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**LA THÈSE A ÉTÉ
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THE CATALYTIC INFLUENCE OF SYNERESIS
AS REVEALED BY THEORETICAL ANALYSIS OF EPENTHESIS
AND ITS DIVERSE REFLEXES IN ROMANCE LANGUAGES

by

Hyung-Soo Kim

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
in the Department
of
Languages, Literatures, and Linguistics

Hyung-Soo Kim 1985

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Examining Committee:

Chairperson: Dr. Neville J. Lincoln
Associate Professor

Senior Supervisor: Dr. James Foley
Professor

Dr. Thomas A. Perry
Assistant Professor

External Examiner: Dr. Douglas Pulleyblank
(in absentia) Department of Linguistics
University of Southern California
Los Angeles, California

Date Approved: July 26, 1985

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The Catalytic Influence of Syneresis as Revealed by Theoretical
Analysis of Epenthesis and its Diverse Reflexes in Romance Languages

Author:

(signature)

H.S. Kim

(name)

July 3, 1985

(date)

ABSTRACT

The phonological theory of J. Foley (Theoretical Phonology) maintains that explanation in phonology cannot be done by grammatical description of rules but must refer to a limited set of universal rules and principles.

This conception of explanation is applied to the analysis of epenthesis and its diverse reflexes in Romance languages. Two aspects of epenthesis are considered: interpretation of epenthesis as 'excrecence' and the interference in this mechanism of syneresis, the process that joins phonological elements together. It is argued that these considerations not only allow for a characterization of epenthesis as a universal process but also offer a coherent and more theoretically motivated explanation of the diverse reflexes of Romance consonant clusters.

Chapter 1 introduces the distinction between descriptive analysis and theoretical analysis, the preferentiality of linguistic change, and the nature of phonological explanation in Theoretical Phonology.

In Chapter 2, syneresis is introduced as a phonological process with its application extended to consonant clusters from the traditional application limited to vowels in hiatus.

In Chapter 3, an analysis of epenthesis is presented: general interpretation of the process and its ramifications, and a systematic analysis of reflexes and configurations of epenthesis under syneresis. It is argued that the application of epenthesis in languages is governed by the principle that the more a consonant cluster is tightly bound by syneresis, the less epenthesis is likely to occur.

In Chapter 4, the reflexes of epenthesis, metathesis, and assimilation are examined. The function of syneresis defined in Chapter 3 is refined further as a 'catalyst': in addition to impeding application of epenthesis, syneresis sometimes expedites occurrence of metathesis and assimilation. The analysis by Walker, which proposes a rule reordering solution to a similar problem in French, is reanalyzed. It is argued that the analysis under syneresis need not refer to exceptions nor rule reordering, as does Walker's, but coherently explains the reflexes in Italian and Spanish as well as in French.

It is concluded that syneresis systematically governs the application of epenthesis and its diverse reflexes are the result of the catalytic influence of syneresis on the phonological processes that often apply to Romance consonant clusters.

12

Table of Contents

Approval -----	ii
Abstract -----	iii
I. Introduction -----	1
II. Syneresis -----	9
III. A Theoretical Analysis of Epenthesis -----	15
IV. The Catalytic Influence of Syneresis -----	60
V. Conclusion -----	101
Bibliography -----	111

I. Introduction

The goal of linguistic science is to explain observed linguistic phenomena by constructing a theoretical system in which linguistically interesting problems can be identified, analyzed, and explained.

In Theoretical Phonology, the theory of phonology being developed by Prof. J. Foley (Foley 1977, 1979, 1981), it is maintained that phonological problems perceived from observed data be explained within a system that comprises three theoretical constructs: a set of abstract phonological elements, a set of universal rules that relate these elements, and a set of principles governing application of phonological rules. It is maintained, in the belief that Language is essentially a 'coherent' system in which a limited number of rules occur universally, that efforts be made to detect universal phonological processes, and explanation of phonological phenomena be provided in terms of these universal processes.

Since the inception of Transformational Grammar, it has generally been considered that the goal of linguistics is to write a simple, adequate grammar of language. This goal was established on the belief that grammatical rules, the rules that describe language correctly, reflect the linguistic knowledge of native speakers. As a result, a trend in linguistics has been to emphasize appropriate description of rules in simple formal notations, and arguments for a linguistic analysis have often been advanced on the basis of such description.

The trend, however, has not been conducive to genuine perception of linguistic change, nor to its explanation in terms of universal phonological processes. A distinctive feature description of a language treats a phonological process as an isolated phenomenon within that language, without relating its development to a similar description in another, thus fails to explain the process universally. Moreover, since the rules are designed primarily to describe language as simple as possible, they often carry little theoretical significance except saving features, and do not reveal the proper linguistic processes involved. This is particularly evident in the treatment of exceptions, where rules such as [-rule X] are used to incorporate anomalous forms to a certain rule into the grammatical description of language.

Theoretical Phonology denies the value of rule description, arguing that striving for descriptive formalism not only drains the energy for real analysis but also obscures the problems behind the description. Nor does it accept the exception rules as an explanatory device, but requires that explanation in phonology be systematic, in terms of universal conditions on phonological processes and the principles that govern application of these processes. The questions asked in Theoretical Phonology are thus not of description but of explanation:

"The grammatical question is which of several possible descriptions is the correct one. The linguistic question is not which description of data is correct, but rather why the particular configuration which exists, exists, rather than some possible other

configurations."¹

The Inertial Development Principle (IDP), which governs the application of phonological rules in relation to the established parameters, states that weak elements weaken first and preferentially in weak environment and strong elements strengthen first and preferentially in strong environment. From this principle, the propensity of linguistic change is predicted; in a weakening process, change first occurs to a weak element in weak environment, then 'generalizes' to occur to stronger elements in strong environment. Similarly, in a strengthening process, change first occurs to a strong element in strong environment, then generalizes to include weaker elements in weak environment.

For example,² apocope applies in Romance languages where vowels often drop in word final position;

Romance	Italian	Spanish	Sursilvan	French
amica	amica	amiga	amitga	amie
amico	amico	amigo	amitg	ami
mare	mare	mar	mar	mer

The question naturally arises as to why certain vowels would drop in a language to the exclusion of the others. In Spanish, for example,

¹
Foley (1981, p59)

²
The following illustration is based on Foley (1983). Sursilvan is a dialect of RaetoRomansh, spoken in Switzerland. Orthographic tg is [ĉ].

e --> Ø (___#) as in Rom.mare Sp.mar "sea" but o, a --> idem (___#)
 as in Rom.amico Sp.amigo "a male friend" and Rom.amica Sp.amiga "a female
 friend".³

Since by ontological principle, nothing is weaker than something,
 the conversion of e to Ø in Spanish is a weakening process and the word
 final position in which such a change occurs is a weak environment.

The configuration in Spanish,

e --> Ø (___#)
 but o --> idem (___#)
 a --> idem (___#)

thus reveals that the weakening process of apocope occurs to e in
 preference to o and a. Also in Sursilvan, the configuration

e --> Ø (___#)
 o --> Ø (___#)
 but a --> idem (___#)

reveals that apocope applies to e and o in preference to a. Combining
 these two observations, we may therefore conclude that apocope occurs
 to e in preference to o in preference to a.

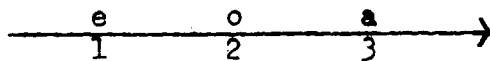
Why does apocope occur to e in preference to o in preference to a?
 A descriptive analysis can not answer this question since it is not
 concerned with the preferential nature of linguistic change, nor with
 the relation of change between languages, but only with description of

 3

"idem" means "the same". Thus the rule A --> idem indicates that
 A has not changed.

the change in individual languages.

With reference to the relative phonological strength of the three vowels,⁴



e is phonologically weaker than o, which is phonologically weaker than a. In other words, e is phonologically the weakest of the three vowels.

In consonance with the IDP, the weakening process of apocope applies first and preferentially to the weakest e, as in Spanish where $e \rightarrow \emptyset$ (___#) but o, a \rightarrow idem. This is the 'primordial' application of apocope with regard to the three vowels. This rule generalizes to occur to the next weaker element on the parameter, resulting in Sur-silvan as e, o $\rightarrow \emptyset$ (___#) but a \rightarrow idem. In French where all three vowels drop by apocope (cf. Fr. amie[ami]), the rule has further generalized to include the strongest a. The Italian configuration where none of the three vowels drop, indicates that the language does not possess the rule.

In Theoretical Phonology, the universal process of apocope and its development among languages are written in a form such as

⁴

Note that this parameter was not established arbitrarily, nor to solve the problem of apocope alone, but rather by examining participation of these vowels in other phonological processes as well, such as, for example, medial vowel weakening in Latin. For the arguments for this and other parameters used in the thesis, see Foley (1977, Chap. 3).

universal process: $V \rightarrow \emptyset (_ \#)$
 universal condition: $|V| \leq m$

parochial condition: $m = 0$ for Italian
 $m = 1$ for Spanish
 $m = 2$ for Sursilvan
 $m = 3$ for French

The universal process states that apocope is a phonological process that drops a vowel in word final position. The universal condition stipulates that the strength value of such a vowel be sufficiently small. The parochial condition is the instantiation of this universal condition in a particular language.

Of the eight logically (combinatorily) possible configurations of apocope with regard to the three vowels,

- | | |
|------------------------------|------------------------------|
| 1) e \rightarrow idem | 5) e $\rightarrow \emptyset$ |
| o \rightarrow idem | o \rightarrow idem |
| a \rightarrow idem | a \rightarrow idem |
| 2) e \rightarrow idem | 6) e $\rightarrow \emptyset$ |
| o $\rightarrow \emptyset$ | o $\rightarrow \emptyset$ |
| a $\rightarrow \emptyset$ | a \rightarrow idem |
| 3) e \rightarrow idem | 7) e \rightarrow idem |
| o \rightarrow idem | o $\rightarrow \emptyset$ |
| a $\rightarrow \emptyset$ | a \rightarrow idem |
| 4) e $\rightarrow \emptyset$ | 8) e $\rightarrow \emptyset$ |
| o \rightarrow idem | o $\rightarrow \emptyset$ |
| a $\rightarrow \emptyset$ | a $\rightarrow \emptyset$ |

the IDP predicts that 1), 5), 6), and 8) are linguistically possible configurations but 2), 3), 4), and 7) are not; 1) is the configuration occurring in Italian, 5) in Spanish, 6) in Sursilvan, and 8) in French.

Whereas a descriptive analysis of the same phenomena would not have made any linguistically significant generalizations concerning the application of apocope in Romance languages, the above Theoretical analysis not only reveals the preferentiality of linguistic change reflected in the configurations of apocope, but also explains why such preferential configurations obtain in natural languages.

Moreover, since the vowels that drop by apocope differ from language to language, a grammatical description of the process with distinctive features would have required a separate rule in each language, despite the fact that these rules are all manifestation of the same weakening process of apocope. In contrast, the form of the universal process of apocope in Theoretical Phonology not only subsumes these rules under one process, but also captures, coherently, the relation of change among the above languages by indicating that apocope has occurred most extensively in French but least extensively in Italian.

Theoretical Phonology explains observed linguistic phenomena as a function of its theoretical system. Since apocope is a weakening process that applies preferentially to weak elements in consonance with the IDP, weak vowels are more likely to drop by apocope than strong vowels. Stronger vowels o and a may drop in a language, but not before weaker e has already dropped. The difference in application of apocope among languages is how extensively the process has developed by rule generalization in a particular language.

Sometimes, however, even a sincere theoretical analysis does not

necessarily guarantee a productive result, but investigative skills and insights into phonological processes must be brought in to solve phonologically more difficult problems. A case in point is the phonological problems in Sp. fragante "fragrant" and the Theoretical solution to these problems in terms of syneresis, the process that joins phonological elements together. Since this process has not been well recognized in linguistic circles but plays an important part in our analysis of epenthesis and its diverse reflexes, we would like to discuss it in a separate chapter, to introduce its development and application in linguistics.

II. Syneresis

Traditionally, syneresis has been observed as applying to vowels in hiatus, similar to the process of contraction. But the distinction between syneresis and contraction has been unclear, if not obscure. Pope (1952, p109), for example, seems to regard the process as the same as contraction, whereas Nandris (1963, p186) maintains that:

"La différence entre la synérèse et la contraction réside dans le résultat atteint; alors que la contraction amène la réduction des deux voyelles à une seule, la synérèse ... transforme deux voyelles contigües, ou devenue contigües, en diphtongue, triphthongue, voire quadriphthongue."

In Transformational Grammar, on the other hand, syneresis has not been recognized as a phonological process yet; the discussion of the process is scarcely visible, nor has any analysis of natural languages in terms of syneresis been presented.

Thus we should ask if syneresis is a genuine phonological process, and if so, how it is distinguished from contraction. Compare, for example, syneresis of ai --> a^v in Rumanian mai [mai] from Lt. magis "more" and contraction of ai --> e in Skt. mahendra from *maha+Indra "great Indra". These rules are similar in that they combine two vowels into one unit, but their reflexes differ; the former gives a diphthong, the latter a monophthong.

In Theoretical Phonology, syneresis is formalized as

$$E_1E_2 \text{ ---} \rightarrow \widehat{E_1E_2}$$

whereas contraction is written

$$E_1 E_2 \text{ ---} \rightarrow E_3$$

with E referring to phonological elements to include consonants as well. And both are interpreted as a strengthening process that increases the bond strength on the Gamma parameter:¹

$$\begin{array}{ccc} 1 & 2 & 3 \\ ai & a^y & e \end{array}$$

On this parameter the relation between the two reflexes is made more clear; whereas syneresis combines the cluster $ai = (a, i)_1$ into the diphthong $a^y = (a, i)_2$ by increasing the bond strength from Gamma 1 to Gamma 2, contraction compresses the same cluster more tightly than syneresis yielding the monophthong $e = (a, i)_3$. Underlying the external differences between these reflexes is the theoretical distinction in their internal structure of bond strength.

We still maintain, however, the coalescent nature common in both processes by interpreting contraction as commencing with syneresis as in

maha-indra	
maha ^h indra	syneresis: ai --> ai ^h
mahendra	contraction: ai ^h --> e

As an argument for this interpretation, consider the following derivation of Fr. maitre [m^htr] (cf. OF maistre) from Lt. magistrum "master":

¹
See Foley (1977, p39).

magistrum	
maistrum	lenition: g --> Ø (V V)
ma ^h istrum	syneresis: ai --> a ^h i
mestrum	contraction: a ^h i --> e
m ^h etr	MR ²

The contiguous a and i combine together to become a diphthong first, then coalesce further to give a monophthong e, which eventually lowers to ϵ in Modern French. The former stage corresponds to OF maistre, the latter to NF m^hatre [m^hetr].

Another reason for distinguishing syneresis from contraction even though both processes are similar is that by regarding syneresis as an independent process that applies to consonant clusters as well, phonological problems that are otherwise unsolvable can receive a clear explanation under syneresis as, for example, in the case of Sp.fragante "fragrant".

In explaining modular depotentiation,³ Foley (1977, p123) notes two problems with Sp.fragante from Lt.fragantis. Firstly, in Spanish f --> h (# ___) as in Lt.fatum Sp.hado [a^ho] "fate" but this rule fails in Sp.fragante. Secondly, an extension of Grassmann's Law also applies in Spanish as in

2

"Miscellaneous Rules". These are the rules that are not directly relevant to the points made in the derivation, such as lowering of e to ϵ in closed syllable, and dropping of the final vowel and consonant in this derivation.

3

Modular depotentiation is a special type of phonetic manifestation where strengthening of the phonologically strongest element in a closed set appears phonetically as the weakest element in that set. Foley (1977, p126), for example, explains the conversion of (cont'ed)

Latin	Spanish	Gloss
triplus	tiple	"treble"
prosternere	postrar	"to humble"
flebilis	feble	"feeble"

where the liquid in the first CL cluster drops when followed by another CL cluster. The dissimilation rule CLVCL \rightarrow CVCL, however, fails in Lt. fragrantis Sp. fragante where instead of the expected ϕ fragante⁴ dissimilation occurs in the reverted direction.

The Theoretical solution to these problems comes from re-consideration of the Spanish rule $f \rightarrow h$ (# ___). Word initial position is a strong position.⁵ In Spanish, for example, initial continuants strengthen in consonance with the IDP as

$r \rightarrow r^+ \rightarrow rr$ (Lt. *rete Sp. red [rred] "net")
 $s \rightarrow s^+ \rightarrow es$ (Lt. scola Sp. escola "school")
 $y \rightarrow y^+ \rightarrow dz$ (Lt. juvenis Sp. joven "young")

But the continuant f appears to weaken rather than strengthen as in the rule $f \rightarrow h$ (# ___) where despite occurring in strong word initial position, it shows the weak reflex h .

 t to a glottal stop in English when contiguous to nasals as in mountain [maw'n?n], Latin [lax'n], by assuming strengthening of t (the strongest element on the Alpha parameter in Germanic languages) in strong environment (i.e. contiguous to nasals) as $t \rightarrow t^+$, followed by its modular depotentiation as $t^+ \rightarrow ?$.

