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# A Glottometric Subgrouping of the Early Germanic Languages

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# A GLOTTOMETRIC SUBGROUPING OF THE EARLY GERMANIC LANGUAGES

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ABSTRACT

A GLOTTOMETRIC SUBGROUPING OF THE EARLY GERMANIC LANGUAGES

By Joshua R. Agee

Historical Glottometry, introduced by Alexandre François (2014), is a wave-based quantitative approach to language subgrouping that is used to calculate the overall strength of a linguistic subgroup using metrics that capture the contributions of linguistic innovations of various scopes to language diversification, in consideration of the reality of their distributions. It primarily achieves this by acknowledging the contribution of areal diffusion to language diversification, which has traditionally been overlooked in cladistic (tree-based) models. In this thesis, the development of the Germanic language family, from the breakup of Proto-Germanic to the latest period of the early attested daughter languages (namely Gothic, Old English, Old Norse and Old High German), is accounted for using Historical Glottometry. It is shown that this approach succeeds in accounting for several smaller, nontraditional subgroups of Germanic by accommodating the linguistic evidence unproblematically where a cladistic approach would fail.

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# LIST OF ABBREVIATIONS

*Languages and Subgroups:*

| | |
|---|---|
| AF | Anglo-Frisian |
| Angl. | Anglian Old English |
| CNWGmc | Continental Northwest Germanic |
| EGmc | East Germanic |
| EN | Modern English |
| Finn. | Finnish |
| GE | Modern German |
| Gmc | Germanic |
| GO | Gothic |
| IC | Icelandic |
| IE | Indo-European |
| Ingv | Ingvaeonic |
| Lat. | Latin |
| ME | Middle English |
| Merc. | Mercian Old English |
| MHG | Middle High German |
| MLG | Middle Low German |
| NEGmc | Northeast Germanic |
| NGmc | North Germanic |
| North. | Northumbrian Old English |
| NNWGmc | Northern Northwest Germanic |
| NWGmc | Northwest Germanic |
| OE | Old English |
| OFr | Old Frisian |
| OHG | Old High German |
| ON | Old Norse |
| OS | Old Saxon |
| PGmc | Proto-Germanic |
| PIE | Proto-Indo-European |
| PNGmc | Proto-North Germanic |
| PNWGmc | Proto-Northwest Germanic |
| PWGmc | Proto-West Germanic |
| WGmc | West Germanic |
| WS | West Saxon Old English |

*Misc. Abbreviations:*

| | |
|---|---|
| acc. | Accusative |
| adj. | Adjective |

| | |
|---|---|
| adv. | Adverb |
| appx. | Appendix |
| cf. | Confer (compare to cognates) |
| cl. | Class |
| cons. | Consonant |
| dat. | Dative |
| def. | Definite |
| deriv. | Derivational |
| du. | Dual |
| e.g. | For Example |
| fem. | Feminine |
| fric. | Fricative |
| HG | Historical Glottometry |
| i.e. | That is; as in the case of |
| imp. | Imperative |
| indic. | Indicative |
| inf. | Infinitive |
| inst. | Instrumental |
| lab. | Labial |
| masc. | Masculine |
| n. | Noun |
| nom. | Nominative |
| neut. | Neuter |
| obl. | Oblique |
| obst. | Obstruent |
| opt. | Optative |
| p.c. | Personal Communication |
| pl. | Plural |
| poss. | Possibly |
| pres. | Present |
| pret. | Preterite |
| prob. | Probably |
| pron. | Pronoun |
| ptc. | Participle |
| rel. | Relative/Related |
| sg. | Singular |
| subj. | Subject/Subjunctive |
| subord. | Subordinate |
| suff. | Suffix |
| ult. | Ultimately (i.e., some intermediate stage(s) of development has been skipped) |
| v. | Verb |
| vel. | Velar |

*Symbols and Notation:*

| | |
|---|---|
| / / | International Phonetic Alphabet (IPA) broad transcription |
| [ ] | International Phonetic Alphabet (IPA) narrow transcription |
| * | Reconstructed form |
| < > | Graphemic symbol or sequence |
| < | Derives from |
| > | Develops into |
| ~ | Alternates with/approximately |
| = | Equivalent, identical, or similar to |
| ≠ | Not equal to/opposite of/contrasting with |
| : | 'is to'; denotes an analogical correspondence/comparison (e.g., *"thunk": drunk*) |
| { } | Glottometric expression (e.g. {$p$ = 1}) |
| Δ | 'increment'; placed next to a variable to denote an increase in the variable's value (e.g., 'Δ$p$ = 1' means 'add one value to $p$') |
| ∨ | 'or'; denotes an alternative classification of an innovation (e.g., '{Δ$p$ = 1} ∨ {Δ$q$ = 1}' means 'either add one value to *p, or* add one value to $q$') |

# 1 INTRODUCTION

## *1.1 Language Change and Subgrouping*

Change seems to be an inevitability of language. All languages develop and diversify significantly over time by accumulating small innovative changes over the course of generations, and these changes can be identified and utilized by historical linguists to measure the distance between varieties within a language family. The changes that give rise to new languages ultimately trace back to dialectal and even idiolectal variation that is diffused freely. This variation is abundant in just about every speech community of just about any size, and it has been recognized since very early in the history of modern linguistics that boundaries between languages are far from distinct (cf. Schmidt 1872; Wenker 1876). Indeed, linguistic similarity or difference "is not a matter of 'yes' or 'no,' but of 'more' or 'less'" (Hock 1991).

Variation arises inevitably due to the imperfect nature of speech. For example, it is likely that, throughout the history of human speech, no two utterances have ever even been produced exactly alike, even by the same speaker (Silverman 2006). Errors inferred via analogical extensions may arise that persist long enough to be transmitted to successive generations, at which point they cease to be considered errors (Ringe and Eska 2013). The list of known causes for language change is extensive.

The primary task of the historical linguist is to 'excavate' a target language family or subgroup for divergent variations via the comparative method, retrace the historical path of a speech community by accommodating such considerations given the evidence at

hand, and attribute attested languages to groups according to the distribution of the variations. This is the foundation of language *subgrouping*.

Subgrouping is the process of accounting for language relatedness within an established language family or group of languages according to the distribution of shared or exclusive changes (Campbell 2004). In dealing with language genealogy, *establishing genetic relatedness* between languages is a simpler task that is less defined in its execution, but is necessary in order to proceed with subgrouping; a genetic relatedness is established merely through a justifiable suspicion of common descent between languages due to a regular resemblance in form (Crowley and Bowern 2010), and perhaps other factors such as geographical proximity.

If a family of languages diverged like a tree, the distance between branches would be measured to identify subgroups. However, languages and trees are hardly comparable, but divergences in language can still be measured. For this, historical linguists employ the *innovation* as the unit of measurement. For the sake of review, recall the difference between innovations and *retentions*, the role they play in subgrouping, and their ramifications for uncovering social interactions between speech communities. Simply put, a similarity between languages may be either a shared change, or some trait that did not change in some language(s), but did in some other(s). The latter, known as a *shared retention*, is of no value in proving that languages form a subgroup. The reason for this is that for two or more languages *not* to innovate together does not imply a relation between speech communities in the way that a shared innovation does (Campbell 2004:197; François 2014). An innovation can be a phonological, morphological, grammatical, or

lexical change that contributes to defining a given variety, language, or subgroup. A *subgroup* is defined here as any number of languages which have undergone at least one innovation together. Crowley and Bowern (2010) lay out the process of subgrouping as a series of steps:

1. Collect data from languages that are already known to be related (recall that subgrouping's purpose is to explain how, not if languages are related)
2. Reconstruct the proto-language using the comparative method
3. Note the sound changes that have occurred in the history of each language
4. Make note of the relative chronology inherent in your reconstructions
5. Group together languages that have undergone shared changes
6. Recall that the best diagnostic evidence for subgrouping is unusual change
7. Draw a family tree which reflects the subgrouping you have worked out
8. Don't forget to check your rules (P. 111)

The present approach deviates somewhat from the traditional process outlined above for subgrouping the early Germanic languages, but the overall methodology is highly similar. Steps such as the reconstruction of the proto-language, observation of sound changes, and grouping together of languages that have undergone common changes are particularly fundamental steps of the comparative method, and are in no way necessarily intertwined with the cladistic ('family tree') approach (François and Kalyan forthcoming). Some of the other steps are approached from a different angle. For one, sound changes are not the only types of innovations that are of use for subgrouping (Anttila 1989; Campbell 2004). Secondly, the cladistic model shall be abandoned in place of a more realistic and efficient quantitative method, Historical Glottometry, crafted by Alexandre François (2014). The end goal is still the same: to produce an accurate subgrouping result for the Germanic (sub)family (accounting for the development of Germanic from the period of Proto-Germanic to the latest phases of the daughter

languages) which has been achieved through a sound application of the comparative method and the identification and classification of innovations.

*1.2 The Stammbaum*

As implied in the previous section, the tree model is not optimal for fully capturing language diversification in most cases. Since its inception by August Schleicher (1860), the tree model (or *Stammbaum*) has historically been spoken of almost interchangeably with the comparative method, but the two need not be so inseparably associated (François 2014). Figure 1 represents a model language family that demonstrates some of the issues touched upon so far. Suppose we have a language family 'ABC,' defined by the languages A, B, and C, and divided into the subgroups A and BC.

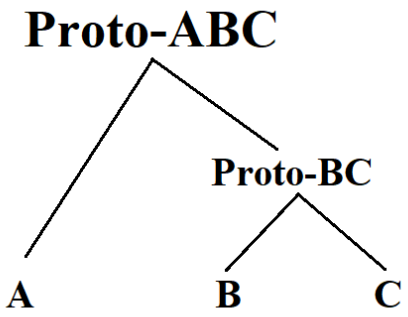


Figure 1. Model language family ABC

As mentioned, the primary issue with cladistic models is the inability for innovations to crosscut splits within the tree. In terms of the family ABC, this means it is incompatible with the tree model to posit any AB or AC innovations; only those that reflect ABC, BC, A, B or C as subgroups are permitted. One result of this limitation is that it has traditionally become the standard practice for rare or unnatural innovations to

serve as anchors for later subgrouping decisions in a cladistic framework. For example, if a historical linguist has posited branches on a tree on the basis of several supporting innovations, but a later discovery of another potentially shared innovation challenges the posited tree, then it is to be dismissed as merely a coincidental parallel innovation in order to satisfy the constraints of the model. However, this rigid constraint that a language must be fully faithful to one node on a tree or the other regarding all of its innovations is not accurate (Gray et al. 2010) and does not hold for all language families throughout the world (Bossong 2009).

Parallel innovations of course can and do arise between distinct subgroups or languages, and identifying them is necessary for an accurate account. One way to identify two innovations as parallel versus reflections of a single shared innovation is to consider the naturalness of the change. Some sound changes, for example, might be more common cross-linguistically, and therefore more likely to occur independently, than others. Additionally, some patterns of syntax or morphology may be prone to similar or identical parallel development across subgroups, such as certain grammaticalization tendencies (Heine and Kuteva 2002; Svorou p.c. 2018). It is naturally these types of changes that have a higher probability of reflecting coincidentally parallel changes than a more uncommon change. However, a shortcoming of the cladistic approach is that it is too eager to dismiss such situations of identical changes as simply parallel, regardless of whether the historical or geographical evidence points in that direction. The reasoning propagating this inclination stems from a bias against language-external diffusion, but

even ‘common’ innovations are often diffused in a crosscutting distribution (François and Kalyan Forthcoming).

With a focus on *internal* changes in language descent, the Stammbaum is limited to diversification situations that are less common (François 2014). Any external parameters such as *horizontal transmission* or *areal diffusion* are considered irrelevant and of no value to subgrouping. The cladistic approach is concerned purely with language *divergence* and ignores language *convergence*[1]. Acknowledging this, the Stammbaum’s broad groupings may be considered sufficient, as long as no more than a broad outline is desired and the Stammbaum model is not over-extended in its explanatory power (Haspelmath 2004). However, one major issue is that this approach only accounts for a portion of language history; a language’s history involves convergence between other subgroups of the family just as well as divergence, so an *accurate* model for accounting for it ought to be capable of taking both phenomena into account. Additionally, there are likely to be families or subgroups in which language-external diffusion is significant, in which case a broad outline arranged only from internal diffusions may miss a great deal of the overall picture.

As a consequence of being unable to handle language convergence and horizontal transmission, or language-external diffusion, there is actually a weakness in the tree model regarding its ability to handle internal diffusion as well. Note that Figure 1 encompasses not just the descent of separate languages, but also the mutually intelligible

[1] Here, *convergence* refers to exchange of innovations between (more or less intelligible) subgroups of the same family. The role of extra-familial influence in language subgrouping is another matter that raises questions beyond the scope of this work.

dialects of the ancestor language that gave rise to those languages. Despite that dialects B and C may have undergone more innovations together, it is still possible that A and B might share an innovation that is not shared by C. As these dialects diverge into separate languages, the innovation(s) that were shared between A and B represent a point of crosscutting even within a single language; thus, there is language-internal diffusion that the Stammbaum is incapable of accounting for because from the viewpoint of that model, once a split has happened, all considerations external to the newly formed subgroup or language are deemed irrelevant. However, initial variation occurs during a period of mutual intelligibility, during which the sharing of innovations is not just entirely possible, but common.

### *1.3 Ramifications for Germanic Subgrouping*

The division of the Germanic (sub)family into subgroups has traditionally been done under a cladistic framework (Schleicher 1860). The classic tree representation usually takes some form resembling that in Figure 2, with varying degrees of detail.

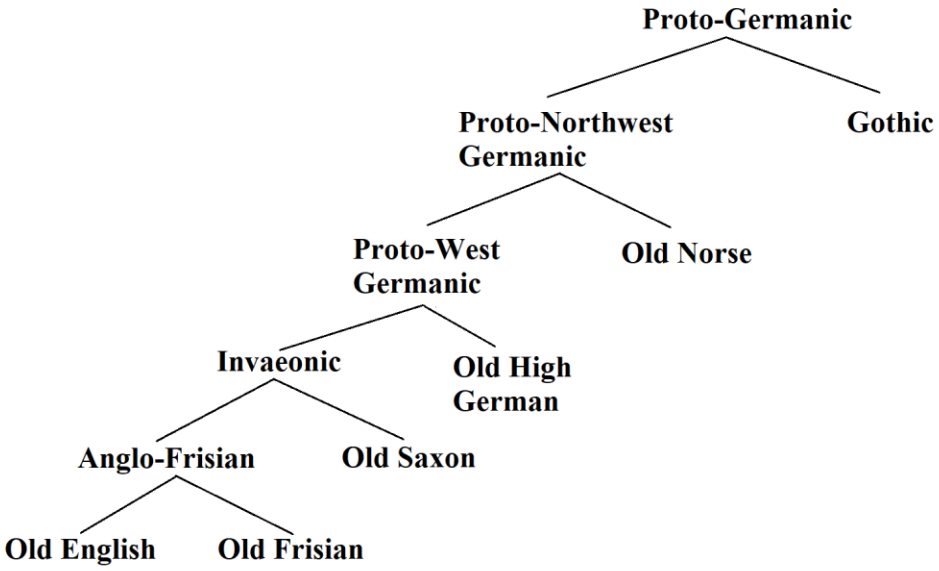


Figure 2. A typical tree of the early Germanic languages

Germanic is one of the best-studied language families in the world, and has been evaluated with many innovative subgrouping approaches, including stochastic, character-based, and distance-based subgrouping models. However, innovation-based subgroupings have often been constrained by cladistic assumptions, and several treatments of the historical development of the family, or of the early daughters, seem to have defaulted to a tree framework (cf. Rask 1818; Schleicher 1860; Krause 1968; Braune and Ebbinghaus 1973; Voyles and Barrack 2009). For example, even in 2009, Voyles and Barrack, in discussing the development of Gothic, address some changes, such as the shift of unstressed *-am* to *-um*, as only possibly reflecting exclusive developments, despite evidence that it may be shared with Northwest Germanic. Additionally, cladistic assumptions have even sometimes been the basis for unnecessary dispute between

historical linguists over the placement of certain languages such as Gothic within the tree (e.g., Holtzmann 1870; Schwarz 1951; Rosenfeld 1954; Kuhn 1955).

The shortcomings of the Stammbaum, however, are actually not a novel topic in Germanic linguistics. Several specialists (Schmidt 1872; Prokosch 1939; Nielsen 1989; Ringe and Taylor 2014) have acknowledged the existence of non-tree-like developments within and across clades, but the apparent lack of alternative frameworks for interpreting these developments into a non-cladistic innovation-based model has seemingly prevented any preferable substitutes to cladistic subgrouping models like that in Figure 2 from surfacing. However, in recent years, several new developments in wave-based subgrouping approaches have begun to remedy this situation, one of which (Historical Glottometry) is central to the present study.

### *1.4 Wave Theory*

The predominant alternative to the Stammbaum, the *wave theory* (or *Wellentheorie*), is far from new, having been first proposed by Johannes Schmidt (1872) only shortly after Schleicher's introduction of the Stammbaum model. It is designed in consideration of areal diffusion and allows for more freedom regarding the range throughout which linguistic innovations may spread. Figure 3 shows an example model given by Bloomfield (1935) for Indo-European (IE), where each numbered wave represents a unique innovation:

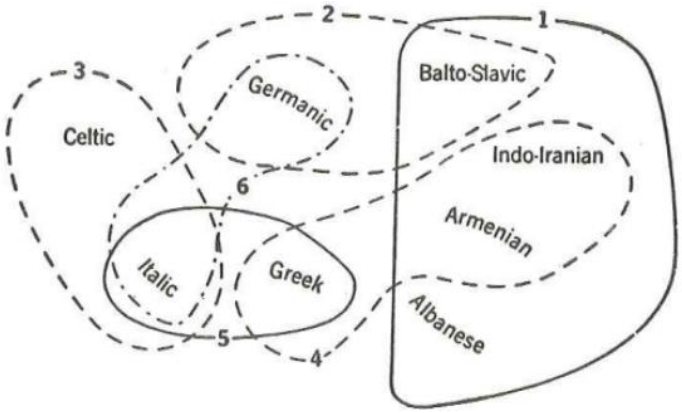


Figure 3. Bloomfield's depiction of a wave network in IE

This more accurately depicts the mechanisms of diffusion that are truly at work in the spread of linguistic innovations. Central to the idea is the independence of the waves from one another—the areal distribution of one wave does not determine the distribution of the next. The area covered by one wave could cover an area that is relatively small, and another one following it could cover an area that is large, even overlapping the area of the previous wave completely. This concept is fundamentally incompatible with the tree model, where the smaller wave would represent a node of departure in the tree, which would not allow for crosscutting of this split by a later overlapping innovation. It shall be demonstrated that this accommodates many developments observable within the history of Germanic. Wave-based approaches, such as Historical Glottometry, are therefore more attractive for truly accurate subgrouping, and is one such approach.

