APOCOPE IN OLD HIGH GERMAN:
A THEORETICAL PHONOLOGICAL APPROACH

by

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U scop in Old High German: A Theoretical Phonological Approach

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Abstract

This thesis analyzes the strength relation of short vowels in Old High German (OHG). The whole analysis is conducted within the framework of Theoretical Phonology (TP).

Chapter 1 briefly states the purpose of TP and that of this thesis. Chapter 2 discusses the strength relation problem raised by OHG apocope. Chapter 3 presents some fundamental principles and concepts of TP that provide the theoretical foundation for the present work. The most important of these is the concept of phonological energy, which is, according to TP, another manifestation of phonological elements. The behavioral differences among phonological elements are explained in TP by the amount of energy they associate with. The concept of energy fluxion not only provides an explanation for deletion and formation of some phonological elements but also supports my hypothesis that penultimate vowels and the consonants following them play a central role in OHG apocope. In chapter 4 a universal apocope rule is formulated based on the study of languages other than OHG. OHG apocope is analyzed in chapter 5, and is demonstrated to be in accordance with the universal apocope rule. In particular, OHG apocope is closely related to the strength of the penultimate vowels. The rule applies when the penultimate vowels are strong (long vowels, diphthongs, or strong monophthongs like a and o). Otherwise the rule fails. This rule and its conditions explain why apocope fails to apply to such words like wini, risi, sunu and situ in OHG. It is shown that apocope fails to apply to these words not because the word-final vowels i and u are stronger than other short vowels in OHG, which is the traditional point of view, but because the penultimate vowels in these words are weak, so that they fail to absorb energy from the word-final vowels and thus fail to induce energy fluxion which in turn induces apocope.

To verify this apocope rule other rules in OHG that show the strength relations among short vowels are examined in chapter 6. These rules yield the same results as the apocope rule does. Finally, the conclusion is drawn that there exists a universal apocope rule, which, with variations in parochial conditions, governs apocope in many different languages, including OHG.
This Thesis is dedicated to my wife,

Lisa Cai,

who encouraged me whole-heartedly during the hard time of its preparation.
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CHAPTER I. INTRODUCTION

1.1 Purpose of Theoretical Phonology

The explicitly stated purpose of Theoretical Phonology (henceforth TP) is to "understand and explain phonological processes" and to determine "the structure of Language",\(^1\) rather than to organize and describe data gathered from the study of sound systems and change processes of natural languages. That is to say that the goal of TP is not to write descriptive grammars. The organization and description of language data in a very brief and neat manner is not the ultimate measure of epistemic satisfaction. Nor is it the end purpose to find and describe what processes exist in a given language or in languages in general. Rather, the necessary questions to ask and address are: why these processes occur, and why they occur in the way they do but not in other ways. That is, the goal is to understand the nature of the processes, and to provide an explanation for these processes. A neat or elegant description is not the final aim in studying phonology, although it is a desirable byproduct achieved through a better understanding of phonological processes.

In order to understand and explain phonological processes, systematic studies of natural languages must be conducted, the relations among the phonological elements and their systematic behavior in participation in phonological processes clearly discerned. The notion that phonological elements have different strength values first arises in TP with the observation that they behave in different manners when participating in phonological processes such as apocope, intervocalic lenition, syncope and assimilation, etc.\(^2\) Such behavioral differences can, of course, also be described in many other ways, but such descriptions, it is claimed, cannot provide the kind of explanation that TP does.

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1. Foley’s original statement (1990:7) is "This is because our goal is not the grammatical description of a single language, nor the development of a formalism therefore (the goal of transformational phonetics), but rather the determination of the structure of Language".

2. The notion that phonological (and phonetic) segments/letter-sounds have relative strong or weak properties is an ancient one in linguistics/phonetics, evidenced in the works of the Indian (e.g. Panini) as well as of the Greek and Latin grammarians (e.g. Dionysius Thrax, Priscian) and philosophers (e.g. Plato). It is clearly explicitly present in the traditional terms lenis/lenition: fortis/fortition. The concept can also easily arise from the interpretation of the distributional character of phonological elements (cp. Bloomfield’s (1933) definition of phoneme in terms of distributional functional sets).
The approach to phonology known as TP was first developed by Foley (1977). In TP there are two fundamental types of processes - strengthening and weakening, and Foley claims to explain the different behaviors of phonological elements in terms of their different ability to participate in particular phonological processes which can be designated in a principled manner as either a strengthening or a weakening process. The phonological elements that are more likely to participate in strengthening processes are said to be stronger than the ones that are less likely to participate in strengthening. Phonological elements are then arranged in an order, called a strength parameter, in a given language. There are several parameters, and phonological elements are specifiable as being composed of values on these parameters.

The strength difference among vowels is one of the most interesting and important relations among phonological elements. The strength of vowels is determined according to their participation in phonological processes such as apocope, syncope, nasalization, diphthongization, etc.. According to the inertial development principle (Foley, 1977:107) (henceforth IDP), in a weakening process, weak elements should weaken first and most extensively in the weakest environment, while, in a strengthening process, strong elements should strengthen first and most extensively in the strongest environment.

From the difference in strengthening among vowels in certain environments, a vowel strength parameter naturally arises, which, provided that the environment is the same or similar, will provide a calculation basis for predicting which vowels should strengthen more readily than other vowels, and which vowels should weaken more readily than other vowels. This strength parameter is not a random arrangement but rather a systematic and consistent arrangement. Once the strength parameter is determined for a certain language through the study of a set of phonological processes, the strength parameter should remain constant for other phonological processes in the same language.

Furthermore, with the establishment of the strength parameter we may predict the behavior of phonological elements in other phonological processes that are not well studied or understood. The systematic study of phonological processes in determining the strength parameter of vowels will provide a deeper understanding of phonology as a branch of science. More may be learnt about the behavior of vowels, the structure of phonological processes, i.e. rules, and insight achieved into some phonological problems, which would otherwise either be unnoted, or remain obscure.
1.2 Purpose and Scope of this Thesis

In this thesis I deal only with the establishment of the strength parameter of short vowels based on a systematic study of the OHG phonological process of apocope, together with some reference to nasalization, synaloepha, etc.

The end purpose is not just to offer an elegant solution to some of the phonological and morphological problems in OHG that involve apocope, but to gain more knowledge and have a deeper understanding of phonology as a science. In addition to offering particular solutions to problems in OHG, I also intend to propose reasonable hypotheses that phonological rules have universal forms both for the elements involved in the rules and for the application environments of the rules. This is the criterion of universality in TP (Foley, 1977:21-22). If a rule formulated for a certain language can not apply to any other language, the rule is said to be parochial and of no interest in phonological theory. In TP rules must have the same form for all languages, that is, rules are universal. The differences in the application of these phonological rules across different languages are due to differences in their parochial conditions (Foley, 1977:53). Parochial conditions may vary from language to language, but the variation is much smaller across dialects of the same language.

In order to attempt to achieve the goals stated above, I first discuss briefly in Chapter 2 the problem of apocope in OHG. Chapter 3 is devoted to a discussion of TP principles and concepts that are crucial to the analysis developed in this thesis. Particularly important is the concept of phonological energy. It will be shown that this concept of phonological energy provides a theoretical explanation for the particular way that apocope applies. In conjunction with the IDP, the concept of phonological energy reinforces the claim that apocope applies preferentially to weak vowels in weak position. Thus, the deletion of a vowel is conditioned not only by the strength value of the vowel itself, but also by the phonological environment it appears in. In the case of OHG the environmental conditioning factors are quite complex.

In Chapter 4 I formulate a general rule of apocope, based initially on phonological analysis of languages other than OHG, and develop the proposal that this rule is universal, i.e. applicable to

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3. As Prof. W. Roberts points out, parochial conditions/parochial condition differences, like element strength and weakness and environment strengthening and weakening, can be ordered, i.e. scaled, so that the differences between so-called 'languages', 'dialects', and even accents, styles, etc. are serialised, thus, for instance, providing a unified quantified/ordered rather than qualitative definition of the notions 'language', 'dialect', etc., and in this way bringing typological and genetic linguistic studies closer to unity.
the languages from which the rule is developed and to the languages that have nothing to do with the formulating of the rule, i.e. OHG as well. The analysis in all cases follows the TP principles and concepts discussed in Chapter 3. I show in Chapter 5 that the apocope rules in OHG can be derived from such a universal rule given adjustments in parochial conditions particular to OHG which are also in full accord with TP principles and concepts. Since the universal apocope rule is first derived without any reference to OHG, its application to OHG can be interpreted as testing, justifying, or even proving the correctness of the rule. In the final chapter, Chapter 6, a strength parameter for OHG vowels is established, based on phonological studies of OHG apocope, and, briefly on some other rules such as nasalisation and synaloepha, and on the interpretation of the application of these rules.
CHAPTER II. PROBLEMS IN OHG APOCOPE

2.1 OHG Nouns

The problem of OHG apocope can be seen in the development of OHG vocalic nouns from their Germanic counterparts. According to Streadbeck (1966) Germanic nouns are formed as:

\[ \text{root} + \text{stem formant} + \text{person/number endings} \]

Streadbeck (1966:79) describes the formation of Germanic nouns as follows: "As with verbs, nouns and adjectives consist of root, suffix and ending. The root is that part of the word which precedes the suffix and ending, and which carries the word meaning. The root plus the suffix forms the stem (or thema); the stem is everything that comes before the ending. The ending is that part of the word which indicates case, the grammatical relationship to the other words in a sentence."

OHG nouns are classified into different classes according to their stem formants. When the stem formant is a vowel the noun is classified as a vocalic stem noun. These classes are a-stem (from IE o-stem), i-stem and u-stem. If the stem formant is not a vowel but a consonant, the noun is then classified as a consonantal stem noun.

Among these different stem classes I am particularly interested in those with short vowels as stem formants. It is my contention that the stems uniformly have these short vowels in their underlying forms, even though their surface forms may not show the stem vowels in some cases. In other words, I contend that, if the stem vowels do not show phonetically, it is because they are deleted by certain phonological rules. I hypothesise that a morphological and phonological study of these nouns in OHG will reveal the conditions under which these vowels are deleted or retained in OHG, and these conditions should be in accordance with the general conditions for final vowel deletion.

2.2 Traditional Analysis of OHG Apocope

The traditional description for final vowel deletion in OHG is that short \( a \) is completely deleted after both "long and short syllables" and short \( i \) and \( u \) are deleted after "long syllables" only and retained after "short syllables". According to this description and the principles of TP we may conclude that \( i \) and \( u \) are stronger than \( a \) since they are more resistant to deletion, i.e. after "long syllables" only, than \( a \) is, which is deleted after both "long and short syllables". Priebsch and Collinson (1966:87) describes this situation as follows:
"The nominative is the case of the subject of the sentence or of the complement of a verb of being, becoming, seeming, etc. It was formed in the singular (masculine and feminine) by adding the specific ending -s to the vowel stems in -o, -i and -u, hence Lat. dominus (domen-o-s), hostis, fructus. In accordance with Verner's Law and the vowel change o > a, we find in Germanic -os > -az, -is > -iz, -us > -uz. Gothic dropped the short vowel in -az and -iz, and devoiced final z, hence dag-s, gast-s, but retained u in sunus... In OHG the nominative shows no trace of the z ending and the short vowel preceding z normally disappears, but -i and -u were retained after a short syllable, e.g. win-i 'friend', sun-u 'son'."

The changes for the nominative endings in OHG can be simplified as an ordered set of three rules:

\[
\begin{align*}
&z \rightarrow \emptyset / \_# \\
&V(a) \rightarrow \emptyset / \_# \\
&V(i, u) \rightarrow \emptyset / VVC\_# \\
&VCC\_#
\end{align*}
\]

According to this description, it seems, at first glance, that -i and -u are stronger than -a , which is a position taken by Murray (1980:14):"As a consequence of (2) [In word final position, a is elided but i and u are maintained after light roots], it may be concluded that a represents a weaker phonological element than do i and u." If this were the case, then, the strength parameter for short vowels in OHG or Germanic would be quite different from the strength parameter in other languages, especially Romance, from which a strength parameter of i < u < a is derived. This analysis of OHG short vowels is then completely parochial, applicable only to OHG, or Germanic dialects. Therefore, either the traditional analysis of OHG apocope is wrong or the strength parameter for Romance languages is wrong. I would say that the traditional analysis of OHG apocope is wrong because it has some problems that can hardly be overcome. In the following section I will discuss these problems.

2.3 Problems with this Traditional Analysis

The traditional analysis of OHG apocope lacks universality and therefore is ex hypothesi unacceptable. I propose the following six reasons:
1. It is parochial. This analysis is against the principle of universality. It can not be related to the analysis of other languages. In fact, there are data in Portuguese that are against the claim that vowels are preferentially lost after "long syllables". "Apocope applies in Portuguese in an environment which can be metrically described. When other factors are held constant, apocope applies after a light (short) syllable, but not after a heavy (long) syllable, i.e. in an environment opposite to that of Old English." (McFetridge, 1989:10) Since OE is also a Germanic language McFetridge's argument against a "syllable weight" analysis in OE is also applicable to OHG. With no universality the syllable weight analysis is unacceptable within the framework of TP, though it is acceptable in other schools of generative phonology where strength parameters are not employed.

2. It is based on direct physical senses, that is, on what can be "directly seen and felt ", but not based on conceptualization. No principles and concepts of phonology are followed in the formulation of this analysis. Though syllable weight is said to be the salient factor in this analysis it is not a phonological principle that all languages follow, i.e. there is no general principle that can connect syllable weight with the deletion of word-final vowels.

3. It does not provide any insight into either OHG phonology or phonology in general. Nothing more is gained by it than what can be seen from the data, i.e. it is completely descriptive. The analysis does not answer that question why some vowels are deleted preferentially after long syllables while others are not.

4. It is inconsistent with other phonological rules in OHG which show that a is stronger than i and u. (see Chapter 5 for discussion of synaloepha).

5. It does not take into account the effect of other elements in the words, such as the preceding vowels and consonants which are demonstrably crucial conditioning factors in apocope, i.e. it is incomplete and unsystematic, even observationally.

6. There are counterexamples to it. Short unstressed i and u are said to remain after "light syllables"(a syllable consists of a short vowel followed by a single consonant), however, words like faz < fatu < *fatu and slag < *slagi < slagiz provide counterexamples which undermine the analysis.
It is, of course, much easier to reject and criticize an analysis than to provide a better one. However, my purpose is not to reject or criticize for the sake of rejection and criticism, but at least to provide the necessary theoretical preparations for a better analysis. A better analysis must be universal, applying to OHG as well as other languages. It must be based on conceptualization, going beyond the physical senses. It must provide insight to OHG phonology and morphology. It must be consistent within the system of OHG phonology. And finally, it must be comprehensive, taking into account the conditioning factors as well as the vowels themselves.

2.4 Old High German Verbs

Thematic Present Formations (o - Verbs)

According to Streadbeck (1966:63) Germanic inherited the IE tradition of forming verb paradigms by adding person/number endings to the root for athematic verbs and to the thematic vowel for thematic verbs. Thematic verbs are the verbs with thematic suffixes e/o. Streadbeck describes this e/o alteration as: "before (person/number) endings beginning with t or s, the e was used; in other places o was used". The paradigm is given as:

- 1sg root -oo (mi drops and o > oo) (-o-mi > oo)
- 2sg root -e-si
- 3sg root -e-ti
- 1pl root -o-mes
- 2pl root -e-te
- 3pl root -o-nti

Note that "The accent is either on the root or on the suffix throughout." (Streadbeck, 1966:63). However, there is a problem in that "the 1pl. ending -o-mes is not PIE and has never been satisfactorily explained." (Russ, 1978:114). I will not discuss the ending for 1pl in this thesis for reasons of space.

The first step in scientific study is to direct our mind to and ask questions about the problems that are taken for granted but yet have no really satisfactory answers. Investigation of OHG verbal morphology and phonology requires asking the following questions concerning the primary endings for thematic verbs:

Why does -mi drop early and lengthen the thematic vowel before it while other endings do not?
Why is -e- used instead of -o- before endings starting with -s and -t? Is there any phonetic or phonological reason for -e- to appear before -s, and -t? If no reason, why should this phenomenon exist?

Which vowel is the original form, e or o since TP requires phonemic uniformity? (see p 57 for phonemic uniformity)

Why does -e- change to -i- in the 2sg and 3sg forms while the -e- remains unchanged for 2pl form?

In order to try to answer these questions a systematic study of the language must be conducted, applying the basic principles and concepts in the theory to the data to find out what is going on. It is also possible that new principles will be found out in the systematic studies. The next chapter will be devoted to a study of TP Theory and its principles and concepts. It is my intention to prove that TP Theory and its principles and concepts can be applied to solve the above problems in OHG as well as problems in other languages.
CHAPTER III. THEORETICAL CONCEPTS USED IN THIS THESIS

In order to solve the OHG apocope problem and determine the relative strength parameter of vowels in OHG I employ the following TP concepts and principles which provide theoretical foundations for the explanation of the phonological processes that are discussed in this thesis. A short description and explanation of each concept is provided. For reasons of space and assumed familiarity with the framework, I do not provide data illustrating these principles and concepts.