⁴
 The symbol ϕ is used throughout to indicate an incorrect form; / for "not", c for "correct".

⁵
 Foley (1977, p109)

Considered in isolation, there seems to be no explanation of why $f \rightarrow h$ (#___) despite the general strengthening of initial continuant in Spanish, nor of the problems in Sp. fragante. To account for problems of this sort, it is instructive to view the problems as related to each other. Foley argues that the Spanish initial f in fact strengthens in consonance with the IDP as

$$f \rightarrow f^+ (\# _ _)$$

but the strengthened f^+ undergoes modular depotentiation with eventual loss as

$$f^+ \rightarrow h \rightarrow \emptyset \text{ (cf. Sp. } \underline{\text{hado}} [\text{a}^{\text{h}}\text{o}] \text{)}$$

unless it undergoes syneric depotentiation with the following r as in

$$(f, r)_1^+ \rightarrow (f, r)_2$$

The strengthening of the initial f in Spanish provides the extra unit of strength necessary for combination of f and r into a single unit fr in Sp. fragante. Consequently, instead of the first liquid bound to f , dissimilation drops the second unbound one. The following derivation illustrates the rules involved:

fatus	fragrantis	triple	
f ⁺ atus	f ⁺ ragrantis	"	strengthening: $f \rightarrow f^+(\# _ _)$
"	fr ⁺ agrantis	"	syneric depotentiation
"	"	triple	regressive dissimilation
"	fragantis	"	progressive dissimilation
hatus	"	"	modular depotentiation
a ^h o	fragante	"	MR

Syneresis initiated by strengthening of initial continuant f accounts for the anomaly in Sp. fragante, providing an argument for modular depotentiation of f⁺ to h in Spanish. Regarding syneresis as an independent phonological process is not only useful for distinguishing its reflexes from those of contraction but also necessary, for without syneresis we can neither explain the two problems in Sp. fragante nor maintain the consonancy of the IDP between change and environment in the rule f --> h (# ___).

Syneresis applies to consonant clusters as well. Although the process is not easy to detect, this nevertheless does not imply its nonexistence. Perhaps recognition of syneresis as an independent phonological process has a greater interest for our study of epenthesis and its diverse reflexes. As will be argued in the following chapters, problems in reflexes and configurations of epenthesis are often solved if we assume prior, preferential application of syneresis to consonant clusters.

III. A Theoretical Analysis of Epenthesis

In previous analyses, epenthesis as occurring in, for example, Lt.camera Fr.chambre "chamber" has been attributed to phonetic causes. Fouché (1927, p46), for example, proposes the following as causes of the phenomenon:

- 1) discordance physiologique entre les divers organes qui concourent à la production d'une consonne
- 2) excès de force dans l'articulation
- 3) différenciation du premier phonème dans sa partie terminale avec le phonème suivant

Explanation of epenthesis in Transformational Grammar is also based on phonetic causes, such as lack of coordination between the two consonants, unstability of particular consonant groups, generally referred to as the phonotactic motivation for occurrence of the process.¹

These explanations, however, suffer fundamentally from their lack of phonological ingenuity, since explanation of epenthesis is not sought by analyzing the process systematically, but by resorting to spurious phonetic causes. They, for example, do not explain why epenthesis would occur to the n'r cluster in French but not in one of the Old Provençal dialects as in Lt.cinere Fr.cedre but O.Prov.cenre "ash". Nor do they propose a universal condition on epenthesis, nor a principle that governs application of epenthesis in all languages.

1

See, for example, Walker (1978, pp 68-70).

If n'r is an unstable cluster, why would it undergo epenthesis in one language but not in the other?

Emergence of these unsystematic yet popular explanations may in fact reflect the complexity of the problems involved in analyzing epenthesis. But it also indicates the deficiency of both traditional and Transformational grammar to present a genuine explanation of epenthesis. It is also reminiscent of the traditional effort to explain language change by resorting to extrasystematic causes such as ease of articulation, substratum, and etc. Foley maintains that such explanations originate from an outdated ontological view that change is not an essential part of nature but a deviation from the norm, something that must be explained somehow:

"If language change were regarded as natural, linguists would not feel compelled to explain it, and could instead devote their energies to discovering the nature of language change"²

For example, the obligation to explain change never emerges in a simple process such as apocope, precisely because we all accept the process as given, thus feel no need to doubt its existence. Rather we concentrate on how the change occurs, by comparing its development in languages as illustrated in the Theoretical analysis of apocope. This is not to say that looking for causal explanation of epenthesis is necessarily a wrong approach but rather that such an approach,

²
Foley (1981, p13)

if feasible, should be based on a systematic analysis of the process, not on the reasons outside the system of phonology as in the previous analysis.

In the following analysis, rather than relying on phonetic causes for explanation of epenthesis, we seek a phonological explanation under the concept of universal phonological process in Theoretical Phonology. This is done by considering two aspects of the process: the mechanism of epenthesis and its interaction with the process of syneresis. The former is important for understanding the process itself, the relation among epenthetic processes, and the internal structure of change by the process, whereas the latter allows us to explain reflexes and configurations of epenthesis in Romance languages.

Interpretation of Epenthesis Mechanism

Epenthesis as occurring in Lt.camera Fr.chambre "chamber" is a complex phonological process organized by several sub-rules. Though often formulated as

$$\emptyset \rightarrow b (m _ r)$$

as in the derivation,

camera	
camra	syncope
cambra	epenthesis: $\emptyset \rightarrow b (m _ r)$
chambre	MR

this misses many insights into the process which otherwise may have increased our understanding of the process.

Two assumptions underlie the above formulation of the epenthesis rule;

- 1) epenthesis is a process that operates on \emptyset element.
- 2) the insertion of the epenthetic element occurs abruptly.

Statement 1) derives from formulation of the epenthesis rule as 'inserting' a new element, i.e. $\emptyset \rightarrow b (m_r)$. And 2) is from the assumption that the mechanism of epenthesis is a simple, abrupt insertion. Both are the views advocated in Transformational Grammar³, but neither is acceptable in Theoretical Phonology; the former because it violates a general principle of scientific investigation (i.e. the geneticity principle, see below), and the latter because it fails to characterize properly the universal process of epenthesis, leaving consonantal epenthesis unrelated to other epenthetic processes such as anaptyxis. In the following we would like to examine the implications underlying the above statements, and present an alternative view of epenthesis that reveals a proper understanding of the process in general.

The Geneticity Principle

In Theoretical Phonology, phonological rules, their formulation and interpretation, are subject to a small set of basic principles

³ Cf. King (1969, Chap. 5)

regardless of simplicity or correctness of their description. One of such principles is the geneticity requirement, which states that 'nothing arises out of nothing and goes into nothing'.⁴ It is a scientific principle that derives from the ontological world view that nothing is created out of the blue, and every single thing in the world has its origin. As in other scientific disciplines, it also applies in linguistics.

For example, in western Romance languages a prothetic vowel is added before initial sC clusters as in⁵

Latin	Spanish	Portuguese	French	Gloss
scala	escala	escada	échelle	"ladder"
sperare	esperar	esperar	espérer	"to hope"
statu	estado	estado	état	"state"

The rule initially appears to be

$$\emptyset \rightarrow e \text{ (\# _ sC)}$$

Foley (1981, p26) argues that this rule violates geneticity in two aspects. The first violation lies in the statement of the prothesis rule that makes it possible for something to come out of nothing. The second violation comes from conception of the prothesis rule. In Transformational Grammar, it is considered that one type of language change occurs by an addition of rules to the grammar of the parent language.

⁴ Bunge (1963), cited in Foley (1981, p25).

⁵ Data from Boyd-Bowman (1954, p114).

This concept of change implicit in the formulation of the above prothesis rule also violates the geneticity principle.

The Theoretical interpretation of prothesis is rather⁶

$$\begin{array}{l} s \rightarrow s^+ (\# _ C) \\ s^+ \rightarrow es \end{array}$$

That is, the initial continuant s strengthens first in the strong word initial position, then depotentiates by appearing with a prothetic vowel. Foley (1975) argues that these rules are derived from the rules already applying in Latin, as in the conjugation of Lt.sum "to be"

sum	sumus
es from * <u>s</u> + <u>s</u>	estis from * <u>s</u> + <u>tis</u>
est from * <u>s</u> + <u>t</u>	sunt

with, however, the restriction of morpheme boundary:

$$\begin{array}{l} s \rightarrow s^+ (\# _ + C) \\ s^+ \rightarrow es \end{array}$$

Prothesis does not occur in Latin if the morpheme boundary is not present as in Lt.scala "ladder". This Latin prothesis rule is the precursor to the Romance prothesis rule, which later generalizes in Romance by losing the morpheme boundary restriction.

This analysis explains that the prothesis rule, $\emptyset \rightarrow e (\# _ sC)$, was not added to the grammar of Latin, but rather the Latin prothesis

6

Throughout the thesis the superscript '+' indicates a strengthened element, the superscript '-' a weakened element.

rule, $s \rightarrow s^+ (\# _ + C)$, has generalized in Romance by eliminating the morpheme boundary restriction. There has been a linguistic change by rule generalization from Latin to Romance by losing the restriction of morpheme boundary as

$$s \rightarrow s^+ (\# _ + C) \longrightarrow s \rightarrow s^+ (\# _ C)$$

If the above interpretation is limited to Romance languages, it may not be considered universal. In German, palatalization occurs to word initial s as in⁷

English	German	
sleep	schlafen	[\hat{s} lafən]
swim	schwimmen	[\hat{s} wimən]
star	Stern	[\hat{s} tɛrn]
spy	Spion	[\hat{s} piən]

The rule is

$$s \rightarrow \hat{s} (\# _ C)$$

Foley (1981, p26) argues that this is the same process as the Romance prothesis, applying in German with a different manifestation. In consonance with the IDP, both German and Romance word initial s undergoes strengthening but depotentiates into different manifestation:

$$s \rightarrow s^+ (\# _ C)$$

$$s^+ \begin{cases} \rightarrow es \text{ in Romance} \\ \rightarrow \hat{s} \text{ in German} \end{cases}$$

⁷ From Foley (1977, p110)

Whereas the two descriptive rule statements

$$\begin{array}{l} \emptyset \rightarrow e \text{ (\# \underline{\quad} sC)} \\ s \rightarrow \hat{s} \text{ (\# \underline{\quad} C)} \end{array}$$

remain unrelated to each other, thus provide no insights into the process underlying both Romance prothesis and German palatalization, the Theoretical interpretation

$$s \rightarrow s^+ \text{ (\# \underline{\quad} C)}$$

not only reveals the underlying nature of the process but also subsumes both phenomena under the general strengthening of word initial s. Although this interpretation of Romance prothesis may be unfavorable in Transformational Grammar since it violates the simplicity of rule description, Theoretical Phonology faced with violation of the geneticity principle is forced to reinterpret the process and look for the 'Latin origin of the Romance prothesis rule'. The result is a deeper understanding of the process by relating the two superficially disparate phenomena under a higher order process.

Consequently it is concluded that the view of epenthesis as insertion cannot be maintained. As in the Theoretical analysis of Romance prothesis, a correct interpretation of the process is required. Formulation of the epenthesis rule for Lt. camera Fr. chambre as

$$\emptyset \rightarrow b \text{ (m \underline{\quad} r)}$$

would not only violate the geneticity principle but also erroneously imply that linguistic change occurs by an arbitrary rule addition.

An obvious alternative formulation would be

$$\emptyset \rightarrow mbr$$

or in general notation,

$$C_1C_2 \rightarrow C_1KC_2$$

where K represents an excrescent epenthetic element.

Foley (1981, p78) interprets this canonical form further, as strengthening of two sufficiently strong elements (facilitation), followed by its depotentiation with appearance of an epenthetic element:

$$C_1C_2 \rightarrow (C_1C_2)^+ \quad (\text{facilitation})$$

$$(C_1C_2)^+ \rightarrow C_1KC_2 \quad (\text{epenthetic depotentiation})$$

Whereas the descriptive formulation of epenthesis violates the ontological principle which applies to all scientific disciplines, and thus isolates linguistics from other branches of science, the above interpretation not only conforms to this basic principle but also reveals the underlying nature of the process, thus providing an understanding of the process of epenthesis.

Mechanism of Epenthesis

The assumption reflected in the rule $\emptyset \rightarrow b (m_r)$, that the mechanism of epenthesis is a simple, abrupt insertion, does not reveal the internal

structure of the change involved nor does it relate consonantal epenthesis to other epenthetic processes. Analysis of a particular phonological process such as consonantal epenthesis can not be done just by describing the process in isolation without considering it under the general process of epenthesis. As in the Theoretical analysis of prothesis, understanding of linguistic processes is not gained by description of rules as disparate phenomena but only by 'interpretation' that reaches beyond superficial description to subsume similar processes under a higher order process.

Yet such a view of epenthesis prevails in Transformational Grammar. For example, arguing against the traditional notion of the gradualness of sound change, King (1969, p111) writes:

"What kind of gradualness is reasonably possible in epenthesis? If null becomes the vowel e in some environment, is it not simpler to assume the addition of a rule $\emptyset \rightarrow [e]$ rather than some hypothetical and completely implausible gradient of sounds between nothing and e?"

Beside simplicity, King's argument for assuming abrupt insertion of epenthetic element is that no plausible alternative exists.

However, a reasonable alternative view is not only possible but also necessary, if we wish to gain a deeper understanding of the process. In fact, this alternative view of epenthesis is not entirely a new idea, but a view implicitly held in traditional grammar. We may compare two traditional terms used for epenthesis: 'insertion' or 'intercalation' and 'excrecence'. Although traditionally these terms have been used

freely to refer to epenthesis and they will be used just as freely here unless the context requires a distinction between them, they nevertheless do not imply the same. On the contrary, theoretically they contrast with each other; insertion implies intrusion of a new element from outside, excrescence, outgrowth of a new element within (cf. Lt. excrescere from *ex "out" + crescere "to grow"). Insertion is the view widely recognized and formalized in Transformational Grammar but it violates the geneticity principle. Excrescence is the term often used in dictionaries to refer to epenthetic elements,⁸ and provides us with an alternative view of epenthesis, an alternative that does not violate the geneticity principle.

Under this alternative view, we interpret the mechanism of consonantal epenthesis as the following three steps;

camera	cinere	
camra	cinre	syncope
cam ^w ra	cin ^y re	1) glide epenthesis
camg ^w ra	cind ^y re	2) glide strengthening: G → CG
cambra	cindre	3) contraction: g ^w → b, d ^y → \hat{d}
"	cindre	phonetic manifestation of \hat{d} as d
chambre	cenre	MR

Glide epenthesis introduces an epenthetic glide w or y. The nature of the glide inserted depends on the nature of the consonant cluster; if both consonants are dental, y is inserted, but if one of them is

8

Note, for example, that Skeat (1980) calls the epenthetic d in thunder (cf. Old English þunor) "excrecent".

a labial, w is inserted.

Glide strengthening is strengthening of the inserted glide by acquiring a stop onset. One manifestation of this process is Holtzmann's Law, which also applies in Romance languages where Germanic w strengthens to g^w in strong word initial position:⁹

Germanic	Italian	Spanish	French	English
werra	guerra	guerra	guerre	war
wisa	guisa	guisa	guise	wise
warjan	guarire	guarecer	guérir	wary

It also applies in the assibilation mechanism. For instance, Foley (1977, p92), in the study of universal phonological rules of assibilation, argues that from Lt. iuvenis, Sp. joven [Xoβen] "young" has the following development;

1. yoven	
2. dyoven	Holtzmann's Law
3. dzyoven	assibilation proper
4. dʒoven	combination of z and y into ʒ
5. ʒoven	lenition, loss of stop onset
6. ʃoven	medieval Spanish sibilant devoicing
7. Xoven	Spanish velarization

Step 4 corresponds to the assibilated reflex of y in It. giovane [dʒovane], step 5 to Fr. jeune [ʒæn], and step 7 to Sp. joven. Whereas in assibilation glide strengthening appears as

y --> dy

⁹ Data from Boyd-Bowman (1954, p135)

with y glide strengthening since assibilation normally does not occur with w glide (cf. Fr. guerre "war" beside Fr. jeune "young"), in epenthesis mechanism it is manifested as

$$\begin{array}{l} w \rightarrow g^w \\ y \rightarrow d^y \end{array}$$

with both w and y strengthening.

Contraction is a strengthening process that coalesces two elements into one by increasing the bond strength on the Gamma parameter. In the epenthesis mechanism, it combines the stop onset and the inserted glide into a single consonant. The same type of contraction also occurs in Romance languages as in Lt. lingua Roumanian limba Sardinian limba "language", where Latin $g^w = (g, w)_2$ converts to $b = (g, w)_3$ in strong syllable initial position.¹⁰

Combination of glide strengthening and contraction also occurs in Spanish as in Lt. vita [wita] Sp. vida [biða] where Latin word initial w undergoes double strengthening:¹¹

wita	
g^w ita	glide strengthening: $w \rightarrow g^w$ (# ___)
bita	contraction: $g^w \rightarrow b$ (# ___)
biða	lenition: $t \rightarrow d \rightarrow \delta$ (<u> </u> <u> </u>)

As for the development of d^y , though there seems to be no tangible

10

Foley (1977, p110)

11

Foley (1977, p111)

examples, we assume, unless evidence to the contrary is adduced, that d^y also contracts to \hat{d} by the same process. Since this palatal \hat{d} does not occur in Romance languages, it appears phonetically as d .