Consider Figure 4, which shows a wave model depiction of the model language family ABC from Figure 1:

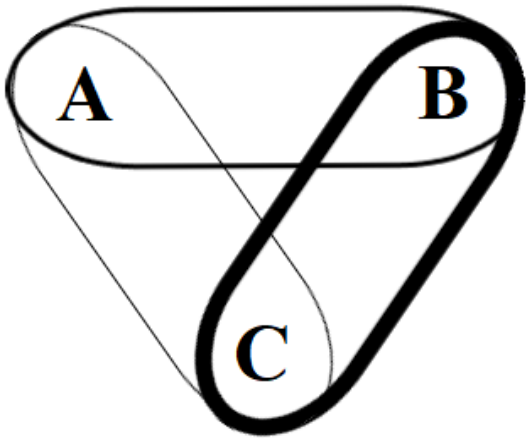


Figure 4. A wave portrayal of the ABC language family

The thickness of the lines is proportional to the strength of the subgroup that each pair of languages comprises according to the number of shared innovations. Naturally, the BC subgroup is the strongest, reflecting the BC subgroup posited in Figure 1. But there are also shared innovations between A and C, and between A and B. This would not be possible in a pattern of development like that of a Stammbaum as depicted in Figure 1.

*1.5 Historical Glottometry*

Historical Glottometry, crafted by Alexandre François (2014), is a quantitative approach to capturing language diversification and accounting for linguistic subgroups. It captures all of the parameters at work in language diversification discussed above by accounting for them using a set of special metrics. Most importantly, it allows for a more accurate and realistic subgrouping by utilizing a wave-based treatment of innovations, and by allowing for the possibility of crosscutting innovations, which cladistic treatments simply disregard. The following sections detail the application of the method.

### *1.5.1 Exclusively shared innovations (ε)*

For a given subgroup, the number $\varepsilon$ of exclusively shared innovations is a measure of "how frequently its members tended to imitate each other's speech[2]" (as opposed to speakers who are not members of the speech community defined by the subgroup; François 2014). Note that this is the concept for which the Stammbaum has been criticized as having severe tunnel vision. It is exclusively shared innovations only that have defined the branches on a Stammbaum. Nonetheless, they do play a major role in language diversification. They tell us a great deal about the community that spoke the variety. In particular, a subgroup with a lower number of exclusively shared innovations (i.e., a lower value for $\varepsilon$), can be assumed to have had weaker social bonds than a subgroup characterized by a higher number of shared innovations (and a higher value for $\varepsilon$).

As mentioned, the development of a language family *can* be tree-like, and innovations *can* resemble others without having been shared, despite a completely contemporaneous diffusion; a more accurate result will be arrived at if innovations are correctly classified as exclusive or shared according to the actual historical or geographical evidence, if the historical linguist is fortunate enough to be equipped with some knowledge of them. However, in the absence of historical knowledge about a language family or the society in which it was spoken (as was the case for François

[2] Several social factors, such as identity-based motivations, may determine whether social groups within a given variety participate in the imitations of speech defining the variety (Julia Swan, p.c.). This sort of variation is of interest to Historical Glottometry, as applied here (i.e. to languages), to the extent that it comes to define entire subgroups that have developed as a result of such variation. However, dialectal variation is largely beyond the scope of the present approach.

(2014) in applying Historical Glottometry to the Torres-Banks languages of Vanuatu), a glottometric treatment frees the historical linguist from the need to be overly concerned with the 'commonality' of a change (though the ramifications for frivolous designations also ought to be considered). This is especially true of small, poorly understood language groups. Fortunately, the Germanic (sub)family, is one of the best-studied of all, and the history of the people of Germanic Europe is relatively well understood in comparison to many other parts of the world.

### *1.5.2 Cohesiveness (k)*

There are several measures at work in the calculation of cohesiveness. For a given subgroup *G*, the variable *p* represents *supporting innovations*: all innovations that include the entire subgroup within their scope, whether exclusive or not (i.e., $p \geq \varepsilon$). The variable *q* represents *crosscutting*, or conflicting, innovations: innovations that characterize *some* members of subgroup *G*, and some that are attested in languages outside of *G*. The cohesiveness quotient is calculated by dividing the number of supporting innovations by the sum of supporting innovations plus conflicting innovations; that is:

$$k_G = \frac{\#\ of\ supporting\ innovations}{total\ \#\ of\ relevant\ innovations} = \frac{p}{p+q}$$

where $k_G$ represents the resulting cohesiveness value for subgroup *G*. This measure is a determination of how close to a perfect, cohesive subgroup the given cluster is. Cohesiveness in a Stammbaum situation would therefore always be $\frac{\varepsilon}{\varepsilon} = 1$ (i.e., a 100 percent tree-like subgroup), because the values *q* and *p* would not be considered. But this is rarely the case in most situations (François 2014).

The cohesiveness quotient yielded by $k_G$ means that when any of the members of the (potential) subgroup *G* underwent an innovation, the isogloss encompassed all members of the subgroup *k* percent of the time. For the sake of demonstration, consider that we are dealing with a potential subgroup with five all-encompassing innovations and two crosscutting innovations (i.e., $p = 5$, $q = 2$). This means that five out of seven times, the innovations that occurred within the proposed subgroup encompassed all of the target subgroup (whether exclusively or encompassing all of the subgroup and some outside of it). It is a way of 'weeding out' the crosscutting innovations which a cladistic approach would make the mistake of simply ignoring as part of the subgroup altogether. By acknowledging the existence of such developments, Historical Glottometry can provide a better picture of the realities of subgroup diversification.

### *1.5.3 Subgroupiness (ς)*

The variables *ε* and *k* are further applied to a final calculation which yields the overall score of a given subgroup's strength. It goes without saying that a subgroup for which both measures *ε* and *k* are high spell out strong support for the subgroup. The purpose of *subgroupiness* is to account for both of these scores in a way that produces a final output that represents the overall strength of a subgroup. It is calculated by multiplying the number of exclusively shared innovations by the cohesiveness quotient. The resulting subgroupiness product is represented by the variable *ς*. The measure is expressed as:

$$\varsigma_G = \varepsilon \times k$$

where the subgroupiness score of subgroup *G* is equal to the product of the sum of its exclusively shared innovations and its cohesiveness quotient. Subgroupiness is unique in

that it is not the direct result of any tangible quantity of some aspect of the language; it is an arbitrary number whose sole purpose is to create an overall score for the strength of a subgroup which may then be weighed against other scores as a means of comparing relative strengths of the support for a subgroup.

Because the two metrics $\varepsilon$ and $k$ are independent dimensions of support for a subgroup, note that it is possible for subgroups to exist that exhibit a high number of exclusively shared innovations but a low cohesiveness quotient, and it is also possible for a subgroup to exhibit a low number of exclusively shared innovations but a high cohesiveness quotient. More glottometric approaches will be necessary in order to better understand what a 'high,' 'low,' or 'average' result typically amounts to.

### *1.5.4 Application to Germanic*

In consideration of the traditional prevalence of the Stammbaum model in Germanic historical linguistic treatments, it goes without saying that a glottometric account of Germanic diversification would be beneficial. For the sake of demonstration, Figure 5 shows a hybrid model of Northwest Germanic, combining the properties of a tree and wave model:

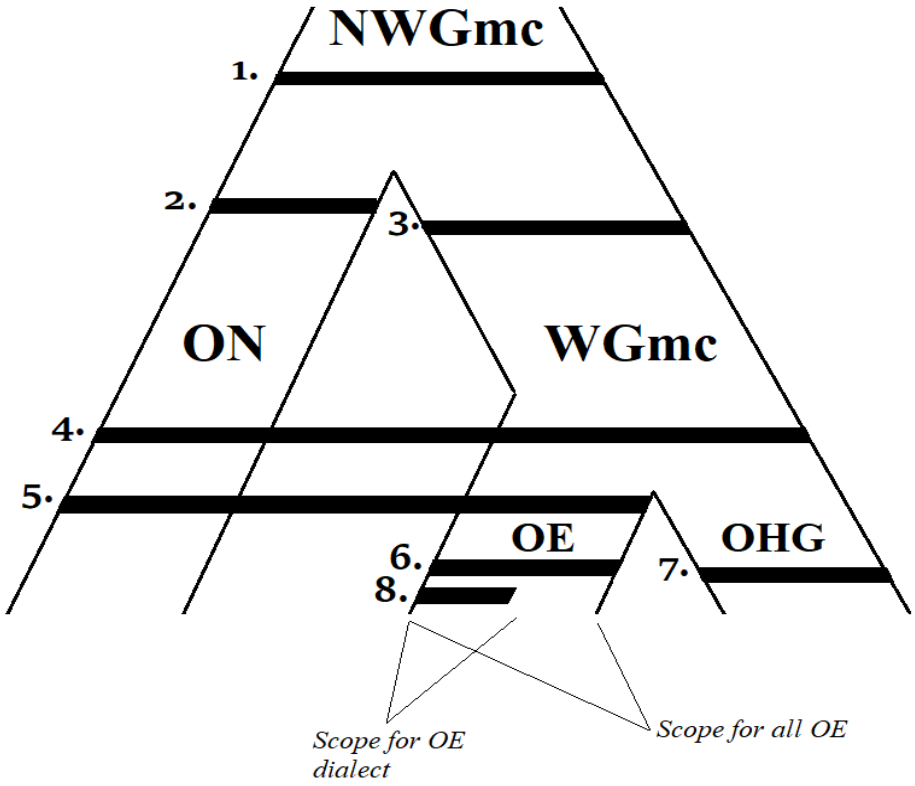


Figure 5. A hybrid tree/wave model of Northwest Germanic

This model exemplifies the types of developments considered in Historical Glottometry in the context of Northwest Germanic and its split into Old Norse and West Germanic, and subsequent breakup of West Germanic into, for example, Old English and Old High German. Each line represents a wave with a different range. Waves 1 and 4 represent innovations that are shared amongst all members of Northwest Germanic; whether they occur prior to or after the subsequent breakup of the subgroup is irrelevant. Waves 2 and 3 represent innovations that are exclusive to the subsequent subgroups (and waves 2, 6 and 7 are exclusive to the resulting languages). Wave 5 represents an innovation that includes all of one branch (Old Norse), but only part of West Germanic.

The black outlines represent the minimum scope of each subgroup or languages for consideration in the present approach; wave 8 therefore represents merely dialectal, or language internal innovations, which fall beyond of the scope of this study.

Even though, as previously mentioned, wave-like diffusions have been acknowledged for over a century, even relatively recent treatments of Germanic development (cf. Voyles and Barrack 2009) have seemingly fallen prey to the unnecessary assumptions of the tree model, and even scholars who have acknowledged the existence of non-cladistic developments, both outside and within the field of Germanic linguistics, have apparently been divided on the issue of how to account for it effectively (cf. Southworth 1964; Anttila 1989; Hock 1991).

Throughout the remainder of this thesis, the innovations that have contributed to the linguistic history of the early Germanic languages shall be classified and processed using Historical Glottometry. Chapter 2 provides an overview of the methodology used in applying Historical Glottometry to Germanic, and clarifies the general approach to both accounting for and processing innovations. In Chapter 3, the results of the study are presented and discussed. In Chapter 4, the results are briefly summarized and conclusions are presented. Appendices A through G present the full database of collected innovations in its entirety. It is comprised of lists of developments of several types that have contributed to the development of Germanic from the Proto-Germanic period to the early Germanic languages, namely Gothic, Old Norse, Old English, and Old High German. Other varieties such as Old Saxon and Old Frisian are considered for their participation in greater developments, but have not been the subject of examination for exclusive

developments. The reader is highly encouraged to refer to the Appendices for further background on the innovations considered for this study.

# 2 METHODOLOGY

## *2.1 Building a Database*

The most important and fundamental step in applying Historical Glottometry is the collection and allocation of innovations that are observable within the family[3]. Historical Glottometry (henceforth HG) utilizes innovations that have been inferred from a particular reconstruction that has been posited through an application of the comparative method. In classifying innovations in this way, there often arise ambiguous cases, or situations in which there may be an overabundance of data, and how exactly an innovation ought to be assigned becomes uncertain. These are not new problems characteristic of HG, but classic problems of historical linguistics that are characteristic to the comparative method and subgrouping. The best we can do is to use our best judgement given what is known about language change and accommodate any language-external facts that harmonize best with the findings, such as the written historical or archeological record, where applicable. For the present approach, the database of innovations was built from innovations collected from the secondary literature on early Germanic development.

The primary challenge in conducting a study of this caliber has been the identification, collection, and interpretation of a massively abundant amount of data into a framework that is compatible with HG and quantitative innovation-based subgrouping

[3] The truly *first* step in the application of HG is to carry out a reconstruction using the comparative method. Even before the comparative method, there should be an internal reconstruction for each language so that the history of individual languages can be laid out before the correspondences between cognates can be identified. Only then can the collection and allocation of innovations begin.

in general. No application of the comparative method was necessary in the construction of the innovation database used here. The comparative method has been applied and reapplied by countless reliable specialists for many years. Indeed, as Ringe and Taylor (2014) put it:

> Comparative Germanic linguistics has been worked over so intensively by so many specialists for so long that getting the facts is seldom a problem, though the wealth of conflicting interpretations has to be sorted (and ruthlessly pruned, since in each case no more than one can be correct) (P. 2).

The reader may notice that most of the data on the prehistoric development of Germanic are drawn from the works of Donald Ringe, who has so far provided the most detailed and useful discussion on the development of the Germanic languages from a contemporary linguistic perspective. His insightful analysis has proven particularly useful for the application of the pre-daughter language data to a HG framework. This has in some cases required some reinterpretation of the data to suit the quantitative nature of HG. For the later languages, several prominent grammars by many influential authors have also been extensively utilized, such as Wright (1888), Noreen (1903), Braune and Reiffenstein (2004), etc.; the reader is encouraged to refer to the References section for a full bibliography.

An important point that ought to be made about HG, and also about any innovation-based subgrouping approach is that, since we are constantly learning about new innovations or reinterpreting those that are already known, it is likely that no glottometric subgrouping will be an end-all solution to the matter of subgrouping within a family[4].

[4] I ask the reader to forgive any inaccuracies in the data and any contributing innovations that I may have neglected to include in my database. While I am confident that I have identified at least the majority of

The exact result will be continuously subject to change as our understanding of a language family changes, and that is something that happens constantly.

*2.2 Organization*

The content of the database is arranged into Appendices labeled A through G according to the 'primary' subgroupings of the Germanic language family, primarily for condensing purposes, but note in Chapter 3 that the results suggest more subgroups than the former. The primary subgroupings will be seen to score high since they are more strongly supported, but other minor subgroups are revealed, and their scores provided. In other words, while the present approach may not drastically uproot the subgrouping of Germanic, interesting deviations and patterns of overlap are revealed, which is more than enough to make it worth doing for any linguist interested in the bigger picture.

Throughout Chapter 3, each subgroup that is supported by the data is discussed in its own section. The chapter concludes with an overview of all supported subgroups, along with their glottometric values, and a glottometric diagram that visualizes the network of subgroup 'waves' within Germanic. The subgroups are posited on the basis of evidence that has been retrieved primarily from four early Germanic languages: Gothic, Old Norse, Old English and Old High German, and the data on these languages are organized into their own appendices. Old Saxon and Old Frisian have been considered to the extent that they participate in shared innovations, but they have not been surveyed for exclusive innovations. The primary reason for this is that the linguistic literature on Old Saxon and

contributing innovations that are observable within the Germanic family during the target period, such a large task almost inevitably threatens the risk of error.

Old Frisian is less abundant than it is on the other early languages, and they do not seem to have received comparable linguistic analysis. Another reason is simply time and space constraints. I consider the exhaustive presentation of the database in the Appendices good practice for any HG subgrouping approach, or any subgrouping approach for that matter, since only a fully transparent approach will have any hope for further contribution or scrutiny from other scholars. I resign myself to the possibility that alternate interpretations of the data than the ones presented here may be preferable for the most accurate result.

### *2.3 Innovations*

Note that innovations in HG are equal in terms of their value for subgrouping. In executing HG, it is tempting to grant an innovation that affects more words of the language more weight than one that is observable in only one word, but the reader is advised to remember that the purpose of subgrouping is to track the *quantity* of innovations. An *innovation,* for the purposes of HG, is any change that reflects a social connection between speech communities. This can be either large or small in scale, ranging from a massive regular phonological chain shift to single analogical extension of a case ending.

Recall from Figure 5 that a minimum scope has been predefined for the consideration of innovations. The early Germanic languages are subgrouped according to the distribution of innovations amongst each other. Only innovations that are considered to have affected all dialects of each language are incorporated into the present database. Innovations affecting only one or more dialects of a language are not considered. Even

innovations that cover most varieties of a language, but not all, still only serve to define a smaller, dialectal subgroup that is beyond the scope of the present study.

Lexical replacements are included in the present approach, but conservatively. There have obviously been numerous changes in the lexicon from the breakup of Proto-Germanic to the development of the individual daughters, but for the present approach, only the clearest cases of lexical replacement and lexically-specific sound- and morphological changes have been considered. This means only words that are most clearly isolated to a particular subgroup are considered. Purely semantic changes such as levellings of synonym complexes (e.g., PGmc **mikilaz* ~ **storaz* ~ **grautaz* 'big' > OE *grēat*), or replacements with native words are not considered. The traditional predominance of sound changes, morphological changes, etc. in the comparative method and subgrouping shall be maintained here.

Following François (2015), innovations that are not regular in scope are considered according to their presence in the 'core vocabulary.' For example, a sound change that has a regular distribution, even if it is rare, is used for subgrouping in this approach, but a lexically specific sound change, lexical replacement, lexically specific levelling, etc. is only considered if it affects a word within the core vocabulary. 'Core vocabulary' here refers to the top 200 words (as defined by the 200-word Swadesh-list; Swadesh 1955). What words truly constitute a universal 'core vocabulary,' and the amount of words to be considered, are of course subject to debate, and I leave that matter open to scrutiny and adjustment by other scholars. For now, the Swadesh list will suffice.

I am confident that the present approach will at the very least set a firm foundation for glottometric subgrouping of the Germanic languages, which may be amended, corrected, and further built upon by other scholars in the field as necessary. Let it also be known that every attempt has been made to confirm the exact distribution of all innovations used for this study. In some cases, the literature is not entirely clear on whether an innovation that affects a particular language also affects some other(s) as well. In such cases I have done my best to confirm with what resources have been available to me.

