cf. let-kuja) one could argue that the pre-vocalic positioning of the [k] in the input made this segment "stronger" phonetically when compared to the [t] which was released by another obstruent. However, in Carib, spoken predominantly in Venezuela, and Tunica, an extinct language once spoken in Louisiana,[54] there are also cases where both consonants which make up the cluster originate in pre-vocalic position. Wilson cites the following examples:

24a. Carib:	/s - enaapi - sa/	> senaasa	'I eat it'
	/s - eneepi - sa/	> seneesa	'I bring it'
24b. Tunica:[55]	/ti'tihki - tʔɛ/	> ti'tihtʔɛ	'a river'

In each case a possible C(V)CV sequence is simplified to a CV sequence in favor of the consonant in second position. There is also an assumed intermediate stage where the interconsonantal vowel has been deleted, thereby putting the consonants into a cluster (i.e. senaa**pis**a > *senaa**ps**a > senaa**s**a) and therefore fitting into Wilson's analysis. However, one cannot ignore this intermediate stage. As noted by Wilson, there must be some form of constraint which accounts for the syncope. Wilson proposes a general SYNCOPE constraint that covers all language-specific processes which would generate the loss of a vowel. Regardless of the reasons for syncope, what is necessary for

[54] Cf. Gildea 1995 for Carib; and Haas 1946 for Tunica. Also, Wilson gives a brief synopsis of the reasons for syncope in each language, but since he is concerned with the consonant cluster neutralization the specific reasons for syncope are irrelevant.

[55] Wilson also includes another example from Tunica, which, for reasons of space, has been omitted here.

Wilson's analysis is simply an intermediate stage of syncope. If the vowel is eliminated, it puts the consonants into a cluster thereby placing one of them (the initial member) into a weak phonetic position. At this point then, the NOWEAKCONS constraint would correctly predict the elimination of the initial weak consonant irrespective of its overall markedness or sonority. Wilson gives the following hypothetical example, based on existing evidence from Diola[56].

Table 12: */letiku/ Perception Grammar

leti+ku	SYNCOPE	⇒NOWEAKCONS	MAX	PL(lab, dor)
a. letiku	letku, leku, letu ≻ letiku !			
b. letku		leku ≻ letku !		
☞c. leku			(letiku, letku ≻ leku)	(letuja ≻ lekuja)
d. letu			letku ≻ letu !	
Final Harmonic Ordering	letku, leku, letu ≻ letiku	leku ≻ letku ≻ letiku (letu ≻ letiku)	leku ≻ letku ≻letu ≻ letiku	

What the SYNCOPE constraint does is essentially rank all other possibilities above the CVC option (*letiku*). Then, the targeted constraint, NOWEAKCONS, ranks the correct selection above the others since it does not contain the weak consonant, *t*. Finally, the MAX constraint ranks *letku* over *letu* which gives an overall ranking of *leku* ≻ *letku* ≻ *letu* ≻ *letiku*. This final ranking yields the result, *leku*, where the initial member of the consonant cluster has been eliminated. Of course, this is a hypothetical example, but the results found in Carib and Tunica confirm that this is a plausible analysis.

[56] For reasons of space and to provide a phonetically similar example to his previous one Wilson cites this hypothetical word. Also, one must keep in mind that language-specific SYNCOPE constraints in Carib and Tunica, though different, would yield the same results.

Turning to the cases from the northern Italian dialects, we see the same process. Since the production grammar dictates that a vocoid be inserted between the consonants in the existing cluster, one must approach the deletion changes from the same perspective as the changes seen in Carib and Tunica. If we take Latin LIBRA as the example, we would see something like LIB^{V}RA as the input.[57] From here, one must assume some sort of SYNCOPE constraint in order to rank the other possible outputs higher than **libara.*[58] Since one of the characteristics of the northern Italian dialects is deletion of atonic vowels (and, at times, even syllables) it is not a stretch to assume the same process is at work here. So, using the same analysis we have the following:

Table 13: /lira/ Perception Grammar

LIB^{V}RA	SYNCOPE	⇒NOWEAKCONS	MAX
a. libara	libra, lira, liba ≻ libara !		
b. libra		lira ≻ libra !	
☞c. lira			(libara, libra ≻ lira)
d. liba			libra ≻ liba !
Final Harmonic Ordering	libra, lira, liba≻ libara	lira ≻ libra ≻ libara (liba ≻ libara)	lira ≻ libra ≻liba ≻ libara

Here, the SYNCOPE constraint ranks *libra, lira,* and *liba* above the epenthesized *libara* due to the loss of atonic vowels.[59] Next, since the [b] is released by a consonant, [r], it is considered a weak consonant and therefore the targeted constraint NOWEAKCONS

[57] As before (Chapter 2) the superscript *V* represents some sort of vocoid. The actual realization of this sound is dialect specific, of which the best evidence comes from Piacentino where we see a schwa, orthographically <a>. (Bandera 2005, Repetti 1997).
[58] Again, here I have elected to use *a* as the representative vowel, even though other dialects may show some other development (i.e. *e*).
[59] N.B. Word-final *a* is not subject to this change.

ranks *lira* above *libra*; this leaves an overall harmonic ranking of *lira* ≻ *libra* ≻ *libara.* There is also a secondary ranking of *liba* ≻ *libara*; however, since to this point there is no indication of whether *liba* or *libra* would be more harmonic it is necessary to go to the MAX constraint to determine the final overall ranking. MAX ranks *libra* above *liba* since it contains more of the elements of the input form, and, just as in the Diola example, MAX would also rank *libra* and *libara* above *lira*. However, because this would be the exact opposite ranking of a higher constraint (SYNCOPE and NOWEAKCONS) it is disallowed in the final overall ranking. This leaves the final overall ranking as: *lira* ≻ *libra* ≻ *liba* ≻ *libara*.

In addition, the SYNCOPE constraint proposed here can also account for changes such as Latin PATRE(M) > Piacentino *pär*. The reason for this is that in PATRE(M) neither atonic vowel is [a] and therefore subject to possible deletion.[60] The following table shows the process and final ranking of the possible outcomes in favor of *pär*:

[60] N.B. The vocoid is written here as <a>, à la Piacentino orthography, but represents a schwa -- therefore not [a].