These three rules in the order presented as above comprise the mechanism of consonantal epenthesis. Among them the most crucial is glide epenthesis; partly because it introduces the primordial epenthetic element, and partly because it is this rule that underlies all other epenthetic processes. Two arguments that can establish glide epenthesis as the first step of epenthesis are presented below; the first shows an evidence for its application in Latin, and the second concerns one of the goals in linguistics, namely the universal characterization of phonological processes.

Latin sibilant epenthesis. Traditionally Latin past participle forms of the type, Lt. visum from *vid+tum (1 sg. video "see"), have been explained by sibilant epenthesis as¹²

$d+t \rightarrow dst \rightarrow ss$

Though descriptively correct, this explanation has some problems. Foley (1981, p102) notes particularly that it does not provide any basis for explaining the later development of Spanish past participle visto (cf. inf. ver "see"). Compared with other past participle forms such as Sp. caso (cf. Lt. casum from *cad+tum, 1 sg. cado "fall"), Sp. visto

12

See Niedermann (1953, p148).

is anomalous since if Sp.caso is from Lt.casum, we would expect the incorrect \emptyset viso from Lt.visum. If, on the other hand, Sp.visto is considered as a regular development, we would rather expect the incorrect \emptyset casto, not Sp.caso. This problem arises partly because a simple, abrupt insertion is assumed in the mechanism of Latin sibilant epenthesis, and partly because the Latin past participles of Lt.visum and Lt.casum are considered as direct sources for the Spanish past participles of Sp.visto and Sp.caso.

The Theoretical solution maintains that the underlying forms for Sp.visto and Sp.caso are *vidto and *cadto. These underlying forms in fact develop from the Latin underlying forms *vid+tum and *cad+tum by the common Romance rules of lowering of u to o and loss of the final consonant.¹³ Foley reanalyzes the Latin sibilant epenthesis as inserting a yod first, followed by metathesis of yod and assibilation:

vid+tum	
vid ^y tum	glide epenthesis
vid ^y um	metathesis of yod
vidsum	assibilation
visum	ds --> ts --> ss --> s

The same development also occurs to Spanish past participle forms except that metathesis of yod with the following consonant fails in Sp.visto:

13

For an argument for these underlying forms, see the later development of the thesis, p87.

cadto	vidto	
cad ^y to	vid ^y to	glide epenthesis
cad ^t yo	fails	metathesis of yod
cadso	vizto	assibilation
casso	visto	assimilation
caso	"	degemination

Foley (op. cit., p103) argues that metathesis fails in Spanish *vid^yto > visto but not in the other forms because Latin initial w undergoes double strengthening in Spanish (cf. Lt.visum [wisum] , Sp.visto [bisto]) as

$$\begin{array}{l}
 w \rightarrow w^{++} \\
 w^{++} \rightarrow (g^w)^+ \\
 (g^w)^+ \rightarrow b
 \end{array}$$

which consequently reverses the normal direction of dissimilation as we saw earlier in the case of Sp.fragante.

The Theoretical interpretation of dissimilation of the type, Skt.dadhami from *dhadhami (cf. Grassmann's Law) or Sp.tiple from Lt.triplus is¹⁴

$$C \varphi K \rightarrow C^- \varphi K^+ \quad \text{where } |C - K| \leq d$$

That is, when two elements are sufficiently similar across whatever comes in between, dissimilation normally weakens the first of the two similar elements, with the weakened element often dropping as in the above examples. Consider, for example, Lt.quinque [k^wink^we] "five" from

¹⁴ See Foley (1981, p85)

IE *penk^we (cf. Gk.pente Skt.panca) where between the two conceptually similar elements of p=(k,w)₃ and k^w=(k,w)₂, weakening of the first element occurs on the Gamma parameter;

$$(k,w)_3 \text{ ---} \rightarrow (k,w)_2$$

A general condition on metathesis is that the yod be sufficiently strong.¹⁵ The double strengthening of the initial glide in Spanish, beside accounting for the conversion of Latin w to b in Sp.visto [bisto] , reverses the normal direction of dissimilation by weakening the second glide instead of the first one as

$$wid^y to \text{ ---} \rightarrow w^+id^y to$$

The weakened yod fails to metathesize yielding an assibilated reflex with the first dental of the cluster in Sp.visto. Where there is no glide strengthening, the yod metathesizes yielding eventually an assibilated reflex with the second dental of the cluster in Lt.visum, Lt.casum and Sp.caso.

A reinterpretation of Latin sibilant epenthesis as commencing with glide epenthesis solves the problem in Sp.visto, thus providing an argument for assuming the glide epenthesis as the first step in the mechanism of epenthesis. All of the rules used in the above explanation are universal rules; for example, the same consequential relation between

15

Foley (1981, p103)

metathesis of yod and assibilation also occurs in Sp.noche from *notye from *noyte from Lt.noctem "night". As in the case of Sp.visto, if metathesis of yod with the following consonant is blocked, no assibilation occurs as in Sp.petral (from *peytral from Lt.pectoralis "pectoral") where metathesis is blocked by the following two consonants.¹⁶

Universal characterization of epenthesis. The above analysis shows that by assuming glide epenthesis as the first step in epenthesis mechanism, we can relate epenthetic processes to each other. Though superficially Latin sibilant epenthesis and consonantal epenthesis of the type Fr.chambre from Lt.camera "chamber" are different in that the former inserts an epenthetic sibilant, but the latter an epenthetic stop, they are related in that the mechanism of both processes commences with glide epenthesis. This leads us to consider other epenthetic processes such as, for example, anaptyxis, the phonological process that inserts a vowel between two consonants as in substandard English ϕ film [filɪm] or Lt.ager for *agr (cf. gen. sg. agris "field").

One may assume a direct insertion of the vowel, but this would not reveal the relation to consonantal epenthesis, nor to Latin sibilant epenthesis. Rather, if we wish to relate anaptyxis to consonantal epenthesis, the process must be interpreted. Foley (1981, p96) posits insertion of glide as the first step, followed by its vocalization:

16

Foley (1981, p102). See also Foley (1979, p129).

film	agr	
fil m	ag ^y r	glide epenthesis
filəm	ager	vocalization

Whereas in consonantal epenthesis the inserted glide strengthens by acquiring a stop onset, in anaptyxis it strengthens by vocalizing.¹⁷

The importance of this interpretation is that though the study of anaptyxis is not our main concern here but a separate topic for investigation, the interpretation allows us to relate anaptyxis to consonantal epenthesis inasmuch as to subsume both processes under one general process of epenthesis, thereby opening the door to the characterization of epenthesis as a universal process.

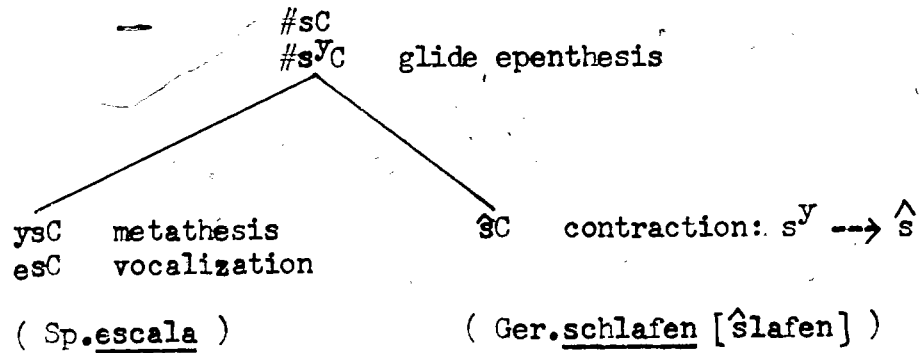
Moreover, the above interpretation has another repercussion. In our previous presentation of Romance prothesis and German palatalization, we explained that both Romance and German word initial s undergoes strengthening followed by its manifestation as

s⁺ $\begin{cases} \rightarrow \text{es in Romance (Sp. escala "ladder") } \\ \rightarrow \hat{s} \text{ in German (Ger. schlafen [\hat{s}lafen] "sleep") } \end{cases}$

but the relation between these reflexes has not been clear. Foley (1981, p96), however, explains that the process in fact begins with glide epenthesis, followed by metathesis of yod and vocalization in Romance but by contraction of s and y into \hat{s} in German:

17

Note that vocalization is a strengthening process depotentialization of which occurs on the Rho parameter. For further discussion, see Foley (1977, p35).



In both Romance and German, the initial sC cluster strengthens (i.e. facilitation), followed by epenthetic depotentiation. The different reflexes result from the different rules subsequently applying in each language.

Furthermore, it is well known that when vowels are in hiatus, a glide is often developed between them unless syneresis or contraction occurs. Thus Pope (1952, p492), for example, notes for the French dialects in the northern region that:

"In the course of Old French labial and palatal glides were often developed between vowels in hiatus ..., e.g. pawour, awiree, ... loweie, ... veyut ... "

From the theoretical point of view, this is another example of glide insertion, related to anaptyxis and consonantal epenthesis under the general process of epenthesis.

The change by epenthesis as occurring in Fr. chambre or Fr. cendre is not a direct modification of

mr --> mbr
and nr --> ndr

nor is the insertion of the new consonant abrupt, but rather it is the result of application of several sub-rules that are found to be applying independently in Romance languages. Since these rules are universal rules that belong to a small subset of the set of possible rules,¹⁸ it is expected that they apply repeatedly, and interact with each other in a complex phonological process such as epenthesis. Thus instead of introducing the above new rules as innovations, we rather view consonantal epenthesis as a coherent collection of three universal rules: 1) glide epenthesis, 2) glide strengthening by acquiring a stop onset, and 3) contraction of the onset and the inserted glide into a single consonant.

Although in a descriptive analysis where the goal is to describe linguistic phenomena simply, complex theoretical interpretations such as the above epenthesis mechanism may not be required, in a Theoretical analysis where the goal is not so much mere description as understanding, the motto is rather "No interpretation, no insights."

A Reflexology Problem in Epenthesis

Reflexology problems are phonological problems that concern reflexes of phonological rules. For example, epenthesis of almost identical clusters sometimes show different reflexes. Note that m'l --> mbl in French as in Lt.similare Fr.sembler "to seem" but m+l --> mpl in Latin as in Lt.exemplum from *ex+em+lom "example" (cf. emo "buy"). From clusters of **the same**

18

Foley (1975)

consonants m and l, the epenthetic reflex is a voiced b in French but a voiceless p in Latin. The same type of difference in epenthetic reflexes also occurs in German. Consider,¹⁹

MHG	German	Gloss
spinnel	Spindel	"spindle"
quenel	Quëndel	"a wild thyme"
ordenlich	ordentlich	"orderly"
öffenlich	öffentlich	"public"

where n+l --> ntl as in Ger.ordentlich from MHG orden+lich with the adjectival suffix -lich, but n'l --> ndl as in Ger.Quëndel from *quenl from MHG quenel.

Unlike the examples of epenthesis such as Fr.ancêtre from Lt. antecessor "ancestor" or Lt.compsi from *com+si (cf. como "place together"), the epenthetic p in Lt.exemplum cannot be attributed to voicing assimilation because the members of the cluster m+l are all voiced, as Niedermann (1953, p151) correctly noted;

"Il est naturel qu'entre s et r et de même entre m et s ou t l'occlusive épenthétique soit une soudre. En revanche, on s'attendrait à ce que entre m et l elle fût sonore. De fait, lat.cum(u)lum, hum(i)lem ont donné en français comble, humble et non *comple, *humple. Le p d'exemplum fait donc difficulté."

One may, however, still believe that the etymon of epenthetic elements in Lt.exemplum and Fr.sembler is the voiceless p, and p converted to

19

Data from Kluge (1963).

b by a voicing assimilation rule $mpl \rightarrow mbl$ in French but not in Latin. But this is not true since in the same language, German, the difference of voicing still exists as in the above Ger.ordentlich but Ger.Quëndel. Moreover, forms such as Lt.templum Fr.temple "temple" argue against this hypothesis since the mpl cluster in these examples has not undergone any change at all, neither in Latin nor in French. If the voicing assimilation rule were responsible for the alternation between the epenthetic reflexes of b and p, either the French reflex of Lt.similare should have been $\$sempler$ or the reflex of Lt.templum should have been $\$temple$ but neither is the case in French.

From these observations, it is concluded that the epenthetic p in Lt.exemplum is not an original reflex but rather a reflex of earlier *b, which somehow evolved to p. As the change in this Latin example is not attributable to voicing assimilation in any reasonable way, it is interpreted as part of the change by epenthesis, in particular as a further strengthening of the epenthetic element than in Fr.sembler as

$$w \rightarrow g^w \rightarrow b \rightarrow p$$

Though the strengthening of b to p is not easy to observe in Romance languages, it occurs in the Spanish dialect of Vasco²⁰ where strengthening of word initial w occurs further than in Spanish as in Lt.vinu Vasco

20

See Garcia de Diego (1959, p210). Note also that p is stronger than b on the Beta parameter (cf. Foley 1977, p33).

pino "wine" (cf. Sp.vino [bino]).

We thus would like to know why the mechanism of epenthesis progresses further in Lt.exemplum than in Fr.sembler and what causes this preferential progression. To answer these questions, we notice that the only difference in epenthesis of these examples is that the cluster m'l was produced by Romance syncope in Fr.sembler whereas there is no application of syncope in Lt.exemplum but merely the presence of a morpheme boundary. In this direction, to account for the different epenthetic reflexes we consider preferential application of syneresis induced by Romance syncope for producing different consonant cluster reflexes.

Syneresis, as mentioned earlier, is a strengthening process that applies preferentially to strong elements in consonance with the IDP. Recall, for example, the case of Sp.fragante where the strength necessary for syneresis of fr into fr̄ was facilitated by strengthening of word initial continuant f in Spanish, as $f \rightarrow f^+ (\# _)$.

According to the strength conservation principle,²¹ when an element weakens in a word by a weakening process as in Romance syncope, it releases a unit of strength S to maintain the constant strength inherent in that word. This unit of strength may combine with other elements for subsequent strengthening in that word. For example, consider the different reflexes of Latin and Romance clusters in the following data:

21

See Foley (1979, Chap. 11). Note that this principle derives from the second part of geneticity requirement, namely that 'nothing goes into nothing'. For further discussion, see Foley (1981, p25 and p34).

Latin	French	Gloss
populus	peuple	"people"
copula	couple	"couple"
duplus	double	"double"

After syncope, the Latin cluster pl converts to bl but the Romance cluster $p'l$ stays the same. The conversion of p to b in Lt.duplus Fr.double occurs by post-vocalic lenition which often applies before resonants as in, for example, Lt.patre It.padre "father". Thus we should ask why in French

$Vpl \rightarrow Vbl$
but $Vp'l \rightarrow idem$

Larousse (1971, p558) considers that the second p in Fr.peuple arises from Old French pueble due to assimilation to the initial p , but this explanation does not hold for Fr.table from Lt.tabula where b does not assimilate to the initial voiceless consonant, not $\#table$. Note, however, that the only difference between $p'l$ and pl is that syncope applied in the former but not in the latter. In consonance with the strength conservation principle, syncope of u releases a unit of strength S which combines with the cluster $p'l$ for preferential application of syneresis as in

$p'l + S \rightarrow \widehat{pl}$
but $pl \rightarrow idem$

This preferential application of syneresis blocks the expected occurrence of post-vocalic lenition in Fr.peuple and Fr.couple, because the cluster $p'l$ is now tightly bound as a single unit \widehat{pl} :

populu	duplu	
poplu	"	syncope: u --> ∅ + S
poplu	"	syneresis: pl + S --> p̂l
fails	dublu	post-vocalic lenition
peuple	double	MR

Returning to our original question, recall that syncope also applies in Fr.sembler from Lt.similare but not in Lt.exemplum from *ex+em+lom. In consonance with the strength conservation principle, syncope of i releases a unit of strength S, which combines with the cluster m'l for preferential application of syneresis as in

ex+em+lom	similare	
"	simlare	syncope: i --> ∅ + S
"	simlare	syneresis: ml + S --> m̂l
		but m+l --> idem

At this stage, intrusion of an epenthetic element is delayed in simlare because the cluster m̂l is now more tightly bound than m+l, and the development of epenthesis in simlare always lags one step behind the development in ex+em+lom:

ex+em+lom	simlare	
exem ^w lom	"	glide insertion / -----
exemg ^w lom	sim ^w lare	w --> g ^w / glide insertion
exemplom	simg ^w lare	g ^w --> b / w --> g ^w
exemplom	simblare	b --> p / g ^w --> b
exemplum	sembler	MR

The different epenthetic reflexes result from the prior, preferential application of syneresis to m'l, which interferes with the mechanical progression of epenthetic element in Fr.sembler but not in Lt.exemplum.

