Summary:

Mechanisms of Language Change. Vowel Reduction in 15th Century West Frisian

This study takes a detailed look at the different aspects of language change and considers how and why these take place. The research has been supported by analysis of data on Vowel Reduction from late mediaeval Frisian language history over the period ± 1300 - 1550. A large part of the study is concerned with the reconstruction of Vowel Reduction in Frisian over this period.

1. Introduction
In chapter one, documents from the corpus of historical Frisian texts are analysed for their suitability for historical phonological research. The second chapter comprises the actual linguistic facts retrieved from the historical sources. These provide considerable detailed information about Frisian phonology over the period ± 1300 to 1550. The third chapter gives a phonological interpretation of the data. The interpretation of Frisian as a tonal language is discussed in chapter four. Chapter five focuses on two reductionist models of language change.

In order to cover the period between 1300 and 1550, two main sources are used:

• The codex Unia. The manuscript is from the late 15th century and is preserved only in the form of a copy dating from the 17th century. The language in the texts covers the 14th and early 15th centuries;
• Approximately 1,200 charters in Frisian from the period 1378 - 1550 and one single charter from 1329.

Evaluation of sources for linguistic interpretation
There was no independent spelling practice for Frisian during the Middle Ages. Authors of Old and Middle Frisian used existing conventions from other languages they were familiar with: Latin and later, Middle Dutch. An ‘Old Frisian spelling tradition’, presumed by some scholars, is the result of an ad hoc application of Latin spelling conventions. Middle Dutch spelling practices were used for Middle Frisian.

The spelling of Old and Middle Frisian was phonemic in principle. In some cases allophonic variations and phonetic details are expressed. The default interpretation of the spelling is a one-to-one match between sign and sound. This interpretation however necessitates corrections to accommodate the diverging practices of Latin and Dutch in the representation of vowel and consonant lengths.
The West Frisian charters were localised using dominant toponymic references in the texts. This toponomy method was corrected for instances where the author has been identified and his place of birth is explicitly known. This information has been used to produce detailed historical dialect maps of West Frisian.

There are more than enough reasons to assume that spelling variations in the original charters are a random sample of linguistic patterns of the time. Spelling variations are not the result of erroneous or careless spelling. With a careful eye for temporal, geographical and individual distortions of the data, token counting is a reliable and statistically beneficial way of evaluating the data. For historical analysis, tokens, preferably from original charters, have been used.

Theoretical framework
This study is in part a search for the reductionist components of language and the way they interact. The working hypothesis is that language is a deterministic, dynamic system, where structures and ‘rules’ (grammar) are the result of self-organisation. Within this framework, language is the result of interaction between the following constituent elements:

- **Meaning / semantics**: The outside world and the human perception of it.
- **Articulation and acoustics**: The entire field of biology and physics connected with the production and transmission of sounds.
- **The biochemical workings of the mind which result in the way human beings perceive, store and retrieve information.**

2. Reconstruction of historical developments
Vowel reduction is the main focus of this study and provides the input for the models in chapter 5. In order to understand the vowel reduction, the following related linguistic processes are investigated:

- **Vowel Balance**: Old Frisian [bi’tālاد] ‘paid’ ~ [ka:pad] ‘bought’ > late-Old Frisian [bi’tālа] ~ [ka:pad]
- **Degemination**: Old Frisian [sɛ’tа] ‘to set’ > Middle Frisian [sɛта]
- **Open Syllable Lengthening**: Old Frisian [dɔrə] ‘door’ > late-Old Frisian [dɔrə]
- **Vowel Reduction**: Middle Frisian [sɛта] > early-Modern Frisian [sɛtə]
- **Vowel Harmony**: Old Frisian [sɛkа] ‘cases’ > late-Old Frisian [sɛkа] (or [saka]?).