3.1 The Inertial Development Principle (IDP)

This principle states two sub-principles:

(1) Strong elements strengthen first and most extensively and preferentially in strong environments (henceforth s/s). Strong elements strengthen in weak environments only after they have already strengthened in stronger environments. Weak elements strengthen only after strong elements have already strengthened in the same environment.

(2) Weak elements weaken first and most extensively and preferentially in weak environments (henceforth w/w). Weak elements weaken in strong environment only after they have already weakened in weak environments. Strong elements weaken only after weak elements have already weakened in the same environment (Foley, 1977:107).

It must be clearly noted that it would be wrong to draw the teleological conclusion that the concept of IDP will lead to a condition that, via strengthening, ultimately, only the strongest element will be left in a language, or, conversely, via weakening, that all elements can weaken and be lost and that language is (phonologically) moving towards a 'null' state. This situation cannot happen because a phonological system is dynamic and self-contained. Like any other dynamic and self-contained system (such as the universe) it is constantly in motion. Furthermore, it is hypothesised that the system as a whole is relatively stable, although elements within the system change across time, and, in relation to any single element, the motion of that element may be seen as being in one direction at any given time. The system is in a state of dynamic balance. For the whole system (If we view the system from a temporary point of view, it would seem that),

\[\text{Cp. The First Markedness Convention in Chomsky and Halle (1968: 408), which appears to imply this.}\]
nothing is lost or gained; energy is merely redistributed. The apparent loss of some elements is
compensated for by the release of phonological energy (see Section 3.2 below p.11-14) and the
formation at some time or stage of other phonological elements. The essential claim is that the
total amount of energy within the system is constant.\(^2\)

It should be noted that the definitions of strengthening and weakening given above entail the
following:

**strengthening** can and does apply to weak elements, but only after it has applied to
the stronger elements first, and later generalizes to the weaker elements.

**weakening** can and does apply to strong elements, but only after it has applied to
the weaker elements first, and later generalizes to the stronger elements.

This is the same situation as in thermophysics. The heat transmission rule states that heat
will travel from a hotter body or place to a cooler body or place, but not *vice versa* (Serway-
Faughn, 1985:255). However, this does not mean that, in the end, the whole universe will reach a
situation called "the heat death", in which everywhere has the same temperature. For in the
physical world the application of the heat transmission rule is confined to certain situations (i.e.
when the universe is not exploding or collapsing but remains unchanged in size), and other
physical rules in the system apply in other situations which balance the effect of the heat
transmission rule within the whole system of the universe.

The **IDP** predicts that, in the same phonological environment, weakening processes start
from the weakest element and strengthening processes start from the strongest element. It also
predicts that, if the same element undergoes weakening in one environment but not in the other,
then the first environment must be weaker than the second one for this process. Conversely, if the
same element undergoes strengthening in one environment but not in the other, then the first
environment must be stronger than the second one for this process.

\(^2\) This must not be taken as implying that the number of phonological elements/'phonemes' remains constant for
a language, nor that the number of phonological elements/'phonemes' must be the same for all languages.
Languages differ in their parochial conditions and thus in the extent to which energy is manifested as phonological
elements/'phonemes' or is in a state of incubation.
3.2 Phonological Energy

The concept of phonological energy was developed by Foley in order to explain the reasons for many kinds of phonological change, particularly nasalization, deletion and insertion. This concept not only explains such problems but also enhances our understanding of phonology as a science. He remarks (1990:10:1):

"Energy is a systemic concept. It is not a property of physical bodies (though strength is), but rather a property of systems. Though historically scientists have first studied matter and then energy, ontologically, the opposite order obtains, matter is reified energy, (as energy in turn is reified thought). Though the concept of energy is most popular in the physical sciences, as perhaps a property of matter, as we have earlier indicated, it is basically a systemic concept, which manifests itself in a manner appropriate to the system in which it is operative; thus in physics it manifests itself as physical energy, in phonology as phonological energy.

The strength of a phonological unit is a reflection of the amount of energy associated with that unit. We will see below that energy may be thought of as a temporal juncture (compared to the spatial junctures, + and #) uniting various temporal states of matter. Though this conceptualization still suffers from viewing matter as primary, it is more insightful than failure to recognize the concept of phonological energy."

The concept of phonological energy is the basis for the concept of phonological strength and the strength difference among phonological elements. The strength of an element comes from the amount of energy associated with that element. Elements differ in the amount of energy that can be associated with them. Stronger elements have more energy associated with them while weaker elements have less energy associated with them.

The systematic explanation of many phonological processes is shown to rely on the concept of phonological energy and its two properties fluxion and conservation (Foley, 1990:8:1-3).
The concept of energy fluxion implies that phonological energy is not statically associated with an element. Within a phonological unit it will sometimes flow from one element to another. The basic pattern for its movement, i.e. fluxion, is that, within the phonological unit, more phonological energy will flow from the weak elements to the strong elements, rendering the strong elements stronger (therefore more stable and resistant to weakening) and the weak elements nearby even weaker (therefore less stable and resistant to weakening). This phenomenon is a kind of energy polarization within a phonological unit. Foley emphasizes that the theoretical explanation of many phonological problems relies on the concept of energy fluxion. He makes the following remarks in one of his teaching materials (1990:8:3-4):

"Evidence for the above conceptualization of fluxion comes from
1. the requirement of coherence,
2. the principle of the conservation of strength, which C/C⁻ violates,
3. the intensification principle, according to which a strong vowel should become stronger, a weak consonant weaker, and
4. empirical evidence, which we present below.

Examples abound of the manifestation of C⁻. In most of the examples so far there has however been no manifestation of V⁺; it has appeared simply as V. We nevertheless assume VC → V⁺C⁻ rather than VC → VC⁻ because of the principle of conservation of strength and because we do have various direct and indirect evidences of the strengthening of the vowel. 'All things are in motion all the time, even though this escapes our senses.' -- Aristotle"

This concept is clearly in accordance with the IDP. Strong elements have more phonological energy associated with them and when in strong environment will gain more phonological energy through fluxion. Therefore, they are more likely to appear to be strengthened in stronger environment and to be more resistant to weakening processes. Weak elements have less phonological energy associated with them and are more likely to lose their energy in weak environment through fluxion to participate in weakening processes, and thus appear to become weaker.

The concept of energy conservation implies that the amount of energy within a language's phonological system, which consists of both energy and its manifestation, i.e. elements, remains unchanged as phonological energy can neither be created nor destroyed; furthermore, phonological energy is interchangeable with phonological elements, just as in physics energy conservation
means that the total amount of energy within the universe, which consists of energy and its
manifestation, i.e. matter, remains unchanged, and it can neither be created nor destroyed, and
matter and energy are interchangeable. That is, phonological elements are another manifestation of
phonological energy, in the same way that matter is another manifestation of physical energy.

The interchange of phonological energy and phonological elements is best seen in such
rules as epenthesis and deletion. When a phonological element is "inserted" into a phonological
unit, the element does not appear out of nowhere. As a rule, a new element must be formed out of
the extra energy accumulated within the phonological unit. When an element is "lost" within a
phonological unit it does not go into nothingness but changes into phonological energy. Thus,
with the loss of a phonological element at one place within a phonological unit, the adjacent
elements get more energy.

The manifestations of this energy left from the loss of an element may vary. Dr. Foley
gives two kinds of manifestations:

i. it may manifest itself as the strengthening of the adjacent elements, as in rules such as
compensatory lengthening and lowering (for vowels)

ii. it may manifest itself as the blockage of weakening processes in such rules as deletion,
lenition, or shortening.

It is possible that there are other manifestations. However, owing to the scope of this
thesis I will not discuss it any further.

3.3 Entropization - The Order Of Rule Schemata Application - From Special
To General

This principle states that rules apply initially in a highly restricted manner (i.e. apply to
special elements in special situations only), and that this restriction gradually relaxes (i.e. more
elements are included in more general, less restrictive situations). When the restrictions are
removed entirely, the rule reaches its final stage of generalization, applying to all elements of a
certain class in all situations. That is, there is no restriction on the application or the application
environment. The function of entropization, as Foley (1990: 5:1) defines it, is that it "determines
the order in which the subparts of a rule occur".
It is necessary to point out here that contrary to the common belief that general rules are simpler in form than specific rules, the concept of entropization implies that general rules may sometimes be even more complex than specific rules since specific rules apply to fewer, special elements only, while general rules apply to more or all elements on more general occasions. This is the situation not only in phonology but also in other branches of science, such as mathematics and physics. An example from mathematics is the following. The formula for circle is simpler than the formula for ellipse, since it applies to circle only, which is a special case of ellipse. The formula for ellipse is more general than the formula for circle since it applies not only to ellipses but to circles as well.

**Formula for circle** (specific rule):

\[ x^2 + y^2 = R^2 \]

**Formula for ellipse** (general rule):

\[
\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1
\]

It can be clearly seen from the above example that the formula for ellipse is more complex than the formula for circle and yet it is a general rule. An example from physics is the following. Newton's *Law of Motion* is simpler and more specific (applicable only when speed is not a significant factor) than Einstein's *Law of Relativity*, which is more complex and more general (applicable also when speed is a significant factor) (Serway-Faughn, 1985:70; 683).

**Newton's Law of Motion:**

\[ L = vt \]

where

- \( L \) = length
- \( v \) = velocity
- \( t \) = time
Einstein's Law of Relativity:

\[ L' = v't' = L \sqrt{1 - \frac{v'^2}{c^2}} \]

where
- \( L' \) = the length measured by the fast moving observer
- \( v' \) = the velocity of the fast moving observer
- \( t' \) = the time measured by the fast moving observer
- \( L \) = the length measured by the slow moving observer
- \( c \) = the velocity of light in vacuum

However, what is more important is not which rule, general or specific, is "simpler" in some sense but that specific rules should be derivable from general rules, while general rules can not be derived from specific rules. Without this derivational relation there would be no specific and general rules. They would simply be two isolated, independent types of rules, with no interrelationship between them. A theory that can not derive specific rules from general rules is not a genuine theory.

In the above mathematical example, the specific rule for circle can be derived from the general rule for ellipse by letting \( a = b \) for circles. The meaning of \( a = b \) is that circles have no different value for the long and short axes. The two axes are equal. Since there is no difference in the long and short axes, there is only one center for circles, and all the points on the circumference are at equal distance from the center, and this distance is the radius. The derivation is shown below:

**Condition for circle:** \( a = b \), then

\[
\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1
\]

can be expressed as

\[
\frac{x^2}{a^2} + \frac{y^2}{a^2} = \frac{x^2 + y^2}{a^2} = 1
\]
or

\[ x^2 + y^2 = a^2 \]

Substituting \( R \) for \( a \) we get the formula for circle:

\[ x^2 + y^2 = R^2 \]

The same is true for the physical examples:

Newton's Law of Motion is a special case of Einstein's Law of Relativity. This relation is shown by the fact that Newton's Law of Motion can be derived from Einstein's Law of Relativity. When the velocity of the moving observer is not significant relative to the velocity of light, it is assumed that it is zero (\( = 0 \)). Then, the formula is changed to:

\[ L' = L \sqrt{1 - 0} = L \]

This means that when the fast moving observer's velocity is relatively small compared to the velocity of light, the actual length measured by both the fast moving and the slow moving observer is the same. However, when the velocity is a significant variable the result is quite different.

This derivational relation is also required in TP as a requirement for a genuine theory. A specific rule must be derived from a general rule, otherwise the two rules are just two separate rules with no relation to each other. For example, a general rule for apocope is

**general rule**

\[ V\eta\omega \rightarrow \emptyset / \_\_\# \]

**general condition**

\[ \eta\omega \leq \tau \]

where

\( \eta = \) "vowel height" strength parameter

\( \omega = \) "vowel backness" strength parameter

\( \tau = \) numerical value of vowel strength on combination of \( \eta \) and \( \omega \) parameters.

**specific rules**

\[ i \rightarrow \emptyset / \_\_\# \]

\[ e \rightarrow \emptyset / \_\_\# \]

**parochial condition**

\( \tau = 2 \)
Here the specific rules can be derived from the general rule. In the general rule \( \tau \) can be any integer (depending on how many vowels there are in the inventory of the language's phonological system) while in the specific rules \( \tau = 2 \), indicating that vowels with a strength value of less than or equal to 2 on \( \eta \omega \) parameter will undergo the apocope rule. Thus, given a strength parameter of

\[
\begin{array}{cccccc}
& i & e & u & o & a \\
\rightarrow & w & 1 & 2 & 3 & 4 & 5 & s
\end{array}
\]

only \( i \) and \( e \) will be deleted by the specific apocope rule.

In this thesis I do not strive to get a "simpler" solution as simplicity by itself is not absolutely necessary in a genuine theory. I will rather emphasize the derivational relation of my solution to the general condition of apocope, since this derivational relation is an important characteristic of a genuine theory.

### 3.4 Energy Distribution in Phonological Units

Since we have the concept of phonological energy in the theory we must also discuss its pattern of distribution within phonological units, such as phonological elements, syllables and words. I have already mentioned earlier that the relation between phonological elements and phonological energy is similar to the relation between matter and physical energy. I expand on this here.

Physical matter is one manifestation of physical energy. And it is a well known fact that matter is not simply measured by the size of the object that contains it. The more matter there is in an object, the more energy it will contain, regardless of the size of the object. Some objects are small in size, yet they contain more matter than do some larger objects. For example, a white dwarf, or a pulsar, is even smaller than the Earth or the Moon. Nevertheless, a white dwarf or a pulsar contains much more matter than either the Earth or the Moon.

Similarly, phonological elements are one manifestation of phonological energy. In physics the amount of matter contained in an object is measured as its mass. In TP the amount of energy contained in a phonological element is measured by the element's phonological strength.
Elements that contain more phonological energy are said to be strong while elements that contain less energy are said to be weak. Just as the mass of an object is determined by its relation with other objects, so is the strength of phonological elements. A phonological element which is more resistant to weakening processes than another phonological element is considered to be stronger than the other phonological element. A phonological element which preferentially undergoes weakening processes is considered weaker than the other phonological elements in related contexts.

The basic phonological unit is the phonological element, such as consonant, or vowel. The unit syllable is made up of one vowel (monophthong or diphthong) and some or no consonants. A unit still larger than syllable is word, which is also a grammatical unit. The key point for energy distribution lies in the structure of syllables. The salient feature is that a syllable contains one vowel, which forms the center of the syllable, with optional consonant or consonants on either side. A word is formed of one or more syllables. From the $\rho$ parameter, the parameter of resonance strength (Foley 1977:35), we know that vowels have the highest value of resonance, followed by glides, liquids, nasals, fricatives and finally stops. The more resonant an element is the stronger it is i.e. the more phonological energy it has (Foley 1977:35-39). Thus, vowels contain most of the energy within a syllable as they have the highest value on the $\rho$ parameter.

Within a word with more than one syllable the energy distribution looks like a sine curve, more energy on the first vowel, less energy on the consonants that follow, then more energy on the second vowel, less energy on the consonants that follow, etc. (see Fig. 1.).

![Figure 1. Distribution of phonological energy within multiple syllable words.](image)

From Fig. 1. we can see that there are high peaks, which stand for concentration of more energy, and low troughs, which stand for less energy distribution within a word with more than one syllable. The higher the peak, the stronger the vowel is. The curve changes according to the resonance value of the elements in the word.

---

3. I disregard variables such as stress here.
With larger phonological units, such as syllables and words, the total amount of energy in the unit is not simply a combination of the energy from each element inside the unit, therefore, a word with six elements does not necessarily have twice as much energy as a word with three elements. There is an upper limit for the total amount of energy that can exist in such units, just as there is an upper limit for the amount of energy within an atom, which is why large atoms are unstable, often radioactive (breaking into smaller units). Thus, the more elements inside the unit the less energy can be distributed to each element, provided that the unit has already reached its upper limit for energy (Foley 1977:86). The manifestation of this pattern of energy distribution explains why elements in a longer word are weaker and thus more likely to participate in weakening processes. For example, an element may undergo a weakening process in a trisyllabic word but remains unchanged in a disyllable word. It also explains why syllables and words have certain size and will not grow "too big".

Since vowels do not have the same amount of energy, the peaks in a polysyllabic word will be different in height. Stronger vowels will have higher peaks while weaker vowels have shorter peaks. When a vowel is weaker than a certain degree, i.e. the peak is lower than a certain height, it is deleted.

A vowel with stress receives extra energy in a word, hence the fact that stressed vowels are stronger than their unstressed counterparts (McFetridge, 1989:29), i.e. stressed vowels have higher peaks than unstressed vowels and they usually do not get deleted.