Conditions on Epenthesis

Like other phonological processes such as apocope, application of epenthesis in languages occurs preferentially. Though such preferentiality in occurrence of epenthesis has generally been overlooked or neglected in distinctive feature description of the process, observing it can lead to formulation of formidable problems, and often provides a basis for explaining the process systematically.

For example, consider

Latin	Old Provençal	French	Gloss
numeru	nombre	nombre	"number"
cinere	cenbre, cenre	cenbre	"ash"
molere	molre	moudre	"to grind"

According to Anglade (1921) and Grandgent (1965), the difference between O.Prov.cenbre and O.Prov.cenre is dialectal. Thus if we consider the two dialectal forms separately, since

m'r --> mbr
n'r --> ndr (cenbre)
but l'r --> idem

in one of Old Provençal dialects (Old Provençal dialect A), we see that epenthesis applies to m'r and n'r in preference to l'r. Similarly, since

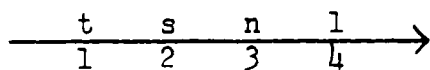
m'r --> mbr
but n'r --> idem (cenre)
l'r --> idem

in the other Old Provençal dialect (Old Provençal dialect B), we can

say that epenthesis occurs to m'r in preference to n'r and l'r. Combining these two observations, we can therefore conclude that epenthesis occurs to m'r in preference to n'r in preference to l'r.

If the two dialectal forms are considered as occurring in one language of Old Provençal, the conclusion is the same; epenthesis always occurs to m'r, but only sometimes to n'r, but never to l'r in Old Provençal.

But this preferential occurrence of epenthesis is not exactly what one would have expected to obtain in languages, given the interpretation of epenthesis as a strengthening process and the IDP that strengthening processes apply preferentially to strong elements. On the Rho phonological parameter



(t for stops, s for sibilants, n for nasals, l for liquids)

liquids are stronger than nasals. Since l is stronger than n, l'r is stronger than n'r. Under the IDP, we may therefore expect the strengthening process of epenthesis to occur to the stronger l'r in preference to the relatively weaker n'r. But the opposite configuration

n'r --> ndr
but l'r --> idem

obtains in Old Provençal dialect A. Thus initially this preferential configuration appears to be anomalous.

Recall, however, that we explained the different epenthetic

reflexes of Lt. exemplum and Fr. sembler by applying syneresis before epenthesis. The derivation is

ex+em+lom	similare	
"	simlare	syncope: i --> Ø + S
"	simlare	syneresis: ml + S --> \widehat{ml}
		but m+l --> idem
exem ^w lom	"	glide insertion / -----
exemg ^w lom	sim ^w lare	w --> g ^w / glide insertion
exemplom	simg ^w lare	g ^w --> b / w --> g ^w
exemplom	simblare	b --> p / g ^w --> b
exemplum	sembler	MR

The progression of epenthesis occurs further when a consonant cluster is less bound together, whereas syneresis, by binding a consonant cluster more tightly, delays intrusion of the epenthetic element. This indicates that though epenthesis occurs to both m+l and m'l, it is less likely to occur when a cluster is more tightly bound by syneresis.

A condition on syneresis is that the elements be sufficiently similar:

$$E_1E_2 \rightarrow \widehat{E_1E_2} \quad \text{where } |E_1 - E_2| \leq d$$

Foley (1979, pl12), for example, explains the failure of IE *k^w to contract to p in Gk. lukos from *luk^wos "wolf" as opposed to its normal contraction in Gk. polos from *k^wolos "axis" as a special type of syneresis where the preceding back vowel attracts the glide element as in lukos from *lu^wkos from *luk^wos. The glide w combines with the preceding vowel u rather than the following o because w is more similar to u than to o. Otherwise IE *k^w contracts to p:

luk ^w os	k ^w olos	
lu ^w kos	"	syneresis
lukos	polos	contraction

The similarity condition refers to similarity among phonological elements, or their closeness on phonological parameters.²² Thus the similarity among the three consonant clusters may be considered on the above Rho parameter. Since, however, among the liquid r is phonologically stronger than l, e.g. r --> rr (#__) as in Lt.rete Sp.red [rred] "net" but l --> idem (#__) as in Lt.leonis Sp.leon "lion", and since the numbers on phonological parameters indicate 'relational' (not absolute) strength of phonological elements, we expand the Rho parameter as

t	s	n	l	r	
1	2	3	4	5.	→

We should also consider the strength relation between m and n, for m and n do not behave the same with regard to epenthesis (i.e. m'r --> mbr but n'r --> idem in Old Provençal dialect B), even though they are both nasals, thus have the same Rho strength value. In Portuguese,²³ intervocalic n effaces as in Lt.manus Port.mão "hand" but intervocalic m remains as in Lt.fumare Port.fumar "to smoke". Effacement of nasals occurs preferentially to weak elements. Since n --> Ø but m --> idem in weak intervocalic position, we conclude that m is phonologically stronger than

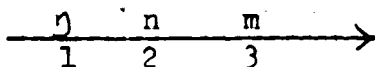
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Foley (1977, p79)

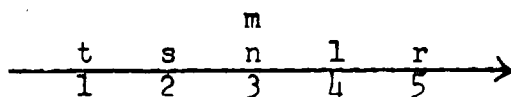
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Foley (1977, p59)

n. The parameter that defines this strength relation is the Alpha parameter in Romance languages:



By overlapping this parameter on the expanded Rho parameter



we can determine the similarity of three clusters in terms of the closeness of elements on phonological parameters. Since l is closer to r than n, l and r are more similar to each other than n and r. Similarly, since n is closer to r than m, n and r are more similar to each other than m and r. Combining these two similarity relations, we can conclude that l'r is more similar than n'r, which is more similar than m'r. We could have arrived at the same conclusion intuitively, but we prefer it this way because we would like to determine the exact condition on syneresis among the three clusters.

Since l'r is the most similar among the three clusters, under the condition on syneresis that the elements be sufficiently similar, it undergoes preferential syneresis as

$$\begin{array}{l} l'r \dashrightarrow \widehat{lr} \\ \text{but } n'r \dashrightarrow \text{idem} \\ m'r \dashrightarrow \text{idem} \end{array}$$

Consequently, intrusion of the epenthetic element to the l'r cluster is blocked in Old Provençal dialect A, because the cluster is now tightly bound by the above preferential syneresis:

numeru	cinere	molere	
numru	cinre	molre	syncope
"	"	mo ^l re	syneresis: l'r --> ^l lr but
			n'r, m'r --> idem
numbru	cindre	"	epenthesis
nombre	cenre	molre	MR

In Old Provençal dialect B, the above preferential syneresis generalizes so that the next similar n'r may undergo syneresis as well

l'r --> ^llr
n'r --> ⁿnr
but m'r --> idem

blocking epenthesis of n'r as well as l'r:

numeru	cinere	molere	
numru	cinre	molre	syncope
"	ci ⁿ re	mo ^l re	syneresis: l'r -> ^l lr, n'r -> ⁿ nr
			but m'r --> idem
nombre	"	"	epenthesis
nombre	cenre	molre	MR

In French where all of the three clusters undergo epenthesis, there is no application of syneresis, thus no blockage of epenthesis in any of these clusters.

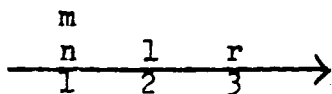
Note that if we do not consider the similarity condition on syneresis, we can not explain the above preferential application of epenthesis coherently. Since m is stronger than n on the Alpha parameter, mr is stronger than nr. One may thus think that the preferential epenthesis of

m'r over n'r in Old Provençal dialect B is due to epenthesis applying preferentially to the stronger m'r in consonance with the IDP. But since l'r is stronger than n'r on the Rho parameter, this assumption would make a wrong prediction that epenthesis will occur to l'r in preference to n'r in Old Provençal dialect A.

Similarly, since syneresis is also a strengthening process, one may consider that the preferential epenthesis of n'r over l'r in Old Provençal dialect A is due to blockage of epenthesis by preferential application of syneresis to the stronger l'r. But since m is stronger than n on the Alpha parameter, such an assumption would wrongly predict that epenthesis will occur to n'r in preference to m'r in Old Provençal dialect B.

These observations, however, do not imply that our interpretation of epenthesis is necessarily wrong, nor that the preferential epenthesis in Old Provençal contradicts the IDP. Rather, they indicate that the Old Provençal configurations of epenthesis are not a product of epenthesis applying directly to consonant clusters but an indirect result of prior, preferential application of syneresis to sufficiently similar clusters, under the principle that the more a consonant cluster is tightly bound by syneresis, the less epenthesis is likely to occur.

Assuming on our abbreviated Rho-Alpha parameter



that the dissimilarity of m and r is greater than that of n and r by

one unit, the conditions on syneresis are

syneresis: Cr \rightarrow Cr̂

universal condition: |C - r| \leq d

parochial condition: d = 0 for French

d = 1 for Old Provençal dialect A

d = 2 for Old Provençal dialect B

Of the following eight logically possible configurations of epenthesis among the three clusters,

- | | |
|--|---|
| 1) m'r \rightarrow mbr
n'r \rightarrow ndr
l'r \rightarrow ldr | 5) m'r \rightarrow mbr
n'r \rightarrow ndr
l'r \rightarrow idem |
| 2) m'r \rightarrow idem
n'r \rightarrow ndr
l'r \rightarrow ldr | 6) m'r \rightarrow mbr
n'r \rightarrow idem
l'r \rightarrow idem |
| 3) m'r \rightarrow idem
n'r \rightarrow idem
l'r \rightarrow ldr | 7) m'r \rightarrow idem
n'r \rightarrow ndr
l'r \rightarrow idem |
| 4) m'r \rightarrow mbr
n'r \rightarrow idem
l'r \rightarrow ldr | 8) m'r \rightarrow idem
n'r \rightarrow idem
l'r \rightarrow idem |

our analysis predicts that only 1), 5), 6), and 8) are linguistically possible configurations but 2), 3), 4), and 7) are not; 1) is the configuration occurring in French, 5) in Old Provençal dialect A, and 6) in Old Provençal dialect B. Configuration 8) is not currently adducible in Romance languages due to changes frequently occurring to the m'r cluster, but this is not sufficient evidence against the above analysis.

Finally, concerning the dialectal forms of cenre and cendre, note that our analysis also offers a coherent explanation of linguistic change that

can be perceived in dialectal variations of a language. In a descriptive analysis, it would be justified enough to say in the grammar of Old Provençal that epenthesis occurs obligatorily to m'r but optionally to n'r without being compelled to ask why only n'r but neither m'r nor l'r would exhibit such an optionality of the epenthesis rule. In our analysis, however, this is not unexpected.

As the similarity condition on syneresis stipulates, among the three clusters l'r ($d = 1$) is the most likely to undergo syneresis whereas m'r ($d = 3$) is the least likely to undergo syneresis. Therefore, if syneresis occurs to the three clusters in a language, we would expect that it will occur first to the most similar l'r, then generalize to include the less similar n'r and the least similar m'r by increasing the value of the condition $|C - r| \leq d$ as in

$$d = 1 \longrightarrow d = 2 \longrightarrow d = 3$$

On the other hand, since m'r is the least likely to undergo syneresis among the three clusters, it is the most likely to undergo epenthesis. Therefore, if epenthesis occurs to the three clusters in a language, we can expect that it will first occur to the least similar m'r, then generalize to include the more similar n'r and the most similar l'r by decreasing the value of the similarity condition as

$$d = 3 \longrightarrow d = 2 \longrightarrow d = 1$$

Either way, our analysis reveals that the dialectal forms arise due

to the failure of these rules to generalize as extensively as to occur to n'r in all dialects of Old Provençal. The fact that only the n'r cluster exhibits such dialectal variation means that it is at a transitional stage with regard to generalization of epenthesis and syneresis. Foley²⁴ uses the term 'transition point' to refer to such a stage at which linguistic rules are in the process of generalization. Thus d. = 2 is a transition point in Old Provençal.

Non-epenthetic Clusters

It has been problematic why clusters such as r'm, l'm, and r'l generally show no epenthetic reflexes in Romance languages, even though they are of the same consonants as the clusters that often undergo epenthesis, thus presumably of same strength and equal similarity. Consider the following examples in French:

	Latin	French	Gloss
m'r → mbr	*rememorare	revenir	"to remember"
but r'm → idem	sacramentu	serment	"an oath"
m'l → mbl	cumulu	comble	"a heap"
but l'm → idem	*calamu	chaume	"a straw"
l'r → ldr	molere	moudre	"to grind"
but r'l → idem	merula	merle	"a black bird"

Among clusters of same members, epenthetic and non-epenthetic clusters are distinguished when the order of consonants in these clusters is reversed.

As the data illustrates, two observations can be made immediately;

²⁴

The term was introduced in a class presentation.

1) among clusters of a nasal and a liquid, identical reflexes occur when a liquid precedes a nasal as in Lt.sacramentu Fr.serment but epenthetic reflexes occur when a liquid follows a nasal as in Lt. *rememorare Fr.remembrer, and 2) if both members of a cluster are liquids, identity occurs when l follows r as in Lt.merula Fr.merle but epenthesis occurs when l precedes r as in Lt.molere Fr.moudre.

On the Rho parameter liquids are stronger than nasals, and among the liquids r is stronger than l. Thus we may combine the above two observations and say that epenthesis occurs only when the second member of a consonant cluster is stronger than the first one. Though this is an improvement over our initial observation, it still is not an explanation, for the reason is not clear why epenthesis should fail when the first consonant is stronger than the second but not vice versa. Moreover, forms such as Lt.compsi (from *com+si) and Eng.Thompson (from *Thom+son) argue against this hypothesis since epenthesis does occur even when the first consonant m (= Rho 3) is stronger than the second consonant s (= Rho 2).

Thus approached directly in this way no solution can be proposed. There is, however, an indirect approach that can lead to an explanation of the above problem. Recall that the mechanism of epenthesis commences with glide insertion as in...

rememorare	
rememrare	syncope
remem ^W rare	glide insertion
rememg ^W rare	glide strengthening
remembrare	contraction
remembrer	MR

The same glide insertion also occurs to the above non-epenthetic clusters. Though the glide element is not readily visible, assuming its existence can solve the problem.

Positing such a preliminary step to solve phonological problems that are otherwise unsolvable is in fact not unusual in Theoretical Phonology. For example, explaining raising of vowels before nasals in words such as Eng. wind (cf. Lt. ventus), Foley (1977, p56) argues that raising is due to vocalization of nasals before consonants that produces an epenthetic high glide to which the preceding vowel assimilates:

wend	
wen ^y d	glide insertion
win ^y d	assimilation of e to y
wind	glide deletion

An independent argument for this procedure comes from conjugation of Latin verb velle "to wish":

volo	volumus
vis	vultis
vult	volunt

The radical vowel is raised when the stem final liquid is directly followed by a consonant as in vis, vult and vultis but not when followed by a thematic vowel. The derivations are

vels	volt'	
vel ^y s	vol ^w t	glide insertion
vil ^y s	vul ^w t	assimilation
viys	"	liquid deletion
"	vult	glide deletion
vis	"	contraction

The nature of the glide inserted here depends on frontness of the preceding vowel. The liquid is deleted when followed by a continuant, otherwise the glide is deleted. The derivation of wind parallels the derivation of vult. In both derivations, raising of the preceding vowel is explained by assuming glide insertion which does not have a phonetic appearance.

Similarly, positing an epenthetic glide for non-epenthetic clusters is an important step toward solution because once we accept that glide epenthesis can occur to these clusters despite its invisibility, the problem becomes more 'apparent'. Underlying the clusters of identity after glide insertion is the syneresis of a liquid with the inserted glide into a tightly bound diphthong, followed by absorption of the glide element as in

sacramentu	
sacrmentu	syncope
sacr ^w mentu	glide insertion
sacr ^w mentu	syneresis
sacrmentu	absorption
serment	MR

Consequently the inserted glide cannot strengthen further since it is tightly bound to r. Compare the following derivations of Fr.serment and Fr.rememberer:

rememorare	sacramentu	
rememrare	sacramentu	syncope
remem ^W rare	sacr ^W mentu	glide epenthesis
"	sacr ^W mentu	syneresis: r ^W --> r ^W
		but m ^W --> idem
remembrare	fails	w --> g ^W --> b
"	sacramentu	absorption
remembrer	serment	MR

In consonance with the IDP, this syneric bonding occurs to sufficiently strong elements. Thus between r^W and m^W it applies preferentially to r^W in the above derivation because liquids are stronger than nasals on the Rho parameter. Moreover, since among liquids r is stronger than l, it occurs to r^V in preference to l^V:

molere	merula	
molre	merla	syncope
mol ^V re	mer ^V la	glide epenthesis
"	mer ^V la	syneresis: r ^V --> r ^V but l ^V --> idem
moldre	"	y --> d ^V --> â --> d
"	merla	absorption
moudre	merle	MR

Finally, this analysis would be incomplete unless it also explains why epenthesis fails to occur to l'n in French as in Lt.alina Fr.aune "an ancient measure". According to our analysis, no epenthesis of l'n would imply prior syneresis of l^V to l^V as

alina	
alna	syncope
al ^V na	glide epenthesis
al ^V na	syneresis: l ^V --> l ^V
alna	absorption
aune	MR

Compared with the preceding derivation of Fr.moudre, the apparent syneresis of l^Y in this derivation appears to contradict the claim that r^Y undergoes syneresis in preference to l^Y .