Vowel Balance
As a phonetic phenomenon, Vowel Balance is ubiquitous in Germanic languages, in some varieties achieving phonological status. Vowel Balance phenomena in
unstressed syllables are indirect indicators of quantity in preceding root syllables. Vowel Balance effects are found in the reduction of an unstressed /a/ > /æ/ and in syncope and apocope of the Old Frisian /æ/.

Degemination

Old Frisian has a phonetic opposition between short and long consonants. Information on consonant length can be obtained from Vowel Balance effects and spelling practices, for example. The combined evidence suggests a rapid loss of long consonants between ± 1420 and 1460.

Open Syllable Lengthening

The oldest stage of Open Syllable Lengthening is the lengthening of /a/, /œ/, /i/ and /u/, when the subsequent unstressed syllable was not an /a/. This lengthening took place at the beginning of the 14th century. Lengthening of /ɛ/ was only a marginal feature at the time of the apocope of final /æ/, in the middle of the 15th century.

On the whole, both word-final /a/, for example in Old Frisian dort ‘doors’, and protected Old Frisian /æ/, for example in Old Frisian bitalad ‘paid’, prevented Open Syllable Lengthening. Lengthening of /ɛ/, /æ/ and /œ/ in open syllables, when followed by an unstressed /a/, took place in the 15th century and was limited to the south-west of Fryslân. Yet even here, it was not everywhere, neither did it always occur. Lengthening before an unstressed /a/ produced a half-long vowel. In the north-east, (half-) shortening of long vowels before unstressed /a/: kâpad <kaeppit> ‘bought’, fôtan <fotten> ‘feet’ is found occasionally.

Vowel Reduction

The protected unstressed /a/ was reduced to an [æ] in the first half of the 15th century. Reduction is earlier when the preceding root is long (< 1430), compared to when the root is short (< 1470). This is the Vowel Balance effect. In word-interior position, as in abbate ‘abbot’ and sunnandei ‘Sunday’, the /a/ is more resistant to reduction in the north-east than in the south-west. Word-final /a/ remains unaltered until ± 1490. There is a Vowel Balance effect with later transition to [œ] after short roots. The transition from [ə] > [œ] is later in the south than in the north.

Syncope of /œ/ in unstressed syllables was a gradual process in Frisian, stretching from the 12th to the 16th century. Syncope of /œ/ could be delayed or even prohibited by factors such as a short root quantity, a position near the end of the word, voice of adjacent consonants, and wellformedness constraints. Apocope of word-final /œ/ was controlled by (at least) three factors: Vowel Balance, voice of adjacent consonants, and morphological patterns (/œ/ as a case ending). Apocope
of /ə/ covers the period from the middle of the 14th century to the late 15th century.

Vowel Harmony
West Frisian shows several types of both forward and backward Vowel Harmony. Vowel Harmony appears in Old, Middle and early-Modern Frisian. The Vowel Harmony type of a-mutation is found in West Frisian words such as *wesa <wassa> (‘to be’) or *degan <dagen> ‘days (nom./acc.)’. This type is reflected in the spelling of the early 15th century but gradually disappears after 1460. In most instances, the phonetic manifestation of Vowel Harmony is reversed in late-Middle Frisian. For example, early-Modern Frisian *wesse, is not *wasse.

3. Phonological Interpretation
Most scholars assume that Old and Middle Frisian had only one unaccented phoneme /ə/, written <e, a, i, u>. This assumption is based on a simplified interpretation and ignores diachronic, etymological and positionally defined patterns in the distribution of spelling variations.

Many of the spelling variations match diachronic or dialectal phonetic or allophonic patterns and are therefore not a ‘free, random variation’. Historically motivated spellings for a single phoneme /ə/ can be excluded. Spelling by convention (spelling rules) does not match the observed gradual quantitative patterns. Spelling reflects phonetic and allophonic variation in the language. The spelling <i> is a variant of <e> as an unaccented vowel /ə/. The alternation of <e> and <i> reflects the phonetic nature of /ə/ as a rather fronted vowel.