Table 14: /par/ Perception Grammar

PAT^{V}RE	SYNCOPE	⇒NOWEAKCONS	MAX
a. padare	padr, par, pad ≻ padare, padar, padre, para, pada !		
b. padre	padr, par, pad ≻ padare, padar, padre, para, pada !		
c. padar	padr, par, pad ≻ padare, padar, padre, para, pada !		
d. padr		par ≻ padr, pad !	
e. para	padr, par, pad ≻ padare, padar, padre, para, pada !		
f. pada	padr, par, pad ≻ padare, padar, padre, para, pada !		
☞g. par			(padr ≻ par)
h. pad			padr ≻ pad !
Final Harmonic Ordering	padr, par, pad ≻ padar, padre, para, pada ≻padare	par ≻ padr (pad ≻ para, padar ≻padre)	par ≻ padr ≻pad (padar≻ para≻padre ≻pada ≻padare)

Essentially, the SYNCOPE constraint eliminates both vowels, leaving the highest ranked possible outputs as *padr*, *par*, and *pad*[61] as compared to *para, pada, padare, padar*, and *padre.* Then, NOWEAKCONS ranks *par* above *padr* (leaving *pad* essentially alone). Finally, MAX ranks *padr* above *pad*, leaving the final harmonic ordering of *par* ≻ *padr* ≻ *pad* ≻ any epenthesized form.[62] What is interesting to note, is that MAX ranks *padar*

[61] I have elected to leave out the constraints leading to the lenition of intervocalic voiceless stops since this change has little to do with any case of deletion or epenthesis. Suffice it to say that the change [t] > [d] is a well documented change in several, if not all Gallo-Italic dialects.

[62] Though I have not gone into detail here, the final order is shown and is determined by the following: SYNCOPE ranks *para, padre, padar,* and *pada* above *padare* since they violate the constraint only once.

as the highest candidate which has not undergone syncope. In fact, this is the alternative output we see in Piacentino, not to mention the optimal candidate in other dialects (cf. Bolognese and Milanese in 1b. above). This suggests some variance in the SYNCOPE constraint. In some dialects this would be a highly ranked constraint, in others it would not. Bolognese and Milanese suggest that MAX would be the highest ranked constraint, which would yield the epenthesized results seen in those dialects. As for Piacentino, there may be some discrepancy over either the relative ranking of the two constraints or the relative strength of the SYNCOPE constraint itself. The most likely solution is that in Piacentino there is fluctuation between the rankings of SYNCOPE and MAX thereby yielding competing candidates: *pär* and *padar*.

5.5 CONCLUSION

This chapter has looked at the third possible change of Latin /Cr/ clusters in the northern Italian dialects: deletion. As one can see, the process is a simplified version of the metathesis/epenthesis changes seen earlier. Wilson's approach to deletion, as adopted here, accounts for not just the elimination of the consonant cluster, but also accounts for why it is the initial member of the sequence that undergoes the change and not the second one. Moreover, it provides a tie-in to epenthesis changes as well. In addition, the simplicity of the theory fits well into the overall theory of this project in that higher frequency words require less analysis and therefore would be more likely to utilize broader constraints such as SYNCOPE, NOWEAKCONS, and MAX. The reason for this will be explained in the following chapter, but suffice it to say that the fine-grained

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NOWEAKCONS ranks *para* and *padar* above *padre*. Finally, MAX ranks *padre* above *pada* and *padar* above *para*.

analyses utilized in Webb & Bradley's theory are not necessary, since the listener is attuned only to broader cues and uses only those cues to determine the optimal form. For example, it is sufficient for this analysis that the speaker analyzes a consonant cluster as having a weak and a strong member. The weak member is deemed as such based on its relatively poor phonetic cues; the strong member conversely is easily distinguished by its stronger phonetic cues. It matters little what the consonants in question are, as the analysis relies on these broad parameters. If a consonant is in a strong phonetic position it is maintained, if it is not then it is lost. This analysis relies on the theory that the perception grammar stores larger units of language (words rather than features) which allows the elimination of one segment to not disrupt the overall unit.

CHAPTER 6

FREQUENCY EFFECTS AND LEXICAL DIFFUSION

6.0 FREQUENCY EFFECTS AND LEXICAL DIFFUSION

While the previous accounts of the changes to post-tonic consonant clusters in Latin seen in this study succeed in describing the process for these changes, they do little to provide an explanation as to why the changes occur, or even why one occurs and not the other. If we assume that there are three distinct yet related processes (i.e. Webb & Bradley's metathesis and epenthesis analysis and Wilson's deletion analysis), we must be able to account for the impetus behind these changes. Given the nature of the changes and the fact that the universality of sound change does not seem to apply (i.e. not every /Cr/ cluster is affected in the same way) and that the three changes seen in the northern Italian dialects are all recognized as being phonetically abrupt but lexically gradual in nature (Phillips 2006), one promising approach is Lexical Diffusion. In fact, as Phillips also notes, "metathesis is a clear example of a phonetically abrupt change that never seems to affect all the words of a language at the same time." While the same cannot be said with such certainty of epenthesis and deletion, these processes do seem to operate on a similar level in that they significantly alter the structure of a given word and seem to "spread" from word to word or sequence to sequence rather than appear in all eligible cases at once. The other factor in determining what change occurs is the frequency of any given word. In general, higher

frequency words are more likely to undergo some sort of change, while words which are encountered less often tend to remain unchanged. While this scenario is not always the case (cf. Phillips 2006 for a lengthy discussion, also see Phillips 1994) it has nonetheless been shown that frequency plays a large role in determining developments of words and phrases both synchronically and diachronically.[63] In the realm of usage-based theories the effect of frequency is referred to as "lexical strength," at least as it pertains to lexical frequency (Bybee 2001). Basically, this idea states that the more encounters a speaker has with a particular word, the stronger this lexical entry becomes. This "strength" can have numerous implications, both phonologically and morphologically. Depending on the lexical strength of a word it will form a different relationship with any of its base words (Bybee 1985) and will store different phonological information, both segmental and suprasegmental (Bybee 2001). This last finding plays a particularly large role in this study, since it has been proposed that different word frequencies help determine different diachronic changes. Earlier in this dissertation it was suggested that higher frequency words undergo deletion, which coincides with the findings of Bybee (2000, 2001) in which high-frequency words are more likely to be reduced. This frequency was not limited to overall occurrence, but also applies to frequency within a single utterence or discourse. This analysis is presumed to be occurring at the Output grammar level. A visual representation of the whole process would be:

[63] Cf. Bybee 2001, Pierrehumbert 2003.