*2.4 Notation*

Finally, a quick word ought to be said about some of the notation used throughout the Appendices. Each innovation included in the Appendices is assigned a value, or set of possible values, in HG terms. For example, the following designation is appended to the end of a discussion of an innovation that has been designated an exclusive Northwest Germanic innovation:

$$\{\Delta\varepsilon_{NWGmc} = 1\}$$

This is read as "increment the value of exclusive Northwest Germanic innovations by 1."

$$\{0 \leq \Delta\varepsilon_{NWGmc} \leq 1\}$$

This designation reads "increment the value of exclusive Northwest Germanic innovations by either 0 or 1" (depending on whether or not the innovation is determined to be of value).

$$\{\Delta\varepsilon_{NWGmc} = 1, \Delta\varepsilon_{GO} = 1\}$$

This designation reads “increment the value of Northwest Germanic innovations by 1 *and* increment the value of exclusive Gothic innovations by 1.” Lastly, logical notation is utilized for some ambiguous situations. For example:

$$\{\Delta\varepsilon_{NWGmc} = 1\} \vee \{\Delta\varepsilon_{GO} = 1\}$$

This designation reads “either increment the value of exclusive Northwest Germanic innovations by 1, *or* increment the value of exclusive Gothic innovations by one.”[5]

[5] The total values for each metric are presented and discussed in the final results in Chapter 3.

# 3 RESULTS

## *3.1 Database of Shared Innovations*

Table 1 lists developments extracted from the full database that are either shared between languages, or identical innovations that project any reasonable possibility of having been shared. It is comprised of 167 innovations that are observable throughout early Germanic (henceforth Gmc), spanning several centuries of development. Most are clearly shared, but some are more ambiguous. Innovations that are exclusive to each of the attested languages, which are much more numerous, are not included in this table, but are presented and discussed in full throughout the Appendices. The languages surveyed for innovations include Gothic (henceforth GO), Old Norse (ON), Old English (OE), and Old High German (OHG)[6]. While Old Frisian (OFr) and Old Saxon (OS) were not surveyed in this study for a full account of exclusive developments, they were considered to the extent that they participated in greater developments. For example, OFr is not surveyed for exclusive innovations at any point in the Appendices, but an Ingvaeonic (OE-OFr-OS) subgroup is observed insofar as it encompasses the other languages.

Checkmarks with asterisks denote innovations that may reflect parallel developments, and checkmarks with question marks involve some kind of complication in classifying the innovation(s). The reader is encouraged to refer to the Appendices for details.

[6] That is, the literature was extensively combed for any and all innovations that exclusively define a 'subgroup' that aligns with what is generally considered to be the entirety of each language, encompassing all dialects, and entered into the database to be processed using HG. Cf. the diagram in Figure 5 for a review of the scope of innovations.

Table 1. Database of Shared Innovations

| *Innovation* | *GO* | *ON* | *OE* | *OFr* | *OS* | *OHG* |
|---|---|---|---|---|---|---|
| **ē > *ā/ [+stress]* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-ī > *-i / _#* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-ō > *-u/ [-stress] _#* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-wū > *-u* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **a > *u/ _*m* | ✓* | ✓ | ✓ | ✓ | ✓ | ✓ |
| **a > *i / [-stress] _ n* | ✓* | ✓ | ✓ | ✓ | ✓ | ✓ |
| **ai > *ē* | ✓* | ✓ | ✓ | ✓ | ✓ | ✓ |
| **u > *[o]/ ]σ [-high]* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **ō > *ū / _ [σ* | | ✓ | | ✓ | ✓ | ✓ |
| **$V_1V_2$ > *$\bar{V}_3$* | | ✓* | ✓ | ✓ | ✓ | ✓ |
| **$k^w$ > *kw* | | ✓* | ✓ | ✓ | ✓ | ✓ |
| **kw > *kkw* | | ✓* | ✓ | ✓ | ✓ | ✓ |
| *dual > Ø* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| *3 imp. > Ø* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| *pres. pass. > Ø* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-miz, *-maz > *-maz* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-aiz- > *-ez-* | | ✓ | ✓ | ✓ | ✓ | ✓ |

| | | | | | | |
|---|---|---|---|---|---|---|
| **-ded-, *-d- > *-d-* | ✓? | ✓? | ✓? | ✓? | ✓? | ✓? |
| *voc. > Ø* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-um(m)ē > *-um* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-ēm > *-um* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-ū-* | ✓? | ✓ | ✓ | ✓ | ✓ | ✓? |
| *-u(-) (appearance)* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| *-u(-) (spread)* | | ✓* | ✓ | ✓ | ✓ | ✓ |
| **þrij- > *þrijō, * þrijǭ* | | ✓* | ✓* | ✓* | ✓* | ✓* |
| **tigiwiz* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **hwī* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **hir > *hēr (lengthening)* | ✓* | ✓ | ✓ | ✓ | ✓ | ✓ |
| **hir > *hēr (lowering)* | ✓* | ✓ | | | ✓ | ✓ |
| **jūz, *jūt > *jīz, *jīt* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **uban-* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| *Null subject* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **hwaþeraz* | | ✓ | ✓ | ✓ | ✓ | ✓ |
| **-(i)ji- > *-ī-* | ✓* | ✓* | | | | |
| **-jj-, *-ww- > -ddj-/-ggj-, -ggw-* | ✓* | ✓* | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **d (/ð/) > /d/ / r _* | ✓? | ✓? | ✓? | ✓? | ✓? | ✓? |
| *-a* | ✓* | ✓* | | | | |
| **-at* | ✓* | ✓* | | | | ✓* |
| **-ā-* | ✓* | ✓* | | | | |
| **-es-* | ✓* | | | | | ✓* |
| *-and-s* | ✓* | ✓* | | | | |
| **-z- ~ *-s-; *-d- ~ *-þ-* | ✓* | ✓* | | | | |
| **u > *u, *o* | | | ✓ | ✓ | ✓ | ✓ |
| **a, *ą > Ø / _ (*-z)#* | | | ✓ | ✓ | ✓ | ✓ |
| **-u > Ø / CC _#* | | | ✓ | ✓ | ✓ | ✓ |
| **zw, *dw > *ww* | | | ✓ | ✓ | ✓ | ✓ |
| **V[ð]V > *V[d]V* | | | ✓ | ✓ | ✓ | ✓ |
| **Vwu- > *Vu* | | | ✓ | ✓ | ✓ | ✓ |
| **-z > Ø* | | | ✓ | ✓ | ✓ | ✓ |
| **Cj > *C$^{j}$C$^{j}$* | | | ✓ | ✓ | ✓ | ✓ |
| **C(l/r) > *CC(l/r)* | | | ✓ | ✓ | ✓ | ✓ |
| **Ṽ# > *V* | | | ✓ | ✓ | ✓ | ✓ |
| **-i, *-u > Ø* | | | ✓ | ✓ | ✓ | ✓ |

| | | | | | |
|---|---|---|---|---|---|
| **-ō(r) > *-ā(r)#* | | ✓ | ✓ | ✓ | ✓ |
| **-V̄r# > *-Vr* | | ✓ | ✓ | ✓ | ✓ |
| **ō > *ū / _n#* | | ✓ | ✓ | ✓ | ✓ |
| **C(C)V > *C(C)V̄* | ✓* | ✓ | ✓ | ✓ | ✓ |
| **-jj-, *-ww- > *-ij-, *-uw-* | | ✓ | ✓ | ✓ | ✓ |
| **-ī- ~ *-ija- > *-i- ~ *-ija-* | | ✓ | ✓ | ✓ | ✓ |
| **-i- > Ø / -t/d- _ -d-* | | ✓ | ✓ | ✓ | ✓ |
| **walid- > *waldē* | | ✓ | ✓ | ✓ | ✓ |
| */x/ > *[h] / #_* | | ✓ | ✓ | ✓ | ✓ |
| **z, *r > *r* | ✓* | ✓ | ✓ | ✓ | ✓ |
| **-izd- > *-īd-* | | ✓ | ✓ | ✓ | ✓ |
| **-īn > *-ī* | | ✓ | ✓ | ✓ | ✓ |
| *dat., inst. > dat.* | | ✓ | ✓ | ✓ | ✓ |
| **-ī* | | ✓ | ✓ | ✓ | ✓ |
| **ijōz > *sijā* | | ✓ | ✓ | ✓ | ✓ |
| **unsiz > *uns, etc.* | | ✓ | ✓ | ✓ | ✓ |
| **-nVssī* | | ✓ | ✓ | ✓ | ✓ |
| *1sg., 3sg. subj. > 3sg. subj.* | | ✓ | ✓ | ✓ | ✓ |

| | | | | | |
|---|---|---|---|---|---|
| **-an* | | ✓ | ✓ | ✓ | ✓ |
| **-nd-ija- > *-nd-ijō-* | | ✓ | ✓ | ✓ | ✓ |
| *inf. + *-ja-* | | ✓ | ✓ | ✓ | ✓ |
| **namô (neut.) > *namō (masc.)* | | ✓ | ✓ | ✓ | ✓ |
| *2sg. *-s* | | ✓ | ✓ | ✓ | ✓ |
| *2sg. past indic. > subj.* | | ✓ | ✓ | ✓ | ✓ |
| **-Ø > *-u/[+heavy] _* | | ✓ | ✓ | ✓ | ✓ |
| **i (cl. I) > *e (cl. IV/V)* | ✓? | ✓ | ✓ | ✓ | ✓ |
| **mati > *matja- : *sagją-* | | ✓ | ✓ | ✓ | ✓ |
| **hehaww > *heuw* | | ✓ | ✓ | ✓ | ✓ |
| **hehēt > *heht* | | ✓ | ✓ | ✓ | ✓ |
| **-i- > Ø* | | ✓ | ✓ | ✓ | ✓ |
| **-dēs* | | ✓ | ✓ | ✓ | ✓ |
| **-st* | | ✓ | ✓ | ✓ | ✓ |
| **-ik* | | ✓* | ✓* | ✓* | ✓* |
| **-CijV- > *-CjV-* | | ✓* | ✓* | ✓* | ✓* |
| *[-voice] > [+voice]* | | ✓ | ✓ | ✓ | ✓ |
| **sī > *si(j)u* | | ✓ | ✓ | ✓ | ✓ |

| | | | | |
|---|---|---|---|---|
| **ijē, *iją̄* | ✓ | ✓ | ✓ | ✓ |
| **wilī* | ✓ | ✓ | ✓ | ✓ |
| **þits/*þitt(i)* | ✓ | ✓ | ✓ | ✓ |
| **sa > *siz* | ✓ | ✓ | ✓ | ✓ |
| **þrīz* | ✓* | ✓* | ✓* | ✓* |
| **twō + *n* | ✓ | ✓ | ✓ | ✓ |
| **dēdē > *dādī* | ✓ | ✓ | ✓ | ✓ |
| **þar > *þār; *hʷar > *hʷār* | ✓ | ✓ | ✓ | ✓ |
| **þē* | ✓ | ✓ | ✓ | ✓ |
| **baum* | ✓ | ✓ | ✓ | ✓ |
| **obat* | ✓ | ✓ | ✓ | ✓ |
| **rindā* | ✓ | ✓ | ✓ | ✓ |
| **waskan* | ✓ | ✓ | ✓ | ✓ |
| **wolkn* | ✓ | ✓ | ✓ | ✓ |
| **gagang(?) > *gang* | ✓ | ✓ | ✓ | ✓ |
| **waht* | ✓ | ✓ | ✓ | ✓ |
| *[+nasal] > Ø* | ✓ | ✓ | ✓ | |
| **e > *i / _m* | ✓ | ✓ | ✓ | |

| | | | | |
|---|---|---|---|---|
| **a, *o > [+front]* | | ✓ | ✓ | ✓ |
| **-lþ- > *-ld-* | | ✓ | ✓ | ✓ |
| **sl > *ls* | ✓* | ✓ | ✓ | ✓ |
| **ā, *ē > *ē* | | ✓ | ✓ | ✓ |
| **h > Ø / _CC* | | ✓ | ✓ | ✓ |
| **-z > Ø* | | ✓ | ✓ | ✓ |
| **VfV, *VbV > *VbV* | | ✓ | ✓ | ✓ |
| **-iw- > *-aw-* | | ✓ | ✓ | ✓ |
| **-ō* | | ✓ | ✓ | ✓ |
| **-i- ~ *-ija- > class II* | | ✓ | ✓ | ✓ |
| *hund-* | | ✓ | ✓ | ✓ |
| *3pl.* | | ✓ | ✓ | ✓ |
| **-ōs* | | ✓ | ✓ | ✓ |
| **-ô > *-a* | ✓ | ✓ | ✓ | ✓ |
| *-ianne* | | ✓ | ✓ | ✓ |
| **-nō- ~ *-na- > class III* | ✓ | ✓ | ✓ | ✓ |
| **a, *o > [+nasal] / _ [+nasal]* | | ✓ | ✓ | ✓ |
| **a > [+round]* | | ✓ | ✓ | ✓ |

| | | | | | |
|---|---|---|---|---|---|
| **lagdun : *satte* | ✓* | ✓ | ✓ | ✓ | |
| **sindi* | | ✓ | ✓ | ✓ | |
| **sīn > Ø* | | ✓ | ✓ | ✓ | |
| **siz > Ø* | | ✓ | ✓ | ✓ | ✓ |
| **sek > Ø* | | ✓ | ✓ | ✓ | |
| **Þ- + *-s* | | ✓ | ✓ | ✓ | |
| **hi- ~ *he-* | | ✓ | ✓ | ✓ | |
| **stā-* | | ✓ | ✓ | ✓ | |
| **lais- ~ *laiz-* | | ✓ | ✓ | ✓ | |
| **i- ~ *e- > *hi- ~ *he-* | | ✓ | ✓ | ✓ | |
| **nigun* | | ✓ | ✓ | ✓ | |
| **hwat* | ✓ | ✓ | ✓ | ✓ | |
| **hwaþeraz* | ✓ | ✓ | ✓ | ✓ | |
| **a > [+front]* | | ✓ | ✓ | | |
| **ō > *ā / [-stress]* | | ✓ | ✓ | ✓? | |
| **-an* | | ✓ | ✓ | | |
| **-w-* | | ✓ | ✓ | | |
| **-ē* | | ✓ | ✓ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| *-s, -þ, -aþ* | | | ✓ | ✓ | | |
| **þaizō, *þaimi* | | | ✓ | ✓ | | |
| **hwa-* | | | ✓ | ✓ | | |
| **hū* | | | ✓ | ✓ | | |
| *V > Ø / _(C)#* | | ✓* | ✓* | ✓* | ✓* | ✓* |
| *i-umlaut* | | ✓* | ✓* | ✓* | ✓* | ✓* |
| *V2* | | ✓* | | | ✓ | ✓ |
| *sé* | ✓* | ✓* | | | | |
| **-hw-, *-h- > -h-* | | | ✓* | ✓* | ✓* | ✓* |
| **-dē > *-dō* | | | ✓? | ✓? | ✓? | ✓? |
| **au > ō* | | | | | ✓ | ✓ |
| *ao > ō* | | | | | ✓ | ✓ |
| *CR# > CVR#* | | | | | ✓ | ✓ |
| **-anu* | | | | | ✓ | ✓ |
| *-īs* | | | | | ✓ | ✓ |
| **-u > Ø / [+light] _* | | | | | ✓ | ✓ |
| *Ø > -u / [+heavy] _* | | | | | ✓ | ✓ |
| *1sg., 3sg. indic. > 3sg.* | | | | | ✓ | ✓ |

| | | | | |
|---|---|---|---|---|
| *-ōno* | | | ✓ | ✓ |
| **þi- ~ *þe-* | | | ✓ | ✓ |
| **hwi- ~ *hwe-* | | | ✓ | ✓ |
| *imu* | | | ✓ | ✓ |
| *-ta* | | | ✓ | ✓ |
| **a > *æ* | ✓ | ✓? | | |

*3.2 Proposed Subgroups*

As mentioned in Chapter 2, the outcome of HG might vary depending on each analyst's perspective on certain developments. It may be gathered from Table 1 that the final subgrouping result inferred from this dataset could vary depending on the way in which inconclusive or ambiguous innovations are interpreted. This can result in messy complications that can turn the simple calculation of a basic formula into a highly complex process. Some subgroups could come out to be quite large in scale if many innovations are generously attributed to them. Others could end up quite small, if many innovations are skeptically dismissed as coincidence. Here, where a compelling case has been made on the status of an innovation as parallel by prior specialists, this designation has generally been accepted. Otherwise, where there is no compelling reason *not* to assume a shared development, this approach has generally been taken in the spirit of the glottometric approach. In such cases, the reader is encouraged to remember that the given analysis is one out of several possible perspectives on the matter (cf. the Appendices for

full discussions). Some uncertain innovations have been decided in one direction or the other depending on the where the evidence points, and a few particularly inconclusive innovations have been excluded altogether. At any rate, every effort has been taken to accommodate both the realities of language diffusion and the indications of the reconstructed evidence where possible. The following sections present my projections for the subgroups of early Germanic, comprising the most reliable interpretations of the presently considered data, as suggested by the historical record, linguistic science, or the inclinations of prior specialists, where they are available.

### *3.2.1 Northwest Germanic*

It has long been claimed that Proto-Germanic first split into a Northwest Germanic (NWGmc) variety and an East Germanic variety (cf. Kuhn 1955; Adamus 1962), and the evidence as indicated by the innovation history of early Germanic certainly confirms that NWGmc is the strongest subgroup to arise immediately after the PGmc period. NWGmc is comprised of OE, ON, and OHG (as well as OFr and OS); that is, essentially all early languages except GO.

According to the collected data, NWGmc is most likely supported by about 23 exclusively shared innovations and likely 3 all-encompassing innovations that probably spread into GO. Thus:

$$\varepsilon_{NWGmc} = 23$$

$$p_{NWGmc} = 26$$

Of the exclusive innovations, 8 are phonological (cf. appx. A.1), 8 are morphological (cf. appx. A.2), 5 are lexical (cf. appx. A.3), and two are syntactic (cf. appx. A.4.1; appx.