A vowel may also be weaker, i.e. have shorter peak, because of its position in a word. Usually a vowel at the end of a word or in the middle of a word is weaker than the same vowel at the beginning of a word.

The weakness of a vowel is relative to its environment. For example, a vowel following a stronger vowel (stressed vowel, long vowel or vowels that have higher value on the \( \eta \omega \) parameter) in the preceding syllable is relatively weaker while a vowel following a weak vowel (unstressed vowel, short vowel or vowels that have lower value on the \( \eta \omega \) parameter) in the preceding syllable is relatively stronger. The reason for this is that when the strength difference between the two vowels is greater than a certain degree fluxion may occur, strengthening the stronger vowel but weakening the weak vowel. This pattern will be demonstrated in the study of apocope in the following chapter.
CHAPTER IV APOCOPE AS A UNIVERSAL WEAKENING PROCESS

4.1 Introduction

In order to understand the OHG apocope problem it is necessary to know the general conditions for apocope. If these general conditions for apocope are right then they should also be applicable to the OHG apocope problems. In this chapter I intend to formulate a general rule for apocope through data examples from other languages than OHG.

Definition of Apocope: Apocope refers to a process that deletes a vowel in word-final position. It can be briefly expressed as:

\[ V \rightarrow \emptyset / _-\ # \]

Schane (1973:57) defines apocope as "the loss of a final unstressed vowel, most often a reduced or schwa-like vowel."

This definition implies, though does not state, that apocope is a weakening process. However, it is often referred to as a weakening process, because the result of the process is the disappearance of a formerly existing element. If we hold that non-existence is the weakest reflection of any existing element, then, we can say that any element is stronger than a non-existing element. Conversely, a non-existing element is weaker than any existing element.

Furthermore, apocope applies to unstressed vowels only, never to stressed vowels. Stressed vowels are more resistant to weakening processes, such as apocope, syncope, medial vowel weakening, etc., than are unstressed vowels, and they are also more likely to undergo strengthening processes, such as diphthongization, etc. In TP the explanation for this is that stressed vowels are stronger (with an extra unit of energy from the stress) and unstressed vowels are weaker (without the extra energy from the stress). Since apocope applies preferentially to weaker vowels, it must be a weakening process. Moreover, apocope applies to vowels in a weak environment -- word-final position. Disregarding the effect of stress, word-initial position is considered to be stronger and word-final position is considered to be weaker (Foley, 1977:109).

\[ ^1 \text{ See also McFetridge} 1989:29 \text{ for argument that stressed vowels are stronger than unstressed vowels.} \]
Yet another reason for characterising apocope as a weakening process is that there are often intermediate stages between a full vowel and its complete loss. The element manifestation of this intermediate stage is a reduced vowel - schwa. For example (Hock, 1991:86):

<table>
<thead>
<tr>
<th>Lat.</th>
<th>Old Fr.</th>
<th>New Fr.</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>causa</td>
<td>chose[ə]</td>
<td>chose[Ø]</td>
<td>'thing</td>
</tr>
</tbody>
</table>

From the above data we can see that vowels can be reduced to schwas first before they are deleted. A schwa is a weaker reflection of any other vowel (so-called full vowels), hence it is called a "reduced vowel". When full vowels are weakened they are usually changed into schwas. We can see the alternation of full vowels when stressed, i.e. in stronger position, and schwas when unstressed, i.e. in weaker position, in many English words. For example:

<table>
<thead>
<tr>
<th>full vowel</th>
<th>schwa</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ri'kæd] /</td>
<td>[rekæd]</td>
</tr>
<tr>
<td>[pri'peə] /</td>
<td>[prepo'reiʃn]</td>
</tr>
<tr>
<td>[di'kleə] /</td>
<td>[dekla'reiʃn]</td>
</tr>
<tr>
<td>[prə'kleim] /</td>
<td>[prokle'meiʃn]</td>
</tr>
<tr>
<td>[hæbɪ'teiʃn] /</td>
<td>[hæbitænt]</td>
</tr>
<tr>
<td>[ko'pæsiti] /</td>
<td>[keipəbl]</td>
</tr>
<tr>
<td>['ætm] /</td>
<td>[a'tomik]</td>
</tr>
</tbody>
</table>

Since schwa is the reflection of a full vowel in a weaker position, i.e. unstressed position, this reduction of a full vowel to a schwa is a weakening process according to IDP. The next step - schwa deletion - is also a weakening process as the schwa is reduced to nothing, i.e. deleted.2

However, my focus of interest is not on defining apocope as a weakening process but rather on the understanding of this weakening process. The following questions thus arise:

1. to what kind of elements does it preferentially apply?
2. what is its preferential application environment?

2. Nothing (i.e. Ø) is weaker than something (Foley 1990:2:6).
From the answers to the above questions and the understanding of this weakening process more knowledge about phonology and phonological theory can be expected to emerge, which is exactly the purpose of TP. Thus, the conditions in which apocope applies are of central concern and interest in this thesis.

4.2 Conditions For Apocope

Since apocope is a weakening process it will apply preferentially to inherently weak vowels and preferentially in weak environment according to the IDP. Theoretically, this process is ideal in providing us with the means to determine the strength parameter of the vowels in a given language's phonological system. Ideally in the same environment the first element to be deleted must be the weakest; and the last element to be deleted must be the strongest. However, situations are usually somewhat more complicated than this, and there are some difficulties with this approach:

a. It is not easy to decide accurately the time at which an element is elided, not to mention the chronological order of the elision; often a "period of confusion" exists during which both the elided and non-elided forms co-exist.

b. It is not easy to find examples of words that provide the same environment for the same phonological processes applying to different phonological elements. With more than one variable the effect of the environment can not be accurately ascertained.

c. The environment, which plays a crucial role in this process, is a large problem since it is often quite complex. That is, the environment is often a combination of many different affecting factors. Consequently, the language data we rely on are usually distorted under the influence of many different forces which are often not easy to recognize.

However, facing these difficulties we still have to come up with some sort of solution that is consistent with all TP principles.

Solution to the first difficulty:

One way to establish the chronological order of the application of the apocope rule is to look for other rule applications that interrupt the application of the apocope rule. It is possible that at any stage of the application of the apocope rule other rules may set in to interrupt the continuous
application of the apocope rule. TP provides a theoretical basis for the explanation of this rule interruption phenomenon found in many languages. Within TP a general rule can be divided into subrules whose application order depends on the direction of entropization. Strengthening processes will start from strong elements while weakening processes will start from weak elements. Assimilation will start from similar elements. Other rules or subrules of other rules may apply inbetween stages from one subrule to the next, thus, separate the subrules or even destroy the application condition of the next subrule. It is this interruption that provides the evidence for the existence of subrules.\(^3\)

Alternatively, we can also compare the language we are studying with its related languages. Related languages usually develop from a single mother tongue, and therefore, they should have the same etyma, from which their surface forms are developed. Since these languages are related they would share some of the rules. They may also depart from each other at different stages of the rule application. Thus, by comparison we may find out these different stages of rule application, and consequently find out the strength parameter.

Another way is to refer to the historically attested data, and find out the relative order of the rule application. To do this we must first interpret the data available according to the fundamental principles of TP, for, from the theoretical point of view, later forms are not derived from earlier forms, but rather derived from the underlying etyma from which both earlier forms and latter forms are derived (Foley, 1991: 137-138).

**Solution to the second difficulty:**

Language is a natural and social phenomenon too large and complicated to allow laboratory tests to see if sound changes will obey certain rules. The language data can only be observed just as the heavenly bodies can only be observed (laboratory tests on heavenly bodies are similarly and equally impossible). Therefore, one can do nothing more than find suitable language data, if one is fortunate enough to find them; if not, no conclusion can be drawn in regard to the language. However, something will definitely be revealed through the study of any kind of language data. What is needed is to propose a reasonable hypothesis and then prove or disprove it.

---

\(^3\) For rule interruption see Foley 1977:73.
Solution to the third difficulty:

The effect of each affecting factor in the environment must be established or discovered. By choosing one variable at a time and keeping other variables relatively constant, the effect of the variable selected for attention can be revealed. Keep on with this pattern the effect of other variables can be decided.

4.3 Affecting Factors In The Environment

Sometimes the properties of other phonological elements in a phonological unit (for instance, word), such as the quantity (number) and quality (strength value) of the consonants before the final vowels and the quantity and quality of the vowels in the penultimate syllable, have no effect on the application of the apocope rule. That is, there is no energy fluxion in the phonological system. In this case only the quality (the value on $\eta_0$ parameter) of the final vowels themselves will determine the order of their elision or retention. For example, in the development from Romanic to Spanish, Provençal and French, apocope applied to all the three languages. Yet the pattern is quite clear: Spanish lost final $e$ only; Provençal lost both $e$ and $o$ while French lost all $e$, $o$, and $a$ (Foley, 1990: 2: 2).

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>cantare</td>
<td>cantar</td>
<td>cantar</td>
<td>chanter</td>
<td>sing</td>
</tr>
<tr>
<td>flore</td>
<td>flor</td>
<td>flor</td>
<td>fleur</td>
<td>flower</td>
</tr>
<tr>
<td>pede</td>
<td>pie</td>
<td>pè</td>
<td>pied</td>
<td>foot</td>
</tr>
<tr>
<td>bove</td>
<td>puey</td>
<td>buòu</td>
<td>boeuf</td>
<td>ox</td>
</tr>
<tr>
<td>caballo</td>
<td>caballo</td>
<td>caval</td>
<td>cheval</td>
<td>horse</td>
</tr>
<tr>
<td>vino</td>
<td>vino</td>
<td>vin</td>
<td>vin</td>
<td>wine</td>
</tr>
<tr>
<td>amigo</td>
<td>amigo</td>
<td>amic</td>
<td>ami</td>
<td>friend</td>
</tr>
<tr>
<td>prato</td>
<td>prado</td>
<td>prat</td>
<td>pré</td>
<td>meadow</td>
</tr>
<tr>
<td>arco</td>
<td>arco</td>
<td>arc</td>
<td>arc</td>
<td>arc/bow</td>
</tr>
<tr>
<td>auro</td>
<td>oro</td>
<td>aur</td>
<td>or</td>
<td>gold</td>
</tr>
<tr>
<td>amica</td>
<td>amiga</td>
<td>amiga</td>
<td>amie</td>
<td>friend</td>
</tr>
<tr>
<td>porta</td>
<td>puerta</td>
<td>porta</td>
<td>porte</td>
<td>door</td>
</tr>
<tr>
<td>amat</td>
<td>ama</td>
<td>ama</td>
<td>aime</td>
<td>loves</td>
</tr>
<tr>
<td>capra</td>
<td>cabra</td>
<td>cabra</td>
<td>chèvre</td>
<td>goat</td>
</tr>
<tr>
<td>causa</td>
<td>cosa</td>
<td>causa</td>
<td>chose</td>
<td>thing</td>
</tr>
</tbody>
</table>
Since all the three languages are descendants of the same mother language, that is, Latin or Proto-Romanic, the environment for apocope in the three languages is the same, and the difference concerning the application of apocope is due to the properties of the final vowels themselves.

Only one vowel is lost in Spanish. Logically that vowel must be the weakest in the language. Two vowels are lost in Provençal, one must be the weakest, the other must be the second weakest, the remaining one must be the strongest. All vowels are lost in French. There is no way of telling which one is weaker and which one is stronger within the language. But since French is related to both Spanish and Provençal the vowel systems of the three languages are quite similar. By comparison of the three languages we can establish the strength relation as:

\[
e \quad o \quad a
\]
\[w \quad 1 \quad 2 \quad 3 \quad \rightarrow s\]

\(e\) is found to be the weakest, which is lost in all the three languages, and \(a\) is the strongest, which remains in both Spanish and Provençal. \(o\) is found to be stronger than \(e\) but weaker than \(a\).

When the other elements in the word have no effects on the application of apocope rule the order of the rule application, i.e. entropization, is determined by the strength relation of the final vowels only. Thus, it is expected that when apocope does apply only three situations are possible: 1. \(e\) is deleted while \(o\) and \(a\) remains unaffected; 2. \(e\) and \(o\) are deleted while \(a\) remains unaffected; 3. all the three vowels are deleted. The schemata are shown below:

1. \(e \rightarrow \emptyset \) / VC ___#
2. \(e, o \rightarrow \emptyset \) / VC ___#
3. \(e, o, a \rightarrow \emptyset \) / VC ___#

Or

universal rule \( V \eta \omega \rightarrow \emptyset / VC ___# \)
universal condition \( \eta \omega \leq \tau \)
parochial condition
  for Spanish \( \tau = 1 \)
  for Provençal \( \tau = 2 \)
  for French \( \tau = 3 \)
The first situation occurs in Spanish where \( \tau = 1 \), and only \( e \), the weakest vowel, is deleted. The second situation occurs in Provençal where \( \tau = 2 \), both \( e \) and \( o \), the weakest and the second weakest vowels, are deleted. And the third situation occurs in French where \( \tau = 3 \), all the three vowels \( e, o \) and \( a \) are deleted. The data fit well with the conditions set up by the theory.

However, very often the properties of other elements within the word play an important role in the application of the apocope rule, that is, energy fluxion occurs. In this case, both the quantity and quality of the preceding consonants and vowels may affect the application of the apocope rule. Each of these situations will be considered one after another.

b. The Quantity Of The Preceding Consonant

Here, the word quantity refers to the number of preceding consonants. The symbol \( \Sigma C \leq \delta \) is used to refer this total number of consonant. Consider the following data in Spanish (Foley, 1990: 3: 4.):

In Spanish the word-final vowel \( e \) is deleted when it is preceded by a single consonant, i.e. \( \Sigma C \leq \delta = 1 \) and the quality of this single consonant plays no role in the rule, for the rule applies regardless of the quality difference of the preceding consonants. The same vowel is retained when it is preceded by a consonant cluster, i.e. \( \Sigma C \geq \delta = 2 \).

<table>
<thead>
<tr>
<th></th>
<th>Romance</th>
<th>Spanish</th>
<th>French</th>
</tr>
</thead>
<tbody>
<tr>
<td>mare</td>
<td>mar</td>
<td>mer</td>
<td></td>
</tr>
<tr>
<td>arte</td>
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<td>art</td>
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<td>pont</td>
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<td>cantare</td>
<td>cantar</td>
<td>chanter</td>
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<td>rete</td>
<td>red</td>
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<tr>
<td>rege</td>
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<td>grege</td>
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</tr>
<tr>
<td>lege</td>
<td>ley</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>hodie</td>
<td>hoy</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>bove</td>
<td>huey</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

From the data above we may establish a preferential condition for the application of the apocope rule in Spanish:
1. $e \rightarrow \emptyset$ / $VC \_\_\_\#$
2. $e \rightarrow \emptyset$ / $VCC \_\_\_\#$

or

| universal rule | $V\eta\omega \rightarrow \emptyset / VC \_\_\_\#$ |
| universal condition | $\eta\omega \leq \tau$ |
| | $\Sigma C \leq \delta$ |
| | where $\delta =$ total number of $C$ |

| parochial condition for Spanish | $\tau = 1$ |
| | $\delta = 1$ |

From the above set of rules we can see that only rule 1. applied in Spanish. Or, the parochial condition for Spanish apocope is $\tau = 1$, $\delta = 1$; if $\Sigma C = 2$, then, the rule fails. Thus, the loss and retention of word-final $e$, the weakest vowel on the $\eta\omega$ parameter, is conditioned also by the number of the preceding consonants apart from the $\eta\omega$ values of the vowels themselves. Apocope applies preferentially after fewer preceding consonants, as illustrated by the data in Spanish.

b. The Quality Of The Preceding Consonants

Here, the word quality refers to the strength value of the consonants on the $p$ parameter, that is, their degrees of resonance. The higher the value is on the $p$ parameter, the stronger the consonant is. In order to find out the effect of the qualities of the preceding consonants consider the following data from Portuguese. In Portuguese apocope applies to the word-final $e$ when the number of the preceding consonant is one. But there is a further condition, that is, that this preceding consonant must not be a stop. McFetridge provides the following valuable data in his doctoral thesis (McFetridge, 1989:19-20):

<table>
<thead>
<tr>
<th>I</th>
<th>Singular</th>
<th>Plural</th>
<th>Stem</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a dente</td>
<td>as dentes</td>
<td>dente</td>
<td>tooth</td>
<td></td>
</tr>
<tr>
<td>a mesa</td>
<td>as mesas</td>
<td>mesa</td>
<td>table</td>
<td></td>
</tr>
<tr>
<td>o livro</td>
<td>os livros</td>
<td>livro</td>
<td>book</td>
<td></td>
</tr>
</tbody>
</table>
He points out that "A stem final e appears in the plural, but is deleted in the singular, where it is word-final, if the preceding consonant is a sibilant or resonant (but not a stop) and is not itself preceded by a consonant (St. Clair, 1971)"