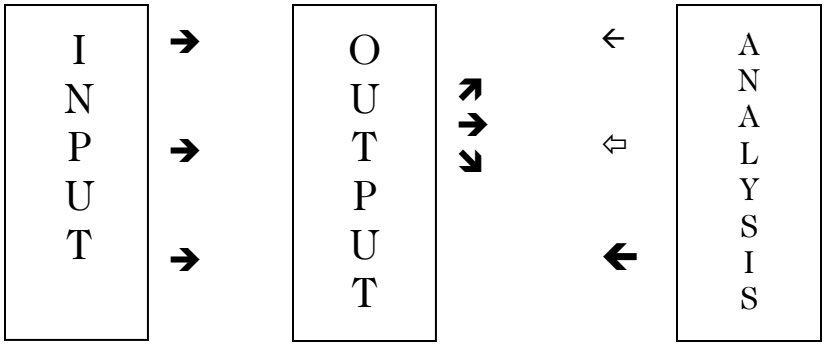

Figure 1: Preliminary representation of dual-grammar interaction

Essentially, the Input grammar generates possible Output forms which, based on their frequency, are analyzed and then stored in the Output grammar. The arrows on the right side of the Output grammar box represent the different frequencies; the diagonal arrow up represents higher frequency words, the horizontal arrow is mid-frequency words, and the diagonal arrow down is lower frequency words. In turn, the arrows coming back from the analysis stage represent the various analases which have occurred. This model will be looked at later in the conclusion of this chapter but for now serves to give an idea of the process of sound change based on the dual grammar model.

6.1 BACKGROUND OF PREVIOUS STUDIES IN FREQUENCY EFFECTS AND LEXICAL DIFFUSION

The role of frequency in language has been studied sporadically since the late sixties (cf. Wang 1969) and has been used in various capacities to explain a range of phenomena. Phillips (2006) gives an excellent history of the use of frequency within various theoretical frameworks through the years, including Optimality Theory and Connectionist models. She concludes that the latter are better suited for incorporating

frequency effects, since the principles of this theory lie in the belief that the usage of forms, i.e. their frequency, determines their role and relationship within the grammar. In other words, the use of language determines the grammar not the other way around. Since frequency of words is something we can more or less concretely analyze, we can test this theory against real data such as speech recordings, books, diaries and emails. The most pertinent finding for this dissertation comes from Bybee (2001) where she demonstrated that higher-frequency words are more susceptible to reduction. One great example is the English phrase, "I don't know," which, when pronounced in rapid speech often results in a greatly reduced, [aɪ dənnə], or even further reduced to a simple shrug of the shoulders coupled with a slight groan. According to Bybee, this is because the lexical strength of these words is so strong, that they are able to withstand dramatic changes to their structure and remain understandable. Though perhaps we cannot go so far as to say that higher frequency words are more susceptible to change (cf. Phillips 2006), we can state that frequency plays a vital role in determining what changes do and do not take place. Because of the interaction between analysis and frequency, a word will be subjected to a certain type of analysis based on its frequency of occurrence. Therefore, a word we encounter over and over does not receive the same treatment as an infrequent word, .

In addition, Hume (2004) also mentions the role of frequency in metathesis in a given language. In her study, a sound is more likely to shift to a position of higher frequency according to existing phonotactic frequencies in that language. For example, if Language X shows a higher frequency of /tr/ clusters word-initially than word-medially, then if a change does occur it is more likely to result in a word-initial /tr/ cluster than a word-medial one. This appears to be the case in Latin. A brief

survey of Caesar's *De Bello Gallico,*[64] revealed that /Cr/ clusters showed up twice as often word-initially as word-medially. This synchronic fact may be used to test the theory that sound change is dependant on phonotactic frequencies of sounds, segments, and words.

6.2 OPTIMALITY THEORY AND FREQUENCY

Since Optimality Theory is primarily designed as a competence-based theory, there have been few attempts to incorporate frequency effects into its various studies -- and these have met with little success. This study does not attempt to directly redress this situation but does propose to offer an avenue of exploration to be pursued in future studies: most notably the idea that two separate grammars (Input and Output) are at work and that it is the frequency of words that determines the level of analysis that each one receives. Previous OT accounts have dealt with frequency, but have met with little widespread acceptance. Perhaps the most influential study is Boersma (1998) and his Gradual Learning Algorithm (GLA). Unfortunately, the GLA fails to differentiate between type frequencies and surface, token frequencies (Pierrehumbert 2003). However, the GLA has been applied to other studies with somewhat better success. Zuraw (2003) proposes the constraint USE-LISTED which is triggered by a certain frequency (the "lexical strength" of a word) and otherwise is passed over for lower ranked constraints. For example, if a word has a lexical strength of 0.5, its USE-LISTED constraint is accessible only 50% of the time and therefore is in use only 50% of the time. The other half of the occurrences are not subject to the constraint and

[64] Kilpatrick (2009). This unpublished study was discussed further in Chapter 2 and Chapter 5. It consists of a quantitative study of Latin /Cr/ clusters in *De Bello Gallico*.

therefore may undergo separate changes. In addition, the USE-LISTED constraint is linked to other FAITHFULNESS constraints which help preserve the original form when the USE-LISTED threshold has been met. Unfortunately though, this theory relies heavily on the idea that it is the most frequent words which change first and never the other way around. Since the constraint can be applied only when a certain frequency is reached, only those words with higher frequencies will be affected. Those words which have a lower lexical strength, i.e. the less frequent words, will rarely engage the USELISTED constraint and therefore rarely undergo any sort of change. As noted in Phillips (2006) however, this is not always the case; in fact the opposite is often true. In cases where the lowest frequency words change first (cf. diatonic pairs in English, *cónvict ~ convíct*, *récord ~ recórd*, etc.) it would be impossible to account for such changes without appealing to the USELIMIT constraint. The problem of course is that without triggering the USELIMIT constraint, the words should not change. Although Zuraw focuses on the higher frequency words changing and not the lower frequency words, this study does offer some advantages over previous OT accounts in that it successfully incorporates frequency into the explanation of certain changes. In addition, it identifies the fact that at certain frequencies words behave differently. Where Zuraw falls short is in the ability to account for disparate changes at different frequencies. Since the approach attempts to treat the possible outcomes as binary,[65] it cannot account for "gray area" changes or competing outcomes. Since the northern Italian dialects show exactly these types of changes, it is necessary to develop some reasoning as to why this occurs.