With regard to this problem two aspects of preferential syneresis are considered. Firstly, as we have maintained in this analysis, syneresis is a strengthening process that applies preferentially to strong elements in consonance with the IDP. Thus between r^Y and l^Y , it applies first and preferentially to the stronger r^Y , and to l^Y only as a generalization. Secondly, concerning the direction of syneresis, note that certain processes are more likely to occur to Cy than yC . For example, in French assibilation occurs to ty but not to yt as in Lt.palatium Fr.palais "palace" but Fr.nuit from *noyt from Lt.noctem "night". Recall also the consequential relation between metathesis of yod and assibilation in Sp.noche from *notye from *noyte from Lt.noctem. Thus between r^Y and Yr , it is expected that syneresis will apply to r^Y first and preferentially as in the following derivation,

cinere	merula	
cinre	merla	syncope
cin ^Y re	mer ^Y la	glide insertion
"	mer ^Y la	syneresis: $r^Y \rightarrow r^Y$ but $Yr \rightarrow$ idem
cindre	"	$y \rightarrow d^Y \rightarrow \hat{d} \rightarrow d$
"	merla	absorption
cedre	merle	MR

then generalize to occur to Yr as well.

The intermediate stage *mol^Yre in the above derivation of Fr.moudre, however, meets neither of the two requirements for preferential syneresis

but rather belongs to the category of generalized application in both respects. It is due to this nature of the cluster *l^yr meeting requirements for generalized syneresis in both directions at the same time, that syneresis fails in Fr.moudre but not in Fr.aune, thus yielding an epenthetic reflex in the former but not in the latter:

molere	alina	
molre	alna	syncope
mol ^y re	al ^y na	glide insertion
fails	al ^y na	syneresis of l ^y to l ^y
moldre	"	y --> d ^y --> d̂ --> d
"	alna	absorption
moudre	aune	MR

To this point, no explanation has been offered for the failure of epenthesis in clusters such as r'm or r'l as opposed to the normal epenthesis of m'r and l'r. In this analysis, a theoretical solution is proposed by assuming an epenthetic glide in the derivations of non-epenthetic clusters as well as the clusters that often undergo epenthesis. The process responsible for the different reflexes in these clusters is syneresis; after glide insertion the preceding **strong** liquid combines with the inserted glide, blocking further strengthening of the glide and eventually absorbing the glide element. Otherwise, the inserted glide follows the routine in the epenthesis mechanism.

Summary

Consonantal epenthesis is a complex phonological process that comprises 1) glide epenthesis, 2) strengthening of glide by acquiring a stop onset, and 3) contraction between the inserted glide and the onset. It is comparable, in this regard, to other complex phonological processes such as nasalization or assibilation.²⁵

In previous analyses, this complex mechanism of epenthesis has not been considered. Instead, the analysis has been centered on describing the process under the mechanism of simple abrupt insertion, while explanation of the process is sought by resorting to phonetic causes for occurrence of the process. As a result, the process has been isolated from other epenthetic processes, and phonological problems such as the following could not be accounted for:

- 1) why $m+l \rightarrow mpl$ but $m'l \rightarrow mbl$ as in Lt.exemplum from *ex+em+lom "example" but Fr.sembler from Lt.similare "to seem"?
- 2) why does epenthesis occur to $m'r$ in preference to $n'r$ in preference to $l'r$ as in Lt.numeru O.Prov. nombre "number", Lt.cinere O.Prov. cedre cenre "ash", and Lt.molere O.Prov. molre "to grind"?
- 3) why $l'r \rightarrow ldr$ but $r'l \rightarrow idem$ as in Lt.molere Fr.moudre "to grind" but Lt.merula Fr.merle "a black bird"?

25

See Foley (1977, Chapters 4 and 6).

In the analysis presented here, it is argued that all of the above three phenomena are due to a systematic interaction of epenthesis with the universal process of syneresis, the process that joins phonological elements when they are sufficiently similar:

$$E_1E_2 \text{ ---} \rightarrow \widehat{E_1E_2} \quad \text{where} \quad |E_1 - E_2| \leq d$$

In particular, earlier preferential application of this process to consonant clusters interferes with the mechanical progression of epenthesis, under the principle that the more a consonant cluster is tightly bound by syneresis, the less epenthesis is likely to occur. Although the manifestation of this principle may differ from language to language or from problem to problem, it is this principle from which the solutions to the above problems are derived;

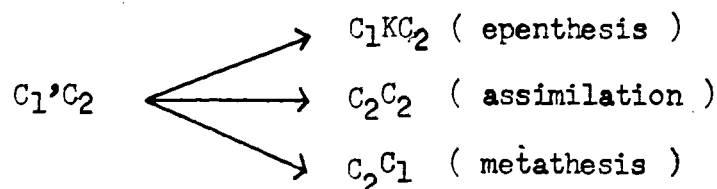
- 1) $m+l \text{ ---} \rightarrow mpl$ in Lt.exemplum but $m'l \text{ ---} \rightarrow mbl$ in Fr.sembler because when Romance syncope of *i* releases a unit of strength in consonance with the strength conservation principle, the strengthening process of syneresis binds the cluster $m'l$ more tightly than $m+l$, lagging the development of epenthesis in Fr.sembler always one step behind Lt.exemplum.
- 2) epenthesis occurs to $m'r$ in preference to $n'r$ in preference to $l'r$ in Old Provençal because syneresis applies to the most similar $l'r$ in preference to the less similar $n'r$ in preference to the least similar $m'r$.
- 3) $l'r \text{ ---} \rightarrow ldr$ but $r'l \text{ ---} \rightarrow \text{idem}$ because after application of glide epenthesis to both clusters, the inserted glide combines with the preceding sufficiently strong liquid for preferential syneresis, consequently blocking further strengthening of the glide and eventually absorbing the glide element.

The advantages of this analysis are:

- 1) It explains epenthesis as a phonological phenomenon without referring to the spurious phonetic causes.
- 2) It relates consonantal epenthesis to other epenthetic processes by replacing the view of epenthesis as 'insertion' with 'excrecence', and by interpreting its mechanism as a complex phonological process accordingly.
- 3) It proposes a principle of epenthesis under which the preferential application of epenthesis in particular languages is systematically governed.
- 4) It incorporates syneresis into the set of universal processes with its preferential application determined by the IDP, whereas in Transformational Grammar no attempt has been made to recognize the process despite the traditional observation made by Nandris.
- 5) It reveals the characteristic influence of syneresis on phonological processes, its interference with their development for producing different consonant cluster reflexes, thus opening a new perspective on phonological problems in the diverse reflexes of epenthesis discussed in the next chapter.

IV. The Catalytic Influence of Syneresis

Generally speaking, consonant clusters that undergo epenthesis in Romance languages result in the following variety of reflexes:



In the preceding chapter we were mainly concerned with explaining epenthesis: its complex mechanism and the different reflexes determined by preferential application of syneresis. In this chapter we examine more reflexes of Romance consonant clusters with regard to the above three phonological processes. In particular, we are interested in explaining phonological problems that arise in diverse reflexes of the type,

m'r --> mbr
but n'r --> rr

or

n'r $\begin{cases} \rightarrow ndr \left(\begin{smallmatrix} \circ \\ \check{v} \\ \hline \end{smallmatrix} \right) \\ \rightarrow rn \left(\begin{smallmatrix} \check{v} \\ \hline \end{smallmatrix} \right) \end{cases}$

by developing further the idea that syneresis influences preferential application of phonological processes. Though in a descriptive analysis these diverse reflexes may not be perceived as a problem, theoretically they require explanations due to various reasons discussed below.

Let us begin, then, with the mixed configuration of epenthesis and assimilation in Italian where m'r --> mbr but n'r, l'r --> rr:

Latin	Italian	Gloss
memorare	membrare	"to remember"
*poneraio	porrò	3 sg. fut. "put"
*valeraio	varrò	3 sg. fut. "be worth"

Considering preferential application of epenthesis for the nonce, since m'r is the most likely to undergo epenthesis among the three clusters, we may derive the above forms as

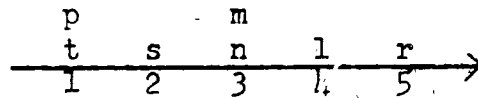
memorare	poneraio	valeraio	
memrare	ponraio	valraio	syncope
"	ponraio	valraio	syneresis: l'r -> lr
			n'r -> nr, but m'r -> idem
membrare	"	"	epenthesis
"	porraio	varraio	assimilation
"	porrò	varrò	MR

Note however that in this derivation earlier preferential application of epenthesis to m'r blocks assimilation of m'r. That is, we cannot be sure that this is the right solution unless we also consider preferential application of assimilation, since assimilation may have occurred to m'r were it not for the epenthesis rule preceding it.

We therefore would like to make a few observations concerning preferential application of assimilation. First, assimilation often applies preferentially to similar elements. Thus between ts and ps in Latin, it occurs to ts in preference to ps:

ts --> ss (Lt.missum from *mitt+sum, cf. mitto "send")
 but ps --> idem (Lt.clepsi from *clep+si, cf. clepo "steal")

The similarity between these clusters is determined on the overlapped
 Rho-Alpha parameter:



ts is more similar than ps as nr is more similar than mr. In Italian,
 the above preferential assimilation generalizes so that the less similar
 ps may undergo assimilation as well:

ts --> ss (It.nesso from *mett+so, cf. inf. mettere "send")
 and ps --> ss (It.cassa from Lt.capsa "case", cf. capio "take")

In certain cases, however, the contrary obtains. Between bs and ps
 in Latin, for example, assimilation occurs to bs in preference to ps:

bs --> ps (Lt.scripsi from *scrib+si, cf. scribo "write")
 but ps --> idem (Lt.capsa "case", cf. capio "take")

though both consonants in ps are voiceless, thus more similar than bs
 where one consonant is voiced but the other voiceless, assimilation
 applies preferentially to the less similar bs. Moreover when this rule
 generalizes in Italian, not only the original ps but also the secondary
 ps undergoes assimilation as

bs --> ps (--> ss)
 and ps --> ss

as in It.scrissi from *scrib+si (cf. inf. scrivere "to write") and
 It.cassa from Lt.capsa "case":

scribsi	capsa	
scripsi	"	1. bs --> ps
scrissi	cassa	2. ps --> ss

This peculiar property of preferential assimilation is not limited to voicing assimilation, but it is also observed in partial assimilation:

m't --> nt	as in Lt. <u>comite</u>	It. <u>conte</u>	"count"
but n't --> idem	as in Lt. <u>bonita</u>	It. <u>bonta</u>	"goodness"

Though nt is more similar than mt on the above Rho-Alpha parameter, assimilation occurs to mt in preference to nt as it occurs to bs in preference to ps. Therefore if assimilation applies to m'r and n'r in a language, we would expect either a preferential assimilation,

m'r --> nr
but n'r --> idem

as in Lt.*cremeraio Fr.craindrai "I will fear" but Lt.teneraio Fr.
tiendrai "I will hold";

cremeraio	teneraio	
cremraio	tenraio	syncope
crenraio	"	assimilation: m'r --> nr
		but n'r --> idem
crendraio	tendraio	epenthesis
craindrai	tiendrai	MR

or a generalized assimilation,

m'r ---> rr (---> rr)
and n'r ---> rr

but not

n'r ---> rr
but m'r ---> idem

We are not concerned here with explaining why assimilation occurs preferentially to similar elements in one case but to less similar elements in the other, but the above observation indicates that assimilation can not occur to n'r unless it also occurs to m'r because it is more likely to occur to m'r than to n'r. But the Italian configuration,

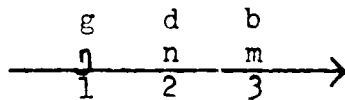
m'r ---> mbr
but n'r ---> rr
l'r ---> rr

does not reflect this property of preferential assimilation. That is, without regard to derivability of correct reflexes, the above Italian configuration poses a problem because though epenthesis of m'r does not necessarily imply epenthesis of n'r nor l'r, assimilation of n'r does imply assimilation of m'r in a language. In the solution proposed at the beginning, this problem was camouflaged by ordering epenthesis before assimilation, which effectively blocked occurrence of assimilation to m'r. We can, however, have a better and more theoretically motivated solution if we regard syneresis already applying in the derivation as influencing not only epenthesis but also assimilation.

As an independent argument for this interpretation, consider

Latin	Spanish	Gloss
lumbus	lomo	"loin"
mundus	mundo	"world"
longus	luengo	"long"

where mb \rightarrow mm \rightarrow m but nd, ŋg \rightarrow idem.¹ If we consider the similarity among these clusters, on the Romance Alpha parameter²



m seems to be as similar to b as n is to d or η is to g. We therefore can not argue that mb is somehow more similar than nd and η g and the above preferential assimilation of mb to mm is due to assimilation applying preferentially to the more similar mb. Since, however, syneresis is a strengthening process and the cluster mb is stronger than nd and η g on the above phonological parameter, we can explain the preferential assimilation by regarding syneresis as influencing the application of assimilation. In consonance with the IDP, the stronger mb undergoes syneresis in preference to the weaker nd and η g as

1

Note that the conversion of mb to m is interpreted as mb \rightarrow mm \rightarrow m on the basis of the degemination rule in Spanish, i.e. mm \rightarrow m as in Lt. flamma Sp. llama "flame". Another interpretation of the change may be 1) m \rightarrow m⁺ (C) 2) m⁺ \rightarrow mm with subsequent loss of b by cluster simplification. This interpretation, however, automatically predicts by the IDP that m should strengthen before p as well because p (= Beta 3) is stronger than b (= Beta 2) and according to the IDP strengthening occurs preferentially in strong environments. Such is not the case in Spanish, however, as can be seen in Lt. tempu Sp. tiempo "time", not ϕtiemo.

2

See Foley (1977, p59).

mb --> \widehat{mb}
 but nd --> idem
 ŋg --> idem

Consequently the more tightly bound mb undergoes preferential assimilation
 as

mb --> \widehat{mb} --> mm

but the other clusters unaffected by syneresis stay the same:

lumbus	mundus	loŋgus	
\widehat{lumbus}	"	"	syneresis: mb --> \widehat{mb} but
			nd, ŋg --> idem
lummus	"	"	assimilation
lumus	"	"	degemination
lomo	mundo	lueŋgo	MA

Note that as the similarity among the three clusters could not determine the preferential application of assimilation to mb, neither can the similarity condition on syneresis because the members in the three clusters are presumably equally similar to each other.

The importance of this analysis is that though we cannot explain why assimilation occurs preferentially to mb over nd and ŋg by considering the similarity among the three clusters, we can explain it by regarding syneresis as influencing the process of assimilation; it is not the case, however, that assimilation occurs preferentially whenever syneresis occurs but rather that syneresis, by its nature, serves as a 'catalyst', facilitating application of other phonological processes.

As an illustration of this concept, consider the application of

prothesis in Latin:

s --> es (# ___ + C) as in Lt. est from *s + t
but s --> idem (# ___ C) as in Lt. scala "ladder"

In a descriptive analysis, the analysis may stop here since the above rules describe the data correctly. In a theoretical analysis, however, such a description is not enough because it does not explain why prothesis applies in Latin only when the morpheme boundary is present but not otherwise. Rather, if one wants to explain linguistic facts rather than just describe them, the analysis must go further, by interpreting the data and by developing universal concepts that can reveal some insights into the nature of Language. Foley (1971, p381) attributes the reason to the 'catalytic influence of morpheme boundary'. Similar to the influence of syneresis on assimilation in Spanish, the morpheme boundary influences application of prothesis by serving as a catalyst, thus facilitating its application even though the contiguity to a morpheme boundary is not particularly a strong environment favorable for prothesis.

It is concluded that the diverse reflexes of epenthesis and assimilation in Italian arise due to the catalytic influence of syneresis; since a condition on syneresis is that the elements be sufficiently similar, l'r and n'r are more likely to undergo syneresis than the less similar m'r:

l'r --> lr
n'r --> nr
but m'r --> idem

This preferential syneresis has two consequences in Italian. Firstly, as in Old Provençal dialect B it blocks intrusion of epenthetic elements in l'r and n'r. Secondly, as in the above preferential assimilation in Spanish it facilitates application of assimilation to l'r and n'r by combining these clusters into tightly bound units;

memorare	poneraio	valeraio	
memrare	ponraio	valraio	syncope
"	po ^h raio	va ^h raio	syneresis: l'r --> l ^h r, n'r --> n ^h r, but m'r --> idem
"	porraio	varraio	assimilation
membrare	"	"	epenthesis
"	porrò	varrò	MR

Note that unlike our first derivation in which the failure of assimilation to m'r despite its occurrence to n'r was explained by ordering epenthesis before assimilation, this derivation explains the diverse reflexes without relying on such ordering relationship; since syneresis impedes intercalation of epenthesis but expedites application of assimilation at the same time, the rule ordering between assimilation and epenthesis is not required.