Frisian maintains a vowel opposition in unaccented syllables in protected position until the early 16th century. The existence of two different phonemes in protected, unaccented position is supported by the developments of syncope and Vowel Harmony. The phonological opposition also functions when /a/ is realised as [ə]. The realisation of historical /a/ by <a>/[a] is too weak and cannot account for its strict separation from historical /ə/ in the diachronic development of the 15th century. It is suggested that underlying /a/ in the 15th century did not find its expression in the phonetic quality [a], but in a contrasting tone contour on the whole word. In word-final position, the phonological opposition between /a/ and /ə/ is lost by the middle of the 15th century. The prototypical realisations of both phonemes, [a] and [ə], become the optional realisation for the new phoneme.

4. Tone contours
Typological parallels for phenomena such as Vowel Balance, Vowel Harmony and the limited application of Open Syllable Lengthening are widely attested in Scandinavian dialects, all of which are from within the zone which has two
contrasting tone contours (Accent I and II) and a relatively late pitch peak on Accent I and II (Level Stress). This suggests a similar accentuation for late mediaeval Frisian.

In Proto-Old Frisian a tone contour originally stretched over the entire length of every polysyllabic word (as was the case with Old Nordic). After the reduction of other full vowels in unstressed position in Old West Frisian to /a/, the non-root vowel /a/ was marked with the originally redundant tone contour. This additional tone contour is probably the reason for the large qualitative and quantitative impact an /a/ had on its phonological surroundings.

Quantitative impact:
The cumulative impact of physical and perceptional cues favours the reinterpretation of the root vowel of, for example, dore ‘door’, as being long, and of dora ‘doors’, for example, as being short. The cumulative impact of physical and perceptional stress cues in for example, mõna ‘moon’ can elicit a reinterpretation of the root vowel’s quantity as being short when placed in additionally shortening contexts, such as the compound mõnande ‘Monday’. The /a/ in a non-root syllable, bearing pitch accent was probably not subject to syncope or apocope, because it was *stricto sensu* not unstressed.

Qualitative impact:
Vowel Harmony (a-mutation) was probably facilitated by the effect of Level Stress. Vowel Harmony developed into a phonological template relying on the tonal contrast (15th century). As pitch is one of the stress cues, a pitch peak is a prerequisite for attracting intensity stress. Some words with /a/ in the second syllable show accent shift in Old Frisian, such as suaynde ‘Sunday’ < suunande.

Given that south-western dialects show fewer features which are typologically connected with pitch peak delay, it may be assumed that peak delay was weaker here than in the north-east. The phonologisation of tone contours in the 15th century was a break with the past, where tone contours were completely predictable from the word structure. Frisian and Scandinavian dialects share this innovation, as distinct from large West-Germanic languages.

5. Modelling language change
In chapter 5, the observed changes in phonological and morphological grammar are modelled. Neither of the two models presented uses common grammatical objects such as ‘rules’ or ‘constraints’.

In the first model the reduction of unstressed vowels in West Frisian between 1300 and 1550 shows a very high correlation with the reconstructed Vowel Intensity
Integrals, a quantitative acoustic measure, of the vowels under consideration. This high correlation provides evidence of a causal relationship between the Vowel Intensity Integral and the reduction process. As deterministic processes rely on causal relationships, this reconstruction supports the hypothesis of the deterministic character of at least some forms of language change.

The model shown in the Bidirectional Table relies on the reductionist components of ‘articulatory convenience’, ‘common practice’ and ‘effective communication’. The shifting ‘grammar’, describing the choice of phonological variants for different morphological categories, which is available to speakers, is the dynamic result of the interaction between these three basic components, assuming that the language user is a probabilistic learner. This can be considered to be a form of self-organisation.

Both models support the idea of language as a deterministic, dynamic system, which offers an established framework for the understanding of change. In the concluding remarks, the concept of dynamic systems is linked to evolutionary science. The future application of evolutionary science and its methods to the study of language as a deterministic dynamic system may well produce interesting results at a later date.