<table>
<thead>
<tr>
<th>II</th>
<th>Singular</th>
<th>Plural</th>
<th>Stem</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>o canal</td>
<td>os canais</td>
<td>canale</td>
<td>canal</td>
<td></td>
</tr>
<tr>
<td>o cão</td>
<td>cães</td>
<td>cane</td>
<td>dog</td>
<td></td>
</tr>
<tr>
<td>o cruz</td>
<td>as cruzes</td>
<td>cruze</td>
<td>cross</td>
<td></td>
</tr>
<tr>
<td>o favor</td>
<td>favores</td>
<td>favore</td>
<td>favour</td>
<td></td>
</tr>
<tr>
<td>o papel</td>
<td>os papeis</td>
<td>papele</td>
<td>paper</td>
<td></td>
</tr>
<tr>
<td>o pão</td>
<td>os pães</td>
<td>pane</td>
<td>bread</td>
<td></td>
</tr>
<tr>
<td>a parede</td>
<td>as paredes</td>
<td>paredes</td>
<td>wall</td>
<td></td>
</tr>
</tbody>
</table>

"The same restriction on apocope is found historically (Williams, 1962). After two consonants or a single stop, final e remains (III). After a single resonant or sibilant it elides (IV)" (McFetridge, 1989:20):

<table>
<thead>
<tr>
<th>III Latin</th>
<th>Portuguese</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>camem</td>
<td>came</td>
<td>flesh, meat</td>
</tr>
<tr>
<td>dentem</td>
<td>dente</td>
<td>tooth</td>
</tr>
<tr>
<td>diixit</td>
<td>disse</td>
<td>to say</td>
</tr>
<tr>
<td>ille</td>
<td>èle</td>
<td>he</td>
</tr>
<tr>
<td>sitim</td>
<td>sede</td>
<td>site</td>
</tr>
<tr>
<td>veritaatem</td>
<td>verdade</td>
<td>truth</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IV</th>
<th>amor</th>
<th>love</th>
</tr>
</thead>
<tbody>
<tr>
<td>amooorem</td>
<td>amor</td>
<td>love</td>
</tr>
<tr>
<td>facit</td>
<td>faz</td>
<td>he makes</td>
</tr>
<tr>
<td>feecit</td>
<td>fèz</td>
<td>he made</td>
</tr>
<tr>
<td>fiinem</td>
<td>fim</td>
<td>limit</td>
</tr>
<tr>
<td>male</td>
<td>mal</td>
<td>evil</td>
</tr>
<tr>
<td>mensem</td>
<td>mès</td>
<td>mind</td>
</tr>
<tr>
<td>quaerit</td>
<td>quer</td>
<td>he asks</td>
</tr>
<tr>
<td>soolem</td>
<td>sol</td>
<td>sun</td>
</tr>
<tr>
<td>venit</td>
<td>vem</td>
<td>he comes</td>
</tr>
<tr>
<td>vicem</td>
<td>vez</td>
<td>change</td>
</tr>
</tbody>
</table>
According to McFetridge the explanation of this phenomenon is "that the environment of apocope is sensitive to the p parameter, which specifies the resonance of phonological elements." The p parameter, as given in McFetridge as well as Foley, is as follows:

<table>
<thead>
<tr>
<th>t</th>
<th>s</th>
<th>n</th>
<th>l</th>
<th>r</th>
<th>y</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

The condition for apocope is then modified as:

universal rule

\[ V\eta \omega \rightarrow \emptyset / VCp \_ \# \]

universal condition

\[ \eta \omega \leq \tau \]
\[ \Sigma C \leq \delta \]
\[ p \geq \lambda \]

parochial condition

for Portuguese

\[ \tau = 1 \]
\[ \delta = 1 \]
\[ \lambda = 2 \]

In Portuguese apocope applies to the weak vowel e when the total number of the preceding consonant is one, and the p value of the preceding consonant must be greater than 1, i.e. \( \lambda = 2 \). Apocope fails when the total number of the preceding consonants is more than 1. It also fails when the total number of the preceding consonant is one but the p value of this single consonant is less than 2, i.e. when it is a stop. Thus, in Portuguese apocope, both the quality and quantity of the preceding consonants are relevant to the application of the rule. This reveals that apocope applies preferentially when the preceding consonant has higher value on the p parameter, i.e. when it is strong.

c. The Quantity Of The Preceding Vowels

Here, the word quantity refers to the number of morae of the vowels in the preceding syllable. The symbol \( \Sigma V \geq \phi \) is used to refer to the total number of morae. A short vowel has one mora while a long vowel or a diphthong has two morae. We need to decide whether apocope applies preferentially after short vowels or after long vowels and diphthongs. Examine the following data from Old English (OE) (Foley, 1990: 3 : 5):
"Old English o-declension, type Latin *templum - templa.*"

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>giefu</td>
<td>giefa</td>
<td>gift</td>
</tr>
<tr>
<td>beadu</td>
<td>beada</td>
<td>battle</td>
</tr>
<tr>
<td>laar</td>
<td>laara</td>
<td>lore</td>
</tr>
<tr>
<td>stoow</td>
<td>stoowa</td>
<td>place</td>
</tr>
<tr>
<td>mææd</td>
<td>mææda</td>
<td>mead</td>
</tr>
</tbody>
</table>

Faced with this kind of data, Foley (1990: 3:5) remarks: "Phonological and morphological analysis establishes the singular morpheme in the above data as -u, and the plural morpheme as -a. As -u is phonologically weaker than -a, we expect that apocope applies to -u in preference to -a, which is the case in Old English. What's interesting is that apocope applied to -u only when the preceding vowel is long, it failed when the preceding vowel is short."

The data and Foley's remarks clearly show that apocope applies preferentially after long vowels (with two morae), i.e. the preferential applicational relation for OE apocope of word-final u can be expressed as:

1. apocope \( u \rightarrow \emptyset / VVC \_ \# \)
2. apocope \( u \rightarrow \emptyset / VC \_ \# \)

The interpretation of this preferential applicational relation is that apocope applies to the vowel \( u \) in OE at the end of a word preferentially when there is a long vowel in the preceding syllable. Apocope applies to word-final \( u \) when there is a short vowel in the preceding syllable only after it has already applied to \( u \) with a long vowel in the preceding syllable. Thus, the second subrule is the generalization of the first subrule. The application order is determined by this preferential relation according to the principle of entropization. However, the second subrule did not apply in OE.

Other examples in OE where apocope applied after long vowels but failed to apply after short vowels can be found in McFetridge (1989:4). According to McFetridge -u is the nominative plural ending for neuter nouns in OE. This -u is deleted in disyllabic words whenever the preceding vowel is long.
<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>aar</td>
<td>aar</td>
<td>brass</td>
</tr>
<tr>
<td>bææl</td>
<td>bææl</td>
<td>funeral pile</td>
</tr>
<tr>
<td>baan</td>
<td>baan</td>
<td>bone</td>
</tr>
<tr>
<td>beor</td>
<td>beor</td>
<td>beer</td>
</tr>
<tr>
<td>blood</td>
<td>blood</td>
<td>blood</td>
</tr>
<tr>
<td>breeost</td>
<td>breeost</td>
<td>breast</td>
</tr>
<tr>
<td>deeor</td>
<td>deeor</td>
<td>wild animal</td>
</tr>
<tr>
<td>duust</td>
<td>duust</td>
<td>dust</td>
</tr>
<tr>
<td>faam</td>
<td>faam</td>
<td>foam</td>
</tr>
<tr>
<td>geear</td>
<td>geear</td>
<td>year</td>
</tr>
<tr>
<td>hreeod</td>
<td>hreeod</td>
<td>reed</td>
</tr>
<tr>
<td>hriis</td>
<td>hriis</td>
<td>twig</td>
</tr>
<tr>
<td>huus</td>
<td>huus</td>
<td>house</td>
</tr>
<tr>
<td>iis</td>
<td>iis</td>
<td>ice</td>
</tr>
<tr>
<td>laam</td>
<td>laam</td>
<td>clay</td>
</tr>
<tr>
<td>leef</td>
<td>leef</td>
<td>leaf</td>
</tr>
<tr>
<td>leean</td>
<td>leean</td>
<td>reward</td>
</tr>
<tr>
<td>leep</td>
<td>leep</td>
<td>song</td>
</tr>
<tr>
<td>liic</td>
<td>liic</td>
<td>body</td>
</tr>
<tr>
<td>liin</td>
<td>liin</td>
<td>flax</td>
</tr>
<tr>
<td>maan</td>
<td>maan</td>
<td>crime</td>
</tr>
<tr>
<td>mood</td>
<td>mood</td>
<td>mind</td>
</tr>
<tr>
<td>neeat</td>
<td>neeat</td>
<td>ox</td>
</tr>
<tr>
<td>niip</td>
<td>niip</td>
<td>enmity</td>
</tr>
<tr>
<td>saar</td>
<td>saar</td>
<td>pain</td>
</tr>
<tr>
<td>sceep</td>
<td>sceep</td>
<td>sheep</td>
</tr>
<tr>
<td>tool</td>
<td>tool</td>
<td>tool</td>
</tr>
<tr>
<td>wiif</td>
<td>wiif</td>
<td>woman</td>
</tr>
</tbody>
</table>

The same vowel is retained in disyllabic words when the vowel in the preceding syllable is short:
<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>brim</td>
<td>brimu</td>
<td>sea</td>
</tr>
<tr>
<td>broc</td>
<td>brocu</td>
<td>affliction</td>
</tr>
<tr>
<td>broð</td>
<td>broðu</td>
<td>broth</td>
</tr>
<tr>
<td>ceaf</td>
<td>ceafu</td>
<td>chaff</td>
</tr>
<tr>
<td>cliof</td>
<td>cliofu</td>
<td>cliff</td>
</tr>
<tr>
<td>col</td>
<td>colu</td>
<td>coal</td>
</tr>
<tr>
<td>dor</td>
<td>doru</td>
<td>door</td>
</tr>
<tr>
<td>geoc</td>
<td>geocu</td>
<td>yoke</td>
</tr>
<tr>
<td>god</td>
<td>godu</td>
<td>god</td>
</tr>
<tr>
<td>hlid</td>
<td>hlidu</td>
<td>lid</td>
</tr>
<tr>
<td>hof</td>
<td>hofu</td>
<td>dwelling</td>
</tr>
<tr>
<td>hol</td>
<td>holu</td>
<td>hole</td>
</tr>
<tr>
<td>lim</td>
<td>limu</td>
<td>limb</td>
</tr>
<tr>
<td>loc</td>
<td>locu</td>
<td>lock</td>
</tr>
<tr>
<td>lot</td>
<td>lotu</td>
<td>deceit</td>
</tr>
<tr>
<td>scip</td>
<td>scipu</td>
<td>ship</td>
</tr>
<tr>
<td>sol</td>
<td>solu</td>
<td>mud</td>
</tr>
<tr>
<td>spor</td>
<td>sporu</td>
<td>track</td>
</tr>
<tr>
<td>twig</td>
<td>twigu</td>
<td>twig</td>
</tr>
</tbody>
</table>

There is a situation where the short root vowels are followed by two consonants, which is classified as "heavy syllable" by the traditional analysis of OE. In this situation the final vowel \( u \) is deleted. The data is shown below:

<table>
<thead>
<tr>
<th>Nom Sg</th>
<th>Nom Pl</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>beam</td>
<td>beam</td>
<td>child</td>
</tr>
<tr>
<td>bold</td>
<td>bold</td>
<td>dwelling</td>
</tr>
<tr>
<td>bord</td>
<td>bord</td>
<td>board</td>
</tr>
<tr>
<td>corn</td>
<td>corn</td>
<td>corn</td>
</tr>
<tr>
<td>fearn</td>
<td>fearn</td>
<td>fern</td>
</tr>
<tr>
<td>feax</td>
<td>feax</td>
<td>hair</td>
</tr>
<tr>
<td>fleax</td>
<td>fleax</td>
<td>flax</td>
</tr>
<tr>
<td>folc</td>
<td>folc</td>
<td>folk</td>
</tr>
<tr>
<td>gearn</td>
<td>gearn</td>
<td>yarn</td>
</tr>
</tbody>
</table>
Although my thesis is not on OE phonology, this situation in OE is so important to the hypothesis that I am going to formulate for apocope in OHG that I have to deal with it here, though briefly. The traditional "heavy syllable" analysis is a descriptive solution, providing no insight to the theory of phonology, and McFetridge (1989) has already provided compelling arguments against it. While I agree with these arguments, I would like to suggest at least a basis for a possible alternative to McFetridge's stress pattern analysis of OE apocope.

It is noticed that, in all the consonant clusters in the examples above, the first consonant has a higher $\rho$ value than the second, except for x (the nature of x is still in debate, therefore it does not concern us here). My proposal is that this more resonant consonant, which is in the same syllable as the preceding vowel, to some extent strengthens the vowel before it. In some cases, this strengthening manifests itself as lengthening. The length difference can still be seen in the modern counterpart of these words. For example: word (the vowel is followed by two consonants with the first one stronger than the second, and the vowel is longer), god (the vowel is followed by only one consonant with low $\rho$ value and the vowel is short), folk (with longer vowel), lock (with short vowel). The strengthened vowels induce word-final apocope while the unstrengthened vowels do not. This alternative analysis, incomplete as it is, is in accordance with my hypothesis that apocope applies preferentially when the preceding vowel is stronger in this thesis, and with TP principles and concepts. A similar solution is also provided by McFetridge regarding the differences in $\rho$ values of the preceding consonants. He puts this idea in his universal apocope rule though he does not apply it to OE (McFetridge, 1989:21-28).
I return now to the discussion of the effect of the length of preceding vowels. The data clearly show that in OE the apocope rule applied to the vowel -u preferentially when there was a long vowel in the preceding syllable (it doesn't mean that apocope doesn't apply when the preceding vowels are short, which is discussed in the preceding paragraph). This indicates that apocope applies preferentially after long preceding vowels. Apocope will apply when the preceding vowels are short as an entropization of the schemata. The general condition can then be expressed as:

1. apocope $V\eta\omega \rightarrow \emptyset / VVC _ {\#}$
2. apocope $V\eta\omega \rightarrow \emptyset / VC _ {\#}$

or

universal rule $V2\eta\omega \rightarrow \emptyset / V1C _ {\#}$
universal condition
- $\eta\omega \leq \tau$
- $\Sigma v_{1} \geq \phi$
- $\Sigma c \leq \delta$
- $\rho \geq \lambda$

parochial condition
for OE
- $\tau = 2$
- $\phi = 2$
- $\delta = 1$
- $\lambda = 1$

Therefore, in OE apocope it is predicted by the parochial condition that two vowels, i and u, will be deleted since the condition $\tau = 2$ determines that vowels stronger than u (i.e. vowels with strength value greater than 2 on the $\eta\omega$ parameter) will not be deleted.\footnote{McFetridge assumes a Vowel Strength relation of $i < e < u < o < a$ upon which a universal apocope rule is based (1989:17). Since I later find out in this thesis that OHG Vowel Strength is a little bit different from the one above, I assume that OE would have a similar Vowel Strength relation with that of the OHG’s. Therefore, I assign a $\eta\omega$ value of 2 to u, 3 to e. This means that when $m = 2$, both i and u are deleted but not the other vowels.}
Other conditions further restrict the deletion of \( i \) and \( u \) at word-final position. \( \phi \geq 2 \) determines that only when there is a long vowel or a diphthong in the preceding syllable can the two vowels, \( i \) and \( u \) at word-final position be deleted. If the vowel in the preceding syllable is not a long vowel or a diphthong, but a short vowel, the vowels \( i \) and \( u \) will not be deleted. Still a further condition is the \( \delta = 1 \) condition. It determines the number of preceding consonants to the vowel to be deleted at word-final position, that is, there should be only one consonant preceding the word-final vowels. The \( \lambda = 1 \) condition means that the quality of the preceding consonant has no effect on OE apocope, i.e. any preceding consonant satisfies this condition. All these parochial conditions work together to determine the application of apocope rule in OE. This parochial condition does not take into account the situation when short vowels are followed by a consonant cluster where the first consonant has a higher \( p \) value and the second one has a lower \( p \) value, since that situation is a little bit complicated.

d. The Quality Of The Preceding Vowels

No suitable data has been found to date to show the effect of the quality of the preceding vowels on apocope in languages other than Germanic. Therefore I have to interpret the data that are available and deduce the effect of vowel quality from the interpretation of the data according to TP theory. I will discuss this interpretation of vowel quality in section 4.5, after I have discussed the effect of the final consonants.

4.4 Interpretation Of The Environmental Conditions For Apocope

In the previous sections it was demonstrated that apocope applies preferentially when there are long vowels in the preceding syllable. An understanding of this process requires asking the question:

Why should apocope apply preferentially after long vowels?