For the syneresis rule formulated in the preceding chapter, Italian has the same parochial condition as Old Provençal dialect B:

syneresis: Cr --> C^hr
 universal condition: |C - r| ≤ d

parochial condition: d = 2 for Italian

Whereas in Old Provençal dialect B the preferential syneresis of l'r and n'r blocks epenthesis of n'r and l'r resulting in preferential epenthesis of m'r to mbr, in Italian it not only blocks epenthesis of n'r and l'r but also facilitates application of assimilation to these clusters, thus resulting in the diverse reflexes of epenthesis and assimilation.

In the following, more examples of diverse reflexes of Romance consonant clusters are examined. In analyzing these examples, our main concern is not whether a certain solution can derive correct reflexes but rather whether such a solution is in fact a theoretically motivated one, acceptable as a valid explanation of the problem. As in the above analysis, a workable solution can not be regarded as a genuine explanation until it finds a theoretical reason that renders some insights into the nature of Language.

Epenthesis and Metathesis in Spanish

The Spanish m'l cluster epenthesizes in certain words but metathesizes in others:

Latin	Spanish	Gloss
tremuláre	temblar	"to tremble"
similáre	semblar	"to make similar"
cúmulu	colmo	"a heap"
túmulu	tolmo	"mound"

The same variety of reflexes also occurs for the Spanish n'r cluster. Consider,

Latin	Spanish	Gloss
ingeneráre	engendrar	"to create"
géneru	yerno	"son-in-law"
Véneris	viernes	"Friday"
téneru	tierno	"tender"

Why from the same clusters, m'l and n'r, do different reflexes arise, one with epenthesis (mbl and ndr) but the other with metathesis (lm and rn)? If we compare the stress pattern in the above Latin words, we notice that epenthesis occurs whenever the main stress falls on the penultimate but metathesis occurs whenever the stress is on the antepenultimate. Thus the pattern seems to be that after syncope,

$$\begin{array}{l} C_1'C_2 \rightarrow C_1KC_2 \left(\begin{array}{c} \overset{\circ}{v} \\ \underline{\quad} \end{array} \right) \\ \text{but } C_1'C_2 \rightarrow C_2C_1 \left(\begin{array}{c} v \\ \underline{\quad} \end{array} \right) \end{array}$$

As before, we consider an explanation of this configuration by referring to rule ordering.

In Theoretical Phonology,³ in addition to the extrinsic ordering of phonological rules, partially identical rules are ordered as well according to their preferential condition, and other phonological rules can interrupt them. This principle of rule interruption often solves phonological problems that are otherwise unsolvable. For example, consider the following reflexes of assibilation in French:

Latin	French	Gloss
basilica	basoche	"lawyer's clerk"
judicáre	juger	"to judge"

³ See Foley (1977, Chap. 5).

From the same etymon k, the assibilated reflex is the voiceless \hat{s} in one case (Fr.basoche) but the voiced \hat{z} in the other (Fr.juger), contrary to the normal parallelism in voicing between the etymon and the assibilated reflex in Lt.centum Fr.cent [sã] "hundred" and Lt.gentum Fr.gent [zã] "nation". Simple ordering of lenition and syncope can not explain this problem. For, if lenition applies before syncope,

basilika	judikare	
basiliga	judigare	lenition: k --> g (V__V)
basilga	judgare	syncope: i --> \emptyset
basilza	judzare	assibilation: g --> z (__a)
\emptyset baso \hat{z} e	ju \hat{z} er	MR

an incorrect \emptyset baso \hat{z} e results. If, on the other hand, syncope applies before lenition,

basilika	judikare	
basilka	judkare	syncope: i --> \emptyset
"	"	lenition: k --> g (V__V)
basilza	judsare	assibilation: k --> s (__a)
baso \hat{z} e	\emptyset ju \hat{s} er	MR

an incorrect \emptyset ju \hat{s} er results. Simple application of lenition and syncope in either order yields an incorrect form, thus can not solve the problem. Since, however, the environment for syncope in each word is different (i.e. one occurs in post-tonic position but the other in pre-tonic position), we can split the syncope rule into two and interrupt lenition between them as in

basílika	judikáre	
basilka	"	post-tonic syncope
"	judigare	lenition: k --> g (V__V)
"	judgare	pre-tonic syncope
basilsa	judzare	assibilation
basoše	južer	MR

where both forms result in correct reflexes.

Syncope is a weakening process (elision) that applies preferentially in weak environments in consonance with the IDP. Though in the above derivation syncope occurs in both post-tonic and pre-tonic position, it occurs earlier in the former because the vowel in the post-tonic position is weaker than the same vowel in the pre-tonic position. The interruption of lenition between the two partially identical rules of syncope explains why the two different reflexes of assibilation arise in French.

The same situation obtains for the different reflexes of m'l and n'r in Spanish. After syncope, if epenthesis precedes metathesis as in

tremulare	cumulu	
tremlare	cumlu	syncope
tremblare	cumblu	epenthesis
"	"	metathesis
temblar	¢comblo	MR

both forms result in epenthetic reflexes. If, on the other hand, metathesis precedes epenthesis as in

tremulare	cumulu	
tremlare	cumlu	syncope
trelmare	culmu	metathesis
"	"	epenthesis
¢trelmar	colmo	MR

then both result in metathetic reflexes. Either simple extrinsic ordering of epenthesis and metathesis yields an incorrect form, thus cannot derive correct reflexes for both forms.

But syncope does not always apply as a single rule. Rather its application is determined by the preferential conditions on the process. Thus in consonance with the IDF, it occurs earlier in post-tonic position than in pre-tonic position. If we assume that metathesis occurs between these two applications of syncope, we can have a correct derivation for both forms:

tremuláre	cúmulu	
"	cumlu	post-tonic syncope
"	culmu	metathesis
tremlare	"	pre-tonic syncope
tremblare	"	epenthesis
temblar	colmo	MR

Note, however, that though the order of the two syncope rules is determined theoretically (i.e. according to the preferential condition on the process), the order of rule application between metathesis and epenthesis is determined by trial and error. That is, we know that metathesis should precede epenthesis in the derivation because if this order is reversed, both forms will result in incorrect etrelmar and etcomblo. This is a problem with the above solution since such an ordering lacks a theoretical motivation: the only reason why metathesis should precede epenthesis is because this order yields correct reflexes whereas the reversed order does not.

We can comprehend why syncope should precede epenthesis or metathesis in the above derivation, for without syncope there would be no Romance clusters available for application of these processes. The order of rules in this case, though determined by the same trial and error method, not only yields correct reflexes but, more importantly, the preceding syncope creates an environment essential for later application of epenthesis or metathesis. In contrast, ordering metathesis before epenthesis in the above solution does not display such motive nor any theoretical reason for the ordering but its sole purpose is to derive correct reflexes. Moreover, the problem is aggravated by the fact that these rules apply to the same etymon m'l. This was exactly why the simple ordering of epenthesis and metathesis did not work, for the ordering relationship between these two rules is such that earlier application of one destroys the environment crucial for later application of the other.

In linguistics we sometimes use this type of rule ordering because often it is the only way to have a correct derivation. But such is not the case here, since we can derive the same reflexes without relying on the problematic rule ordering. As we know from Verner's Law, the weakening process of lenition occurs preferentially after an unstressed vowel as in Eng.exist [egzi^oist] but Eng.exit [éksit]. Thus the configuration

$$\begin{array}{l} ks \rightarrow gz \quad \left(\begin{array}{c} \overset{\circ}{\underset{\circ}{\underline{v}}} \\ \underline{\underline{v}} \end{array} \right) \\ \text{but } ks \rightarrow \text{idem} \quad \left(\begin{array}{c} \overset{\circ}{\underline{v}} \\ \underline{\underline{v}} \end{array} \right) \end{array}$$

shows that the post-tonic position is stronger than the post-atonic position because weakening processes occur preferentially in weak

environment in consonance with the IDP:

$$(\acute{v}__) > (\overset{\circ}{v}__)$$

Then the observed pattern in Spanish,

$$\begin{array}{l} C_1' C_2 \longrightarrow C_1 K C_2 \left(\overset{\circ}{v}__ \right) \\ \text{but } C_1' C_2 \longrightarrow C_2 C_1 \left(\acute{v}__ \right) \end{array}$$

suggests that the strengthening process of syneresis occurs preferentially in the strong post-tonic position as

$$\begin{array}{l} C_1' C_2 \longrightarrow \overset{\frown}{C_1 C_2} \left(\acute{v}__ \right) \\ \text{but } C_1' C_2 \longrightarrow \text{idem} \left(\overset{\circ}{v}__ \right) \end{array}$$

As arguments for this interpretation consider,

- 1) syneresis is a strengthening process that applies preferentially in strong environments in consonance with the IDP. Since the post-tonic position is stronger than post-atomic position, it is thus expected that syneresis will occur preferentially after a stressed vowel
- 2) preferential syneresis also explains why mb \rightarrow m but nd, ŋg \rightarrow idem in Spanish.
- 3) under the principle of epenthesis, epenthesis occurs preferentially when syneresis does not occur.

It is concluded that this preferential syneresis induces the diversity in reflexes of m'l and n'r in Spanish. As in the analysis of

diverse Italian reflexes, the above preferential syneresis of m'l and n'r in post-tonic position has two consequences. First, it blocks the expected occurrence of epenthesis in post-tonic position. Secondly, by combining the clusters into tightly bound units, it facilitates the application of metathesis in the same position as

$$C_1C_2 \rightarrow \widehat{C_1C_2} \rightarrow C_2C_1$$

The relevant derivations are:

tremuláre	cúmulu	ingeneráre	téneru	
tremlare	cumlu	ingenrare	tenru	syncope
"	cumlu	"	tenru	syneresis: $\widehat{C_1C_2}$
				$\rightarrow \widehat{C_1C_2}$ (\leftarrow)
tremblare	"	ingendrare	"	epenthesis
"	culmu	"	ternu	metathesis
temblar	colmo	engendrar	tierno	MR

This analysis illustrates how recognition of syneresis as a catalyst can explain the diverse reflexes of Romance consonant clusters coherently. Though the solution in terms of rule interruption can derive correct reflexes, it is suspect because it was unjustifiably assumed that metathesis should precede epenthesis in the derivation but not vice versa. Since, however, epenthesis occurs preferentially when a cluster is not bound by syneresis under our principle of epenthesis, we can explain the diverse reflexes without referring to the unmotivated rule ordering, by regarding syneresis as influencing not only epenthesis but also the application of metathesis.

On the basis of the two analyses presented so far, we summarize the function of syneresis in determining different reflexes of Romance

consonant clusters. In epenthesis, the prior application of syneresis to consonant clusters works against the process, thus impeding or blocking the intercalation of epenthetic elements. In metathesis and assimilation, it influences the processes in such a way that it often facilitates a basis for their occurrence even in an environment not likely to induce application of these processes.

The rationale for assuming the first function is rather simple; it is because syneresis systematically governs the application of epenthesis under the principle that the more a cluster is tightly bound by syneresis, the less epenthesis is likely to occur. The rationale for the second function, however, is more subtle since such a phenomenon is not systematically governed but observed only in certain particular cases. We will not speculate here on why assimilation and metathesis are favored in syneric environment but may point out that these processes differ from other processes in that they are not primarily governed by strength operation: among fundamental processes, Foley (1981, p99) lists these processes under 'nonaffective processes' but epenthesis under 'affective processes' (processes that involve strengthening or weakening of phonological elements). We therefore may suspect that nonaffective processes such as metathesis and assimilation are more likely to be favored by syneresis than affective processes such as epenthesis because these are the processes that are not primarily affected by strength fluxion.

Epenthesis and Assimilation in French

Epenthesis of the m'r cluster exhibits alternate reflexes between mbr and ndr in the history of French:

Latin	Old Fr.	New Fr.	Gloss
cremere	criembre	craindre	"to be afraid of"
gemere	giembre	geindre	"to moan"
premere	priembre	(em)preindre	"to (im)print"

Traditionally,⁴ explanation of this alternation has resorted to analogical influence of forms such as Fr. ceindre and peindre (cf. Lt. cingere "to gird", Lt. pingere "to paint"). Walker (1978, p79), in his article on "Epenthesis in Old French", also considers that the traditional attribution to analogy may well constitute part of the impetus for the change but concedes,

"One difficulty with such frequent analogical claims is their extremely unconstrained nature. No doubt other, parallel forms could be adduced to show, post factum, equally plausible but opposite development"⁵

Rather than regarding the historical change as completely analogical, Walker (op. cit., p77) instead proposes a solution in terms of rule reordering. Observing that synchronically epenthesis should precede assimilation of nasals to following liquids in order to condition an

⁴ See Pope (1952, p354).

⁵ Walker (1978, p80 f.)

epenthetic reflex in forms such as Fr. prendre from /prentre/ (cf. Lt. prehendere "to take"), while historically nasal assimilation preceded epenthesis, Walker argues that the change in the epenthetic reflexes of m'r in French is caused by reordering nasal assimilation before epenthesis. Walker's solution, a sample derivation of which is⁶

Old French		Modern French	
/crem'tre/		/crem'tre/	
crembre	1. epenthesis	crenre	1. assimilation
"	2. assimilation	cren're	2. epenthesis
criembre	MR	crainde	MR

has exceptions. He notes:

"There are several OF forms, particularly the futures of doner 'give' ... which are exceptions to epenthesis and to which assimilation subsequently applies to give dorrai ..."

Both traditional and Transformational explanations are not acceptable in Theoretical Phonology; the former because it relies on the un-systematic concept of analogy and the latter because of the exceptions. Although Walker (op. cit., p78) attempts to maintain his analysis by saying that forms such as OF dorrai in which epenthesis exceptionally fails but assimilation subsequently occurs, indicate the necessity of reordering epenthesis and assimilation in the sense that assimilation

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Walker (1977, p179)

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Walker (1978, p77)

'removes' the exceptions to the epenthesis rule by applying after epenthesis, it is moot to base the argument for rule reordering on exceptions. Furthermore, an examination of reflexes of n'r in Old French reveals that forms such as OF dorrai are not exceptions to epenthesis but rather a separate phonological problem to solve. Consider⁸

Romance	Old French	Gloss
*veniraio	vendrai	"I will come"
*teneraio	tendrai	"I will hold"
*doneraio	dorrai	"I will give"

where the n'r cluster which arises due to loss of thematic vowels, exhibits alternate reflexes between epenthesis and assimilation.

The reason why Walker considers OF dorrai as an exception to epenthesis in Old French is rather obvious; it is because in Transformational Grammar phonological rules are viewed as applying to a general class of sounds that share feature notations. Since m'r --> mbr in Old French and m and n are both nasals, it was immediately assumed that n'r should always undergo epenthesis in Old French. However, this is not true since 1) m'r --> mbr but n'r --> idem in Old Provençal as in Lt.numeru O.Prov.nombre "number" but Lt.cinere O.Prov.cenre "ash" and 2) m'r --> mbr but n'r --> rr in Italian as in Lt.memorare It.membrare but Lt.*poneraio It.porro. Configurations such as the one in Old Provençal,

m'r --> mbr
but n'r --> idem

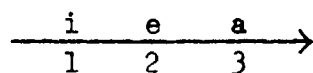
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The Old French data are from Einhorn (1974, pp149-165).

indicate that phonological change is rather preferential, i.e. phonological rules typically apply to particular elements first and to a group of elements only as a generalization of this preferential application.⁹

Thus from the observations made so far, we have two phonological problems to consider: the historical change in epenthetic reflexes of m'r from Old French to Modern French and the alternate reflexes of n'r between epenthesis and assimilation in Old French. It will be argued below that both phenomena are the result of the catalytic influence of syneresis on assimilation.

Considering first the question on the Old French reflexes of n'r, note that the only difference in environments for n'r in these examples is what theme vowel is lost by the pre-tonic syncope. We may therefore consider an explanation in terms of preferential syncope and rule interruption. Syncope, as mentioned earlier, is a weakening process that occurs preferentially to weak vowels in consonance with the IDP. With reference to the abbreviated phonological parameter of vowels,¹⁰



though syncope occurs to all of the three vowels in the above Old French future forms, it occurs earlier to i than e and a, or earlier to i and e than to a since a general condition on elision is that elision occurs

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Foley (1977, p27)

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Foley (1977, p45)

preferentially to weak elements. In other words, since a is the strongest vowel among the three vowels, it is the last to drop by syncope.

If we assume that epenthesis applies after syncope of i and e but assimilation applies after syncope of a

veniraio	teneraio	donaraio	
venraio	"	"	syncope 1: i --> Ø
"	tenraio	"	syncope 2: e --> Ø
vendraio	tendrai	"	epenthesis: n'r --> ndr
"	"	donraio	syncope 3: a --> Ø
"	"	dorraio	assimilation: n'r --> rr
vendrai	tendrai	dorrai	MR

we can easily derive the correct reflexes in all of the three forms. But this solution raises the question why epenthesis should precede assimilation but not vice versa, the same question we raised against the rule ordering solution for the two reflexes of m'l and n'r in Spanish. The problem is that if we reverse the rule order between epenthesis and assimilation in the above derivation, all of the three forms will result in incorrect øverrai, øterrai, and ødondrai.