[65] In other words the change either occurs (meets the USELIMIT requirements) or doesn't. Gradient changes are not possible. This is also noted by Phillips 1994, who cites the loss of the glide /j/ after /t, d, n/, where the lower frequency words are found to be "less glideful."

6.3 /Cr/ CLUSTERS

If the frequency of a word is high enough, the cluster will undergo deletion (of the consonant not the rhotic), otherwise the cluster will undergo either metathesis or epenthesis. The application of these two processes is such that neither relies solely on frequency, but seems to involve the following restrictions: bare /Cr/ clusters will undergo metathesis if their resulting output does not produce an otherwise non-existent cluster (cf. Hume, Type-Frequency) or simply an undesired cluster, otherwise, the cluster will undergo epenthesis. Finally, if the frequency of the word is low enough, there will be no change to the /Cr/ cluster at all. It is worth mentioning that many words which maintain the /Cr/ cluster are late borrowings from Latin (i.e. learned borrowings, medical terms, etc.) and therefore may have entered the lexicon after these processes lost their productivity.[66] As shown before, some words develop differently in different dialects and some show various competing forms within the same dialect. This can be accounted for by looking at frequency effects. This phenomenon is discussed below in section 6.5 and is the main focus of this chapter.

6.4 /CCr/ CLUSTERS

For /CCr/ clusters epenthesis seems to be the initial outcome, since both deletion and metathesis may be blocked by the intervening consonant. That is to say, the feature spreading of the rhotic, which produces the perceptual confusion, is prevented from continuing on to the initial syllable, thereby disallowing metathesis. Therefore, if the

[66] As mentioned in chapter 3, epenthesis seems to be the only productive process in the dialects, as new words do not undergo metathesis or deletion. Words are still borrowed with "no change" though, but the same frequency requirements apply -- i.e. they are low-frequency words. As of this writing I know of no study which has looked at synchronic epenthesis in borrowings, though I assume higher frequency words would be subject to epenthesis and lower frequency words would not be changed.

frequency falls within the appropriate range, epenthesis occurs for word-medial CCr clusters. As for deletion and no change, their frequencies seem to remain the same -- high frequency leads to deletion and low frequency leads to no change - with one small adjustment: the frequency requirement for deletion seems to be raised. Specifically, a word with a /Cr/ cluster requires a lower frequency to undergo deletion than a word with a /CCr/ cluster.

6.5 FREQUENCIES OF /Cr/ WORDS IN LATIN

To determine the frequency of different Latin /Cr/ cluster words, the online Latin corpus, The Perseus Digital Library, was used. Through this corpus of over 8 million words, including both prose and poetry, from Classical and Vulgar Latin stages, it is possible to run a frequency test to see the number of occurrences of any given word. The overall frequency is given as well as the frequency according to genre and author. For this study, a preliminary search was conducted utilizing dictionaries from Latin, standard Italian, and the five dialects to find possible candidates. As mentioned in the introduction, the study focused on post-tonic -(C)Cr- clusters only and the placement of the tonic vowel was determined using the modern outcomes of the words (i.e. the stress placement in Italian and the dialects). If there was discrepancy between Italian and the dialects over stress placement, the dialect placement was used to determine whether or not the /Cr/ cluster was post-tonic or pre-tonic.

In the following two tables, we can see the outcomes of the selected words in the various dialects and their respective frequencies. The first table gives the Latin word and the dialectal outcome. The second table gives us the same results ranked from highest-frequency to lowest-frequency.

Table 15: Latin words and their dialectal outcomes

LATIN	Piemontese	Piacentino	Genovese	Milanese	Bolognese
FIBRA	****	****	****	*fia*	**cavazeina*
PATER	*pare*	*pär/padar*	*poæ*	*pàder*	*pader*
MATER	*mare*	*mär/madar*	*moæ*	*màder*	*mader*
NOSTER	*nost, nost*	*nostar*	*nòstro*	*nòst*	*noster*
LIBRA (monetary unit)	*lira*	*lira*	*lïa*	*lìra*	*lira*
SUPER	*dzor*	*suar/suvar*	*sorve*	*dzora*	*sôuvra*
PETRA	*preja*	*preda*	*pria*	*prèia*	*prêda*
PALPEBRA	*parpèila*	*parpella*	*parpella*	*palpébra*	*palpèider*
COOP(E)RIRE	*cheurve*	*cu(v)arciä*	*crovî*	**quercia*	*cruver*
AP(E)RIRE	*durvì*	*ärv*	*arvî*	*dervi*	*avrir*
DE INTRO	*drinta*	*deintar*	*drento*	*denter*	*déinter*
FEBRIS	*frev*	*freva*	*freve*	*féver*	*fivra*
PIGER	*pigher*	*pigar*	*pigro*	*pìgher*	*pigher*
NIGER	*négher/nèir*	*negar*	*neigro*	*negher*	*naigher*
SEMPER	*sèmper*	*seimpar*	*sempre*	*sémper*	*sänper*
IUNIPERUS	*zenèiver*	*znevar*	*zeneivio*	*zenéver*	*znaver*
LABRUM	*lavèr*	*labbar*	*labro/lerfo*	*lavur*	*lâber*
CAPRA	*crava*	*cräva*	*crava*	*càvra*	*cavra*
LIBER	*lìber*	*libar*	*libbro*	*liber*	*lîber*
ASPER	*aspr*	*aspar*	*aspro*	**àgher*	*asper*
QUADRUS	*quàder*	*quädar*	*quaddro*	*quader*	*quader*
SEPTEMBER	*stèmber*	*steimbar*	*settembre*	*settémber*	*setémber*
DECEMBER	*dzèmber*	*dzeimbar*	*dexembre*	*dicémber*	*dȥenber*
MEMBRUM	*mèmber*	*member*	*membro*	*mémbro*	**cumpunänt*
NOVEMBER	*novèmber*	*nuveimbar*	*novembre*	*nuember*	*nuvêmber*
OCTOBER	*otóber*	*uttubar*	*ötobre*	*ottóber*	*utôber*
CANCER	*càncher*	*càncar*	*càncro*	*cáncher*	*cancher*
SACER	*sàcr*	*sac(c)ar*	*sacro*	*sàcro*	*sâcher*
ALACER	*alégher*	*allegar*	*allegro*	*alegher*	*aligher*
MACER	*màgher*	*mägar*	*magro*	*màgher*	*magher*
SINISTER	*snistr*	*sinistar*	*sinistro*	*sinister*	*sinésster*
ASTRUM	*àster/astr*	*astar*	*astro*	*aster*	****
MONSTRUM	*mostro*	*mustar*	*mostro*	*moster*	*måsster*
MINISTER	*ministr*	*ministar*	*ministro*	*minìster*	*minister*
MAGISTER	*meistro*	*màistar*	*meistro*	*meistro*	*méster*
ALTER	*àutr*	*ätar*	*ätro*	*álter*	*èter*
CONTRO-	*contra*	*cuntra*	*contra*	*cóntro*	*cånter*
METER	*meter*	*metar*	*metro*	*méter*	*mêter*
NEUTER	*nèutr*	*neütar/neutro*	*neutro*	*nèuter*	*neutrèl*
PATRIA	*patria*	*pàtaria/patria*	*patria*	*patria*	*patria*