A.4.2). It was only apparently crosscut by NEGmc innovations (of which there were likely no more than 6)[7] and one apparent ON-GO-OHG innovation (cf. appx. B.2.3).

$$q_{NWGmc} = 7$$

Its cohesiveness therefore amounts to:

$$k_{NWGmc} = \frac{p}{p+q} = \frac{p = 26}{(p = 26) + (q = 7)} \approx$$

$$k_{NWGmc} \approx 0.788$$

and its subgroupiness:

$$\varsigma_{NWGmc} = \varepsilon \times k = (\varepsilon = 23) \times (k = 0.788) \approx$$

$$\varsigma_{NWGmc} \approx 18.12$$

In all likelihood, NWGmc was a relatively cohesive subgroup with a cohesiveness rate of at least around 78.8 percent. The subgroupiness value, which is not a percentage, is the product of a 78.8 percent cohesiveness quotient and 23 exclusive innovations. Recall that subgroupiness is a measure that is determined by the both the strength of the cohesiveness rate and the number of exclusively shared innovations. In the case of NWGmc, there is an abundance of exclusive innovations to strengthen the subgroupiness value, and a relatively high cohesiveness percentage of 78.8 percent does not water down the subgroupiness of NWGmc to any significant degree. As mentioned in Section 1.5.3, more glottometric approaches will be necessary to understand the relative significance of this particular result with respect to subgroups within other language families throughout the world, but what can be said is that this score ranks a few points above the most

[7] However, NEGmc innovations are not always certain, so it is entirely within the realm of possibility that NWGmc was more cohesive than projected here.

'subgroupy' score in the database of François (2014), which comes out to 12.82 (where $\varepsilon$ = 14, $k$ = 0.92). It is not surprising that NWGmc ranks higher, given the greater amount of attention it has received from so many more specialists over so long a period.

### *3.2.2 Northeast Germanic (ON-GO)*

For about as long as a NWGmc-EGmc split was proposed as initiating the breakup of PGmc, other scholars have insisted on a WGmc-NEGmc split, maintaining closer connections between ON and GO than the two have with any other Gmc language (cf. Holtzmann 1870; Rosenfeld 1954). While many of these claims have been erroneously based on shared retentions, there is an interesting handful of possible shared developments between ON and GO.

NEGmc is supported in the database by 6 exclusively shared innovations plus 4 encompassing innovations. While Holtzmann's Law is the only traditionally supported NEGmc innovation, if such a development is possible, the possibility that other ON-GO innovation exchanges could also happen is a scenario that ought to be considered. In the absence of any glaring incentive *not* to classify innovations as NEGmc, I have been relatively generous in my treatment of this subgroup. The following values therefore ought to be taken as leaning towards the high end of possible scores:

$$\varepsilon_{NEGmc} = 6$$

$$p_{NEGmc} = 10$$

Of the exclusive innovations, a total of 2 are phonological (cf. appx. B.1.13; appx. B.1.18) and 4 are morphological (cf. appx. B.2.9; appx. B.2.15; appx. B.2.17; appx. B.1.19). However, it was crosscut several times:

$$q_{NEGmc} = 32$$

Its cohesiveness therefore amounts to:

$$k_{NEGmc} = \frac{p}{p+q} = \frac{p = 10}{(p = 10) + (q = 32)} \approx$$

$$k_{NEGmc} \approx 0.238$$

and its subgroupiness:

$$\varsigma_{NEGmc} = \varepsilon \times k = (\varepsilon = 6) \times (k = 0.238) \approx$$

$$\varsigma_{NEGmc} \approx 1.43$$

NEGmc therefore would have had a maximum cohesiveness of somewhere around 23.8 percent, and a maximum subgroupiness of around 1.43.

### *3.2.3 Continental Northwest Germanic*

A 'Continental Northwest Germanic' (CNWGmc) subgroup (comprising ON, OS, OFr, and OHG, and excluding OE) is never explicitly mentioned in the literature, but it is supported by one exclusive innovation, the distribution of which has been acknowledged (cf. Krause 1971; Ringe and Taylor 2014). It is encompassed by every NWGmc innovation:

$$\varepsilon_{CNWGmc} = 1$$

$$p_{CNWGmc} = 27$$

This single exclusive development is a phonological innovation that raised unstressed *$\bar{o}$ to *$\bar{u}$ in non-final syllables (cf. appx. A.1.9). This subgroup was crosscut many times:

$$q_{CNWGmc} = 114$$

Its cohesiveness therefore comes out to:

$$k_{CNWGmc} = \frac{p}{p+q} = \frac{p = 27}{(p = 27) + (q = 114)} \approx$$

$$k_{CNWGmc} \approx 0.191$$

and its subgroupiness:

$$\varsigma_{CNWGmc} = \varepsilon \times k = (\varepsilon = 1) \times (k = 0.191) \approx$$

$$\varsigma_{CNWGmc} \approx 0.191$$

CNWGmc therefore hardly ranks much higher than NEGmc in terms of subgroupiness and cohesiveness, but it is supported by at least one relatively solid sound change. Only one exclusively shared innovation means that its subgroupiness is equal to its cohesiveness.

### *3.2.4 Northern Northwest Germanic*

A 'Northern Northwest Germanic' (NNWGmc) subgroup (comprising ON, OE, OFr, and OS) is supported by around 6 probable exclusively shared innovations plus 26 encompassing innovations:

$$\varepsilon_{NNWGmc} = 6$$

$$p_{NNWGmc} = 32$$

Of its exclusive innovations, four are morphological, and two are syntactic (cf. appx. A.4.1; appx. D.1.4.1). It is crosscut 87 times by innovations that include GO or OHG and part of NNWGmc in their scope:

$$q_{NNWGmc} = 87$$

Its cohesiveness therefore amounts to:

$$k_{NNWGmc} = \frac{p}{p+q} = \frac{p = 32}{(p = 32) + (q = 87)} \approx$$

$$k_{NNWGmc} \approx 0.269$$

and its subgroupiness:

$$\varsigma_{NNWGmc} = \varepsilon \times k = (\varepsilon = 6) \times (k = 0.269) \approx$$

$$\varsigma_{NNWGmc} \approx 1.61$$

NNWGmc was apparently also a relatively small subgroup, but it is supported by several exclusive innovations which seem more or less attributable to a NNWGmc subgroup.

### *3.2.5 West Germanic*

WGmc (comprising OE, OS, OFr, and OHG) is a very strong subgroup, having been identified as distinct from NGmc and EGmc since at least as far back as Schleicher (1860). Here, it is supported by 63 exclusive innovations and 25 encompassing innovations:

$$\varepsilon_{WGmc} = 64$$

$$p_{WGmc} = 90$$

Of its exclusive innovations, 22 are phonological (cf. appx. C.1), 26 are morphological (cf. appx. C.2), and 16 are lexical (cf. appx. C.3). It is crosscut 10 times in the data:

$$q_{WGmc} = 10$$

Its cohesiveness comes out to:

$$k_{WGmc} = \frac{p}{p+q} = \frac{p = 90}{(p = 90) + (q = 10)} \approx$$

$$k_{WGmc} \approx 0.90$$

and its subgroupiness:

$$\varsigma_{WGmc} = \varepsilon \times k = (\varepsilon = 64) \times (k = 0.90) \approx$$

$$\varsigma_{WGmc} \approx 57.6$$

Not surprisingly, WGmc is an extremely well supported subgroup. It has been debated as to whether it was ever spoken as a single 'language' (cf. Robinson 1992), but its sheer wealth of developments certainly points in favor of the possibility that it was spoken as a unitary Proto-WGmc language for at least some period of time before beginning to disintegrate (Stiles 2013).

### *3.2.6 Northern West Germanic (Ingvaeonic)*

An Ingvaeonic (Ingv) subgroup (comprising OE, OFr, and OS) has been recognized since at least 1919 by Ferdinand Wrede. Here it is supported by 27 exclusive innovations plus 97 encompassing innovations:

$$\varepsilon_{Ingv} = 27$$

$$p_{Ingv} = 124$$

Of the exclusive innovations, 11 are phonological (cf. appx. D.1.1), 7 are morphological (cf. appx. D.1.2), and 9 are lexical (cf. appx. D.1.3). It is crosscut 17 times in the data:

$$q_{Ingv} = 17$$

Its cohesiveness is therefore:

$$k_{Ingv} = \frac{p}{p+q} = \frac{p = 124}{(p = 124) + (q = 17)} \approx$$

$$k_{Ingv} \approx 0.879$$

and its subgroupiness:

$$\varsigma_{Ingv} = \varepsilon \times k = (\varepsilon = 27) \times (k = 0.879) \approx$$

$$\varsigma_{Ingv} \approx 23.73$$

### *3.2.7 Anglo-Frisian*

An AF subgroup (i.e., OE-OFr) is supported here by 9 exclusive innovations and 124 encompassing innovations. It has been identified as a subgroup since before Ingv was established as one, since it was apparently not until Wrede (1919) that OS was proposed as also constituting a member of the 'North Sea Germanic' languages.

$$\varepsilon_{AF} = 9$$

$$p_{AF} = 133$$

Of its exclusive innovations, at most 2 are phonological (cf. appx. D.2.1.1; appx. G.1.3), 4 are morphological (cf. appx. D.2.2), and three are lexical (cf. appx. D.2.3). It is apparently only crosscut twice in the data:

$$q_{AF} = 2$$

Its cohesiveness is therefore:

$$k_{AF} = \frac{p}{p+q} = \frac{p = 133}{(p = 133) + (q = 2)} \approx$$

$$k_{AF} \approx 0.985$$

and its subgroupiness:

$$\varsigma_{AF} = \varepsilon \times k = (\varepsilon = 9) \times (k = 0.985) \approx$$

$$\varsigma_{AF} \approx 8.87$$

### *3.2.8 Teuto-Saxon (OHG-OS)*

Despite their separation by a northern and southern WGmc isogloss, similarities between OHG and Ingv through OS have been acknowledged since at least Wrede

(1919). Here, a 'Teuto-Saxon' (i.e., OHG-OS) subgroup is supported by 13 exclusive innovations plus 94 encompassing innovations:

$$\varepsilon_{OHG\text{-}OS} = 13$$

$$p_{OHG\text{-}OS} = 107$$

Of the exclusive innovations, 3 are phonological (cf. appx. F.1.15, appx. F.1.18, appx. F.1.19), 7 are morphological (cf. appx. F.2), and 3 are lexical (cf. appx. F.3). It appears to have been crosscut 35 times in the data:

$$q_{OHG\text{-}OS} = 35$$

Its cohesiveness is therefore:

$$k_{OHG-OS} = \frac{p}{p+q} = \frac{p = 107}{(p = 107) + (q = 35)} \approx$$

$$k_{OHG-OS} \approx 0.753$$

and its subgroupiness:

$$\varsigma_{OHG-OS} = \varepsilon \times k = (\varepsilon = 13) \times (k = 0.753) \approx$$

$$\varsigma_{OHG-OS} \approx 9.79$$

### *3.2.9 Old Norse-Old Saxon-Old High German*

Assuming the appearance of V2 (verb-second) syntax in OHG is the result of the same innovation that affected ON and OS, a very small ON-OS-OHG may be inferred from the data. It would be supported by 2 exclusive innovations plus 26 encompassing innovations:

$$\varepsilon_{ON\text{-}OS\text{-}OHG} = 2$$

$$p_{ON\text{-}OS\text{-}OHG} = 28$$

Of the 2 exclusive innovations, one is a lexically-specific sound change (cf. appx. A.3.4), and the other is syntactic (cf. appx. F.4.3). It appears to have been crosscut 106 times in the data:

$$q_{ON\text{-}OS\text{-}OHG} = 106$$

Its cohesiveness is therefore:

$$k_{ON-OS-OHG} = \frac{p}{p+q} = \frac{p = 28}{(p = 28) + (q = 106)} \approx$$

$$k_{ON-OS-OHG} \approx 0.21$$

and its subgroupiness:

$$\varsigma_{ON-OS-OHG} = \varepsilon \times k = (\varepsilon = 2) \times (k = 0.209) \approx$$

$$\varsigma_{ON-OS-OHG} \approx 0.418$$

*3.2.10 Old Norse-Gothic-Old High German*

An ON-GO-OHG subgroup is supported in the data by only one apparent, but uncertain, innovation (cf. appx. B.2.13), plus a maximum of 3 other potentially encompassing NWGmc innovations.

$$\varepsilon_{ON\text{-}GO\text{-}OHG} = 1$$

$$p_{ON\text{-}GO\text{-}OHG} = 4$$

It appears to have been crosscut 116 times in the data:

$$q_{ON\text{-}GO\text{-}OHG} = 116$$

Its cohesiveness is therefore:

$$k_{ON-GO-OHG} = \frac{p}{p+q} = \frac{p = 4}{(p = 4) + (q = 116)} \approx$$

$$k_{ON-GO-OHG} \approx 0.033$$

and its subgroupiness:

$$\varsigma_{ON-OS-OHG} = \varepsilon \times k = (\varepsilon = 1) \times (k = 0.033) \approx$$

$$\varsigma_{ON-OS-OHG} \approx 0.033$$

### *3.2.11 Teuto-Gothic (GO-OHG)*

The most likely explanation for the few identical GO-OHG innovations is that they are independent parallel developments, and that GO and OHG did not innovate together, at least not according to the majority interpretation.

### *3.2.12 Central Germanic (OFr-OS-OHG)*

A 'Central Germanic' (i.e., comprising OFr, OS and OHG) subgroup is reliably supported by a single exclusive innovation (poss. more), and is encompassed by 89 more:

$$\varepsilon_{OFr\text{-}OS\text{-}OHG} = 1$$

$$p_{OFr\text{-}OS\text{-}OHG} = 92$$

The single defining innovation is a lexical innovation, replacing the masc. 3sg. possessive pronoun with the reflexive (cf. appx. D.1.3.3). It is crosscut 46 times, according to the present data:

$$q_{OFr\text{-}OS\text{-}OHG} = 46$$

Its cohesiveness therefore amounts to:

$$k_{OFr-OS-OHG} = \frac{p}{p+q} = \frac{p = 92}{(p = 92) + (q = 46)} \approx$$

$$k_{OFr-OS-OHG} \approx 0.667$$

and its subgroupiness:

$$\varsigma_{ON-OS-OHG} = \varepsilon \times k = (\varepsilon = 1) \times (k = 0.667) \approx$$

$$\varsigma_{ON-OS-OHG} \approx 0.667$$

In all likelihood, Central Gmc was a real subgroup supported by at least a single innovation. Its position within WGmc and NWGmc served to fortify its cohesiveness, which probably amounts to at least 66.7 percent.

### *3.2.13 The Daughter Languages*

In harmony with the probable pattern of shared developments projected throughout Section 3.2 up to this point, Table 2 accounts for the exclusive developments defining the individual daughter languages that were identified in this study. Since variation internal to these languages was beyond the scope of this study, crosscutting developments have not been deliberately identified; but by examining the separate developmental histories of the daughters, several interesting post-split developments were identified, contributing to the support for greater subgrouping patterns. At any rate, it is probably safe to say that the amount of crosscutting between the languages only decreased as these speech communities began to become more exclusive and their languages became less intelligible from one another, and that the subgroupiness values of each language are probably quite high, perhaps not deviating from their $\varepsilon$ values to a significant degree.

Table 2. Exclusive Developments of the Daughter Languages

| ***Language*** | ***Types of Innovations*** | | | | |
|---|---|---|---|---|---|
| | ***Phon.*** | ***Morph.*** | ***Lex.*** | ***Synt.*** | ***Total*** |
| Gothic | 21 | 16 | 22 | N/A | 59 |
| Old Norse | 43 | 16 | 19 | N/A | 78 |
| Old High German | 30 | 26 | 18 | 2 | 76 |
| Old English | 26 | 30 | 24 | N/A | 80 |

*3.3 Final Results*

Table 3 summarizes the glottometric values for each subgroup that has been observed in the present study, processed from the data arranged in Appendices A through G. Each subgroup has been discussed individually throughout Section 3.2.

Table 3 Glottometric Values for Supported Germanic Subgroups

| ***Subgroup*** | ***ε*** | ***k*** | ***Subgroupiness (ς)*** |
|---|---|---|---|
| West Germanic (WGmc) | 64 | 0.90 | 57.6 |
| Ingvaeonic (Ingv) | 27 | 0.879 | 23.73 |
| Northwest Germanic (NWGmc) | 23 | 0.788 | 18.12 |
| Teuto-Saxon (OHG-OS) | 13 | 0.753 | 9.79 |
| Anglo-Frisian (AF) | 9 | 0.985 | 8.87 |
| North. Northwest Germanic (NNWGmc) | 6 | 0.269 | 1.61 |
| Northeast Germanic (ON-GO) | 6 | 0.238 | 1.43 |
| Central Gmc (OFr-OS-OHG) | 1 | 0.667 | 0.667 |
| ON-OS-OHG | 2 | 0.21 | 0.418 |
| Continental Northwest Gmc (CNWGmc) | 1 | 0.191 | 0.191 |
| ON-GO-OHG | 1 | 0.033 | 0.033 |

Recall from Section 1.3 that a cladistic approach to Gmc subgrouping only reveals a portion of these subgroups. Assuming these results are indeed the most realistic subgroupings and do reflect the true pattern of isoglosses within Gmc, then seven subgroups are revealed through HG that the cladistic approach overlooks (cf. Figure 2).

It is immediately clear that the primary subgroups tend to be concentrated at the top of the table. This is little surprise, since they are supported by many more innovations and reflect speech networks that were tightly geographically contiguous. Teuto-Saxon breaks the mold in that it is supported by many innovations, but crosscuts the established division between northern and southern WGmc.

As it turns out, no Gmc subgroup is 100 percent tree-like. That is, no subgroups are defined by a history of entirely exclusive developments. This is reflected in the assortment of cohesiveness values. The lowest cohesiveness rate is observable in the potential ON-GO-OHG subgroup, at 3.3 percent. AF claimes the highest apparent cohesiveness rate with a result of 98.5 percent.

Since the Gmc language family is one of the best-studied language families, and written documents in these languages has allowed for a wealth of information on their developmental histories, it is no surprise that a few subgroups, such as WGmc and Ingv, return particularly high subgroupiness scores in comparison to the range of scores produced by François (2014) and François and Kalyan (forthcoming) in their treatments of the Torres-Banks languages of Vanuatu. In their studies, the 15 highest subgroupiness scores (cf. Table 4 below) range quite evenly from 2.37 to 12.82. The results in Table 3 are similar in showing several small subgroups in addition to large ones, but different in that the range of scores is not as gradual, instead jumping several points between most subgroups (e.g. from 1.61 (NNWGmc) to 8.87 (AF)). This is likely also due to the fact that many more languages were surveyed in their approach (17 total), which allows for a greater variety of possible patterns of isogloss distributions. Additionally, François and Kalyan were entirely unconcerned with the possibility of parallel innovations, instead freely assuming any identical innovations to be shared. This practice is perfectly acceptable in dealing with language families with poor written attestation, but the wealth of historical context and expert insight on the development of the Gmc family warrants a more cautious and conservative approach in this regard.