The answer must come from the phonological properties of long vowels, i.e. from the so-called property of vowel length. My interpretation is that vowel length is a manifestation of phonological strength. In other words, long vowels are stronger than short vowels. As stronger elements are more likely to strengthen and are more resistant to weakening processes (IDP), I predict that long vowels must have these properties. If they do, my interpretation is at least internally justified.
The data available clearly show that long vowels are stronger. This can be seen from their behavior in participation in phonological rules.

a. Long vowels are more resistant to weakening processes

In all the available data apocope applies to short vowels only; it does not apply to long vowels. Although syncope\textsuperscript{5} applies to long vowels in French, it applies preferentially to short vowels. That is to say, syncope applies to short vowels first, and it applies to long vowels only as a \textit{generalisation} of the rule schemata, or as a result of entropization. Of course, long vowels do participate in weakening processes in weak positions. When in word-final position, short vowels are often deleted by apocope, but long vowels usually remain, only they are shortened, not deleted. The shortening of long vowels into short vowels in weak position is a weakening process since it involves the loss of one mora and also since a similar weakening process, apocope, occurs in the same position.

This phenomenon clearly shows that long vowels are more resistant to weakening processes, i.e. they are stronger than short vowels since long vowels are not deleted while short vowels are. It also shows that short vowels are the weakened reflections of long vowels just like zero is the weakened reflection of short vowels in apocope.

b. Long vowels are more likely to be strengthened

Since the IDP states that strengthening applies preferentially to stronger elements, then long vowels should undergo strengthening processes more readily than short vowels. One such strengthening process is diphthongization. Thus, long vowels should be more likely to undergo diphthongization. This is what we find in OHG. W.Germ. \textit{oo} developed into OHG \textit{uo}, while \textit{o} remained unchanged. For example:

\begin{tabular}{ll}
\textbf{W.Germ.} & \textbf{OHG} \\
dook & tuok (Streadbeck, 1966:52) \\
floot & fluot (Priebsch, 1966:138) \\
foor & fuor (Priebsch, 1966:138) \\
\end{tabular}

c. Long vowels are sometimes strengthened manifestation of short vowels

\textsuperscript{5} Since this thesis concentrates on apocope, restriction of space and time excludes extensive discussion of and data presentation for syncope.
Foley, when discussing the predictability of vowel length, says "we assume that in principle long vowels are secondary developments from short vowels, either by contraction of two short vowels, or by lengthening in open syllable, or by "compensatory lengthening", or some other phenomenon (Foley 1991:172). Both lengthening in open syllable and "compensatory lengthening provide evidence that long vowels are sometimes strengthened manifestation of short vowels. Even the contraction of two short vowels into one long vowel shows that long vowels are stronger than short vowels since one long vowel is equal to two short vowels.

Another manifestation of vowel strength is stress. That is, stressed vowels are stronger than unstressed vowels. In all the available data apocope applied to unstressed vowels only, never to stressed vowels. This situation is also true for syncope, which does not apply to stressed vowels. Since stressed vowels are more resistant to weakening processes they must be stronger than unstressed vowels. Stressed vowels are also more likely to get strengthened, as is expected. One of the vowel strengthening processes is diphthongization as long vowels are stronger than short vowels. The IDP predicts that strengthening processes should apply to stronger elements first and more extensively in stronger environment. Therefore, diphthongization should apply preferentially to stressed vowels and apply to unstressed vowels only as a generalization. Note that, in Italian, for instance, short e diphthongization requires the condition that the short e be stressed (Foley, 1991:8):

<table>
<thead>
<tr>
<th>Latin</th>
<th>Italian</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>pêde</td>
<td>piede</td>
<td>foot</td>
</tr>
<tr>
<td>sêdet</td>
<td>siede</td>
<td>sits(sédre)</td>
</tr>
</tbody>
</table>

Because Italian stressed vowels undergo diphthongization (strengthening) while unstressed vowels do not, it can be concluded that stressed vowels are stronger than unstressed vowels as stronger elements undergo strengthening processes first and more extensively in accordance with the IDP.

Since I have concluded from observation and conceptualization that stressed vowels are stronger than unstressed vowels, I should expect apocope to apply preferentially after stressed vowels just as it does after long vowels. In fact, this is exactly what is found to occur. In French, apocope applies to disyllabic words with stress on the first syllable while some trisyllabic words with stress on the first syllable retain the final vowel, though the medial vowels are deleted by syncope (Foley, 1987:12).
<table>
<thead>
<tr>
<th>Lat.</th>
<th>French</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>mare</td>
<td>mer</td>
<td>sea</td>
</tr>
<tr>
<td>carus</td>
<td>cher</td>
<td>dear</td>
</tr>
<tr>
<td>centum</td>
<td>cent</td>
<td>hundred</td>
</tr>
<tr>
<td>campus</td>
<td>champ</td>
<td>field</td>
</tr>
<tr>
<td>passus</td>
<td>pas</td>
<td>step</td>
</tr>
</tbody>
</table>

Schane (1973:57) provides similar data:

<table>
<thead>
<tr>
<th>Lat.</th>
<th>French</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>p6pulum</td>
<td>peplə</td>
<td>people</td>
</tr>
<tr>
<td>tábula</td>
<td>təblə</td>
<td>table</td>
</tr>
<tr>
<td>pérdere</td>
<td>perdrə</td>
<td>to lose</td>
</tr>
<tr>
<td>arborem</td>
<td>arbrə</td>
<td>tree</td>
</tr>
</tbody>
</table>

The preferential relation can be expressed as:

1. \( V \rightarrow \emptyset / 'VC __ \) #
2. \( V \rightarrow \emptyset / VC __ \) #

When we put the two situations together, that is, the preferential application of apocope after long vowels in the preceding syllable and stressed vowels in the preceding syllable, we may conclude that at an abstract level apocope should apply preferentially when the preceding vowels are stronger.

This conclusion is derived by transition from the fact that apocope applies preferentially when the preceding vowels are longer and stressed, i.e. when the preceding vowels are stronger. Here, I conceptually equate the quality of length with the quality of strength, as length is one of the manifestations of strength. At an abstract level they should represent the same thing.

Since at an abstract level both length and stress represent the same concept - strength -, we may conclude that the strength value of the preceding vowels (\( V_1 \)) is also a conditioning factor for the application of apocope of word-final vowels (\( V_2 \)), which is exactly what happens in OHG. The general condition for apocope is that apocope applies preferentially after stronger vowels. The preferentiality is shown below:
1. **apocope** \( V_2 \rightarrow \emptyset/\, V_1^+C \_ \_ \# \\
2. **apocope** \( V_2 \rightarrow \emptyset/\, V_1C \_ \_ \# \\

However, for each language the strength value of vowels must be determined individually within the phonological system of the language.

The situation for vowels is now quite clear. At an abstract level both stressed vowels and long vowels represent stronger vowels. And apocope applies preferentially when the preceding vowels are stronger, i.e. when the final vowel is relatively weaker or in a relatively weak position. However, the situation for the preceding consonants is not so clear at first sight. Two questions remain to be answered:

1. Why should apocope apply preferentially after a single consonant?
2. Why should apocope apply preferentially after consonants with higher \( \rho \) value?

Before answering these two questions, the properties of both single consonant and consonants with higher \( \rho \) value must first be decided.

**a. Properties of single consonants**

It is possible that the number of consonants is not an appropriate reference, for it might be obscuring insight into the problem. For this reason, the meaning of this number value may have to be reinterpreted. One way of getting out of this rather small dilemma is to look at this problem from a different viewpoint. Note the following data (Foley, 1991:18):

**Diphthongization of Italian short \( e \):**

<table>
<thead>
<tr>
<th>Latin</th>
<th>Italian</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>pede</em></td>
<td>piede</td>
<td>foot</td>
</tr>
<tr>
<td><em>sedet</em></td>
<td><em>siede</em></td>
<td>sits(sédé)</td>
</tr>
<tr>
<td><em>festa</em></td>
<td>festa</td>
<td>feast</td>
</tr>
<tr>
<td><em>pectu</em></td>
<td>petto</td>
<td>breast</td>
</tr>
<tr>
<td><em>vetat</em></td>
<td>vieta</td>
<td>forbids</td>
</tr>
<tr>
<td><em>vetu</em></td>
<td>vieto</td>
<td>stale; obsolete</td>
</tr>
<tr>
<td><em>metit</em></td>
<td>miete</td>
<td>measures</td>
</tr>
</tbody>
</table>
The above data show that in Italian short e diphthongizes when it is followed by a single consonant. The diphthongization does not happen if short e is followed by two consonants. But specifying the number of consonants is perhaps misleading. If the end goal is just to organize the data, the number of consonants can clearly be easily used in the statement of the rules. However, the goal is to understand the essence of phonological processes, therefore, the following question must be asked:

Why should short e diphthongize when followed by a single consonant and fail to diphthongize when followed by two consonants?

In TP, diphthongization is a strengthening process and the argument for this consideration is that one mora of vowel is converted to two morae through diphthongization, and its effect is the same as vowel lengthening. According to the IDP, strengthening processes apply preferentially to stronger elements in stronger environment. Since the quality of the element is kept constant (in this case only one vowel, that is, short e, is considered), the only remaining factor is the environment. In other words, the short e is in a stronger position when followed by a single consonant since it undergoes diphthongization, but in a weaker position when followed by double consonants since it fails to undergo diphthongization.

Another example is found in English. It also shows that vowels are weaker when followed by two or more consonants, but stronger when followed by fewer consonants. Kiparsky (1967) refers to a vowel shortening rule in English as follows:

"In English, underlying long vowels, which are otherwise realized as diphthongs, are shortened in two main phonological environments: before two or more consonants (for example, keep:kept) and in the third syllable from the end of the word (for example, vain: vanity, severe: severity). The rules which bring these shortenings about are the following:

5'  \[ V \rightarrow [ - \text{long}] / \_CC \]
5'\'  \[ V \rightarrow [ - \text{long}] / \_C\ldots V\ldots V \]

The theory of generative grammar requires that 5' and 5'\' be collapsed into a single rule as follows:

5.  \[ V \rightarrow [ - \text{long}] / \_\_C\_\_ C\ldots V\ldots V \]
It asserts that of the two descriptively equivalent grammars, one of which contains the two rules (5' and 5") as separate processes, and the others as a single process combined into 5 by factoring out their common part and enclosing the remainder in braces, it is the latter which is the psychologically correct one.

Rule 5 arose in Early Middle English as a generalization of a much more restricted process of shortening. In Old English, vowels were shortened before three or more consonants (for example, goodspell > godspell, bræemblas > bræmbles) and in the third syllable from the end provided they were followed by two consonants (for example, bleedisian > bleedisian). The corresponding rules were:

\[
\begin{align*}
6' & \quad V \to [\ - \text{long}] / \_\_\_CCC \\
6'' & \quad V \to [\ - \text{long}] / \_\_CC\ldots V\ldots V \\
\end{align*}
\]

Again, these rules must be collapsed as before:

\[
C \\
6. \quad V \to [\ - \text{long}] / \_\_CC\ldots V\ldots V \\
\]

On comparing the Old English rule in 6 and the Early Middle English (and indeed Modern English) rule in 5 we see that the only difference between them is that the later rule (5) has lost one of the required consonants in its environment. It represents a simpler, more general form of the Old English vowel-shortening process. It will apply in all cases where 6 applied but also in cases where 6 would not have applied. Evidently the change from 6 to 5 is an instance of simplification, which we have seen to be one of the basic mechanisms of linguistic change."

Although Kiparsky argues that rule 5, which is collapsed from rule 5' and 5", "is the psychologically correct one", he gives no phonological reasons why rule 5 is better than 5' and 5''.

What knowledge about phonology and phonological theory can we gain from the collapsing of two rules like rule 5' and 5"? What's in common between these two rules? Why should they have similar effects? There is no answer to these questions in his argument, and there is no conclusion that can be drawn from collapsing the two rules. Collapsing these two rules is just another way of presenting the observed data. It does not provide any insight into the problem.
While I agree with Kiparsky in that rule 5' and 5" are generalizations of rule 6' and rule 6", (we can see the development from specific rules to general rules here, i.e. entropization) and am also interested in the development of rule 5' from rule 6', and rule 5" from rule 6", my particular concern goes well beyond merely collapsing the two rules into a single rule. I am not concerned with writing a "simpler" grammar, but, on the contrary, with the proper interpretation of these rules by themselves and in terms of their interrelationships to other rules. They may indeed in any case be two separate rules.

By the principle of entropization, rules start out highly restricted and this restriction gradually relaxes, allowing a more general application of the rule. From the fact that long vowels are stronger than short vowels, the development from long vowels to short vowels is known to be a weakening process. And, according to the IDP, weakening processes apply to weak elements first and most extensively and preferentially in weak environment, and gradually apply to strong elements in strong environments as the restrictions relax.

Logically the development from rule 6' and 6" to rule 5' and 5" indicates a relaxation on the application environment, or a generalization of the rule application from weak elements only to including strong elements. It is then not hard to conclude that the elements in rule 6' and 6" are weaker than the elements in rule 5' and 5", or, alternatively, the environments in rule 6' and 6" are weaker than the environments in rule 5' and 5".

This conclusion is exactly what the strength difference between vowels in open syllable and vowels in closed syllable indicates. At a more abstract level, vowels are seen to be weaker when followed by more consonants, and stronger when followed by fewer consonants. (When claiming this principle it is essential to point out that the comparison is made with reference to the same morpheme, e.g. keep:kept, deep:depth, five:fifth etc.. The general tendency that vowels are stronger when followed by fewer consonants and weaker when followed by more consonants should not be confused with the tendency that vowels are also stronger when followed by consonants with higher p value. When the two tendencies are in conflict, it is the later that often prevails. The vowel in part is stronger than the vowel in pat even though it is followed by two consonants. Any further discussion of this matter is beyond the scope of this thesis, for phonology is really a complicated subject and there is no single overall solution to its problems.)

---

6. See below on the notions 'open' and closed' syllable.
But why should they have this strength difference? It is possible simply to say that when a vowel is followed by a single consonant it is stronger than when it is followed by two consonants, and that a stronger vowel is diphthongized, but its weaker counterpart is not. And then a rule for this situation may even be formulated, e.g.:

\[
\begin{align*}
V & \rightarrow V + / _\_ C^1 \\
V & \rightarrow idem / _\_ C^2
\end{align*}
\]

or

\[
\begin{align*}
V & \rightarrow idem / _\_ C^1 \\
V & \rightarrow V - / _\_ C^2
\end{align*}
\]

Alternatively, yet another parameter \( \lambda \) may be formulated, for instance, to express this relation:

\[
\begin{array}{c}
VCC \\
\lambda
\end{array} \quad VC
\]

\[
\begin{array}{c}
1 \\
\rightarrow
\end{array} \quad 2
\]

This kind of answer is still not satisfactory, for it is simply a formalized expression of data observed (substituting letter symbols for words) and it does not give any reason why vowels followed by fewer consonants should be stronger than the same vowels followed by more consonants.

In order to escape this deadlock, the concept of phonological energy and its distribution pattern within phonological units must be considered. The principle of energy distribution states that the longer a unit is, i.e. the more elements in the unit, the weaker the elements in the unit are, for the unit has an upper limit to the amount of energy it can contain. The Italian data and the English data fit perfectly with this statement.

A syllable is a phonological unit. When a vowel is not followed by any consonant within the syllable it is in an 'open' syllable. When a vowel is followed by one or more consonants within the syllable boundary it is in a 'closed' syllable. Therefore, there are more elements in a closed syllable than in an open syllable. According to the principle of energy distribution (Foley, 1977:86) a vowel (an element) is stronger in an open syllable since there are fewer elements in the syllable, but weaker in a closed syllable since there are more elements in the syllable. The more consonants follow the vowel the weaker the vowel is.
b. Properties of \( \rho \) value for consonants

\( \rho \) value is derived from the comparison of the relative resonance of consonants, or the ability for consonants to vocalize. Therefore, the higher the \( \rho \) value the more vowel-like the consonants are. In other words, they are phonologically stronger. When a phonological element is adjacent to another strong phonological element (i.e. with greater \( \rho \) value) it can gain phonological strength from the neighboring strong phonological element. This strengthening may manifest itself either as strengthening or as the blockage of weakening. For example:

In Norwegian, \( s \) palatalizes (strengthens) to \( \ddot{s} \) before liquids (stronger element with \( \rho \) value of 4) but not before nasals (weaker than liquids with \( \rho \) value of 3): e.g. slem [\( \dddot{s}l\dot{e}m \)] 'bad', snâ [\( s\ddot{n}o \)] 'snow'.

In Italian, assibilation occurs before a front vowel, but not after a nasal (stronger element with \( \rho \) value of 3): e.g.

\[
\begin{array}{ccc}
Sg. & Pl. & Gloss \\
amico & amici [ami\ddot{c}i] & friend \\
banco & banchi [banki] & bank \\
\end{array}
\]

As Foley (1977:111) states:

"The above examples show strengthening (or the failure of some weakening processes) occurring, not in any of the typically strong positions, but rather in the neighbourhood of strong elements."