QUATTUOR	*quatr*	*quattar*	*quattro*	*quater*	*quâter*
INCONTRA	*ancontr*	*incontar*	*incontro*	*incónter*	*incónter*
ULTRA	*oltra*	*vutar*	*oltre*	*ólter*	*oultra*
LATRO	*làder*	*lädar*	*laddro*	*lader*	*lader*
VITRUM	*véder*	*vedar*	*veddro*	*véder*	*véider*
TIGRIS	*tigra/tigre*	*tighar*	*tigre*	*tígher*	*tigra*
PARAGRAPHUS	*paràgrafo*	*paràgraf*	*paragrafo*	*paragrafo*	*paragraf*
CATHEDRA	*càtedra*	*cattedra*	*cattedra*	*càttedra*	*câtedra*
UMBRA	*(pen)ombra*	*(pen)ombra*	*ombra*	*ómbra*	*ombra/omber*
FUNEBRIS	****	*funebre*	****	****	****
VIP(E)RA	*vipra*	*vipra*	*vípera*	*vìpera*	*vepera*
RECIPROCUS	*rèssiproch*	*recipruc*	****	*recìproch*	****
LACRIMA	*làcrima*	*lägrima*	*làgrima*	*làcrima*	*làgherma*
PALAESTRA	*palestra*	*palestra*	*palestra*	*palestra*	*palestra*
ORCHESTRA	*orchestra*	*urchestra*	*orchestra*	*orchèstra*	*urchèstra*
INDUSTRIA	*industria*	*indüstria*	*industria*	*industria*	*indostria*
NUTRIRE	*nutre*	*nütrì*	*nutrî*	****	*nutrir*
FENESTRA	*fnestra*	*finestra*	*fenestra*	*finèstra*	*fnéstra*
SINISTRA	*snistra*	*sinistra*	*sinistra*	*sinistra*	*sinésstra*
LIBRA (astrological sign)	*livra*	*libra*	*libbra*	*libra*	*libra*

Table 16: Latin word frequencies

Word	Frequency	Outcome	Example
PATER	40.7%	Del/Epen.	Pc. *pär/padar*
NOSTER	30.6%	Del?/Epen/NoCh?	Pc. *noss*, *nostar*, Pm. *nòstr*
NIGER	18%	Del/Epen.	Pm. *nèir*, Bo. *naigher*
LIBER	7.8%	Epen/NoCh	Bo. *lîber*, Gn. *libbro*
MATER	7.1%	Del/Epen.	Pc. *mär/madar*
LIBRA (monetary unit)	6.2%	Deletion	Ml. *lìra*
ALTER	5.9%	Epen/NoCh	Bo. *èter*, Gn. *ätro*
SUPER *sorve*	5.8%	Del/Epen/Met?/NoCh.	Pc. *suar, suvar, suvra*, Gn.
FIBRA	5.05%	Deletion	Gn. *fïa*
PETRA	4.7%	Metathesis	Bo. *prêda*
FEBRIS	3.7%	Met/Epen	Pc. *freva,* Ml. *féver*
APRIRE	3.01%	Metathesis (local)	Pc. *ärv*
SEMPER	2.9%	Epenthesis	Pc. *seimpar*
ASPER	2.6%	Epen/NoCh	Pc. *aspar*, Pm. *aspr*
CAPRA	2.07%	Met/NoCh	Gn. *crava*, Ml. *càvra*
LATRO	1.9%	Epen/NoCh	Pc. *lädar*, Gn. *laddro*
UMBRA	1.85%	No Change	Ml. *ómbra*