Table 4. The 15 Strongest Torres-Banks Subgroups (François and Kalyan forthcoming)

| **Subgroup** | ς |
|---|---|
| Volow–Mwotlap | 12.82 |
| Hiw–LoToga | 12.45 |
| Vurës–Mwesen | 9.34 |
| Lemerig–Vera'a | 6.78 |
| Koro–Olrat–Lakon | 6.63 |
| Dorig–Koro–Olrat–Lakon | 6.01 |
| Olrat–Lakon | 5.34 |
| Lehali–Löyöp–Mwotlap–Volow | 5.22 |
| 15 Banks languages (LHI → LKN) | 3.92 |
| Dorig–Koro | 3.90 |
| Löyöp–Volow–Mwotlap | 3.64 |
| Lehali–Löyöp | 3.53 |
| Hiw–LoToga–Lehali | 3.43 |
| southern Banks (Mwerlap + Gaua) | 2.99 |
| Dorig–Mwerlap | 2.37 |

The larger subgroups that are revealed generally seem to align with the historical outline that characterizes the history of the Germanic tribes during this period[8]. The same seems to hold for the smaller subgroups as well, but with subgroups that exhibit a subgroupiness of less than 1, it is difficult to say whether the historical record explicitly supports them independently. There is no reason, for example, to discredit a subgroup like ON-OS-OHG according to the geographical evidence, which is much more plausible than an 'Anglo-Gothic' subgroup. Harmonizng with this fact is the observation that identical innovations between OE and GO, even though they are certainly parallel, appear much less often in the data than identical innovations between most geographically neighboring languages. And of course, the historical records show no evidence of contact

[8] A detailed overview of the history and archeological record of the Germanic peoples is beyond the scope of this study, but works like Todd 1992 are indispensable resources on the topic.

between Goths and Anglo-Saxons during this period. In the case of subgroups such as OFr-OS-OHG, the probable scenario that WGmc was for some time a single language lends credit to the scenario that communication between the remaining WGmc speakers on mainland Europe was still possible to the degree that at least one development could be shared after the early dissolution of WGmc. The presence of a CNWGmc development similarly suggests the possibility of some degree of mutual intelligibility of the NWGmc dialects after the departure of OE.

The diagram in Figure 6 below depicts the subgroups listed above in the form of waves, where thicker lines represent higher subgroupiness. Note the similarity of subgroup waves to the distributions of isoglosses and isogloss bundles in dialectology.

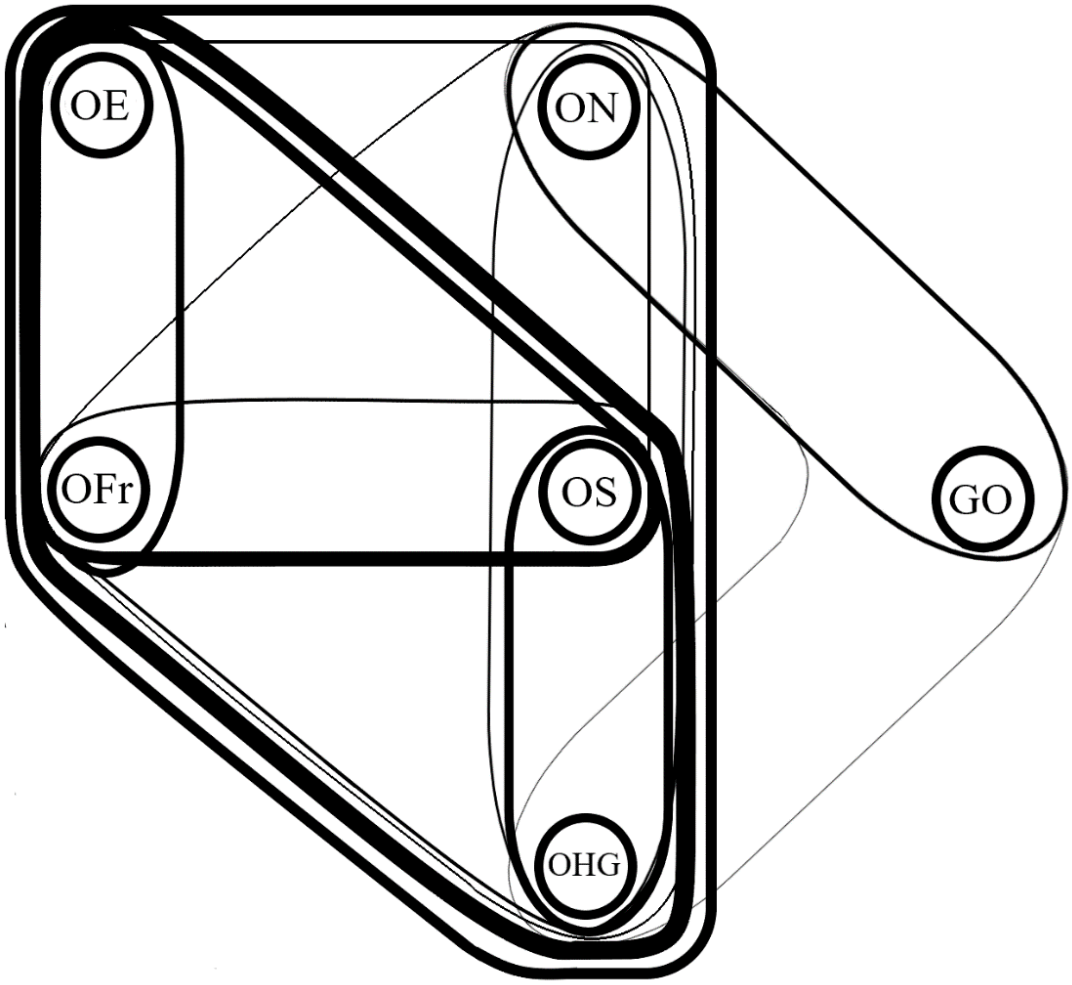


Figure 6. A glottometric diagram of Germanic

# 4 CONCLUSION

It has been demonstrated in the preceding chapter that the development of the Germanic (sub)family is characterized by a significant amount of conflation across subgroups. While it features no shortage of exclusive, tree-like innovations, there has also been no shortage of wave-like developments throughout the history of its diversification. Several small subgroups have been revealed which are overlooked in the traditional cladistic approach. In particular, seven small subgroups which deviate from the arrangement outlined in the traditional Germanic Stammbaum in Figure 2 have been revealed. These include a 'Continental Northwest Germanic' subgroup, a 'Northern Northwest Germanic' subgroup, a 'Northeast Germanic Subgroup,' a 'Central Germanic' subgroup, and several others (cf. Table 3).

While HG is a novel subgrouping approach, it has been shown in Section 3.3 that subgroupiness scores can vary dramatically. In this thesis, the most 'subgroupy' of the subgroups detected was by far WGmc at $\varsigma = 57.6$. The next highest score was Ingv at $\varsigma = 23.73$, and after that was NWGmc at $\varsigma = 18.12$. Next, the existence of a Teuto-Saxon (OHG-OS) subgroup, and an AF subgroup, were supported with scores of $\varsigma = 9.79$ and $\varsigma = 8.87$ respectively. After these, subgroupiness values take an apparent dip, with the next highest value belonging to NNWGmc at only $\varsigma = 1.61$. The three highest Gmc subgroupiness scores greatly outscore the highest subgroupiness score of François and Kalyan (forthcoming), the title of which goes to the Volow-Mwotlap subgroup at only $\varsigma = 12.82$ (cf. Table 4). Considering the sheer abundance of research that has been undertaken on the development of the Gmc languages over the course of the last few

centuries, in addition to the fact that Gmc languages have a long history of written attestation, it is no surprise that such a high result is returned for WGmc. There are also fewer languages involved in the Gmc situation than there are in the Torres-Banks network. It will be interesting to see how all of these results compare to those of other language families as more linguistic subgroupings are performed using HG.

The present study has therefore addressed the non-cladistic developments of the early Germanic varieties with a reasonable degree of confidence by using HG to take into consideration the reality of areal diffusion. In addition, the identification of non-cladistic developments by previous scholars of Germanic linguistics has been particularly helpful in achieving this. By accounting for the distribution of each and every innovation that is observable throughout early Germanic, and by accommodating crosscutting developments, HG has proven itself a powerful method for linguistic subgrouping. A cladistic approach to subgrouping, given the database used here, would undoubtedly have inaccurately dismissed several identical developments as merely parallel innovations, whereas HG has handled all conflicting developments unproblematically.

Finally, it could be that the precision of the glottometric account of the attested languages could benefit from further attention from other scholars, since there is more direct evidence to be combed through (certainly there is more work to be done on the internal variation of the daughters). Whatever the true number of innovations defining the early attested daughters amounts to, the objective of the present approach has been sufficiently achieved by accounting for the alternate subgroups of early Germanic; the

importance of precision begins to diminish as the languages develop independently and their speech communities become more exclusive.

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# APPENDIX A: NORTHWEST GERMANIC DEVELOPMENTS

## *A.1 Northwest Germanic Phonological Innovations*

### *A.1.1 *ē > *ā/ [+stress].*

PGmc **ē* was lowered and backed to PNWGmc **ā* within fully stressed syllables. It is evident in many words, including past stems of class IV and V strong verbs (Ringe and Taylor 2014:10-13):

PGmc **slēpaną* 'to sleep' > PNWGmc **slāpaną*; (cf. GO *slepan*)

PGmc **sēgun* 'they saw' > PNWGmc **sāgun*; (cf. GO *sehʋun*)

PGmc **kʷēmun* 'they came' > PNWGmc **kʷāmun*; (cf. GO *qemun*)

This sound change was subject to i-umlaut in several later NWGmc languages. It is a strongly attested NWGmc sound change.

$\{\Delta\varepsilon_{NWGmc} = 1\}$

### *A.1.2 *-ī > *-i / _#.*

Long, word-final PGmc **-ī* merged with short, word-final **-i* in PNWGmc. The evidence is best in the small class of fem. nouns in WGmc which take the form **-usi*, **-isi* (< PGmc **-Vsī*; Ringe 2002:138, 152), and there is probable evidence in the derivation OE fem. nouns:

OE *bliss* 'happiness' < *blīþs* < PNWGmc **blīþisi* (PWGmc **-isi* < PGmc **-isī*)

OE (Merc.) *æces*, OS *acus*, OHG *achus* 'ax' (< PWGmc **akusi* < PGmc **akʷisī*)

OE *bend* ‘fetter’ < **bœndi* < **bąndi* < PWGmc **bandi* < PGmc **bandī* (cf. GO *bandi*, where the final vowel would not have survived had it not originally been long; Ringe and Taylor 2014:14)

ON *vil* ‘(s)he wants’ < **wili* < PGmc **wilī* (same note as the GO example above)

The third (OE) example, however, is not airtight, as there is no guarantee that the nom. sg. ending was not replaced by **-iju* (based off of acc. sg. **-ijǭ*) which later would have been lost in OE, or that it was replaced by short i-stem **-iz*, which is apparently what happened in ON (where the nom. sg. ending has been replaced by *-r* (< PGmc **-iz*; Noreen 1923:264-5)). More confusing, but helpful in proving the likelihood of this change as a PNWGmc innovation, is the fact that the loss of the PGmc endings **-z*, **-az*, and **-ą* in PWGmc produced resulting developments of long **-ī* during the same time that the **-ī* > **-i* change would have been happening. Examples include instances like the OE *bend* example above (Ringe and Taylor 2014:15):

| PGmc | | PWGmc | | OE | OHG |
|---|---|---|---|---|---|
| **bandī* | > | **bandi* | > | *bend* | -- |
| **gastīz* | > | **gastī* | > | *[ġiestas]* | *gesti* |
| **andijaz* | > | **andī* | > | *ende* | *enti* |

The **-ī* that results from the loss of the endings **-z*, **-az*, and **-ą* does not shorten, suggesting that the original shortening of **-ī* was either an early PWGmc change, or a PNWGmc change, and the accompanying ON evidence points in favor of the latter. $\{\Delta\varepsilon_{NWGmc} = 1\}$

*A.1.3 *-ō > *-u/ [-stress] _#.*

This is a regular sound change identified as the shortening of PGmc word-final non-nasalized long **-ō* to short PNWGmc **-u* in unstressed syllables. Examples amongst the inflectional endings are plentiful (Ringe and Taylor 2014:15):

OS *dagu*, OHG *tagu* 'day (a-stem inst. sg.)' (< PNWGmc **dagu* < PGmc **dagō*)

ON *gjǫf*, OE *ġiefu* 'gift (ō-stem nom. sg.)' (< PNWGmc **gebu* < PGmc **gebō*)

ON *grǫs*, OE *grasu* 'grass (a-stem nom./acc. pl.)' (< PNWGmc **grasu* < PGmc **grasō*)

OHG *lant*, ON *lǫnd*, OE *land* 'lands (nom./acc. pl.)' (< PNWGmc **landu* < PGmc **landō*)

ON *kom*, OE Angl. *cumu*, OS *kumu*, OHG *quimu* 'I come' (< PNWGmc **$k^w$emu* < PGmc **$k^w$emō*)

The change likely played out as **-ō > *-ū > *-u*, since it allows for the positing of a more regular and economical shortening rule for word-final long vowels (i.e., **-ū > *-u* and **-ī > *-i*).

$\{\Delta\varepsilon_{NWGmc} = 1\}$

*A.1.4 *-wū > *-u*

This sound change is a clear consequence of the one described immediately above. **w* was dropped between a consonant and unstressed **-u* (Ringe and Taylor 2014:16-17):

OE *searu, searwes* (gen. sg.), *searu* (nom. pl.) 'artifice, armor,' OHG *saro* 'armor, gear' < PNWGmc **sarwą, *saru* (nom. pl.) < PGmc **sarwą, *sarwō* (nom. pl.) 'device, tool, weapon' (cf. GO *sarwa* 'armor (pl.)')

ON *bǫð*, *bǫðvar* (gen. sg.), OE *beadu*, *beadwe* (obl.) < PNWGmc **badu*, **badwō-* < $\{\Delta\varepsilon_{NWGmc} = 1\}$

*A.1.5 *a > *u/ _*m*

Unstressed **a* merged with **u* immediately before **m*. It covers all of PNWGmc, as well as possibly some of GO:

ON *dǫgum*, OE *dagum*, OS *dagun*, OHG *tagum*/*-un* 'days (dat./inst. pl.) < PNWGmc **dagumaz/-iz* < PGmc **dagamaz/-iz*; (cf. GO *dagam*)

ON *berum*, OHG *berumēs* 'we carry' < PNWGmc **berumaz* < PGmc **beramaz*; (cf. GO *baíram*)

GO *ainummehun* 'any, anyone (dat. sg.),' but *ƕammeh* 'each one (dat. sg.),' *ƕarjammeh* 'to everyone,' *ƕaþarammeh* 'to each (of the two)' *ainƕarjammeh* 'to each, to everyone,' etc.)

Whether or not this change happened before the PGmc merger of PIE **a*, **o* > PGmc **a* is debated (cf. Ringe and Taylor 2014:17). Regarding the GO evidence, it is only in the neut. dat. sg. example above that this innovation is attested in GO. It is unclear if this represents a shared innovation or a parallel one.

$\{\Delta p_{NWGmc}\} \vee \{\Delta\varepsilon_{NWGmc} = 1, \Delta\varepsilon_{GO} = 1\}$

*A.1.6 *a > *i / [-stress] _ n*

It is not entirely clear if this is even a regular sound change, or just a minimally distributed irregular sound change that only affected a few words (Ringe and Taylor 2014:18-20):

Early Runic *minino* ‘my (acc. sg. masc.)’ < PGmc **mīnanǭ*; (cf. GO *meinana*; Krause 1971:108, 152)

OE Angl. *enne* ‘one (acc. sg. masc.)’ < *ænne* < *ǣnne* < **ānne* < PGmc **ainanǭ*; (cf. GO *ainana*)

Since the PNWGmc change of unstressed **-am-* to **-um-* seemed to affect GO to some extent, the masc. acc. sg. inflection of ‘one’ might provide insight on the **-an-* to **-in-* situation, but it turns out to be the syncopated reflex *ainnohun* (Ringe and Taylor 2014). Though it is unfortunate that the vowel of interest is syncopated, this might serve as grounds for an argument that the innovation affected GO as well; the combined facts that it seems to have been syncopated in the OE example above, plus the consideration that it would be phonetically plausible to syncopate a front high vowel between sounds where the tongue position is also high lend credit to the possibility that GO also partly shared this innovation. Complicating the situation further are a series of freely alternating preforms, both within and across languages:

OE *āgen*, OS *ēgan*, OHG *eigan* ‘own, property (neut.)’ < **aiganaz*, **aiganą*, but ON *eiginn*, OE *ǣġen*, OHG *eigin* ‘own’

These alternations are reliably traced back to PGmc, suggesting that the alternation first arose from some type of pre-PGmc alternation of ablauting suffixes. The question,

then, is: does this alternation between *-*ana*- and *-*ina*- have anything to do with the masc. acc. sg.? The short answer is that it is too complicated to tell with any confidence, and further study of this situation is necessary. Since we are not faced with any blaring evidence against **a > *i / [-stress] _n* as a crosscutting PNWGmc + GO (i.e., Gmc) innovation, we can at least reasonably entertain the possibility.

$\{\Delta p_{NWGmc}\} \vee \{\Delta \varepsilon_{NWGmc} = 1, \Delta \varepsilon_{GO} = 1\}$

*A.1.7 *ai > *ē*

The monophthongization of unstressed **ai* as a long mid vowel **ē* is reflected throughout the post-PNWGmc dialect continuum:

OE *hātte* 'was called' < PWGmc **haittē* < **haitadē* (cf. GO *haitada,* note that the GO reflex of final **ai* is -*a*) < PGmc **haitadai* 'was called (3sg. past. pass.)'

OHG *guotēm* 'good (dat. pl.)' < **gōdēmaz* (cf. GO *godaim*) < PGmc strong adj. **gōdaimaz* 'good (dat. pl.)'

ON *degi*, OE *dæġe*, OS *dage*, OHG *tage* 'day' < **dagē* (cf. GO *daga*) < PGmc a-stem **dagai* 'day (dat. sg.)'

The attested ending -*az* (> ON -*ar*), which comes from PGmc **-aiz* (Krause 1971:118, 175) suggests that the ending survived into ON without merging with **ē*. Also, the Early Runic 3sg. past *talgidai* 'engraved' exhibits -*ai*. Though it is suspected that <*ai*> is an inverse spelling reflecting the already merged **ē*, it is thought that it would have to imply that the merger was relatively recent, namely of a post-PNWGmc date,

though it is possible that it started during PNWGmc, reaching completion after the split (Ringe and Taylor 2014:25-7).