Since an element sometimes gains energy from its strong neighboring elements and gets stronger when adjacent to a strong element, a vowel when followed by a consonant with higher \( \rho \) value may gain energy and be stronger than the same vowel followed by a consonant with lower \( \rho \) value. And since stronger vowels in the penultimate syllable are more likely to induce apocope we expect that apocope applies preferentially when the vowels in the preceding syllable are followed by a consonant with higher \( \rho \) value. This conclusion is in accordance with the fundamental principle of the apocope rule, which states that apocope applies preferentially after a stronger vowel in the preceding syllable.
In phonological analysis, apocope sometimes refers not only to the loss of vowels in absolute word-final position but also to vowels followed by a word-final consonant. In this case the value of this final consonant also plays a role in the conditional environment of the application of apocope.

From the theory and the previous analysis of apocope it may be predicted that apocope applies preferentially to a vowel followed by a single consonant with lower \( \rho \) value, since a vowel followed by a consonant with lower \( \rho \) value is weaker than a vowel followed by a consonant with higher \( \rho \) value, and apocope applies preferentially to a weaker vowel. This situation occurs in OHG final vowel deletion, which will be dealt with in the next chapter.

4.6 Conclusion.

At this state of the thesis, I have answered the two questions that were raised in the last section. I have analyzed the different factors in the environment for apocope, including the number of preceding consonants, the quality in terms of value of the preceding consonants, the length and stressness of the vowels in the preceding syllable and the quality of the vowels in the preceding syllable. The conclusion is that apocope is a weakening process that deletes a vowel in word-final position. It applies preferentially to weak vowels. The weakness of a vowel may be inherent, i.e. by comparison with other vowels in the same language system. Or the weakness may be positional, i.e. because the preceding vowel is stronger and thus takes up more phonological energy through energy fluxion. There are several different manifestations of strength in the preceding vowels. They may be strong because they are stressed, or because they are longer, or because they are followed by a single consonant, or because they are followed by strong consonants. Exactly what is affecting the application of apocope is language specific, but the general trend is the same, universal.

Finally the apocope rule is formulated as:

\[
\begin{align*}
\text{universal rule} & : V_2 \eta \omega \rightarrow \emptyset / V_1 \eta \omega \rho \_ \# \\
\text{universal condition} & : V_2 \eta \omega \leq \tau \\
& : V_1 \eta \omega \geq \gamma \\
& : \Sigma V_1 \geq \phi \\
& : \Sigma C \leq \delta \\
& : \rho \geq \lambda
\end{align*}
\]
I claim this rule of apocope to be universal, applicable to all languages with changes in parochial conditions. To verify its universality I shall apply this universal rule to OHG apocope in the next chapter. (Note: this universal rule of apocope does not include the situation where the difference in \( \rho \) value of the preceding two or more consonants affects the word-final vowels which is already dealt with in McFetridge 1989:21-28).
CHAPTER V APOCOPE IN OHG

5.1 Introduction

In the previous chapter the phonological conditions for apocope through data observation and conceptualization were studied. The data were chosen from languages other than OHG. The general conditions for the application of apocope in these languages are established as:

Apocope applies preferentially to weak vowels.
Apocope applies preferentially when the vowels in the preceding syllable are strong.

And a universal apocope rule which integrates the two conditions for apocope is established as:

\[
\text{universal rule} \quad V_2 \eta \omega \rightarrow \emptyset \mid V_1 \eta \omega C \rho \quad \# \\
\text{universal condition} \quad V_2 \eta \omega \leq \tau \\
V_1 \eta \omega \geq \gamma \\
\Sigma V_1 \geq \phi \\
\Sigma C \leq \delta \\
\rho \geq \lambda
\]

The first condition can be derived from the IDP, which governs the behavior of phonological elements in their participation in phonological processes. As apocope is a weakening process it is natural that it applies preferentially to weak vowels. Here weakness refers to the value of the inherent phonological strength of the vowels as shown on the \( \eta \omega \) parameter. The lower the value the weaker the vowel is.

The second condition is an extension of the first. It is derived from the principle of energy fluxion. The underlying reason is that stronger preceding vowels (stressed, long, nasalized, followed by a single consonant, or followed by consonant with higher \( \rho \) values) tend to absorb more phonological energy and become stronger. Since the total amount of energy in a word, which is a phonological unit, is relatively constant, the strengthening of the vowels in the preceding syllable will weaken other elements in the word, preferably the vowels in word-final position, as word-final is the weakest position, according to the principle of energy conservation. That is, the final vowels will lose some energy as a result of the strengthening of the vowels in the preceding syllable.
This loss of energy when the preceding vowels are stronger (energy fluxion) explains why some word-final vowels are positionally weaker than they are "supposed to be", i.e. weaker than their inherent strength and also weaker than the same vowels preceded by weaker vowels. The phonological reflection of this phenomenon is the "irregular" loss of some word-final vowels and the "irregular" retention of the same vowels in other words. This irregularity constitutes the problem in OHG apocope discussed in Chapter 2., in which some i and u are lost while others are retained.

The cause of this superficial irregularity is the fact that both inherently weak vowels and positionally weak vowels are more likely to undergo apocope. In some languages, such as Span., Prov., Fren. etc (see page 25), only the first condition applies to apocope, i.e. with no effect of energy fluxion, thus the preceding vowels and consonants have no influence on the deletion of word-final vowels while, in other languages, such as Portuguese (see page 28), both the first and the second conditions apply, i.e. with the effect of energy fluxion, and the situation for apocope is much more complex in these languages.

In this chapter I apply these general conditions for apocope to the situation in OHG. It is shown that the conditions for the application of apocope in OHG are the same at an abstract level as the conditions for the application of apocope in other languages. The differences lie only in parochial conditions, which are different from language to language.

This consistency of rules for all languages at an abstract level is a crucial condition in TP, as this condition is one of the foundations of the theory. TP emphasizes universality, that is, the theory predicts that there exists a set of universal phonological rules which can apply to all natural languages. Although these rules may seem to be different from language to language, this is a superficial difference, and is actually due to the different parochial conditions. If a rule derived from the study of a certain language can not apply to other languages (e.g. the syllable weight solution to OHG apocope), then this rule is of no theoretical interest, for it is only a parochial rule, and lacks universality. The likelihood is that such rules are not well-formulated. A well-formulated rule should apply to all languages, i.e. be a universal rule.

Furthermore, in TP, the phonological study of a particular language is closely related to the study of the morphological structures of the language being studied. This is because phonological variations or changes in a language are often reflected through its morphological structures, as different morphological conditions lead to different phonological conditions. Thus, in my study of OHG phonology, phonological examples are given through OHG morphological variations.
First, a brief account of the morphological structure of OHG is provided, as far as this is pertinent within this thesis - giving the roots, stems and endings as they are in underlying forms. A very detailed study of OHG morphology would be beyond the aim and scope of this thesis. However, it must be noted that it is often the case that in scientific research some unexpected results may be achieved even though they are not the researcher's original intention. Thus, the study of OHG apocope may lead to some better understanding of both OHG phonology and morphology. From the underlying forms, which must *ex hypothesi* be uniform, I derive the attested surface forms through a set of proposed phonological rules. These rules are all universal rules that can apply to OHG and other languages as well. They are subjected to close scrutiny in order to see whether they are well-formulated.

5.2 OHG Nouns

The apocope problem in OHG Nouns has already been described in Chapter 2. The main point to this problem is that the vowels *i* and *u* appear to be stronger than the vowel *a* if we stick to a syllable weight solution which I have criticised in Chapter 2. After the discussion of general conditions for apocope in the previous chapter it is noticed that both preceding vowels and consonants may have some influence on the word-final vowels. Therefore, the conditions in OHG apocope are more important to the solution to this problem.

If the conditions for apocope in OHG were simple, that is, if the preceding vowels and consonants had no effects on the rule application, the relative strength among short vowels *a*, *i* and *u* could have been determined according to which one or ones are deleted by apocope and which one or ones are not. The one or ones that are deleted should be weaker than the one or ones that are not deleted by apocope. However, the situation in OHG is obviously not that simple, therefore without considerations of the effect of preceding vowels and consonants a genuine solution can not be found. It is noticed that all three vowels are deleted by apocope in most of the cases, but there are some exceptions or "irregularities". That is, in certain cases, some of the stem vowels are not deleted, and these so-called exceptions need to be explained.

One way to achieve a more reliable and insightful analysis is to observe the data and then apply the existing theoretical principles to them. It is noticed that in OHG all the short unstressed vowels in word-final position are deleted, except for a few isolated cases. This means that apocope in OHG almost reaches its final generalization stage - all short unstressed vowels are deleted in word-final position. In this case there will be no way of telling which vowel is stronger or weaker than the others through the observation of which one or ones are deleted. (The same situation
obtains for French apocope discussed in Chapter 4.) What is more important now is the conditioning factors, i.e. the preceding vowels and consonants. It will then be necessary to decide the conditioning factors for those isolated cases in which the short unstressed word-final vowels are not deleted, since they generally are.

First, nouns are arranged according to their stem vowels. The underlying forms (which I reconstructed according to word class and paradigm) are given with a small circle (°) before them. -z is the sg. nom. ending; -m is the sg. acc. ending; -es is the pl. nom. ending and -ns is the pl. acc. ending (Priebsch and Collins, 1966:87-89). The attested surface forms are given below the underlying forms.

<table>
<thead>
<tr>
<th>i-stem</th>
<th>u-stem</th>
<th>a-stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>gegast-i-z</td>
<td>°sun-u-z</td>
<td>°tag-a-z</td>
</tr>
<tr>
<td>gast</td>
<td>sun(u)</td>
<td>tag</td>
</tr>
<tr>
<td>°gast-i-m</td>
<td>°sun-u-m</td>
<td>°tag-a-m</td>
</tr>
<tr>
<td>gast</td>
<td>sun(u)</td>
<td>tag</td>
</tr>
<tr>
<td>°gast-i-es</td>
<td>°sun-u-es</td>
<td>°tag-a-es</td>
</tr>
<tr>
<td>gesti</td>
<td>suni</td>
<td>taga</td>
</tr>
<tr>
<td>°gest-i-ns</td>
<td>°sun-u-ns</td>
<td>°tag-a-ns</td>
</tr>
<tr>
<td>gesti</td>
<td>suni</td>
<td>taga</td>
</tr>
<tr>
<td>°slag-i-z</td>
<td>°sig-u-z</td>
<td>°stein-a-z</td>
</tr>
<tr>
<td>slag</td>
<td>sigu</td>
<td>stein</td>
</tr>
<tr>
<td>°slag-i-m</td>
<td>°sig-u-m</td>
<td>°stein-a-m</td>
</tr>
<tr>
<td>slag</td>
<td>sigu</td>
<td>stein</td>
</tr>
<tr>
<td>°slag-i-es</td>
<td>°sig-u-es</td>
<td>°stein-a-es</td>
</tr>
<tr>
<td>slegi</td>
<td>sgi</td>
<td>steina</td>
</tr>
<tr>
<td>°slag-i-ns</td>
<td>°sig-u-ns</td>
<td>°stein-a-ns</td>
</tr>
<tr>
<td>slegi</td>
<td>sgi</td>
<td>steina</td>
</tr>
<tr>
<td>°win-i-z</td>
<td>°fat-u-z</td>
<td>°arm-a-s</td>
</tr>
<tr>
<td>wini</td>
<td>faz</td>
<td>arm</td>
</tr>
<tr>
<td>°win-i-m</td>
<td>°fat-u-m</td>
<td>°arm-a-m</td>
</tr>
<tr>
<td>wini</td>
<td>faz</td>
<td>arm</td>
</tr>
<tr>
<td>°win-i-es</td>
<td>°fat-u-es</td>
<td>°arm-a-es</td>
</tr>
<tr>
<td>wini</td>
<td>fati</td>
<td>arma</td>
</tr>
<tr>
<td>°win-i-ns</td>
<td>°fat-u-ns</td>
<td>°arm-a-ns</td>
</tr>
<tr>
<td>wini</td>
<td>fati</td>
<td>arma</td>
</tr>
</tbody>
</table>

(For the word faz < fatu < °fatuz see Prokosch, 1939:134)

From the data above it is noted that in sg. nom/acc forms the stem vowels are followed by a single word-final consonant, either -z or -m as person/number endings. The word-final -z and -m are all deleted in OHG while in Gothic -z remains, though devoiced to -s, cf. Gothic dags, OHG tag. After the loss of word-final single consonants in OHG the stem vowels are exposed in word-final position. Then, apocope applies to sg. nom/acc forms to delete the word-final vowels.
It is also noticed that the stem vowels are retained in the plural nom/acc forms. I believe that there must be an environmental difference between the singular and plural forms. The difference is that, in plural forms, the stem vowels are not followed by a single consonant while in singular forms they are. In pl. nom. forms the stem vowels are followed by the ending -es and in pl. acc. forms the stem vowels are followed by the ending -ns. These longer endings are deleted in OHG surface forms but the stem vowels are preserved. In OHG pl. nom/acc forms apocope does not apply because the stem vowels are not in word-final position after the deletion of the word-final consonant. There are a vowel e pl. nom. forms and a consonant n in pl. acc. forms. Therefore, only the cases in singular forms need to be discussed, where the stem vowels are in word-final position after the deletion of word-final consonant and most often deleted by apocope.

**TP** requires that a rule should uniformly apply to the same phonological element in a given language. The failure or the blockage of a rule application is due to different environmental conditions. Thus, I assume here that the loss or retention of underlying -i - and -u - in OHG i -stem and u -stem nouns is due to difference in the environment as the vowels themselves are not variants here, while the environmental conditions may differ from word to word.

What could be the conditioning factors in the apocope of OHG i and u? It is known from the general conditions for apocope which I have derived in the previous chapter that both the quality and quantity of the preceding consonants and the preceding vowels can have effect on the application of the apocope rule. Thus, the possible effects of these preceding vowels and consonants in OHG must be considered.

Careful observation of the available data reveals that whenever the preceding vowels are i and u the final stem vowels i and u are retained (I and IV below). However, when the preceding vowels are either a diphthong, a long vowel, or a monophthong like a and o, the stem vowels i and u are deleted (II, III and IV below). This shows that the quality or the strength of the vowels in the preceding syllable is the salient factor for the application of apocope in OHG, while the number and the quality of preceding consonants have little or no effect on its application since the stem vowels are deleted regardless of the number of preceding consonants. See the following examples:

I i is retained when the preceding vowels are either i or u.

- wini < win-i-s/m(friend)
- risi < ris-i-s/m(giant)
- quinti (saying)
- kumi (arrival)
II  
\[ i \] is deleted when the preceding vowel is an \[ a \].

- slag < slag-i-s/m
- gast < gast-i-s/m
- nuas < naw-i-s/m
- haz < hat-i-s/m (Priebsch and Collins, 1966:158)

III  
\[ i \] is deleted when the preceding vowels are long vowels.

- fard < fard-i-s/m
- anst < anst-i-s/m
- flood < flood-i-s/m
- fuust < fuust-i-s/m (Fullerton, 1977:21-22)

IV  
\[ u \] is retained when the preceding vowels are either \[ i \] or \[ u \].

- sunu < sun-u-s/m
- situ < sit-u-s/m pl. siti, siteo, sitim
- fridu < frid-u-s/m
- hugu < hug-u-s/m
- sigu < sig-u-s/m
- witu < wit-u-s/m (wood)
- fihu < fih-u-s/m (the only neuter)

V  
\[ u \] is deleted when the preceding vowels are long or a single \[ a \].

- dom < dom-u-s/m (Goth. daursus)
- tood < tood-u-s/m (Goth. daupus)
- hungar < hungar-u-s/m
- wald < wald-u-s/m
- faz < fat-u-s/m (Prokosch, 1939:134)
- fiskoop < fiskooup-s/m (Fullerton, 1977:21-22)

There are dialectal differences and border cases in OHG dialects, such as the word "sunu": "sunu retained the -u only in the oldest Franconian sources, otherwise the form is sun" (Prokosch, 1939:248). The word sun is also a counterexample to the "syllable weight" analysis. However, the general trend is clear:

The rule for deleting \( i \) appears to be:

\[
\begin{align*}
    i & \rightarrow \emptyset / V+C \quad (C)# \\
    i & \rightarrow \text{idem} / VC \quad (C)#
\end{align*}
\]

\[ V^+ = VV, a \]

\[ V = i, u \]

The rule for deleting \( u \) appears to be:

\[
\begin{align*}
    u & \rightarrow \emptyset / V+C \quad (C)# \\
    u & \rightarrow \text{idem} / VC \quad (C)#
\end{align*}
\]

\[ V^+ = o, a, VV \]

\[ V = i, u \]
In these two simplified rules, $V^+$ simply stands for the vowels that can induce the apocope of $i$ and $u$, while $V$ stands for the vowels that can not induce the apocope of $i$ and $u$.