NEUTER	1.7%	Epen/NoCh	Pc. *neütar, neutro*
MINISTER	1.6%	Epen/NoCh	Ml. *minìster*, Pm. *ministr*
PATRIA	1.5%	Epen/NoCh	Pc. *pàtaria, patria*
TIGRIS	1.5%	Epen/NoCh	Pm. *tigra, tigre*, Ml. *tígher*
ULTRA	1.46%	Epen/NoCh	Ml. *ólter,* Pm. *oltra*
MAGISTER	1.4%	Epen/NoCh	Pc. *màistar*, Pm. *meistro*
QUATTUOR	1.4%	Epen/NoCh	Bo. *quâter*, Gn. *quattro*
LABRUM	1.3%	Epenthesis	Bo. *lâber*
MEMBRUM	1.3%	Epen/NoCh	Ml. *mémber, mémbro*
SINISTER	1.3%	Epen/NoCh	Pc. *sinistar*, Pm. *snistr*
CANCER	1.16%	Epen/NoCh	Pm. *càncher*, Gn. *càncro*
PALPEBRA	1.16%	Metathesis?	Gn. *parpella*
PIGER	1.09%	Epenthesis	Ml. *pìgher*
LACRIMA	1.08%	No Change	Gn. *làgrima*
QUADRUS	1.04%	Epen/NoCh	Pc. *quädar*, Gn. *quaddro*
METER	1.03%	Epen/NoCh	Ml. *méter*, Gn. *metro*
OCTOBER	1.02%	Epen/NoCh	Pm. *otóber*, Gn. *ötobre*
ASTRUM	1.01%	Epen/NoCh	Pm. *àster, astr*
FENESTRA	0.99%	No Change	Ml. *finèstra*
SEPTEMBER	0.99%	Epen/NoCh	Pm. *stèmber*, Gn. *settembre*
SACER	0.95%	Epen/NoCh	Bo. *sâcher*, Ml. *sàcro*
VITRUM	0.91%	Epen/NoCh.	Ml. *véder,* Gn. *veddro*
MONSTRUM	0.9%	Epen/NoCh	Bo. *måsster*, Pm. *mostro*
NOVEMBER	0.81%	Epen/NoCh	Pm. *novèmber*, Gn. *novembre*
NUTRIRE	0.75%	No Change	Pc. *nütrì*
ALACER	0.73%	Epen/NoCh	Pc. *allegar*, Gn. *allegro*
SINISTRA	0.62%	No Change	Bo. *sinésstra*
DECEMBER	0.49%	Epen/NoCh	Pm. *dzèmber*, Gn. *dexembre*
INDUSTRIA	0.38%	No Change	Pm. *industria*
LIBRA (astrological sign)	0.3%	No Change	Pm. *livra*
ORCHESTRA	0.29%	No Change	Bo. *urchèstra*
RECIPROCUS	0.29%	No Change	Ml. *recìproch*
CATHEDRA	0.24%	No Change	Bo. *câtedra*
VIP(E)RA	0.11%	No Change	Pm. *vipra*
PALAESTRA	0.05%	No Change	Pc. *palestra*
FUNEBRIS	0.02%	No Change	Pc. *funebre*
CONTRO-	n/a	Epen/NoCh	Bo. *cånter*, Ml. *cóntro*
COOP(E)RIRE	n/a	Metathesis	Pm. *cheurve*, Gn. *crovî*
DE INTRO	n/a	Epen?/Met?	Pc. *deintar*, Pm. *drinta*
INCONTRA	n/a	Epen/NoCh	Ml. *incónter, incóntro*
IUNIPERUS	n/a	Epenthesis	Pm. *zenèiver*
MACER	n/a	Epen/NoCh	Ml. *màgher*, Gn. *magro*
PARAGRAPHUS	n/a	No Change	Pm. *paràgrafo*

Based on an analysis of 60 possible candidates[67], a distinction can be seen for those words exhibiting no change, metathesis, and deletion. Those words showing no change show up with a frequency of 0-1.5% (with the exception of LIBER which has a frequency of 7.8% yet shows no change in Genovese, *libbro* - however, this is quite possibly a borrowing from standard Italian given the appearance of the geminate [bb]); those showing metathesis fall between 2-5% (with the notable exception of PALPEBRA, which shows a frequency of 1.16%, but also is in doubt as to whether it has undergone metathesis or rhoticism). Deletion shows up on the high end of the frequency with a range of 5% and above. Epenthesis on the other hand shows a large range of frequency, from the higher end of the low-frequency range to the lower end of the high-frequency range (0.5%-40%). This falls in line with the idea that epenthesis serves as a default change and its role as a productive change, at least in Piemontese. It is important to keep in mind that the ranges are not limits. That is to say, there is some overlap between the frequency ranges, but only of the patterns no change/epenthesis, metathesis/epenthesis, and deletion/epenthesis. However, there are no instances of overlap between deletion and no change[68] (i.e. there are no instances of a dialect or dialects showing both changes for the same word). The frequency ranges must be viewed as a continuum and those words which approach the upper or lower limits between two outcomes often, but not always, show competing forms.

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[67] Origianlly there were 92 candidates, but the remainder were eliminated due to dubious etymologies (Devoto 1985) and/or because they were borrowings from other languages. Of note here though is It. *scheletro*, dialectal *scheleter* which was borrowed from Gr. *skeletos* (cf. Devoto 1985 for the emergence of the /Cr/ cluster). This case is interesting because it shows epenthesis in a late borrowing from around 1560 (Devoto 1985), which gives more evidence in favor of epenthesis being the productive change seen in the dialects.

[68] Although with Lat. NOSTER/NOSTRA we do see a possible competetion between Pm. *nost, nostr,* and Pc. *noss.*

The implications of using the same corpus for each dialect leads to the result that any differences in dialect outcome, aside from external borrowing or selection of competing internal terms, are due to different trigger levels for analysis rather than differences in dialect-specific frequencies. In other words, it may very well be the case that the frequency trigger-levels are similar for each dialect but the actual token frequencies vary and therefore the outcomes are different. However, due to the unfortunate lack of substantial dialect corpora, especially of the online variety, the assumption at this point must be that the frequency trigger levels are dialect specific and not the frequencies. What this means is that the cases where some dialects show epenthesis and others show deletion are due to different levels of analysis and not different frequencies:

25a. Lat. PATER (frequency: high) >	Pm. pare Pc. pär, padar Gn. poæ Ml. pàder Bo. pèder

In this case, Piacentino is at the threshold of deletion, since we see both deletion and epenthesis. What this means is that the frequency of the word is high enough to trigger deletion, but not so high as to avoid epenthesis. In other words, there is a continuum from epenthesis to deletion and PATER's frequency is right on the cusp, for Piacentino[69]. The other dialects which show only deletion are firmly in the frequency range for deletion. These listeners have utilized a smaller degree of analysis and therefore have "allowed" or "selected" the simplified consonant cluster -- and in some

[69] As mentioned earlier, the competing outcomes in Piacentino also reflect its positioning as a transition dialect -- between the "deletion" dialects (Piemontese and Genovese) and the "epenthesizing" dialects (Bolognese and Milanese).

cases eliminated both consonants, cf. Genovese *poæ*. In those dialects where we see only epenthesis, Milanese and Bolognese, the frequency of PATER is firmly embedded in the epenthesis range.