In addition, the examples above show that GO exhibits word-final <*a*> where other NWGmc dialects have merged to **-ē*. Ringe and Taylor (2014) note that the reflex in *-a* probably implies a preceding change to **-ē*. It is possible, therefore, that this represents a shared development with GO, whereas GO later continued to innovate **-ē* to *-a*. This is not an uncommon change, so it could very well count as a (parallel) exclusively shared innovation $\varepsilon$ in GO[9]. At any rate, as far as NWGmc is concerned, this may be a post-PNWGmc innovation that is shared by GO.

$\{\Delta p_{NWGmc} = 1\} \vee \{\Delta \varepsilon_{NWGmc} = 1, \Delta \varepsilon_{GO} = 1\}$

### *A.1.8 *u > *[o]/ ]$_\sigma$ [-high]*

There was a lowering of **u* to **[o]* in stressed syllables, when the following syllable featured a non-high vowel, provided that there was no nasal or **j* in the coda to intervene (Ringe and Taylor 2014:27).

ON *hodd*, OE, OS *hord*, OHG *hort* (cf. GO *huzd*) < PGmc **huzdą* 'treasure'

ON *dóttir*, OE *dohtor*, OFr *dochter*, OS *dohtar*, OHG *tohter* (cf. GO *daúhtar*) < PGmc **duhtēr* 'daughter'

ON *opinn*, OE, OFr *open*, OS *opan*, OHG *offan* < PGmc **upanaz* 'open'

[9] Potentially supporting this is the fact that **ai* is known to have monophthongized universally throughout GO, not just in unstressed syllables. A similar universal monophthongization of **au* in GO also helps to support this.

ON *broð-gýgir* ‘broth-cooks,’ OE *broþ*, OHG *brod* < PGmc **bruþą* ‘broth’

ON *goð ~ guð*, OE, OFr, OS *god*, OHG *got* < PGmc **gudą* ‘god’

In the NWGmc area, stressed **u* was lowered unless it was followed by a nasal in the syllable coda, or if the next vowel/glide was high and front, or if the next vowel was **u*:

ON, OS, OHG *sunna*, OE, OFr *sunne* < PGmc **sunnōn-* ‘sun’

ON *kyn*, OE *cynn*, OFr *ken*, OS, OHG *kunni* < PGmc **kunją* ‘lineage’

ON *hulpu*, OE, OFr *hulpon*, OS *hulpun*, OHG *hulfun* < PGmc **hulpun* ‘they helped’

In sum, the full details of this sound change are very extensive, but what is important is that there was a post-PNWGmc lowering of **u* to **o* which varied regarding its exact extent and environmental constraints.

$\{\Delta\varepsilon_{NWGmc} = 1\}$

### *A.1.9* $*\bar{o} > *\bar{u} \,/\, \_\,[_{\sigma}$

The raising of **ō* to **ū* in unstressed non-final syllables is most clearly observed before **n* in fem. n-stems in ON and WGmc (ON *tungu*, OS *tungun*, OHG *zungūn* ‘tongue’). There is, however, evidence of feminine names in *-on* in Early Runic (Krause 1971:119), suggesting that this innovation covered the post-PNWGmc dialects excluding OE. Most examples involve an adjacent syllable in **-ū-* (e.g., **-ōCū-*), the potential influence of which on the raising of **ō* is highly plausible (Ringe and Taylor 2014).

$\{\Delta\varepsilon_{CNWGmc} = 1\}$[10]

[10] Where CNWGmc refers to an early *Continental NWGmc* dialect network.

*A.1.10 *$V_1V_2$ > *$\bar{V}_3$*

Unstressed diphthongs were monophthongized to long mid vowels:

OE, OFr *suna* 'son's (gen. sg.)' < **sunā* < **sunō* < PWGmc **sunau* < PGmc **sunawz*

A similar change of unstressed **au* > *o* also happened in NGmc (Early Runic *magoz* 'son's,' cf. appx. E.1.15; Krause 1971). Though this could be a parallel innovation, it is worth considering the possibility that it is shared.

$\{\Delta\varepsilon_{WGmc} = 1, \Delta\varepsilon_{ON} = 1\} \vee \{\Delta\varepsilon_{NWGmc} = 1\}$

*A.1.11 *$k^w$ > *kw*

Labiovelars became a sequence of a velar + **w* in PWGmc.

PGmc **$k^w$ik$^w$az* 'alive' > **kwikwaz*, **kwikwa-* > PWGmc **kwi/eku*, **kwi/ek(k)wa-* > OE *cwic ~ cucu*, OS *quik*, OHG *queh ~ quek*; (cf. ON *kvikr*; Ringe and Taylor 2014)

A similar change happened in ON. It is not entirely clear if this represents a shared innovation or a parallel one. In the former case, it would have to have been a late, post-PNWGmc innovation.

$\{\Delta\varepsilon_{NWGmc} = 1\} \vee \{\Delta\varepsilon_{WGmc} = 1, \Delta\varepsilon_{ON} = 1\}$

*A.1.12 *kw > *kkw*

PGmc **þekuz*, **þik$^w$ī* 'thick' > **þekuz*, **þikkwī* > PWGmc **þikkwī* > OE *þicce*, OS *thikki*, OHG *dick(i)* 'thick,' OFr *thiukke* ('extent')

ON underwent a similar change here as well (e.g., *þjokkr ~ þykkr*). As with the **$k^w$* > **kw* change above, it is unclear as to whether it represents a parallel innovation or a

shared post-PNWGmc one. Word-finally, velars were lost across the board amongst the attested languages, but this is likely a series of parallel sound changes. Note also that the vel. + **w* sequence usually survived in word-initial position (e.g., PGmc **hʷes* 'whose?' (cf. GO *ƕis*, ON *hvess*) > PWGmc **hwes* > OS *hwes*, OHG *wes*).

$\{\Delta\varepsilon_{NWGmc} = 1\} \vee \{\Delta\varepsilon_{WGmc} = 1, \Delta\varepsilon_{ON} = 1\}$

## *A.2 Northwest Germanic Morphological Innovations*

### *A.2.1 dual > Ø; 3 imp. > Ø; pres. pass. > Ø*

The development of PNWGmc involved much loss of morphological categories preserved in GO. Amongst these innovations are the loss of the dual verb forms, the loss of the third person imperative, and the loss of present passive forms, with the exception of **haitaną* 'to call, name' (> PNWGmc **haitē* 'I am called'; Ringe and Taylor 2014:21).

$\{\Delta\varepsilon_{NWGmc} = 3\}$

### *A.2.2 *-miz, *-maz > *-maz*

There was apparently a sweeping syncretism of the dat. pl. **-maz* and the inst. pl. **-miz*. Ringe and Taylor (2014:21) note that phonological developments may have encouraged the syncretism, but it cannot be said that that is what made it possible, since there is plenty of evidence of syncretism between categories that are not phonologically identical.

$\{\Delta\varepsilon_{NWGmc} = 1\}$

### *A.2.3 *-aiz- > *-ez-*

The strong adjective ending sequence PNWGmc *-*aiz*- monophthongized to *-*ez*-. Consider the following examples (Ringe and Taylor 2014:22-3):

ON -*rar*, OE -*re*, OHG -*era* (but GO -*aizos*), 'gen. sg. fem.' < PNWGmc *-*ezōz* < PGmc *-*aizōz*

ON -*ri*, OE -*re*, OHG -*eru* (but GO -*ai*[11]), 'dat. sg. fem.' < PNWGmc *-*ezôi* < PGmc *-*aizôi*

Though unstressed **ai* was usually monophthongized to **ē*, it is not necessary to posit **ai* > **ē* > *e* as the change responsible for this pattern, because shortening **ē* alone amongst the long vowels is unlikely. More likely is a remodeling of the sequence with third person pronouns as the primary basis (**ezōz*, **ezôi*, **ezǭ*). There are no other explanations, since the inherited unstressed PIE **e* had been raised to **i* by PGmc, except before **r* (Ringe and Taylor 2014:23).

$\{\Delta\varepsilon_{NWGmc} = 1\}$

### *A.2.4 *-ded-, *-d- > *-d-*

PNWGmc has extended the weak past suffix *-*d*- to cover the entire paradigm of past tenses, where GO has preserved the use of *-*d*- in the indicative singular and *-*ded*-

[11] Cf. appx. B.2.7 for the loss of *-z- here.

everywhere else. Ringe and Taylor (2014:23) give the paradigm of the verb ‘filled’ as an example:

| | | GO | ON | OE | OS | OHG |
|---|---|---|---|---|---|---|
| indic. | 1pl. | *fullidedum* | *fyldum* | -- | -- | *fultum* |
| | 2pl. | *fullideduþ* | *fylduð* | -- | -- | *fultut* |
| | 3pl. | *fullidedun* | *fyldu* | *fyldon* | *fuldun* | *fultun* |
| | subj. | *fullidedei-* | *fyldi-* | *fylde-* | *fuldi-* | *fultī-* |

It could also possibly be that GO is actually the innovative paradigm. We therefore have a potential innovation, the status of which may affect the value for $\varepsilon$ in GO, since if this does not count as a point towards $\varepsilon$ here, it would instead count towards $\varepsilon$ for GO.

$\{\Delta\varepsilon_{NWGmc} = 1\} \vee \{\Delta\varepsilon_{GO} = 1\}$

### *A.2.5 voc. > Ø*

The vocative was merged with the nominative throughout NWGmc, but there is Early Runic evidence of it (Krause 1971:116, 118), possibly suggesting that that might have been a post-PNWGmc change. Otherwise it is difficult to pinpoint. Here I assume it to be a NWGmc innovation.

$\{\Delta\varepsilon_{NWGmc} = 1\}$

*A.2.6 *-um(m)ē, *-ēm, etc. > *-um*

The dat./inst. pl. a-stem ending *-*um* was levelled to other noun classes, and extended to the strong adj. masc./neut. dat. sg. (replacing *-*um(m)ē),* as well as the strong adj. dat./inst. pl. (replacing **-ēm*). This change affected ON and northern WGmc, whereas OHG at least retained *-*ēm*.

$\{\Delta\varepsilon_{NNWGmc} = 1, \Delta\varepsilon_{NWGmc} = 1\}$[12]

*A.2.7 *-ū-*

The northern NWGmc languages show class II strong verbs in **ū* where OHG and GO show **eu*. It is likely a remodeling of a root vowel probably originally in **eu* (Ringe and Taylor 2014:39). Its restriction to strong class II verbs suggests that instances of it reflect the same psychological innovation, which spread only throughout northern NWGmc. The other, more unlikely scenario is that the forms in **eu* are an OHG-GO innovation.

OE *būgan* 'to bend' (cf. OHG *biogan*) < PNWGmc **būgan* < PGmc **beuganą*

$\{\Delta\varepsilon_{NNWGmc} = 1\} \vee \{\Delta\varepsilon_{OHG\text{-}GO} = 1\}$

*A.2.8 -u(-)*

Endings in *-u(-)* appear throughout fem. and neut. n-stems in ON and WGmc (e.g., *tungu* (obl. sg.), *tungur* (nom./acc. pl.), *tungum* (dat. pl.) 'tongue'). Ringe and Taylor

[12] Where NNWGmc refers to an early *Northern NWGmc* dialect network

(2014:62) note that it is thinkable that the appearance of the ending was shared, but its spread throughout their respective paradigms was not.

$\{\Delta\varepsilon_{NWGmc} = 1\}$

## *A.3 Northwest Germanic Lexical Innovations*

### *A.3.1 *þrij- > *þrijō, * þrijǭ*

It is possible that during the PNWGmc period, there was a development of a distinctive nom. fem. and acc. fem. for the word 'three' by simply adding those regular endings to the stem **þrij-*. However, there may be evidence from OHG that this was possibly a later parallel innovation (cf. appx. F.3.8; Ringe and Taylor 2014:24).

$\{\Delta\varepsilon_{OHG} = 1, \Delta\varepsilon_{OE} = 1, \Delta\varepsilon_{ON} = 1\} \vee \{\Delta\varepsilon_{NWGmc} = 1\}$

### *A.3.2 *tigiwiz*

The NWGmc languages show reflexes of **tigwiz* phrased with numerals to yield the meaning of the suffix '-ty' (e.g 'twen*ty*'). This replaced an earlier PGmc innovation of **-tēhund-* that spread to a few numerals, and which GO has preserved and even extended to 'ten' to yield 'one hundred' (cf. appx. B.3.22) The spread of **tigwiz* must therefore have been a post-PGmc innovation (Ringe 2006:206).

$\{\Delta\varepsilon_{NWGmc} = 1\}$

### *A.3.3 *h$^{w}$ī*

While GO solidly attests only an inst. sg. of 'who/what' in **h$^{w}$e*, the NWGmc languages show an alternative **h$^{w}$ī* (Ringe 2006:290), a possible NWGmc lexical innovation.

PNWGmc? **h$^{w}$ī* > OE *hwȳ*, ON *hví*, OHG *(h)wiu* (?)

{$\Delta\varepsilon_{NWGmc} = 1$}

### *A.3.4 *hir > *hēr*

This lengthening and lowering of the vowel in the word 'here' occurred only in certain NWGmc dialects, suggesting it is of a post-PNWGmc date. Consider the following distributions:

ON *hér*, OE, OS *hēr*, OHG *hiar*, but OFr, OS *hīr*

This innovation is posited by Ringe and Taylor (2014:36), who suggest that the lengthening alone was a post-PNWGmc innovation, but that the lowering was a partially crosscutting innovation including only a few NWGmc dialects. Others have attributed the vowel in this word (and a small group of others) to inherited **ē$_2$*, which was represented with a separate character in Early Runic. **ē$_2$* has been treated differently by different scholars: e.g., as **ī* (Krahe 1969); as **ēi* (Voyles and Barrack 2009:60), etc. If it represents a separate phoneme, then this innovation would not have happened as titled, but it would instead be a merger of PGmc **ē$_2$* > PNWGmc **ē*, whereas PGmc **ē$_1$* generally became PNWGmc **ā* (cf. appx. A.1.1). The presence of lowering in OE but not OFr is unusual, but perhaps might be explained by the possibility that OE *hēr* actually

comes from **he-* ‘this’ + **r* (Grønvik 1981; Ringe and Taylor 2014), meaning this is an ON-OS-OHG change.

$\{\Delta\varepsilon_{NWGmc} = 1, \Delta\varepsilon_{ON\text{-}OS\text{-}OHG} = 1\}$

### *A.3.5 *jūz, *jūt > *jīz, *jīt*

The second person non-singulars (plural and dual) **jūz* ‘you (pl.)’ and **jūt* ‘you (du.)’ were changed to **jīz* and **jīt* on the basis of the corresponding first person forms: **wīz* ‘we’ and **wit* ‘we (du.)’:

ON *ér*, *it*, OE *ġē*, *ġit*, OS *gī ~ gē*, *git* < PNWGmc **jīz*, **jīt* < PGmc **jūz*, **jūt* (Ringe and Taylor 2014:23)

$\{\Delta\varepsilon_{NWGmc} = 1\}$

### *A.3.6 *uban-*

PNWGmc seems to have innovated a derivative of **uber* ‘over’ to create a new word **uban-* ‘above’ (< ON *ofan*, OS *oƀana*, *bioƀan*, OHG *obana*). GO lacks this reflex.

$\{\Delta\varepsilon_{NWGmc} = 1\}$

## *A.4 Northwest Germanic Syntactic Innovations*

### *A.4.1 Null subject*

While PGmc has long been assumed to be a null subject language (Grimm 1837; Paul 1919; Fertig 2000), it may be the case that PNWGmc innovated into what Walkden

(2014) refers to as a *partial null argument* language, which, as put by Holmberg (2009), "allow(s) null subjects but under more restricted conditions than consistent null-subject languages." The reader is referred to Walkden 2014:157-226 for a comprehensive discussion of the issue as it relates to Gmc subgrouping.

$\{\Delta\varepsilon_{NWGmc} = 1\}$

### *A.4.2 *h$^{w}$aþeraz*

According to Walkden (2014:154-5), questions formed using **h$^{w}$aþeraz* (cf. EN *whether*) in PGmc only allowed for a semantic reading of 'which (of two).' However, a shift to a second stage is characteristic of NWGmc: the dropping of one of the two options allows an utterance to be analyzed as a disjunctive (yes/no) question. Walkden provides an example of (a) and (b) below, where the shift characteristic of NWGmc is one from (a) to (b):

(a) *Tell me which you would prefer—that I walk, or that I cycle?*

(b) *Tell me which you would prefer—that I walk?*

$\{\Delta\varepsilon_{NWGmc} = 1\}$

APPENDIX B: GOTHIC DEVELOPMENTS

## *B.1 Gothic Phonological Innovations*

### *B.1.1 *V̂# > V̄; *V̄# > V; *V# > Ø*

In word-final position, there seems to have been a chain shift of vowel length in GO. PGmc word-final short vowels were deleted, word-final long vowels were shortened to regular short vowels, and word-final overlong vowels were shortened to regular long vowels (Ringe 2006:75).

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.1.2 *e, *i > i*

PGmc short **e* became universally raised to *i* in GO (Voyles 1968:740; Peters 2010), merging with inherited *i*:

GO *sigis* 'victory' < PGmc **segaz*

GO *bida* 'a prayer' < PGmc **bidō*

GO *giba* 'gift' < PGmc **gibō*

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.1.3 *$\bar{e}_1$, *$\bar{e}_2$ > *$\bar{e}_1$*

The vowel ***$\bar{e}_2$ only occurred in a few words, and it is only attested from evidence in the NWGmc languages, whereas GO seems to have merged it with regular long ***$\bar{e}_1$. Meanwhile, PNWGmc turned ***$\bar{e}_1$ it into ***$\bar{a}$:

PGmc *$h\bar{e}_2r$ ‘here’ > GO *hēr*, OHG *hiar*, OE *hēr*

PGmc *$sl\bar{e}_1pan\acute{q}$ > GO *slēpan* (<*slepan*>) (cf. PNWGmc *$sl\bar{a}pan\acute{q}$)

*$\bar{e}_2$ has been interpreted as several different segments by various specialists. Regardless of its original realization, there must have been a merger with $\bar{e}$ in GO.

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.4 *a > *u/_*m*

Probably partly shared with PNWGmc (cf. appx. A.1.5). In that case, it would be a point for $q_{GO}$. Recall that it is only in the neut. dat. sg. example above that this innovation is attested in GO.

$\{\Delta p_{NWGmc}\} \vee \{\Delta\varepsilon_{GO} = 1\}$

*B.1.5 *i, *u > [ɛ, ɔ] / _ /r, h, hʷ/*

The inherited vowels *i* and *u* in GO were subject to allophonic variation, whereby they were realized as *[ɛ]* and *[ɔ]* before the segments *r*, *h* or *hʷ* (< hu>; Voyles 1968:740).