In Chapter 4 it is already concluded that one of the general conditions for apocope is that it applies preferentially when the vowels in the preceding syllable are strong. Since in OHG apocope applies preferentially when the vowels in the preceding syllable are $o$, $a$, $W$, and does not apply when the vowels in the preceding syllable are $i$ and $u$, the logical conclusion will be that $o$, $a$, $W$ are stronger than $i$ and $u$. It is also concluded in Chapter 4 that long vowels are stronger than short vowels. Naturally the short vowels that behave like long vowels, i.e. stronger vowels, should be stronger than the short vowels that do not behave like long vowels. According to the above analysis a strength relation of:

$$i,u < o,a$$

can be derived for short unstressed vowels in OHG. That is, $o$ and $a$ are stronger than $i$ and $u$. Or $i$ and $u$ are weaker than $o$ and $a$ in OHG, as they can not induce preferential apocope, while $o$ and $a$ can. This strength relation is the opposit to the strength relation given by syllable weight solution, but in accordance with the strength relation obtained for Romance languages though it is still premature. At this stage I do not consider the strength relation of $e$ to other vowels since there are no data to show the strength relation. However, I believe that the strength value of $e$ is somewhere between $i$ and $o$ as is the case in Romanic languages.

Assuming that, at this stage, there are only four short unstressed vowels in OHG I assign strength values of 1 - 4 to these four vowels. 1 and 2 are assigned to $i$ and $u$; and 3 and 4 are assigned to $o$ and $a$. Even though the strength relation between $i$ and $u$ is not clear it is certain that they are weaker than $o$ and $a$. Based on the data and my analysis a more integrated rule for OHG apocope can be formulated which has the same universal form as the apocope rule derived in the previous chapter with parochial conditions for OHG:

**universal rule**

$$V_2\eta\omega \rightarrow \emptyset / V_1\eta\omega C \rho \_\_ \#$$

**universal condition**

$$V_2\eta\omega \leq \tau$$

$$V_1\eta\omega \geq \gamma$$

$$\Sigma V \geq \phi$$

$$\Sigma C \leq \delta$$

$$\rho \geq \lambda$$
parochial condition
for OHG
\[
\begin{align*}
\tau &= 4 \\
\gamma &= 3 \\
\phi &= 1 \\
\delta &= 2 \\
\lambda &= 1 \\
\end{align*}
\]

This rule and its conditions predict that in OHG all the short unstressed vowels are deleted if the following conditions are met:

If the preceding short vowel has a strength value of greater than or equal to 3, i.e. the vowel must be either o or a, but can not be i and u, the two weakest vowels in OHG at this stage.

If the preceding vowel is a diphthong or a long vowel, since long vowels and diphthongs are stronger even than o and a.

If the total number of consonants before the final vowel is less than or equal to 2. When the number of preceding consonants is 3 the rule fails. hirti < hirt-ja-s.

If the strength value of the preceding consonant is greater than or equal to 1 i.e. any consonant.

The hypothesis that monophthongs like a and o are stronger than i and u, is deduced through conceptualization (which is very important in formulating a theory, see Foley, 1991:68-70) from the fact that a and o can induce apocope of the short vowels in the following word-final syllable just like diphthongs and long vowels do, while monophthongs like i and u can not have this effect.

Since one of the general conditions for the application of apocope is that apocope applies preferentially after stronger vowels, it is rationalized that the vowels that cause preferential application of apocope are assumed to be stronger than vowels that do not.
Another argument for the strength relation of \( o, a > i, u \) is that, although \( a \) and \( o \) are monophthongs, they have the effect of diphthongs or long vowels. And since diphthongs are stronger elements, monophthongs that behave like them should also be stronger than the monophthongs that do not.

A possible argument against the above hypothesis is that short unstressed vowel \( a \) is uniformly deleted in word-final position while some of the short unstressed \( i \) and \( u \) are remained in exactly the same situation. This argument against my hypothesis does not stand firmly for it sees only part of the problem, that is, the strength relation of the word-final vowels themselves. This argument does not take into account the effect of the environment, i.e. the effect of the preceding vowels and consonants. An analysis that does not take into account of the environmental factors can not explain the fact that \( i \) and \( u \) are uniformly deleted after preceding \( o, a \), diphthongs and long vowels but uniformly remain after preceding \( i \) and \( u \). The uniform deletion of \( a \) in OHG is only a superficial irregularity, one which can be explained by my hypothesis in which the conditioning factors of apocope are considered.

According to my hypothesis the reason for this irregularity is that in OHG apocope the strength value of the final vowels themselves is not the most salient factor. Nor is the strength value of the preceding consonants. The most salient factor in OHG apocope is the strength value of the preceding vowels. Observing the available data carefully reveals that there are no short \( i \) and \( u \) in the preceding syllable for a-stem nouns. The vowels in the preceding syllable are either a monophthong \( a \) (tagas/m, armas/m), or a diphthong \( ei \) (steinas/m, IE %woida > Germ. weiz ).

Thus, these words, in which short unstressed \( a \) is deleted, provide no counter examples for the hypothesis that \( a \) is stronger than \( i \) and \( u \). True counterexamples should be (1) words with monophthongs \( a \) and \( o \), diphthongs, or long vowels in the preceding syllable where the short unstressed stem vowels \( i, u, o \) and \( a \) are retained and (2) words with monophthongs \( i \) and \( u \) in the preceding syllable where the short unstressed stem vowel \( i, u, o \) and \( a \) are deleted. There are no counterexamples of the (1) type. All the words with \( a \) and \( o \), diphthongs, or long vowels in the preceding syllable show the lost of the word-final short unstressed vowel, regardless of their strength. There are no counterexample of (2) type either. When the preceding vowels are \( i \) and \( u \) the stem vowels are also \( i \) and \( u \). I have found no words with \( i \) and \( u \) in the preceding syllable and \( o \) and \( a \) as stem vowels. It may seem peculiar that no such words are found in OHG in terms of vowel strength. However, this distributional peculiarity may be the result of an earlier mutation rule which assimilates the height of the preceding vowels to the height of the word-final vowels.
With no counterexamples found I assume the hypothesis is correct. Another way to verify the correctness of this hypothesis is to check to see if it is applicable to other situations in OHG. If it is applicable it is verified again; if it is not applicable some doubts rise to the hypothesis. I’ll try to check the hypothesis with OHG verbal morphology in the next section.

5.3 OHG Verbs

From the general conditions on apocope it is also predictable that apocope preferentially applies after nasalized vowels and fails to apply after non-nasalized vowels since nasalized vowels are stronger than non-nasalized. In OHG or Germanic in general this situation obtains for verbal morphology.

The formation of thematic verbs in OHG has already been presented in Chapter 2. They have a form of:

root + thematic vowel + person/number endings

The paradigms are shown below:

1sg  root  -oo (mi drops and o > oo) (-o-mi > oo)
2sg  root  -e-si
3sg  root  -e-ti
1pl  root  -o-mes
2pl  root  -e-te
3pl  root  -o-nti

In order to find answers to the questions given in Chapter 2, TP principles and concepts will be applied. As has already been stated and demonstrated in Chapter 3, within the framework of TP, the process of entropization means that application of phonological rules is a gradual process, starting in a highly restricted manner, and gradually losing the restrictions. Apocope as a weakening process is no exception to this. The loss of -mi can not be a sudden change and it must be a gradual process. Thus, either -i is deleted first or -m - is deleted first, but not both simultaneously.

Since apocope is a phonological process that deletes an unstressed vowel in word-final position, it is not unreasonable to consider as a first hypothesis that -i is deleted first. Moreover,
apocope is a natural rule which is commonly found in Germanic languages, as well as in many
other languages, while the loss of an intervocalic nasal is less frequently found (Foley, 1977:54). 
Therefore, I assume that i is deleted first by apocope. After the application of apocope the -m- in
-mi is in word-final position. It is fairly common for a consonant, including nasals, to be deleted in
word-final position. If the loss of -mi is explained in this order, then the first question raised in
Chapter 2 naturally arises and a phonological reason for this early loss of word final i in -mi must
be found.

Examination of the general conditions on apocope in this thesis has revealed that a vowel is
preferentially lost after stronger preceding vowels, such as stressed vowels, longer vowels, and
inherently stronger vowels. To these general conditions, another case may be added: a vowel is
preferentially lost after nasalized vowels. This condition can be derived from the general condition
for apocope: since apocope applies preferentially after stronger preceding vowels, and also since a
nasalized vowel is stronger than its non-nasalized counterpart, therefore, we can expect that
apocope applies preferentially after a nasalized vowel while the same rule may fail to apply after a
non-nasalized vowel.

This condition of preferential apocope after nasalized (stronger) vowels has the added
advantage of generating a solution for the person/number ending problem of OHG thematic verbs.
In other words, the two questions 1. and 2. can have one simple answer. The key point in this
solution here is to postulate a nasalization rule. Though phonetic manifestation of OHG does not
show the nasalized vowel, the different phonological development that nasalized and non-nasalized
vowels undergo provides important clues to the postulation of the nasalization rule.

Another process to be considered in my solution here is mutation, or vocalic assimilation.
The preferential application condition on assimilation is that assimilation applies preferentially to
similar elements (Foley, 1977:36). The similarity, as Foley points out, could be either phonetic or
phonological. Therefore, nasalized (stronger) -o- is phonologically less similar to the high vowels
i and e as it is further away from them on \( \eta_o \) parameter since nasalized vowels are stronger. And it
is also phonetically less similar to the high vowels i and e, since it is a nasalized vowel which
combines both the feature of a vowel and the feature of a nasal. Consequently, the nasalized,
stronger -o- conditions the preferential application of apocope which deletes the final i, and it also
blocks the application of the assimilation rule which changes non-nasalized o to e to i when there
is an i or e in the following syllable. The non-nasalized o, which is more similar to i or e, undergoes assimilation, \( o > e > i / \_i/e \).

Before continuing to the overall solution, two other analytical principles of TP should be
mentioned - morphemic ubiquity and morphemic uniformity (Foley, 1991:166-167).
Morphemic ubiquity refers to the notion that "morphemes exist at the abstract level despite the possibility that they may not appear at phonetic level". Morphemic uniformity refers to the belief that "at the abstract level a morpheme has only one spelling (or form)". Because of these two principles, I contend that person/number endings exist in the underlying forms throughout the paradigm. That is, there is a person/number ending for 1sg. form. I also contend that the thematic vowel has only one underlying form throughout the paradigm. The lack of person/number ending for 1sg. form and the thematic vowel variation in 2sg., 3sg. and 2pl. forms are due to regular phonological changes.

The underlying forms are reconstructed as root + thematic vowel + person/number endings:

<table>
<thead>
<tr>
<th></th>
<th>root</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1sg</td>
<td>-o-mi</td>
<td></td>
</tr>
<tr>
<td>2sg</td>
<td>-o-si</td>
<td></td>
</tr>
<tr>
<td>3sg</td>
<td>-o-ti</td>
<td></td>
</tr>
<tr>
<td>2pl</td>
<td>-o-te</td>
<td></td>
</tr>
<tr>
<td>3pl</td>
<td>-o-nti</td>
<td></td>
</tr>
</tbody>
</table>

The thematic vowel is reconstructed as -o -. The theoretical reason for choosing -o - rather than -e - is that stronger (nasalized) vowels are more likely to resist weakening, therefore more likely to preserve their original qualities. Since a nasal consonant can be found after -o -, but not after -e -, I assume that -o - is the original form preserved as a result of nasalization. A practical reason is that I can derive the -e - from -o - by an assimilation rule since there are two front vowels -i - and -e - in the following syllable and -i - is known to cause mutation of other vowels in the preceding syllables. This mutation rule exists in Germanic already, it is not added to Germanic phonology for the sole sake of my analysis.

On the other hand, if -e - is selected as the underlying form a rule would have to be postulated to change -e - to -o - when nasalized. Such a rule, however, has a counter example, for in the 3pl. it does not change to -o - but rather to -a -. For these reasons the choice of -o - rather than -e - is well-motivated and well-justified.

The thematic vowel -o - and the person/number endings undergo the following phonological changes:

**Nasalization**

Wherever the -o - is followed by a nasal consonant it is nasalized and strengthened (For nasalization of vowels as a strengthening process, see Foley, 1977:65-66). The strengthened -o - remains unchanged.
Mutation

The unstrengthened (non-nasalized) -o - changes to -e - because of the i and e in the following syllable. This mutation rule is conditioned to apply to -o - (non-nasalized), which is more similar to -i - and -e -, but fails to apply to the nasalized -o -, which is less similar to -i - and -e -. This kind of conditioning is in accordance with the general conditions on the application of assimilation rules, as assimilation rules apply preferentially to similar elements.

Preferential Apocope

Word-final -i - is deleted if the preceding vowel is nasalized (stronger) and there is no other consonant except the nasal before it (preferential apocope after a single consonant).

preferential apocope

\[ i \rightarrow \emptyset / VN \_ \# \quad VN = V^+ \]
\[ i \rightarrow \text{idem} / VC(C) \_ \# \]

or

universal rule

\[ V_2 \eta \omega \rightarrow \emptyset / V_1 \eta \omega C \rho \_ \# \]

universal condition

\[ V_2 \eta \omega \leq \tau \]
\[ V_1 \eta \omega \geq \gamma \]
\[ \Sigma V_1 \geq \phi \]
\[ \Sigma C \leq \delta \]
\[ \rho \geq \lambda \]

parochial condition for Germ.

\[ \tau = 1 \]
\[ \gamma = 3 \]
\[ \phi = 1 \]
\[ \delta = 1 \]
\[ \lambda = 3 \]

This rule explains why -i - is deleted early in -mi while it is retained in -si, -ti, and -nti until a later time. The condition \( \tau = 1 \) restricts the vowel being deleted to the weakest vowel, i.e. i only. The condition \( \lambda = 3 \) restricts the rule application to the cases where the preceding consonant is a nasal or stronger consonant. The condition \( \phi = 1 \) means that the preceding vowels can be both...
short or long. The condition $\delta = 1$ restricts the rule application to the cases where the total number of the preceding consonant is one. The condition $\gamma = 3$ restricts the rule application to the cases where the vowels in the preceding syllable must be $o$ or stronger (assuming 4 vowels in OHG). Thus, $-si$, $-ti$, and $-nti$ are ruled out by these conditions.

This preferential apocope rule seems different in parochial conditions from the rule I derive earlier in this chapter when discussing OHG nouns. The reason of this difference is that this rule and its conditions show an earlier stage of OHG apocope. The rule and its conditions I get earlier in this chapter is a more generalized form for the same rule. The two stages of the rule show a development of rule schemata through entropization, i.e. from more restricted in condition to less restricted in condition.

Loss of final nasals and compensation lengthening
After the application of preferential apocope which deletes the $i$ in $mi$, the nasal consonant in word-final position is lost and the vowel before the nasal consonant is lengthened for compensation (nasal effacement and compensation lengthening). This compensation lengthening is due to the phonological energy released from the loss of the nasal consonant after the vowel at the end of the word.

According to the Principle of Energy Conservation an element is not exactly lost: it merely changes its form from element into energy. i.e. $E \rightarrow \emptyset^+$ where $E$ stands for an element and $+$ stands for energy. This energy is then combined with the preceding thematic vowel, manifesting itself as lengthening of the vowel. The nasal effacement and compensation lengthening rules are also needed for other phonological processes in Germanic (see examples below).

Vowel Lowering
Where the nasal is not lost the vowel is lowered (lowering of nasalized vowel). The lowering of nasalized vowel is also a manifestation of vowel strengthening, and it is very common in Germanic languages. For example, compare the following difference between American English and British English:

<table>
<thead>
<tr>
<th>American</th>
<th>British</th>
</tr>
</thead>
<tbody>
<tr>
<td>dans</td>
<td>dans</td>
</tr>
<tr>
<td>kænt</td>
<td>kant</td>
</tr>
<tr>
<td>bræntʃ</td>
<td>brantʃ</td>
</tr>
<tr>
<td>plænt</td>
<td>plant</td>
</tr>
</tbody>
</table>
In British English the vowel \( a \) is lowered to \( a \) when it is followed by a nasal plus another consonant.