In terms of syneresis, however, we can provide a better solution without referring to this problematic rule ordering. As we recall, the strength conservation principle stipulates that when an element in a word weakens by a weakening process such as syncope, it releases a unit of strength S in order to maintain the constant strength inherent in that word. This unit of strength can be then used for subsequent strengthening of other elements in that word. Foley (1979, p202), for example, uses this concept in explaining the two different reflexes of

the d'y cluster in French: the 3 sg. forms of croie (cf. inf. croire "to think") and close (cf. inf. clôre "to close"). From almost identical etyma, *credeya and *claudeya, the former has the contraction reflex y from d'y but the latter the assibilated reflex s;

credeya	claudeya	
credya	claudya	syncope: e --> Ø + S
"	clodya	contraction: au+S --> o
creya	"	contraction: dy+S --> y
"	closa	assibilation: dy --> dsy --> s
croie	close	MR

Contraction is an endothermic process that requires strength.¹¹ The unit of strength released by syncope of the theme e provides the strength necessary for both contractions of dy --> y and au --> o. Foley argues that the weak assibilated reflex dy --> s instead of the strong contraction reflex of dy --> y in Fr. close is the result of the contraction of au to o, which removes the unit of strength, blocking the contraction of dy to y and eventually yielding the assibilated reflex.

Implied in the strength conservation principle is the constant strength relation between the elided element and the unit of strength released from that element. That is, the unit of strength released from a relatively strong element must be substantially greater than the unit of strength from a relatively weak element. For example, in the syncope of three vowels (i, e, a), the strength unit released from elision of

11

Foley (1979, p202)

a must be greater than that released from elision of i or e, in order to retain the greater loss of strength incurred by loss of the strongest a as in

i --> Ø + 1S
 e --> Ø + 2S
 a --> Ø + 3S

where the relative strength of (i, e, a) parallels the relative amount of strength unit released.

In consonance with the IDP, the strengthening process of syneresis applies only when the unit of strength released is greater or equal to 3 as in

n'r + 3S --> nr̂
 but n'r + 2S --> idem
 n'r + 1S --> idem

Consequently epenthesis occurs preferentially when a cluster is less tightly bound by syneresis but assimilation occurs when a cluster is more tightly bound by syneresis:

veniraio	teneraio	donaraio	
venraio	"	"	syncope 1: i' --> Ø + 1S
"	tenraio	"	syncope 2: e --> Ø + 2S
"	"	donraio	syncope 3: a --> Ø + 3S
"	"	donraio	syneresis: n'r+3S --> nr̂
			but n'r+2S, n'r+1S --> idem
vendraio	tendraio	"	epenthesis
"	"	dorraio	assimilation
vendrai	tendrai	dorrai	MR

The stronger assimilation reflex, n'r --> rr, results from preferential syneresis induced by greater strength unit released from syncope of the strongest a. The less strong epenthetic reflex, n'r --> ndr, results from relatively weaker strength unit released from syncope of weaker i and e.

OF dorrai is not an exception to epenthesis nor an example that can be adduced to support Walker's rule reordering argument, but rather it is simply a product of the catalytic influence of syneresis on assimilation induced by Romance syncope of thematic vowels under the strength conservation principle in conjunction with the IDP. Whereas the solution in terms of rule interruption had to resort to the assumption that epenthesis precedes assimilation in Old French where the motivation for such an ordering is not well founded, the above solution does not depend on such unmotivated rule order but explains the different reflexes as a coherent consequence of prior, preferential syneresis.

Having explained why OF dorrai is not an exception but a regular development in Old French, we now consider the historical change in epenthetic reflexes from OF criembre to NF craindre. But first, it should be noted that beside the synchronic/diachronic distinction maintained in Walker's analysis but denied in Theoretical Phonology,¹² another basic assumption also distinguishes the Theoretical position

¹²

See Foley (1979, p2), McFetridge (1981).

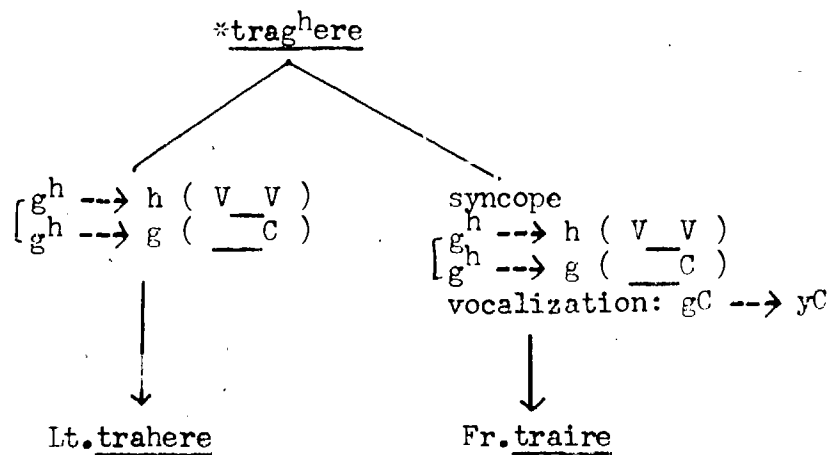
from Transformational Grammar.

Traditionally, the philological study of linguistic change has accounted for the development of phonetic forms from one time in history to another, for example, from Latin to French in the belief that since historically Latin precedes French and French developed from Latin, French phonetic forms must be direct descendents from their Latin counterparts. Thus for example, from Lt. vita Fr. vie "life" and other easily observable data of the same type, a phonetic correspondence rule $t \rightarrow \emptyset (V _ V)$ would be established without interpretation of the data. This assumption also underlies Walker's analysis; when Walker argues that the historical change in reflexes m'r in French is caused by rule reordering, he is apparently assuming that NF forms should be directly derivable from their historically precedent OF counterparts. Since there is no plausible phonetic explanation for the change from mbr to ndr, a reason was sought in terms of rule reordering between epenthesis and assimilation.

Although generally accepted as a working assumption in the philological study of historical phonetic change, Theoretical Phonology denies the assumption that Romance phonetic forms are directly derived from Latin phonetic forms, nor NF forms from OF forms for that matter, arguing that historical precedence of a phonetic form does not necessarily imply its ontological or etymological priority. Rather the theory maintains:

"... the French superficial phonetic forms are not derived from the Latin superficial phonetic forms, whether classical or popular, but rather both are derived from abstract etymological forms."¹³

Foley (1979, p25), for example, does not regard Fr.traire "to draw" as a direct phonetic result from Lt.trahere but rather derives both forms from the same underlying etymon *trag^here:



French differs from Latin for having the Romance syncope and vocalization in this particular example. The different phonetic forms are derived by applying different rule sets in each language.

Recall also our explanation of Sp.visto from *vidto beside Lt.visum from *vid+tum where a direct phonetic correspondence rule could not be established for Lt.visum Sp.visto because of examples such as Lt.casum from *cad+tum and Sp.caso (from *cadto). Rather, in this case the

13

Foley (1979, pl)

Latin abstract underlying forms of *vid+tum and *cad+tum develop into the Spanish underlying forms *vidto and *cadto by the well known Romance rules of lowering of u to o and loss of the final consonant. Examples such as these argue that 'a phonetic form can not be a direct source for another phonetic form'. Though statistically frequent forms such as Lt.vita Fr.vie may be viewed as a primary source for rule writing in traditional and Transformational Grammar, in Theoretical phonology these forms are considered as a special case of the more general type such as the above, which happens to share the abstract etymon with the Latin phonetic form.

The above illustration does not bear directly on our problem of the epenthetic reflexes of m'r between Old French and Modern French where the abstract etymon is the same as the Latin phonetic form for both OF and NF forms. It does indicate however that contrary to the traditional and Transformational assumption, OF criembre can not be a direct source for NF craindre but rather both must be derived from an abstract etymological form which incidentally is the same as the Latin phonetic form.

Therefore, we should ask

- 1) why m'r --> mbr. in Old French but m'r --> ndr in Modern French as in Lt.cremere OFcriembre but NF craindre?
- 2) what causes the historical change of mbr to ndr in the transition from Old French to Modern French?

Walker's analysis was concerned with the second question only, ignoring the basic question underlying the observable historical change. But in our analysis, both of these questions are equally indispensable because without answering one, explication of the other would not be complete.

As was assumed by Walker, m'r converts to ndr in Modern French by assimilation with subsequent epenthesis as in

cremere	
cremre	syncope
crenre	assimilation: m'r --> nr
crendre	epenthesis
craindre	MR

whereas in Old French m'r directly converts to mbr:

cremere	
cremre	syncope
crembre	epenthesis: m'r --> mbr
criembre	MR

One may consider appearance of the assimilation m'r --> nr in NF craindre but not in OF criembre as an innovation in Modern French. However, in view of forms such as Fr. nombre from Lt. numeru "number" where m'r does not follow the same development as NF craindre, we can not simply assume that the partial assimilation rule mr --> nr was newly introduced in Modern French. Rather as in all the phonological analyses we have done, a theoretical reason should be offered on the basis of what is distinguishable between the two forms. The fact that

though syncope occurs in both Fr.craindre and Fr.nombre, the syncopated vowel is a thematic vowel in the former but a radical vowel in the latter indicates that what is relevant here is what type of vowel drops by syncope.

This observation that thematic vowels may not behave the same as the radical vowels is not unusual in Theoretical Phonology. Foley (1979, p139), for example, explains forms such as Fr.savoir (cf. OF saveir) from Lt.sāpĕre where the short theme ĕ shows the reflex of the long theme ē (as in Lt.habĕre Fr.avoir "to have") by assuming a rule that lengthens the theme vowel whenever the preceding radical vowel is short as well:

sāpĕre
 sāpēre thematic vowel lengthening
 s.apoire diphthongization: ē --> ei --> oi
 savoir MR

Traditionally forms such as Fr.savoir "to know" have been explained either by analogy (under the influence of Fr.avoir) or by change of conjugation class, but such explanations are not acceptable in Theoretical Phonology due to their unsystematic nature. Foley rather argues that a simple rule of 'length alternation' governs the development of thematic vowels from Latin to French.

On the basis of the observation that the thematic vowel lengthens only when the preceding radical vowel is short but not when it is long (cf. Lt.scribĕre Fr.ecrire "to write"), the process is inter-

preted as a dissimilation between two quantitatively similar vowels
 (i.e. between two short vowels);

$$\check{V}_1CV_2 \text{ ---} \rightarrow \check{V}_1C\check{V}_2^+$$

with subsequent depotentiation of the strengthened vowel as a long
 vowel:

$$\check{V}^+ \text{ ---} \rightarrow \bar{V}$$

In addition to the condition of sufficient similarity between the
 two elements, another condition on dissimilation is that both elements
 be sufficiently different from what comes in between.¹⁵ For example,
 in Latin dissimilation of liquids occurs when a vowel comes between
 the liquids as in Lt.singularis "singular" from *singulalis (with
 the adjectival suffix '-alis'), or a combination of vowels and a
 nasal as in Lt.lunaris "lunar" from *lunalis, but not when the inter-
 vening element is a liquid as in Lt.floralis "floral", not ~~ϕ~~floraris.¹⁶
 This is because among the resonants that come between the two l's,
 the liquid r is the most similar to the liquid l.

The advantage of the above interpretation is that though neither

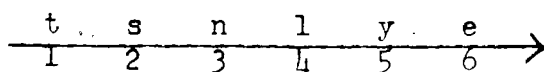
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See Foley (1981, p85).

16

Cf. Niedermann (1953, p163)

OF criembre nor NF craindre shows the reflex of a long theme e because the theme vowel drops by syncope in both cases, the interpretation in conjunction with the above condition on dissimilation allows us to offer a coherent explanation of the historical change in reflexes of m'r in French. On the expanded Rho phonological parameter,¹⁷



vowels are more similar to nasals than to stops. Therefore the dissimilative thematic vowel lengthening applies preferentially when the intervening consonant is a stop, as in the following derivation of OF saveir and OF criembre:

sāpēre	crēmēre	
sāpēre	"	preferential lengthening of theme e
sapēre	crēmēre	stress assignment
"	cremre	syncope
"	crembre	epenthesis
saveir	criembre	MR

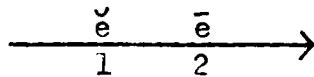
This preferential lengthening rule then generalizes in Modern French to include the more similar nasal consonant, which occurs after the stress assignment as in

17

See Foley (1977, p48)

sápěre	crēměre	
sápěre	"	preferential lengthening
sápěre	crēměre	stress assignment
"	crēměre	generalized lengthening
"	cremre	syncope: ē → ∅ but ē̄ → idem
"	crendre	m'r → nr → ndr
savoir	craindre	MF

Viewed in this way, it is evident that the historical change of epenthetic reflexes in OF criembre and NF craindre is not caused by rule reordering between epenthesis and assimilation but rather it is the result of the catalytic influence of syneresis induced by generalization of the thematic lengthening rule in the transition from Old French to Modern French. Between long and short vowels, long vowels are phonologically stronger than short vowels:



In consonance with the strength conservation principle, syncope of ē̄ releases a greater unit of strength than syncope of ē̄:

$$\begin{array}{l} \check{e} \rightarrow \emptyset + 1S \\ \bar{e} \rightarrow \emptyset + 2S \end{array}$$

Consequently, syneresis occurs preferentially when the released strength unit is greater or equal to 2 as in

$$\begin{array}{l} m'r + 2S \rightarrow \widehat{mr} \\ \text{but } m'r + 1S \rightarrow \text{idem} \end{array}$$

facilitating the cluster just enough to undergo partial assimilation but not quite enough to initiate total assimilation. Compare the following derivations of OF criembre and NF craindre:

crēmēre	crēmēre	
"	"	preferential lengthening
"	crēmēre	generalized lengthening
crembre	"	syncope 1: ē̃ --> ∅ + 1S
"	cremrē	syncope 2: ē̃ --> ∅ + 2S
"	crēm̄re	syneresis: m'r + 2S --> m̄r but m'r + 1S --> idem
"	crenre	assimilation: m̄r --> nr but mr --> idem
crembre	crendre	epenthesis
criembre	craindre	MR
(OF)	(NF)	

m'r --> mbr in Old French but m'r --> ndr in Modern French not because the order of assimilation and epenthesis is reversed but because the Old French dissimilative thematic lengthening rule that applies preferentially with an intervening stop generalizes in Modern French to include the less different nasals. This lengthened theme vowel which later drops by syncope induces the preferential syneresis of m'r in Modern French, catalytically influencing the cluster enough to undergo partial assimilation with subsequent epenthesis of the cluster.

A further support for this analysis comes from the various forms attested in Old French. Beside criembre, Einhorn (1974, p152) gives criendre, crembre, etc. Note that Walker's analysis can not explain these forms coherently since it does not recognize the preferential application

of phonological rules nor the interruption of partially identical rules by other phonological rules. OF criendre reflects the same rules that have applied in NF craindre except the historical transition of ie to ai, which does not concern us here. OF crembre is a further development from OF criembre by loss of y after two consonants as in OF grieve NF grève 1 sg. "burden". The difference between OF criendre and OF crembre is that whereas the former has the OF reflex of e --> ie but NF reflex of m'r --> nr, the latter has the NF reflex of the radical vowel but the OF reflex of the consonant cluster. In OF cremir, however, neither of these rules applies. Rather the development is

crēmĕre	
"	preferential lengthening
crēmĕre	generalized lengthening
crēmĕre	stress assignment
cremir	$\bar{e} \rightarrow ei \rightarrow i$
cremir	MR

Note that the same change of $\bar{e} \rightarrow ei \rightarrow i$ induced by thematic vowel lengthening and subsequent stress assignment occurs in Lt. rāpĕre Fr. ravir "to ravish".¹⁸ Presumably, the two Old French forms OF criembre and OF cremir reflect the change in the rule schemata, from an interrupted rule schema in the former to an uninterrupted schema in the latter:¹⁹

1) preferential lengthening	1) preferential lengthening
2) stress assignment	2) generalized lengthening
3) generalized lengthening	3) stress assignment
(criembre)	(cremir)

18

Foley (1979, p136)

19

Foley (1979, p83 and p115)

The Spanish n'r Cluster

One of the better consequences of our analysis of epenthesis and its diverse reflexes is that we can theoretically define the strength of the different reflexes in terms of syneresis. For example, between the two reflexes of rr and ndr in Old French, rr is stronger than ndr since the former arises as a result of losing the strongest a (cf. Lt. *donarai OF dorrai) but the latter as a result of losing weaker e and i (cf. Lt.*tenerai OF tendrai and Lt.*venirai OF vendrai). Similarly, between the different reflexes of n'r in Spanish the metathetic reflex rn is stronger than the epenthetic reflex ndr because the former arises as a consequence of preferential syneresis in the strong post-tonic position (Lt.gèneru Sp.verno) but the latter due to the failure of syneresis in the weak post-atomic position (Lt.ingenerare Sp.engendrar).