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.6 *h (/x/) > /h/*

The PGmc phoneme */x/*, traditionally represented by **h*, likely became */h/* in GO (Moulton 1948; Voyles 1968:720). This would also affect the GO labialized phoneme /hʷ/ (< hu>), preserved from PGmc. It is probably an exclusive GO innovation, since,

according to Ringe and Taylor (2014), while it is possible that **h* was *[h]* word-initially in PWGmc, it was still *[x]* word-internally in that variety.

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.7 -ggw-, -ngw- > -/ngw/-*

Bennet (1964:22-5) claims that the sequence *-ggw-* merged with *-ngw-*, yielding the latter in all instances, but retaining its spelling of *-ggw-*. However, the evidence for this change is scant, so it is a highly uncertain sound change.

$\{0 \leq \Delta\varepsilon_{GO} \leq 1\}$

*B.1.8 *ē > a / [+stress] _*

PGmc **ē* became GO *a* in unstressed positions that immediately followed a stressed syllable (Voyles and Barrack 2009:59). The most notable examples are the r-stem kinship terms:

PGmc **brōþēr* 'brother' > GO *broþar*

PGmc **fadēr* 'father' > GO *fadar*

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.9 h > $C_\alpha$ / _ #$C_\alpha$*

*h > Ø*

In GO, the segment *h* (likely reflecting true /h/ and not /x/) could assimilate fully to any consonant across a word boundary (Voyles 1968:729):

GO *jah* ‘and’ + *þan* ‘then’ > *jaþþan*

In other instances, *h* could be simply deleted, such as before a word-internal consonant, before consonant clusters, and word-finally after stressed syllables (Voyles and Barrack 2009:60):

GO /*hiuma*/ ~ /*hiuhma*/ < *hiuhma* ‘crowd’

GO *waúrstw* ‘work’ < **worhstw* < PGmc **wurkijanǫ* ‘to work’

GO *ƕilaikuh ~ ƕilaiku* ‘what kind of’

A similar phenomenon exists within words in ON (e.g., *átta* ‘eight’), but the GO change seems only to have occurred across word boundaries, not within (e.g., GO *ahtau*). {$\Delta\varepsilon_{GO} = 1$}

*B.1.10 *ai > /ɛ/*

**au > /ɔ/*

PGmc diphthongs **ai* and **au* were monophthongized to */ɛ/* and */ɔ/* respectively. One piece of evidence for this change is that Wulfila uses <*aw*> to transcribe the Greek sequence <*aû*>, but uses <*au*> to transcribe the Greek letter <*ó*>. There are also alternations in native GO words like *wái* ‘woe,’ vs. *wajamerei* ‘bad reputation’ (Voyles 1968:720).

In word-final position, **-ai* became *-a* in GO (cf. *haitada* < PGmc **haitadē* ‘was called’). It was noted above that in unstressed positions, the PNWGmc shift of **ai* to **ē*

might be shared with GO (and that GO 1. further extended the monophthongization to stressed positions, and 2. further changed final unstressed *-*ai* to -*a* (cf. appx. A.1.7).

{$\Delta\varepsilon_{GO} = 2$}

*B.1.11 *z > s*

Whereas in the NWGmc languages the PGmc segment **z* underwent rhoticism to **r*, it seems for the most part to have been only devoiced to *s*. This usually occurred word-finally, but *s* appears in some non-final positions.

PGmc **laiziþi* 'teaches' > GO *laiseiþ*

PGmc **midjaz* 'middle' > GO *midjis*

{$\Delta\varepsilon_{GO} = 2$}

*B.1.12 *i > Ø / _ *jV*

**a > Ø / _z#*

A few changes observable in nominal endings interacted with each other. The syncope of **i* before the sequence of **j* plus a vowel worked in conjunction with word-final shortening of **ī* to *i*. These two innovations led to a merger of the original two results of Sievers' Law in Gmc (Ringe 2006:223), playing out as *-*Ciją* > *-*Cī* > *Ci*, and thus merging with *-*Cją* > *-*Ci*.

In the case of a change like *-*Cjaz* > *-*Ciz* > *-*Cis* > -*Cjis*, however, it appears that an earlier syncope of **a* before final *z triggered the above rule by creating an **i* (< **j*), which was then futher turned into **ji* via an analogical extension of *j* before *i* in GO. For

this reason, endings in *-*Cjaz* often appear as -*Cjis* (e.g., *midjis* 'middle' < PGmc **midjaz*).

$\{\Delta\varepsilon_{GO} = 2\}$

*B.1.13 *-(i)ji- > *-ī-*

The sequence *–(i)ji-* became monophthongized to *-ī-* (<*ei*>) following heavy syllables (i.e., ending in two consonants, or containing a long vowel/diphthong + coda consonant) or a sequence of two light syllables. It primarily affected inflectional morphemes:

GO *hairdeis* 'shepherd (gen. sg.)' < **hirdij* + *-is*

GO *mikileiþ* 'praises' < *mikilj* + *-iþ*

GO *harjis* 'army (gen. sg.)' < **harj* + *-is*

GO *nasjiþ* 'saves' < *nasj* + *-iþ*

Note that in the latter two examples the syllable is not heavy enough for the rule to take effect (Voyles and Barrack 2009:61). ON and GO exhibit **ī* for PGmc **iji* after heavy syllables (Ringe 2006:224), which means that this might be a partly shared innovation between NGmc and EGmc.

$\{\Delta\varepsilon_{NEGmc} = 1\}$[13] $\vee$ $\{\Delta\varepsilon_{ON} = 1, \Delta\varepsilon_{GO} = 1\}$

[13] Where *NEGmc* refers to a 'Northeast Germanic' network consisting of ON and GO.

*B.1.14 *-mz > -m*

In GO, the word-final sequence **-mz* was simplified to **-m*. This affected certain inflectional endings, namely the dat. pl. Voyles and Barrack (2009:61) describe the process as having involved a change from **-mz* > *-mm* > *-m*, but I see no reason not to regard the change as loss of **-z* rather than assimilation followed by simplification.

PGmc **dagamiz* 'day (dat. pl)' > **dagamz* > GO *dagam*

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.15 r/n > l*

The segments *r* and *n* both became *l* within words that contained a preceding *r* or *n* (Voyles and Barrack 2009:61). This therefore must have been a process of dissimilation.

GO *niuklahs* 'newly born' < PGmc **niuknahs*

GO *aúrali* 'handkerchief' < Lat. *orarium*

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.16 Thurneysen's Law*

This innovation, popularly known as Thurneysen's Law, is a rule that affects morphemes containing voiceless fricatives. It is relatively regular, but there exist exceptions. Essentially it is a dissimilation rule, whereby the fricatives *f, þ, h,* and *s* become voiced when the preceding consonant is voiceless. Consider the examples given by Voyles and Barrack (2009:62).

GO *fastubni* 'act of fasting' < *fast-* + *-ufni*

GO *auþida* ‘desert’ < *auþ-* + *-iþa* ‘(fem. nom. sg.)’ vs. *daubiþa* ‘deafness’ < *daub-* + *-iþa* ‘(fem. nom. sg.)’

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.17 ē, ō > /ɛ̄, ɔ̄/ / _ V*

The vowels *ē* and *ō* were lowered to */ɛ/* and */ɔ/* respectively apparently before any vowel.

GO *sēþs* ‘seed’ vs. *saian* ‘to sow’

GO *sauil /sɔ̄il/*, ult. < PGmc **sōwilō*

However, exceptions such as *lailoum* ‘ridiculed,’ which do not exhibit the lowering, suggest the rule became morphologically conditioned (Voyles 1968:727). The segments **ī* and **ū* apparently underwent the same change.

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.18 *-jj-, *-ww- > -ddj-/-ggj-, -ggw-*

This sound change, popularly known as Holtzmann’s Law or *Verschärfung*, is the best-known example of a possible shared innovation between GO and ON. This change may have happened during the unity of PNWGmc, so it represents a possible crosscutting innovation that affected all of GO as well as NGmc. Whether or not it was actually shared between the two dialects is a matter of debate amongst specialists.

$\{\Delta\varepsilon_{NEGmc} = 1\} \vee \{\Delta\varepsilon_{GO} = 1, \Delta\varepsilon_{ON} = 1\}$

*B.1.19 *-z > Ø / V r/s _*

In GO, word-final *-*z* was deleted after *r* or *s* (in turn preceded by a short vowel), probably due to assimilation considering the phonetic similarity of those sounds.

PGmc **weraz* 'man' > **werz* > GO *wair*

PGmc **anþeraz* 'other' > **anþarz* > GO *anþar*

Perhaps as part of the same innovation, the *z* became assimilated to *r* when immediately preceding (Voyles and Barrack 2009:64). This was obligatory for dependent morphemes but optional for adjacent words:

GO *ūrreisan* 'to arise' < *ūz-* + *reisan*

GO *ūr riqiza* ~ *ūz riqiza* 'out of darkness'

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.20 *fl- > þl-*

The initial sequence **fl-* became GO *þl-* in some instances, despite the fact that *fl-* still remains.

GO *þliuhan* (cf. OHG *fliohan*, OE *flēon*, ON *flýja*) < PGmc **fleuhaną* 'to flee'

GO *flōdus* (cf. OHG *flōt*, OE *flōd*, ON *flōð*) < PGmc **flōduz* 'flood' (Krause and Slocum)

$\{\Delta\varepsilon_{GO} = 1\}$

*B.1.21 *d (/ð/) > /d/ / r _*

It is unclear if the reflex of PGmc **d* was realized as a stop after **r*, but this seems to have been the case for GO. ON and WGmc, however, show **d* as a fricative in this environment (Ringe 2006:215). It is therefore not certain which is the innovative realization.

$\{\Delta\varepsilon_{GO} = 1\} \vee \{\Delta p_{NWGmc} = 1\}$

*B.1.22 *þ > t / _ s*

The GO second person dual ending *-ts* seems to reflect **-þs* < PGmc **-diz*. This shift of **þs* to *ts* is not attested elsewhere, but Ringe (2006:237) notes that it is possible that it did occur elsewhere, but was eliminated by paradigmatic levelling. ON shows an identical change in mediopassive suffixes, but it is likely unrelated, since 1. It affects a different suffix, and 2. it is probably a common sound change.

GO *nasjats* 'save (2du. pres.)' < pre-GO **nasjaþs* < PGmc **nazjaþiz*

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2 Gothic Morphological Innovations*

*B.2.1 -aiwa, -aima, -aina*

Very early in the pre-history of GO, the subjunctive 1du., 1pl., and 3pl. suffixes seem to have innovated a word-final long vowel, not reflected in any other daughter language (Ringe 2006:238):

PGmc **sōkijaiw* ‘seek (2du. subj.)’ > pre-GO **sōkijaiwā* > GO *sōkjaiwa*

PGmc **sōkijaim* ‘seek (1pl. subj.)’ > pre-GO **sōkijaimā* > GO *sōkjaima*

PGmc * *sōkijain* ‘seek (3pl. subj.)’ > pre-GO **sōkijainā* > GO *sōkjaina*

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.2.2 Ø > j / _ i*

As mentioned, it seems that an earlier syncope of **a* in sequences like **-Cjaz* led to the creation of an **i* (< **j*), which was then futher turned into **ji* through an analogical extension of *j* before *i* in GO. For this reason, endings in **-Cjaz* often appear as *-Cjis* (e.g., *midjis* ‘middle’ < PGmc **midjaz*).

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.2.3 *-n-*

In the class IV weak verbs, GO appears to have innovated the present stem suffix **-n-* plus the usual thematic vowel. The NWGmc data, however, suggests that this was not the original stem suffix, but that it would have been PGmc **-nō- ~ *-na-* (Ringe 2006:259). Consider the present of the verb ‘to become lost’:

PGmc **fraluznō- ~ *fraluzna-* ‘to become lost,’ **fraluznōsi* (2sg.), **fraluznōþi* (3sg.), **fraluznaþiz* (2du.), etc. > GO *fralusnis*, *fralusniþ*, *fralusnats*

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.4 sijai-*

In GO, the subjunctive singular stem **sijē-* of the verb 'to be' was first remodeled as *sijai-*, then was further levelled into the dual and plural subjunctives (Ringe 2006:262):

| | | | |
|---|---|---|---|
| PGmc | **sijēs* (2sg. subj.) | > | GO *sijais* |
| | **sijē* (3sg. subj.) | > | *sijai* |
| | **sīw* (1du. subj.) | > | *sijaiwa* |
| | **sīm* (1pl. subj.) | > | *sijaima* |

$\{\Delta\varepsilon_{GO} = 2\}$

*B.2.5 siju-*

GO seems to have replaced the present non-singular stems (except the 3pl.) of indicative 'to be' with the subjunctive stem *siju-* (Ringe 2006:195):

| | | | |
|---|---|---|---|
| PGmc | **izum* (1pl. indic.) | > | GO *sijum* |
| | **izud* (2pl. indic.) | > | *sijuþ* |
| | **izū* (1du.) | > | *siju* |
| | **izudiz* (2du.) | > | *sijuts* |

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.6 -uh > -h*

*V > Ø / _-uh/-ei*

There was a pattern of vowel deletion involving some clitics. The two clitics *-uh* 'and' and *-ei* '(subord. clause marker)' in particular were subject to a morphologically

conditioned rule in GO. The first part of the rule affected only *-uh*: it became *-h* after a long or stressed vowel. The second part, applying to both clitics, deleted short vowels that preceded the clitics. For example (Voyles and Barrack 2009:63):

GO *þizēh* 'these (gen. pl.)' < *þizē* + *-uh*

GO *sah* 'this (nom. sg. masc.)' < *sa* + *-uh*

GO *þatuh* 'this (nom. sg. neut.)' < *þata* + *-uh*

GO *þanei* 'this (acc. sg. masc.)' < *þana* + *-ei*

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.7 *-aiz- > -ai*

GO shows a loss of **z* in the PGmc dat. sg. fem. ending **-aizôi-* (Ringe 2014:22).

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.8 *-r-iz > -r-jus*

The remodeling of the nom. pl. ending of the r-stems (Ringe 2006:276).

GO *fadrjus* 'fathers' < PGmc **fadriz*

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.9 -a, -o, -o*

Within the n-stems, GO has probably levelled in the masc. nom. sg. ending *-a* from the acc. sg. *-an* and the nom./acc. pl. *-ans*. The fem. *-o* could have been levelled in from

acc. sg. *-on* and the nom./acc. pl. *-ons*. Also, the neut. nom./acc. sg. *-o* could have been levelled in from nom./acc. pl. *-ona* (Ringe 2006:274-5). Early Runic shows the same levelling in of masc. nom. sg. *-a* (though the vowel was later lost), so this might reflect a shared change between GO and ON, plus an extension of the levelling in GO.

$\{\Delta\varepsilon_{NEGmc} = 1, \Delta\varepsilon_{GO} = 1\} \vee \{\Delta\varepsilon_{GO} = 1, \Delta\varepsilon_{ON} = 1\}$

### *B.2.10 -o : -e*

Within the oblique cases of the pl. of the strong adjectives, GO has innovated a gender opposition of fem. *-o* to non-fem. *-e*. Also, the fem. dat. pl. may have been attested in *-om* (Braune and Ebbinghaus 1973:80).

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.2.11 þata*

GO has added an additional *-a* ending to the inherited words **þat* 'that,' **hit* 'this,' and **it* 'it' (Ringe 2006:144):

PGmc **þat* 'that' > GO *þata* (cf. ON *þat*, OHG *daʒ*, OE *þæt*)

PGmc **hit* 'this' > GO *und hita* 'until now' (cf. OE *hit*)

PGmc **it* 'it' > GO *ita* (cf. OHG *iʒ*)

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.12 *-īn- > Ø*

GO may have eliminated the weak fem. adj. stem in **-īn-*. Instead, the masc./neut. are formed like ja-stems and the fem. is formed like jō-stems. It is unclear if this is a GO innovation or a reflection of PGmc (Ringe 2006:283). Therefore:

$\{0 \leq \Delta\varepsilon_{GO} \leq 1\}$

*B.2.13 *-at*

All of the daughter languages except for northern WGmc show a longer alternate form of the neut. nom./acc. sg. strong adjective ending (cf. GO *goþ ~ godata*, OHG *guot ~ guotaʒ*, ON *gott* (only the longer form)). The reconstruction of **-atō* explains GO and OHG, but not ON, and **-at* explains ON and OHG but not the extra vowel in GO. Ringe (2006:282) suggests that this longer ending represents a parallel innovation between GO, OHG and ON, and that GO took it one step further by adding *-a*. The reason for this is that the longer ending in GO was more commonly used attributively than as a predicative adj., and this led to the addition of *-a* through influence with the determiner *þata* (< PGmc **þat*). Therefore, the other languages did not take on *-a* because they did not have that vowel in their respective reflexes of **þat*. This is an unusual situation, since both options are counterintuitive: on the one hand, a shared ON-GO-OHG innovation that did not affect northern WGmc would be a strange distribution for an innovation; on the other hand, it also seems difficult to imagine that such a change would have coincidentally happened independently three times.

$\{\Delta\varepsilon_{GO\text{-}OHG\text{-}ON} = 1\} \vee \{\Delta\varepsilon_{GO} = 1, \Delta\varepsilon_{ON} = 1, \Delta\varepsilon_{OHG} = 1\}$

*B.2.14 *-assu-*

The inherited PGmc suffix **-assu-* formed nouns from verbs in **-atjanǫ* (Meid 1967:159-62; Ringe 2006:293). In GO, it became associated with class II weak verbs, in particular those in *-inon* (e.g., *lekinassus* ‘healing,’ *horinassus* ‘adultery,’ etc.).

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.15 *-ā-*

GO and most of ON show a replacement of the **-ja-* (< the PIE o-grade) alternant of the inherited weak class III stem suffix **-ai- ~ *-ja-* of stative verbs with **-ā-* (the corresponding alternant) of factive verbs (verbs derived from adjectives), yielding **-ai- ~ *-ā-* (Ringe 2006:179-80). Note the correspondences in the resulting forms:

PGmc **armai-* ‘to pity’ (< **arma-* ‘poor’) > OHG *ir-b-armēn*, GO *arman*

It is worth considering that this may be a shared GO-ON innovation.

$\{\Delta\varepsilon_{NEGmc} = 1\} \vee \{\Delta\varepsilon_{GO} = 1, \Delta\varepsilon_{ON} = 1\}$

*B.2.16 *-es-*

In GO (and OHG; cf. appx. F.2.18), the a-stem gen. sg. ending shows a reflex of **-es-* instead of the expected **-as-*. This is apparently due to analogy; in both GO and OHG the strong adj. gen. sg. ending shows **-es*, plus the gen. sg. demonstrative shows **þes*. Ringe

(2006:201) proposes that the a-stem gen. sg. ending may have been imported from the strong adj. ending, and that in turn from the demonstrative.