The rules of nasal effacement, lowering and compensation lengthening can be expressed as:

**nasal effacement**

\[
N \rightarrow \emptyset + / V \_ \# \\
N \rightarrow \text{idem} / V \_ CV\#
\]

**lengthening**

\[
V^+ \rightarrow VV
\]

**lowering**

\[
o \rightarrow a / \_ NC\#
\]

Vowel lengthening after nasal effacement, which is a very good example for the principle of energy conservation, is well attested in Germanic. Some short vowels when followed by an /nh/ cluster lose the nasal but lengthen the vowels. Compare Keller (1978:81): "One further allophonic development occurred before /n/ plus /h/. In this position /a, i, u/ developed nasalized allophones [ā, ĩ, ū]. After the loss of /n/ and compensatory lengthening, the resulting long vowels were denasalized and joined corresponding long vowels. It is this process which accounts for the modern irregular forms brachte - brought and dachte - thought, the past tenses of bringen - bring denken - think respectively." The rules and their ordering are shown as follows:

**nasalization**

\[
V \rightarrow V / _{\_} Nh
\]

**nasal effacement**

\[
N \rightarrow \emptyset + / V \_ hCV\#
\]

\[
N \rightarrow \text{idem} / V \_ CV\#
\]

**lengthening**

\[
V^+ \rightarrow VV
\]

**lowering**

\[
o \rightarrow a / \_ NC\#
\]

The loss of word-final nasals is common in Proto-Germanic. The -m as a sg. acc. ending for nouns is lost early in word-final position. Again see Keller (1978:90): "Final nasals were lost early. Hence the distinction between plural and singular in the chief neuter class of nouns (nom. and acc.) was undermined and, in fact, no longer existed in West Germanic. The nom./acc. distinction in the vocalic masculine and feminine stems also disappeared (cf. Latin servus/servum; silva/silvam; turris/turrem) after West Germanic lost its final -z < -s as well."
The problems are that the loss of \(-m\) in acc. sg. case does not lengthen the preceding vowels and that the loss of /n/ occurs only when the following consonant is /h/. The solution to these problems has a lot to do with the concepts of energy, energy distribution and fluxion. For reasons of lack of space I will not pursue a solution to this problem in this thesis.

With this reconstruction and phonological analysis the surface forms can be derived through regular phonological processes. The derivation of these changes are shown below:

<table>
<thead>
<tr>
<th>1 sg</th>
<th>2 sg</th>
<th>3 sg</th>
<th>2 pl</th>
<th>3 pl</th>
</tr>
</thead>
<tbody>
<tr>
<td>omi</td>
<td>osi</td>
<td>oti</td>
<td>ote</td>
<td>ont</td>
</tr>
<tr>
<td>1 nasualization V → V- / _N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 preferential apocope</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i → Ø / V~ _#</td>
<td></td>
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</tr>
<tr>
<td>3 final nasal effacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>m → Ø+ / _#</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 mutation o → e / _Ci/e</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5 mutation e → i / _Ci</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6 general apocope i/e → Ø / _#</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 lengthening Ø+ → oo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 lowering õnt → ant / _#</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 final vowel shortening</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VV → V / _#</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 final vowel reduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o → u / _#</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

The derivation of the verb *liogan* is shown below:

<table>
<thead>
<tr>
<th>1 sg.</th>
<th>2 sg.</th>
<th>3 sg.</th>
<th>2 pl</th>
<th>3 pl</th>
</tr>
</thead>
<tbody>
<tr>
<td>ōleugomi</td>
<td>ōleugosi</td>
<td>ōleugoti</td>
<td>ōleugote</td>
<td>ōleugōnti</td>
</tr>
<tr>
<td>leugōmi</td>
<td>leugōm</td>
<td>leugō</td>
<td>leugōnti</td>
<td>leugōnti</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>leugōm</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>leugō</td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
The application of this set of rules is not restricted to this order. We could as well move rule 8, 9, and 10 before rule 4, 5 and 6. Also rule 9 could be ordered after rule 10 or before rule 8.

The general apocope rule $i/e \rightarrow \emptyset / \_ \_ \#$ seems to have a condition that the preceding vowels are $i$ and $e$, which is different from the condition I get from the study of OHG nouns. But, I need to point it out that these $i$ and $e$ are not the original forms. They are derived from an underlying $o$ through mutation rule. This mutation rule changes a stronger vowel $o$ into weaker vowels $i$ and $e$. According to the principle of energy conservation this process will release some phonological energy. It is this energy that keeps $i$ and $e$, which are derived from an underlying $o$, stronger than they appear to be, and thus, induces the general apocope of the following word-final vowels. It is also noticed that this general apocope rule applies to longer words (with three syllables). According to energy distribution principle elements in longer words get less energy and thus weaker than the same elements in shorter words it is expected that $i$ and $e$ are more likely to be deleted in trisyllabic words than in disyllabic words and the strength requirement for the loss of $i$ and $e$ in trisyllabic words is also lower.

This solution is not the original intention of this thesis. It is a by-product that accompanied my research for apocope problems in OHG which induce the discussion of vowel strength parameter in OHG.

In section 5.2 where the OHG vocalic stem nouns are discussed I get a strength relation of:
It is clear that o and a are stronger than i and u, but the strength relation between either i and u or o and a is not clear. In this section I discuss the problem of thematic verbs in OHG and I get a set of rules for the solution of the problem. One of the rules is a vowel lowering rule in which a nasalized o is lowered to a. Since in TP lowering is a strengthening process, then, a must be stronger than o since a is the strengthened reflection of o. I will discuss this lowering rule and its explanation in detail in chapter 6.

At this stage, the strength relation in OHG is modified as:

\[ i, u < o, a \]

This means that a is the strongest short vowel in OHG; o is weaker than a but stronger than i and u. i and u are weaker than both o and a. But we still don't know the strength relation between i and u. I shall briefly discuss the strength relation between i and u in the final chapter.
CHAPTER VI OTHER CHANGES AND CONCLUSION

In the preceding chapters the strength relations among short unstressed vowels in OHG have been discussed with particular reference to apocope. It has been shown that this process is governed by a universal rule which preferentially deletes both the inherently and positionally weaker vowels. The strength parameter obtained from the study of apocope in OHG is similar to the strength parameter in Romanic languages. It appears that enough work has already been done to justify the theory. However, there is a further requirement in TP for an analysis to be verified as correct: the strength parameter must be consistent in a given language, i.e. it should apply to other processes in the language, in this case OHG.

Some of the other processes, to be examined further, that confirm the strength parameter derived from apocope are discussed in the following sections of this chapter.

6.1 Word Final Weakening In Monosyllabic Words

From the study of apocope it can be concluded that in OHG the word-final position is the weakest position (all short unstressed vowels are deleted in this position except for a few isolated cases but only i and sometimes e are deleted by syncope in word-medial position. Theoretically, u should also be deleted by syncope). Thus, it is expected that weakening processes apply more extensively in word-final position than in word-medial position. It is also concluded that elements in longer words are weaker than elements in shorter words (distribution pattern of phonological energy). Thus, it is expected that weakening processes apply more extensively to elements in longer words than in shorter words. In other words, an element may undergo a weakening process in a bisyllabic word but it may not undergo the same process in a monosyllabic word. However, if an element undergoes a weakening process in a monosyllabic words, it will most probably undergo the same weakening process in bisyllabic words (IDP).

Apocope is the ultimate stage of a weakening process, and there are other intermediate stages before the complete loss of a vowel. In this weakening process the reflex in each later stage is weaker than the reflex in the previous stage. Thus, this process will show the strength relations among vowels.

Priebsch (1966:76) talks about a large-scale change of this type, though he does not provide a theoretical explanation of it. The change he describes is summarized as: In monosyllabic words IE ee in final position remains unchanged in Germ. (represented by Goth.) and OHG while in the same position the short e changes to i in Goth. and OHG. See the data below:
This change reveals a strength relation between \( i \) and \( e \) as:

\[ i < e \]

that is, \( e \) is stronger than \( i \). I derive this relation because of the following two reasons:

1. According to the IDP a weakening process will apply first to a weak element while a strengthening process will first apply to a strong element. Since this process started at a weak element (short vowels are weaker than long vowels) it must be a weakening process.

\[
\begin{align*}
ee \rightarrow \text{idem} / \_\_\# & \text{ long vowel (stronger element) remained} \\
e \rightarrow i / \_\_\# & \text{ short vowel (weaker element) weakened}
\end{align*}
\]

2. The reflex at each stage of a weakening process is weaker than the reflex at the previous stage. Since \( e \) is the reflex of a previous stage and \( i \) is the reflex of the later stage \( e \) must be stronger than \( i \).

\[ e > i > \emptyset \]

\( i \) is the reflex of an intermediate stage of a weakening process

The conclusion derived from this process (word-final weakening) is consistent with the conclusion I arrived at from the study of apocope. In the study of OHG apocope in this thesis, it is concluded that \( i \) is the weakest vowel in OHG and all other vowels are stronger than \( i \) (this conclusion does not include \( e \)). However, this word-final weakening process shows that \( e \) is stronger than \( i \), but it does not reveal the relative strength of \( e \) and \( u \). No matter what implication this process may have, it surely provides a further evidence that the strength relation I established from the study of apocope in the previous chapters is correct.
6.2 Nasalization and Lowering

Another process that may help to decide the strength relation is nasalization. According to TP nasalization is a strengthening process, that is, a nasalized vowel is stronger than a non-nasalized vowel. This strengthening may manifest itself in one of the two ways:

1. Strengthening (lowering and lengthening)
2. Blocking of a weakening process

The second stage (lowering) of this manifestation provides a clue as to the strength relation among vowels, as. usually, the strengthened (lowered) reflex of a vowel is one unit stronger than the vowel before the strengthening (lowering). This kind of strengthening is often manifested as lowering and it reveals the general property that low vowels are stronger than high vowels. This relation is also true in OHG. When a nasalized vowel changes its quality, it changes to a vowel one unit lower in height.

This can be seen in the morphology of OHG nouns, especially consonantal n-stem nouns. Priebsch (1966:87-88), referring to n-stem nouns, makes the following comment:

"The n-stem either lengthened the final syllable of the stem to -een, ... or -oon, ..., or had a nominative in ō. -een gives in O.N. -e, e.g. hane; -oon gives in Goth. -oo, e.g. tuggoo, augoo and in OHG -a, e.g. zunga, ouga; ō gives -o in OHG hano."

To put this in a simplified formalized way we have:

\[ oon \rightarrow a / \_\_\# \text{ in OHG} \]

Since what is needed is not a long o but a short o followed by a nasal consonant this change of \( oon \rightarrow a \) can not be used directly to prove that \( a \) is the nasalized reflex of \( o \) in OHG. To solve this problem another problem needs to be solved first. The problem is the nom. sg. ending for n-stem nouns.

Traditional study of OHG morphology believes that there are no person/number endings for the nom. sg. form for n-stem nouns (Priebsch, 1966:87-88, 174). But it has been noted that, in this form, the vowel is lengthened. TP desires to find an elegant solution which involves
setting up a uniform underlying form for a morpheme (Foley, 1991:166-167). It is thus hypothesised that it is "unreasonable" for n-stem nouns not to have person/number ending for nom. sg. form while the other forms do have such endings. Therefore, I assume that there is a person/number ending for the nom. sg. form of n-stem nouns in the underlying forms, and that this ending is the same as the nom. sg. ending for other forms, i.e. -s. With natural phonological rules I can derive the surface forms with no ending but a lengthened and later lowered vowel. That means the original vowel o (maybe IE) is short. Thus, the problem of vowel lengthening in this form is also solved. The derivation is shown below:

\[
\begin{array}{ccc}
\text{"zungon-s"} & \text{"ougon-s"} & \text{loss of final consonant, release of energy} \\
\text{zungon$^+$} & \text{ougon$^+$} & \text{compensatory lengthening(strengthening)} \\
zungoon & ougoon & \text{final vowel shortening} \\
zungon & ougon & \text{loss of final nasal, release of energy} \\
zungo$^+$ & ougo$^+$ & \text{compensatory lowering(strengthening)} \\
zunga & ouga & \\
\end{array}
\]

This derivation has a final vowel shortening rule which is common in Germanic (Keller, 1978:90). The key point here is the loss of word-final consonants, including the nasal and the person/number ending. The loss of final consonants releases phonological energy which is then combined with the preceding vowels and thus strengthens these vowels. This strengthening is manifested as either lowering or lengthening.

6.3 Synaloepha

Foley (1991:63) gives the definition of synaloepha as:

"Synaloepha is the repression of a vowel joined to another vowel by a word boundary or morpheme boundary, as in Th'Omnipotent for The Omnipotent, or L ama from "ama+o."

The general principle for synaloepha is not the order of vowels but the relative strength of the vowels. That is, relatively weaker vowels will be deleted while the relatively stronger vowels remain. This situation can be seen in nom. pl. forms of OHG vocalic stem nouns. The formation of nom. pl. forms of OHG vocalic stem nouns is:

\[
\text{root } + \text{ stem } V + \text{ es}
\]
The stem vowels are juxtaposed across a morpheme boundary with the vowel in the person/number morpheme. One of them will be deleted. Exactly which one is deleted depends on the relative strength of the vowels juxtaposed together. The following derivation shows the development from underlying forms to the surface forms with the necessary rules.

<table>
<thead>
<tr>
<th>a-stem</th>
<th>i-stem</th>
<th>u-stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>tag-a-es</td>
<td>gast-i-es</td>
<td>sun-u-es</td>
</tr>
<tr>
<td>tagas</td>
<td>gastes</td>
<td>sunes</td>
</tr>
<tr>
<td>tagaz</td>
<td>gastez</td>
<td>surez</td>
</tr>
<tr>
<td>taga</td>
<td>gaste</td>
<td>sune</td>
</tr>
<tr>
<td></td>
<td>gasti</td>
<td>suni</td>
</tr>
<tr>
<td></td>
<td>gesti</td>
<td>suni</td>
</tr>
</tbody>
</table>

\[ VV \rightarrow V (ae \rightarrow a, ie \rightarrow e, ue \rightarrow e) \]
\[ s \rightarrow z / \_# \]
\[ z \rightarrow \emptyset / \_# \]
\[ e \rightarrow i / \_# \]
\[ i - mutation \]

Why should this change be synaloepha rather than contraction or some other changes? The argument is that contraction will result in a reflex different from either vowels, usually a phonetic compromise of the two vowels (Foley, 1991:16). With synaloepha only one of them is lost the other is preserved. The preservation of \( a \) from \( ae \) can be seen clearly in the word taga < tag-a-es. Though it is not quite clear which vowel is preserved in the other two words as the surface form is different from all the three vowels, the surface reflex of \( i \) suggests that it is the \( e \) which is preserved with the consequent change of \( e \) to \( i \). Since \( e \) is already shown to be stronger than \( i \) at the beginning of this chapter and the reduction of final \( e \) to \( i \) is also common it is assumed that \( i \) instead of \( e \) is deleted in gast-i-es through synaloepha. The word suni offers no problem as the final \( i \) can be easily derived from \( e \) but not from \( u \).

From the principle of synaloepha it is expected that the relatively stronger vowel remains while the relatively weaker one is deleted. The above derivation shows that \( a \) is stronger than \( e \); since \( ae \rightarrow a; e \) is stronger than \( i \); since \( ie \rightarrow e; e \) is also stronger than \( u \), since \( ue \rightarrow e \). By transition it is concluded that \( a \) is also stronger than both \( i \) and \( u \), since \( a \) is stronger than \( e \) which is stronger than both \( i \) and \( u \). At this point in this Master's thesis, the study of vowel strength parameter in OHG that I embarked is complete, and the strength parameter is given as:

\[
\begin{array}{cccc}
  i & u & e & o & a \\
  \hline
  1 & 2 & 3 & 4 & 5 \\
\end{array}
\]
This parameter scale is the same as that for Northern Greek dialects derived by Foley (1977:46-47). It is also quite similar to the strength parameter of Romance languages and standard Greek (Foley, 1977:87 and 46-47). The difference lies only in the relative strength of u and e, which may differ from language to language (Foley, 1977:47-48). Since the vowel strength parameter in OHG is the same as that of Northern Greek, and the vowel strength parameter in OHG is also quite similar to that of the Romanic languages, it is highly probable that this vowel strength parameter is universal, or, at least, given the small differences noted, indicative of a progression towards establishing such a universal parameter. It is also claimed that it is equally probable that the rule for apocope which I derive in this thesis is similarly universal.

6.4 Conclusion

In this thesis I have provided extensive discussion of the phonological process of apocope, and, due to the constraints on the present work, made limited reference to three others that help decide the strength relation of short unstressed vowels in OHG. As was mentioned in Chapter I, my purpose in the study of OHG phonology is to understand more about phonological theory. To achieve this purpose I have compared apocope in other languages with apocope in OHG. It is concluded that the vowel system of OHG is the same as that of the Northern Greek dialects. It is also concluded that there exists a universal apocope rule that governs the deletion of word-final vowel. With alteration of parochial conditions, apocope in different languages can be described by this universal apocope rule. These conclusions strongly suggest the existence of a set of universal phonological elements, rules, and effects of phonological energy.

This study of OHG phonology makes no claim to completeness. However, it does, I claim, provide a foundation for further theoretical study of the language. It also provides evidence to support the hypotheses of TP. The success of TP can be seen not only in the fact that it can give elegant solutions to many phonological problems, but also in the fact that it can provide theoretical explanations of these problems. The predictive and explanatory power of TP gives it the status of a genuine phonological theory. Its development will further enlighten and deepen our understanding of phonology as a branch of scientific study.

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1 The assumption is that there are other processes and parochial conditions to be established which will explain this difference.
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