The frequency of words also helps explain why different outcomes of similar words are seen within a dialect. The outcomes for Latin PATER and PETRA seen in the various dialects (deletion and metathesis) seem to contradict themselves. Why does PATER yield deletion/epenthesis, while PETRA yields metathesis? Since both words have similar structures, /pVtrV/,[70] they should undergo similar changes, provided the difference in vowels is not responsible for the separate developments. However, looking at the frequency of each word gives a different picture:

26a. Lat. PATER (frequency: high) >	Pm. pare Pc. pär, padar Gn. poæ Ml. pàder Bo. pèder
26b. Lat. PETRA (frequency: mid/low) >	Pm. preja Pc. preda Gn. pria Ml. prèia Bo. prêda

The frequency of PATER is high (40.7%) whereas the frequency of PETRA is mid-frequency (4.7%). Therefore, PETRA should undergo a higher degree of analysis than PATER, which it does as evidenced by the metathesis change. What has happened is that the listener, when encountering the Input form for PETRA, has to rely on more phonetic cues (pre- vs. post-consonantal positioning, vocoid intrusion, etc.) to process

[70] I'm assuming here that the Accusative, PATRE(M), is the form from which the modern forms are descended, as discussed earlier.

what was heard; as opposed to the more frequent PATER, which has greater lexical strength and requires fewer linguistic cues to be processed (i.e. the MAX constraint which preserves overall structure but does not require fine-grained details).

The story becomes even more interesting when a low-frequency word with a similar structure, PATRIA, is compared. Only Piacentino and Piemontese show direct descendants, Pm. *patria* and Pc. *patria/pàtaria*, but even these few examples are notable for two things: the /Cr/ cluster is maintained (in competition with an epenthesized version in Piacentino) and there is no lenition of the voiceless obstruent [t].[71] Again, in Piacentino there is a dual outcome, this time with no change and epenthesis, but this can be explained through frequency. The frequency of PATRIA is low (1.5) so the lack of change is expected. However, it is also on the cusp of the high range of no change frequencies (~0.8-1.5) and therefore there is some variation in the form (cf. PATER > *pär/padar* above). In Piemontese, there is no change to the cluster (or the word, for that matter). Again, this is due to the low frequency of the word, and therefore the high degree of analysis performed on the input form.

6.6 CONCLUSION

So far this dissertation has discussed the various approaches, via Optimality Theory, used to explain metathesis, epenthesis, and deletion in the northern Italian dialects. What has been added in this chapter is the role that frequency plays in determining what change a word undergoes. Restated again here, the order from high frequency to low frequency is as follows:

[71] The change of [t] > [d] (>Ø) would be the expected outcome in the Gallo-Italic dialects.

1. Deletion
2. Metathesis
3. No Change

In addition, epenthesis operates as a default change which occurs when the primary change is unavailable due to phonotactic or other linguistic constraints such as the possible confusion encountered in dual-formation stems such as PATER/PATREM or syllabification differences. Epenthesis also seems to occur at slightly higher frequencies than the lowest No Change tokens and at slightly lower frequencies than the highest Deletion tokens. So, the entire range looks something like this:

High Frequency	Deletion	
		Epenthesis
		⇧
Mid Frequency	Metathesis	⇳
		⇩
		Epenthesis
Low Frequency	No Change	

Figure 2: Diachronic processes in relation to frequency

This analysis is based on the findings of Bybee (1985, 2001, among others) and the realization that frequency plays a large role in sound change. While Bybee -- and Pierrehumbert (2003), Phillips (1994), and Fowler and Housum 1987 -- all note the importance of not discounting low frequency words in a model, the evidence in the northern Italian dialects suggests that in this case the lower frequency words do not change. In fact, the type of change seen in the northern Italian dialects reflects the findings of Bybee (2000, 2001) in that deletion is often seen in higher frequency words. I propose that this is the result of a stronger lexical "strength" which allows the speaker to recall or understand the word with fewer linguistics cues. In other words, because the listener has encountered that particular token so many times, it is not necessary to

analyze or recall every detail of every sound in every position; rather the listener can determine what word has been used by utilizing broad phonetic and contextual clues. This is exactly the position taken in this study where the analysis required to achieve deletion uses broad phonetic cues to determine the outcome. The listener is still able to process the word with the changes and store the new lexeme in the Output grammar. The lower the frequency the more likely the listener will "stop" and examine what was said a little more closely. This closer examination results in a lower probability of change, since the linguistic cues reinforce the existing "exemplar"[72] already in the grammar. This exemplar, due to lower frequency, also has a lower lexical strength, which can be interpreted to mean that it has larger amounts of linguistic information stored with it. If a word is encountered infrequently enough, it is almost as if every occurrence were the first occurrence. Therefore, every time a listener encounters a low-frequency word, every possible piece of linguistic information is also stored so that future encounters can be more recognizable.

Therefore, the final process would need to allow for interaction between the lexicon and the Output Grammar to account for the different levels of analysis. In other words, the lexicon would analyze the words according to how frequntly they are encountered. If a word has a high frequency, it would have a greater lexical strength and therefore would need fewer linguistic cues to be processed. Of course, the opposite would hold true for low-frequency words. Also, the ranges would need to be on a continuum so as to allow for productivity of the changes. The following diagram gives a visual interpretation of the process:

[72] Cf. Bybee 2001 among others. The "exemplar" is the primary storage unit in the lexicon (and Phonological System?) to which other tokens attach forming stronger or weaker ties depending on frequency.