This increased understanding of the strength relation among the diverse reflexes sometimes leads us to formulate new phonological problems. Consider,²⁰

Romance	Old Spanish	Modern Spanish	Gloss
*ponerai	porné, porré	pondré	"I will take"
*venirai	verné, verré	vendré	"I will come"
*tenerai	terné, torré	tendré	"I will hold"

where the Spanish n'r cluster that arises due to Romance syncope exhibits a historical change in its reflexes. A descriptive explanation of

20

Cf. Menéndez Pidal (1966, p323)

this historical change may be that the unstable Romance cluster n'r was removed in Spanish by changing into the above various reflexes. However, such an account would be at best spurious since it would not reveal why the direction of the transition is from reflexes of metathesis or assimilation in Old Spanish to the reflexes of epenthesis in Modern Spanish nor what caused the transition. These questions particularly arise because we now partly know the strength relation among the three reflexes; though we do not know whether the metathesis reflex is earlier than the assimilation reflex or vice versa, nor which of the two is stronger than the other, we know that the transition of these reflexes is from 'strong' in Old Spanish to 'less strong' in Modern Spanish because the reflexes of assimilation or metathesis are stronger than the epenthetic reflexes if they are from the same etymon.

Moreover, since the transition does not occur for nouns nor for infinitives but only for future and conditional forms in Spanish (cf. Lt. generu Sp. verno, not eyendro and Lt. ingenerare Sp. engendrar, not engernar), an explanation is required of why such a transition occurs in one case but not in the other.

As the reconstructed Latin forms indicate, Romance future and conditional forms are traditionally derived from combination of an infinitive and the auxiliary habere by synthesis as

ponere#habeo	
poner # aio	changes before synthesis
poner + aio	synthesis
poneraio	MR

We also assume that before synthesis (i.e. when the infinitive and the auxiliary were not yet fused together but still separated by a word boundary), each word had its own stress as Lt.pónere and Lt.hábeo. But as the result of synthesis, in Spanish the stress on the main verb disappeared whereas the stress on the auxiliary remained as indicated in the orthography O.Sp.poné and N.Sp.pondré.

These two observations combine to give a clue to the cause for the above transition in Spanish. In particular, the assumption that there were two original word stresses in the synthesized forms allows us to interpret the loss of the main stress as a strength dissimilation between the two stresses. That is, we explain the loss of the main stress as opposed to the retention of the auxiliary stress as

stress dissimilation: $\acute{V} \varphi \acute{V} \rightarrow \acute{V}^- \varphi \acute{V}^+$

with the first weakened stress lost but the second strengthened stress retained as in

ponere#habeo	
poner # aio	changes before synthesis
poner + aio	synthesis
po ⁻ ner+ a ⁺ io	dissimilation: $\acute{V} \varphi \acute{V} \rightarrow \acute{V}^- \varphi \acute{V}^+$
poner + aio	$\acute{V}^- \rightarrow V$ but $\acute{V}^+ \rightarrow \text{idem}$
poneraio	MR

The advantages of this interpretation are two. First it immediately distinguishes forms such as Sp.yerno and Sp.engendrar from the above forms since the former had only one original stress but the latter, two. Secondly and more importantly, it provides a basis for explaining the

transition of reflexes in terms of the catalytic influence of syneresis induced by the universal process of dissimilation.

As the main stress decreases by dissimilation, the auxiliary stress correspondingly increases:



As a result, the environment for the n'r cluster weakens, either by losing strength of the environment itself (in the case of póné'raio --> pon'raio) or by losing the amount of strength unit released from syncope of the thematic vowel (in the case of vení'raio --> ven'raio and tené'raio --> ten'raio), causing decrease in bond strength of the n'r cluster by syneresis. The historical transition in Spanish then, reflects this transition in bond strength of n'r. The strong metathesis or assimilation reflex results in Old Spanish from syneresis of n'r in the relatively strong environment. As however the dissimilation of stress weakens the environment for n'r further, the less strong epenthetic reflex results in Modern Spanish.

Whereas the explanation that the newly created n'r cluster was removed in Spanish by changing into the various reflexes, does not reveal the cause for the historical transition, this analysis provides a phonological explanation for the transition, that it is caused by the phonological process of dissimilation between the two stresses. Moreover, it reveals the continuing trend of linguistic change, that change is not random nor static but a coherent behaviour subject to constant evolution.

But most of all, it illustrates how recognition of syneresis as a catalytic process can solve phonological problems that are seemingly intractable.

Summary

It is argued that the diverse reflexes of Romance consonant clusters are the result of the catalytic influence of syneresis. Although the types of diversity in these reflexes may differ from language to language or from one stage in history to another, they are all related under the influence of syneresis serving as a catalyst.

The advantages of this analysis are:

- 1) It reveals the phonological problems in the diverse reflexes of Romance consonant clusters, the problems that have not been well perceived before, and explains these problems by adopting the theoretical concept of catalytic influence to the process of syneresis.
- 2) It defines the strength relation among the diverse consonant cluster reflexes by analyzing these reflexes in terms of syneresis.
- 3) Unlike Walker's Transformational analysis, it does not rely on analogy or exception rules but explains the reflexes by referring to universal processes.
- 4) It reveals the continuing trend of linguistic change by rule generalization reflected in the historical change of consonant cluster reflexes in French and Spanish.

V. Conclusion

Previous analyses have all contended that epenthesis is a process that inserts a new element under a simple abrupt mechanism. This view of epenthesis was adopted mainly for its advantage in the formal representation of the process in the grammar: the simplicity of rule description. This assumption, however, has not been instrumental to explanation of epenthesis as a universal process, nor to perception of the phonological problems in the diverse reflexes of Romance consonant clusters. In general, the interpretation of epenthesis as a simple insertion process renders an account of the process isolated in one language without allowing much room for a systematic investigation of the process across languages. As a result, the following isolations have occurred in the previous analyses of epenthesis:

- 1) separation of linguistics from other branches of science by violating the geneticity principle.
- 2) failure to subsume epenthetic processes under the general process of epenthesis
- 3) parochial descriptive analysis of the process limited to a language without relating to a similar description in other languages

Another evidence for this isolated treatment of epenthesis is the detachment of phonological analysis from explanation. If an analysis is a genuine one, explanation should naturally follow. But this necessary connection between analysis and explanation is not maintained in the previous analysis; while analysis of epenthesis is done by describing

the process with feature notations, explanation is sought by referring to phonetic causes of the phenomenon.

In Theoretical Phonology, it is maintained that:

"The rules of a language must belong to the set of universal phonological rules. They can not be created ad hocally and justified by workability or simplicity."¹

Therefore if a certain rule formulated for description of a language does not belong to this set of universal rules, it is not only unacceptable as a rule but also requires a correct interpretation of the process involved. It is for this reason that consonantal epenthesis is interpreted as a strengthening process that comprises 1) glide epenthesis, 2) strengthening of glide by acquiring a stop onset, and 3) contraction between the inserted glide and the onset, all of which are the rules found to be applying independently in Romance languages. In particular, by assuming glide epenthesis as the first step in epenthesis mechanism, the interpretation relates consonantal epenthesis to other epenthetic processes such as anaptyxis where the inserted glide rather vocalizes, and all epenthetic processes are subsumed under the general process of epenthesis.

Given, however, the interpretation of epenthesis as a strengthening process and the Inertial Development Principle that strengthening applies preferentially to strong elements, the configuration in Old Provençal,

¹
Foley (1975, p37)

m'r --> mbr
 n'r > ndr
 > idem
 l'r --> idem

poses a problem. For, though l'r is stronger than n'r on the Rho parameter, n'r undergoes epenthesis in preference to l'r in one of the Old Provençal dialects. Moreover, a coherent explanation is required concerning the preferential application of epenthesis among the three clusters. In this analysis it is argued that application of epenthesis is not directly governed by the IDP but rather by the principle that the more a consonant cluster is tightly bound by syneresis, the less epenthesis is likely to occur. This principle is conceived from the observation that the mechanical progression of epenthesis is delayed when earlier preferential application of syneresis to a consonant cluster combines the cluster into a tightly bound unit, interfering with excrescence of the initial glide element (cf. Lt.exemplum from *extem+lom but Fr.sembler from Lt.similare).

Though traditionally application of syneresis has been limited to vowels in hiatus, by maintaining syneresis as a universal process that applies to consonant clusters as well, as a process that strengthens by increasing the bond strength between elements when they are sufficiently similar, the analysis offers a systematic account of the epenthesis configurations in Romance languages. Moreover, it reveals that the linguistic change by epenthesis is coherent in that the IDP systematically governs the application of syneresis, which in turn determines the likelihood

of preferential epenthesis under the principle of epenthesis.

In Old Provençal, under the condition of sufficient similarity on syneresis, the most similar l'r undergoes syneresis in preference to the less similar n'r in preference to the least similar m'r, resulting in total blockage of epenthesis to l'r but partial blockage to n'r but no blockage of epenthesis to m'r. The mere existence of the two dialectal forms of O.Prov.ceudre and O.Prov.cenre "ash" is an indication that the n'r cluster is at the transitional stage with regard to epenthesis under the similarity condition on syneresis in Old Provençal. In French where all of the three clusters undergo epenthesis, the similarity condition is more restricted than in Old Provençal to allow epenthesis of even the most similar l'r:

syneresis: Cr → Cr̄ where |C - r| ≤ d

- d = 0 for French
- d = 1 for Old Provençal dialect A
- d = 2 for Old Provençal dialect B

Analyses of reflexes and configurations of epenthesis in the above Romance languages show two types of interference with development of epenthesis. First is the retardation of epenthesis mechanism by syneresis as reflected in the different epenthetic reflexes of Lt.exemplum and Fr.sembler, and the second, blockage of epenthesis by syneresis allowing no intercalation of an epenthetic element in O.Prov.molre and O.Prov.cenre. A third and slightly different type of interference is also observed in those non-epenthetic clusters where though the initial stage

of glide epenthesis does occur, syneresis combines the inserted glide with the preceding sufficiently strong liquid, blocking further strengthening of the glide and inducing the eventual absorption of the glide by the liquid. This explains why these clusters generally show no epenthetic reflexes, even though they are of same consonants as the clusters that often undergo epenthesis, thus of same strength and equal similarity.

The above theoretical analysis of epenthesis also opens a new perspective on the phonological problems in the diverse reflexes of Romance consonant clusters. In previous analysis of epenthesis, configurations such as the one in Italian,

m'r --> mbr
but n'r --> rr
l'r --> rr

have not been perceived as a problem probably because once a correct description of the phenomenon is done, no further problem remains. However, since assimilation of n'r implies assimilation of m'r according to our observation of preferential assimilation in Italian, an explanation is required of why the above diverse reflexes arise. Moreover, since epenthesis of m'r does not necessarily guarantee assimilation of n'r and l'r, the preferential application of n'r and l'r in Italian but not in Old Provençal presents a problem. It is argued that this problem is only apparent, once we realize that in Italian the preferential application of syneresis to sufficiently similar l'r and n'r

not only blocks epenthesis but also facilitates application of assimilation to these clusters.

The claim made here is not that assimilation occurs preferentially whenever syneresis occurs to a consonant cluster (which is not the case in Old Provençal) but rather that the process of syneresis, by its nature, serves as a catalyst facilitating application of assimilation. This claim is based on the observation in Spanish that though mb is not particularly more similar than nd and ŋg, thus no more likely to undergo assimilation, the preferential application of syneresis to the stronger mb induces the preferential assimilation of mb by combining the cluster more tightly than nd and ŋg:

mb \rightarrow \overline{mb} \rightarrow mm (\rightarrow m)
 but nd \rightarrow idem
 ŋg \rightarrow idem

(cf. Lt. lumbus Sp. lomo but Lt. mundus Sp. mundo
 and Lt. longus Sp. luengo)

This catalytic influence of syneresis is not limited to the above examples in Italian but also occurs to the Spanish reflexes of n'r and m'l. Without syneresis serving a dual function in determining the diverse reflexes of Romance consonant clusters, no theoretical reason can be adduced as to why in Spanish

$C_1' C_2 \rightarrow C_2 C_1$ (\checkmark)
 but $C_1' C_2 \rightarrow C_1 K C_2$ (\checkmark)

(cf. Lt. generu Sp. verno but Lt. ingenerare Sp. engendrar)

Since, however, the post-tonic position is relatively stronger than the post-~~atonic~~ position (e.g. exit [éksit] but exist [egzíst]) and epenthesis applies preferentially when syneresis does not occur, we can explain the above diverse reflexes by regarding syneresis as facilitating application of metathesis as well as assimilation. In consonance with the IDP, the strengthening process of syneresis applies preferentially in the strong post-tonic position, thus not only blocking epenthesis but at the same time inducing metathesis of the consonant clusters after a stressed vowel. Although the same reflexes can be derived in terms of preferential syncope and rule interruption, by assuming that metathesis precedes epenthesis in the derivation, this solution is abandoned because of the problems it creates concerning the rule ordering between epenthesis and metathesis and in favor of the above more theoretically motivated solution.

Whereas the previous study of epenthesis has presented only a scanty analysis as limited to parochial description and spurious phonetic causal explanation of the process, the analysis offered here not only presents a systematic explanation of epenthesis but also reveals the phonological problems in the diverse reflexes of Romance consonant clusters, and explains these problems coherently under the theoretical concept of the catalytic influence of syneresis.

The lack of concern for coherent phonological explanation of epenthesis is especially evident in Walker's analysis of Old French epenthesis where forms such as OF dorrai are listed as exceptions to

epenthesis and used as an argument for his rule reordering solution for the problem of epenthetic reflexes in OF criembre and NF craindre. This unsystematic explanation arises mainly from two assumptions in Transformational Grammar: 1) change by epenthesis occurs to a certain group of consonant clusters that share feature notations and 2) historical change is best explained as a change in grammar, by directly comparing two synchronic stages of the grammar in history. By denying both of these assumptions and replacing them with the appropriate assumptions in Theoretical Phonology, the analysis also offers a coherent explanation of the historical transition in reflexes of Romance clusters in French as well as in Spanish.

Firstly, a direct comparison of OF dorrai (from Lt.*donaraio) with OF criembre (from Lt.*crēmēre) would not reveal anything since not only the etymon but also the theme vowels that drop by syncope are different. Rather in order to do a valid phonological investigation, it is important to maintain the environmental and elemental variables as minimal as possible. For example, a comparison of OF dorrai with OF vendrai (from Lt.*veniraio) and OF tendrai (from Lt.*teneraio) reveals that the different reflexes are the function of what theme vowel drops by syncope. Thus in consonance with the strength conservation principle syncope of the strongest a releases a strength unit greater than syncope of the weaker i or e, which combines with the cluster n'r for preferential syneresis, resulting in the strong assimilation reflex in OF dorrai but in the less strong epenthetic reflex in OF vendrai and tendrai.

Secondly, investigation of historical change requires more than a direct comparison of synchronic grammars of a language. Although the rule ordering solution for the problem in OF criembre and NF craindre works, it is suspect because 1) it does not reveal the characteristic continuity of linguistic change and 2) the same change does not occur when a radical vowel is lost by syncope as in Lt. numeru Fr. nombre, not nondre. Rather the fact that this historical transition occurs only when a thematic vowel is lost by syncope indicates that the dissimilative thematic vowel lengthening that applies preferentially in Old French with an intervening stop consonant (e.g. OF saveir from *sapēre from Lt. sapēre) generalizes in Modern French to include the less different nasal consonant; this lengthened thematic vowel which later drops by syncope if unstressed, induces the preferential application of syneresis of m'r in Modern French, binding the cluster enough to undergo partial assimilation with subsequent epenthesis. This results in an epenthetic reflex in NF craindre stronger than in OF criembre.

Thirdly, it is important to realize that linguistic change is not random nor static but a coherently organized behaviour subject to constant evolution. Though the historical transition in the Spanish reflexes of n'r may be viewed as arising due to instability of the cluster in Romance, this explanation does not reveal the reason why the transition is from the strong metathesis or assimilation reflex in Old Spanish to the less strong epenthetic reflex in Modern Spanish nor why it does not occur to nouns and infinitives but only to future

and conditional forms. Rather the fact that the historical alternation occurs only to the synthesized forms that had two original word stresses indicates that the phenomenon is due to a dissimilation between the two stresses; it is argued that the continued application of stress dissimilation weakens further the environment for the n'r cluster in Modern Spanish, decreasing bond strength of the cluster and thus resulting in the less strong epenthetic reflex in Modern Spanish.

Finally, in a study of historical change in a group of languages such as Romance languages, we can achieve a better understanding of linguistic change if similar changes are subsumed under one theme, given that these changes are related to each other. For example, on a superficial level the transition in reflexes of m'r in French may seem to bear no relation to the transition of reflexes of n'r in Spanish. On a higher level, however, these changes are related in that 1) they uniformly reflect the change in strength of reflexes, from less strong (mbr) to strong (ndr) in French but from strong (rn, rr) to less strong (ndr) in Spanish and 2) both are caused by the same phonological process of dissimilation, though the elements the process operates on are different (between two types of vowels in French but between two types of stresses in Spanish). Moreover, they are related in that both are the result of the catalytic influence of syneresis on Romance consonant clusters, the theme that also explains the other diverse reflexes in Romance languages.

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