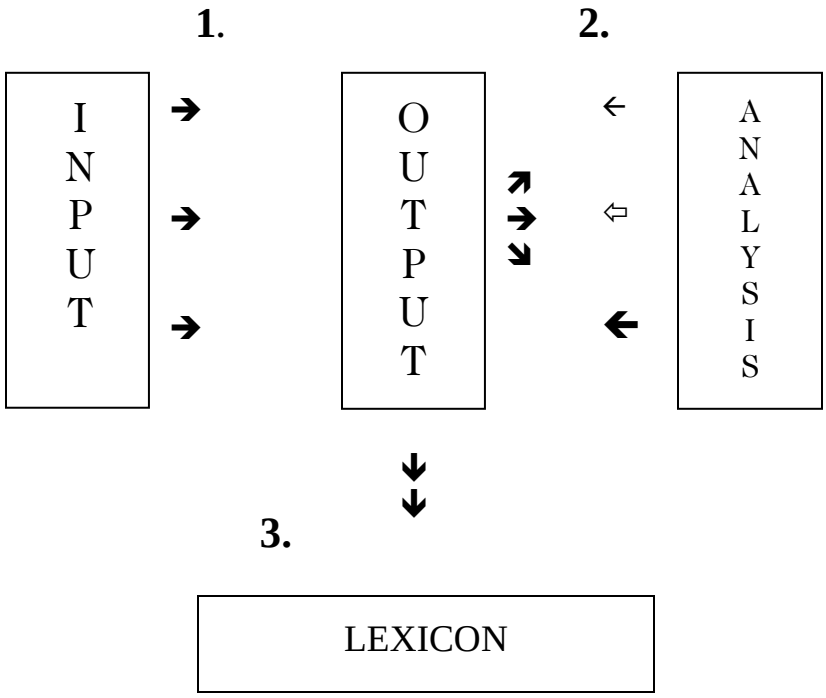

Figure 3: Final representation of dual-grammar interaction

Here, the Input Grammar feeds the Output Grammar (1), the Output Grammar analyzes the different tokens according to their frequency (2), and finally, the Output Grammar stores the selected outcome in the Lexicon (3). Also, the exemplar would have a designated lexical strength[73] which would determine the level of analysis necessary to process what was heard. The more frequently a word is experienced, the stronger its lexical strength becomes and the fewer the linguistic cues necessary to recall or process it. If we view the lexical strength of a word as being dynamic, this allows for a link between frequency and productivity. As a word or process becomes less productive, it becomes less frequent. This can lead to retention of outdated forms,

[73] This lexical strength would be variable since more or less exposure to the token would necessarily alter this strength and therefore also alter the level of linguistic information stored with it and the level of analysis necessary to process the word.

words, morphemes, etc. which resist the changes seen in more productive and more frequent tokens. Though this study has focused on word frequency and the effects on a particular sound change, it is certainly possible to see the same effects on individual morphemes (Bybee 1985) and perhaps even syntactic structures. Though frequency is not the sole determiner in the development of the post-tonic, word-medial /Cr/ clusters in the northern Italian dialects,[74] it certainly plays a vital role. The fact that there appears to be a continuum from low to high frequency words which consistently show the same changes for the same frequencies suggests that how often a speaker or listener encounters a particular token does help determine the treatment of said token. Though the specific changes or lack thereof may be different from language to language or dialect to dialect, it seems that the same types of words behave the same way and that this is due to the frequency of the words.

[74] Cf. phonotactic constraints, borrowing, prosody, and syllabification.

CHAPTER 7

CONCLUSIONS

7.0 CONCLUSIONS

What this study has sought to accomplish is to group together the four separate outcomes of Latin post-tonic consonant + [r] clusters as related changes within the five northern Italian dialects of Piemontese, Piacentino, Genovese, Milanese, and Bolognese. Though the outcomes may seem superficially incongruous -- metathesis, epenthesis, deletion and no change -- they are in fact phonotactically similar changes that can be explained through similar approaches within the Optimality Theory framework. However, the use of OT does not provide the entire explanation of why these changes take place. Some dialects show different developments from the same ancestor while other dialects even show internal variation for the same word. Optimality Theory is unable to fully explain these discrepancies and therefore a usage-based approach must be included to handle the variation as well as provide some sort of mechanism for the changes themselves. In fact, according to this study frequency effects play a substantial role in determining which changes occur to which words and helps explain why. For example, higher frequency words have a tendency to undergo deletion which falls in line with what would be expected for lexical items with greater lexical strength since they do not require as much analysis or linguistic detail to be processed by the listener. Though these two theories have not proven to be very

compatible in the past, they can be made to coexist within the same approach. Optimality Theory provides a clear and concise explanation of *how* a change occurs and a usage-based/frequency approach gives a reason *why* the change occurs. Together, they can provide a complete picture of language change.

The importance of Webb & Bradley's theory of two separate but interacting grammars (Production and Perception) is critical for this dissertation. It allows for two different stages of possible language change: the production and the perception. In reality this mirrors the actual linguistic interaction between speakers. There are variations in the way one speaks, both individually and when compared to other speakers; and there is variation in what one processes when hearing the same token, or similar tokens, time and time again. In fact, Bybee (2001) notes that even within one discourse, the production aspect of words changes, often being reduced the more frequently a word is used in a discourse. This tells us that not only does the production grammar change within a discourse, but the perception grammar does too, assuming that the listener can understand these reduced tokens. This flexibility is reflected in the analysis phase of the proposed grammar structure (fig. 3 above). Constant analysis at the perception grammar results in a dynamic grammar system that has a formal representation (OT) but with a usage-based ability to fluctuate with the changing frequencies of its tokens. What causes the structural change is the change in frequency and therefore the analysis of the individual tokens. However, we must keep in mind that this does not necessarily mean that the higher frequency words will change first. In the case of the English glides, Phillips (2006) found that the level of analysis would still change according to a word's frequency, but the higher degree of analysis (lower frequency of occurrence) would result in changes to the

original forms while the lower degree of analysis (higher frequency of occurrence) would result in less change.

Though it is certainly possible, if not probable, that the frequency effects from language to language and from dialect to dialect will not be the same; the evidence from the northern Italian dialects suggests that the phonological changes of similarly structured sequences within a language/dialect are the same within a given frequency range. Because speakers and listeners are processing these words in the same manner with respect to degree of analysis based on frequency of occurrence, the same results manifest themselves. Although phonotactic constraints, prosodic limitations, and external factors may mask these systematic changes, they do exist, though perhaps not as visible without some exploration.

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