The ending is known not to be inherited since 1. the expected PIE antecedent is not attested anywhere else, and 2. it escaped OHG raising to *i* which would have to have happened if it were inherited (Ringe 2006:201). Ringe classifies these innovations as having occurred within the separate histories of OHG and GO. It is of course worth considering the scenario that it was shared as well.

$\{\Delta\varepsilon_{GO} = 1, \Delta\varepsilon_{OHG} = 1\} \vee \{\Delta\varepsilon_{GO\text{-}OHG} = 1\}$

*B.2.17 -and-s*

In GO and ON, there was an innovation in the present participles whereby they became always inflected as weak. However, GO has additionally created an alternative nom. sg. masc. in *-and-s* for the consonant-stems (in PGmc *-*and*-; Ringe 2006:203).

Additionally, in the feminine of the i-stems, GO shows -*s*, and in the u-stems, it shows -*us*, but the inherited feminine endings for those forms had to have originally been inherited as *-*ī*, so GO must have innovated on this point.

Lastly, the default masc./neut. stem -*ja*- was probably backformed to fem. -*jō*- (Ringe 2006:203).

The date of the latter two innovations is uncertain. They may have happened during the PGmc period, or during GO.

$\{\Delta\varepsilon_{NEGmc} = 1, \Delta\varepsilon_{GO} = 2\} \vee \{\Delta\varepsilon_{GO} = 1, \Delta\varepsilon_{ON} = 1\}$

*B.1.18 1sg., 3sg. > 1sg.*

The 3sg. past indic. verbal inflection has been lost in GO via syncretism with that of the 1sg. Consider the verb 'to save' (Walkden 2014):

| GO | Past Indic. | OE | Past Indic. |
|---|---|---|---|
| 1sg. | *nasida* | 1sg. | *nerede* |
| 2sg. | *nasidēs* | 2sg. | *neredest* |
| 3sg. | *nasida* | 3sg. | *neredeþ* |

As it will be seen in the following sections, there was much conflation within the inflectional paradigms of verbs in similar ways across the early Gmc languages. It is difficult to tell what was independent and what may have been shared.

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.19 *-z- ~ *-s-; *-d- ~ *-þ-*

ON and GO seem to have generalized the voiced fricative alternants of PGmc Verner's Law alternations in voicing of some present strong verb personal endings (Ringe 2006:182). It is worth considering that this may be a shared development.
In the strong verb past stems, however, GO has nearly completely levelled in favor of the voiceless alternant (Ringe 2006:191).

$\{\Delta\varepsilon_{NEGmc} = 1, \Delta\varepsilon_{GO} = 1\} \vee \{\Delta\varepsilon_{GO} = 2, \Delta\varepsilon_{ON} = 1\}$

## *B.3 Gothic Lexical Innovations*

### *B.3.1 ƕa*

The GO question word *ƕa* ‘what’ seems to have lost its ending where the other daughter languages have retained it. This is probably via analogy with the neut. nom./acc. sg. strong adjective ending (Ringe 2006:144).

PGmc **h$^{w}$at* ‘what’ > GO *ƕa* (cf. ON *hvat*, OE *hwæt*, etc.)

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.3.2 *ƕwō*

GO may have developed a fem. form of the nom./acc. of the otherwise neuter interrogative ‘what’ (Prokosch 1938:279; Walkden 2014:113). Otherwise, these fem. forms are retentions of PGmc reflexes and NWGmc lost them.

$\{\Delta\varepsilon_{GO} = 1\} \vee \{\Delta\varepsilon_{NWGmc} = 1\}$

### *B.3.3 iusiza*

GO shows an innovative form *iusiza*, meaning ‘better,’ though it is attested once and does not seem to have replaced the inherited word (Ringe 2006:285).

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.3.4 godai*

Sometime after the monophthongization of **-ai* to *-a*, GO appears to have reintroduced the diphthong back into the nom. pl. masc. of the adj. ‘good’ via analogy with the pl. demonstrative *þai* ‘those’ (Ringe and Taylor 2014:25).

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.3.5 alþeis*

GO has remodelled the reflex for ‘old’ as an ija-stem:

PGmc **aldaz* ‘old,’ **alþizô* ‘older,’ **alþistaz* ‘oldest’ > GO *alþeis, alþiza, alþists* (Ringe 2006:285)

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.3.6 *hir > her*

GO shows lowering of the vowel of the deictic ‘here.’ An identical change happened in the NWGmc languages, but it was likely independent.

$\{\Delta\varepsilon_{GO} = 1\}$

### *B.3.7 sauil*

According to Ringe (2006:277), the GO neut. l/r-stem *sauil* ‘sun’ apparently reflects levelling of the oblique suffix ablaut **-e-* (> *i*) into the direct form with **-l*. This seems to be a lexically-specific change.

$\{\Delta\varepsilon_{GO} = 1\}$

*B.3.8 *fōr ~ *fun- > for ~ funin-*

GO generalized the n-ending variant over the r-ending variant of the word ‘fire,’ plus created an alternate with *-in* from influence from *watin-* ‘water’ (Ringe 2006:122, 277).

$\{\Delta\mathcal{E}_{GO} = 1\}$

*B.3.9 tunþus, fotus*

GO seems to have shifted the realization of the reflexes for ‘tooth’ and ‘foot’ from monosyllabic consonant stems to u-stems (Ringe 2006:86, 279):

PGmc **tanþ-* > GO *tunþus*

PGmc **fōts* > GO *fotus*

$\{\Delta\mathcal{E}_{GO} = 1\}$

*B.3.10 sehun*

GO levelled in the labiovelar <*hu*> into the past pl. of ‘they saw’ from the sg. (Ringe and Taylor 2014:11).

$\{\Delta\varepsilon_{GO} = 1\}$

*B.3.11 wato, watins, etc.*

According to Ringe (2006:276), GO remodeled the nom./acc. sg. of the o-grade **watōr* 'water' as an n-stem, yielding e.g., nom. sg. *wato*, gen. sg. *watins* (< GO n-stem ending *-s* < PGmc n-stem gen. sg. **-iz*).

{$\Delta\varepsilon_{GO} = 1$}

*B.3.12 iddj- ~ iddjed-*

GO has apparently reanalyzed the suppletive past tense of 'to go' as a weak past, but it does not show the expected first of the two weak past coronal obstruents (i.e., *-ded-*, as in *fulli-ded-um* 'we filled'). Ringe (2006:194) suggests this is analogical.

{$\Delta\varepsilon_{GO} = 1$}

*B.3.13 sitan, ligan*

In the verbs 'to sit' and 'to lie (down),' GO has innovated a simple thematic present where the original PGmc form was a j-present (Ringe 2006:188-9):

PGmc **sitjan* 'to sit,' *sitjō* 'I sit' > GO *sitan, sita*

PGmc **ligjan* 'to lie,' **ligjō* 'I lie' > GO *ligan, liga*

{$\Delta\varepsilon_{GO} = 1$}

*B.3.14 *anguz > aggwus*

In the masc. reflex of the word 'narrow,' GO levelled in *gw* in place of basic *g* from the labiovelar $g^w$ found in the feminine version of this adjective, **ang*$^w$*ī* (Ringe 2006:91, 93).

{$\Delta\varepsilon_{GO} = 1$}

*B.3.15 nahtam*

The dat. pl. of 'night' probably takes its variant ending *-am* via analogy with 'day' (Ringe 2006).

{$\Delta\varepsilon_{GO} = 1$}

*B.3.16 *taujan*

The inherited word 'do' (**dōną*) was replaced in GO with its reflex of **tawjaną* 'to fit together' > *taujan*.

{$\Delta\varepsilon_{GO} = 1$}

*B.3.17 stōþ*

GO generalized the ending *-*þ*- throughout the paradigm of the past tense of 'stand' where other daughter languages show *-*d*-, suggesting levelling of a Verner's Law alternation (cf. OE *stōd*; Ringe 2006:78).

{$\Delta\varepsilon_{GO} = 1$}

*B.3.18 wesun*

The GO reflex of ‘they were’ shows levelling of a voiceless Verner’s Law alternant from the sg. (cf. ON *váru*, OHG *wārun*, etc.; Ringe and Taylor 2014:11).

$\{\Delta\varepsilon_{GO} = 1\}$

*B.3.19 ufar*

The GO reflex of ‘over’ shows levelling of the voiceless Verner’s Law alternant (Ringe and Taylor 2014:33).

$\{\Delta\varepsilon_{GO} = 1\}$

*B.3.20 hausjan*

GO has levelled a voiceless Verner’s Law alternant into the reflex for ‘to hear’ (< PGmc ***hauzijanǫ*). Ringe and Taylor (2014:83) propose that it was imported from ‘ear.’

$\{\Delta\varepsilon_{GO} = 1\}$

*B.3.21 gadaúrsun*

GO *gadaúrsun* ‘they dared’ shows levelling of a voiceless Verner’s Law alternant (cf. OE *durron* < PGmc **(ga)durzun*; Ringe and Taylor 2014:84).

$\{\Delta\varepsilon_{GO} = 1\}$

*B.2.22 taihuntehund*

GO shows an extension of the of use the inherited numeral suffix **-tēhund-* (‘-ty’ e.g., six*ty*) to allow attachment to *taihun* ‘ten’ to create a new word for ‘one hundred,’ *taihuntehund* (Ringe 2006:206).

$\{\Delta\varepsilon_{GO} = 1\}$

APPENDIX C: WEST GERMANIC DEVELOPMENTS

## *C.1 West Germanic Phonological Innovations*

### *C.1.1 *u > *u, *o*

This split is related to the post-PNWGmc lowering of **u* > *[*o*] discussed above (cf. appx. A.1.8). It would have to have occurred before the PWGmc loss of **a* in final syllables because almost all a-stems feature lowering, but no root nouns feature it (Ringe and Taylor 2014:28-9).

$\{\Delta\mathcal{E}_{WGmc} = 1\}$

### *C.1.2 *a, *ą > Ø / _ (*-z)#*

The vowels **a* and **ą* were lost word-finally, as well as before final *-*z* (Ringe and Taylor 2014:44).

PGmc **stainą* ‘stone (acc.sg.)’ > PWGmc **stain* > OE *stān*, OFr *stēn*, OHG *stein*; (cf. Early Runic *staina*; Krause 1971:116)

PGmc **þewaz* ‘slave (nom. sg.)’ > PWGmc **þeu* > OE *þēo*(*w*), OHG *deo*; (cf. Early Runic *þewaz*; Krause 1971:116, 171)

This sound change brings up the issue of ordering with the loss of *-*z*. ON apparently lost the low vowels first through a similar (later) change. But if the same ordering is the case for WGmc, why was the vowel lost before *-*z* but not before *-*s* or *-*r*? The ordering of *-*z* > Ø first is more attractive due to its relative simplicity, but possible counterexamples are the names of Matrona-goddesses found in 2nd and 3rd century

inscriptions near the lower Rhine: *Aflims*, *Vatvims*, and *Saithamims* (Neumann 1987:108; Ringe and Taylor 2014). It is believed, however, that the loss of **-z* in unstressed syllables (discussed above) was an early change, so this tilts the odds slightly in favor of that sound change having occurred first. This innovation ust have come after the split **u* > **u, *o* above (Ringe and Taylor 2014).

OE *stān*, OHG *stein*, OFr *stēn* 'stone' (cf. Runic *staina*) < PWGmc **stain* < PGmc **stainą* (acc. sg.)

As a result, the postconsonantal segments **w, *j*, and **ij*, which preceded those lost vowels, naturally became **u, *i*, and **ī*.

PGmc **sarwą* 'device, tool, weapon (nom. sg.),' **sarwō* (nom. pl.) > PWGmc **saru* > OE *searu*, OHG *saro*; (cf. GO *sarwa* 'armor')

PGmc **harjaz* 'army' > PWGmc **hari* > OE *here*, OS, OHG *heri*; (cf. GO *harjis*, ON *herr*)

PGmc **rīkiją* 'rule, kingdom' > PWGmc **rīkī* > OE *rīċe*, OFr *rīke*, OS *rīki*, OHG *rīhhi*; (cf. GO **reiki*, ON *ríki*)

$\{\Delta\varepsilon_{WGmc} = 1\}$

### *C.1.3 *-u > Ø / CC _#*

This change was mentioned above in the discussion of the change **-ō* > **-u* / [-stress] (cf. appx. A.1.3). Final **-u* was lost after heavy syllables, but retained after light ones.

OHG *lant*, ON *lǫnd*, OE *land* 'lands (nom./acc. pl.)' (< PNWGmc **landu* < PGmc **landō*)

OS *dagu*, OHG *tagu* ‘day (a-stem inst. sg.)’ (< PNWGmc **dagu* < PGmc **dagō*)

{$\Delta\varepsilon_{WGmc} = 1$}

### *C.1.4 *zw, *dw > *ww*

This regular sound change occurred when the intervocalic clusters **zw* and **dw* assimilated and merged into **ww*. Note that **z* and **d* here are coronal fricatives. There are few examples, however (and it may have affected all voiced fricatives, though there is unfortunately no direct evidence):

PGmc **fedwōr* ‘four’ > PWGmc **fewwār* > **feuwar* > OE *fēower*, OFr *fiūwer*, OS *fiuwar*, OHG *fior*; (cf. GO *fidwor*)

PGmc **izwiz* ‘you (dat. pl.)’ > PWGmc **iwwi* > **iuwi* ~ **iuw* > OE *īow*, OFr *iū*. OS, OHG *iu*; (cf. GO *izwis*)

Some nominal stems with **-dwō-* apparently restored **-d-* via levelling from nom. sg. (Ringe and Taylor 2014:42), and there are some stems in **-dwa-* that were originally u-stems and thus would have been without **-dw-* during the time of this innovation. This change must have happened before the **Vww* > **Vuw* sound change.

{$\Delta\varepsilon_{WGmc} = 1$}

### *C.1.5 *V[ð]V > *V[d]V*

Voiced stops exhibited allophonic fricatives in intervocalic positions for much of the history of Gmc up to PWGmc. By PWGmc, however, **d* became a stop in all positions. This undoubtedly has to do with the crosslinguistic markedness of interdental sounds. In

fact, it has been noted that the change */d/ > /ð/* is more often than not part of a larger schema of fricativization, such as a chain shift, and that languages that do exhibit the change usually rapidly transform the resulting phoneme into something else (Ferguson 1978:437). Note also that this change very likely happened after the merger of the fricative-glide clusters (cf. appx. C.1.4).

$\{\Delta\varepsilon_{WGmc} = 1\}$

### *C.1.6 *Vwu- > *Vu*

The glide **w* was dropped between a stressed vowel and unstressed **u*:

PGmc **knewō* 'knees (nom./acc. pl.)' > PNWGmc **knewu* > PWGmc **kneu* > OE *cnēo*(*w*); (cf. GO *kniwa*)

PNWGmc **fawu* 'few (nom./acc. pl. neut.)' > PWGmc **fau* > OE *fēa*

The loss of the ending in the other WGmc languages confines the evidence of this innovation to OE, though it is always possible that this change affected the other languages before that loss. This change is nonetheless dated to PWGmc since it took place before the development of OE diphthongs (Ringe and Taylor 2014:61).

$\{\Delta\varepsilon_{WGmc} = 1\}$

### *C.1.7 *-z > ∅*

Word-final, unstressed **-z* was lost in PWGmc, but is retained in the form of *-s* in GO and *-r* in ON. Nominal endings serve as classic examples (Ringe and Taylor 2014:43):

PGmc **sunuz* ‘son (nom. sg.)’ > PWGmc **sunu* > OE, OFr *suna*; (cf. GO *sunus*, ON *sonr*)

PGmc **gastīz* ‘guests (nom. pl.)’ > PWGmc **gastī* > OS, OHG *gesti*; (cf. GO *gasteis*, ON *gestir*)

PGmc **gastinz* ‘guests (acc. pl.)’ > PWGmc **gastį̄* (?) > OHG *gesti*; (cf. GO *gastins*)

Note that the loss of **-z* in unstressed syllables is separate from the loss of **-z* in stressed/monosyllables, which was likely a later innovation that was not uniform throughout the dialects. It is also possible, though unlikely due to the lack of morphological interference typical of long innovations, that they *are* the same sound change which took a long time to complete its spread to monosyllables (Ringe and Taylor 2014:44).

$\{\Delta\varepsilon_{WGmc} = 1\}$

### *C.1.8 *Cj > *C$^{j}$C$^{j}$*

Sequences of a consonant + **j* resulted in the gemination of the consonant. This regular sound change affected many words.

PGmc **satjaną* ‘to seat/set’ > PWGmc **satjan* > **[sat$^{j}$t$^{j}$an]* > OE *settan*, OFr *setta*, OS *settian*, OHG *sezzen*; (cf. GO *satjan*, ON *setja*)

PGmc **wiljaną* ‘to want’ > PWGmc > **wiljan* > **[wil$^{j}$l$^{j}$an]* > OE *willan*, OFr *willa*, OS *willian*; (cf. GO *wiljan*, ON *vilja*)

The sequence **wj* therefore also became geminate **ww* in WGmc (Wright 1907:120):

PGmc **frawjǫ̂* ‘lady’ > PWGmc **frawwǫ̂* > **frauwǫ̂* > OHG *frouwa*

PGmc **niwjaz* ‘new’ > PWGmc **niwwaz* > **niuwaz* > OHG *niuwi*, OS *niuwi*, OE *nēowe*

Exceptions to this are **z* and **r* (e.g., PGmc **wazjanǫ* ‘to clothe’ > PWGmc **wazjan* > OE *werian*, OHG *werien*; cf. GO *wasjan*, ON *verja*). This is no surprise given the phonetic nature of these two segments which make them difficult to palatalize. A similar innovation happened in ON that affected only **k* and **g* (cf. appx. E.1.25) though that was much later and therefore likely unconnected (Noreen 1923:203-4).

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.1.9 *C(l/r) > *CC(l/r)*

There was an apparent gemination of **p*, **t*, **k*, and **h* before **r* and **l*. It is possible that this change only occurred in disyllabic words, but the exact source and scope of this gemination is unclear. At any rate, the following examples point to the existence of such a sound change, whatever its exact nature.

PGmc **apluz* ‘apple’ > PWGmc **applu* > OE *æppel*, OFr *appel*, OS *appul*, OHG *apful*

Freely alternating doublets of geminate vs. non-geminate forms are found as well:

PNWGmc **bitraz*, **bitra-* ‘bitter’ > PWGmc **bitr*, **bittra-* > OE *bitor ~ bittor*, OS *bitar ~ bittar*, OHG *bittar*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.1.10 *Ṽ# > *V*

Contrastive word-final nasalization was lost in PWGmc. Combined with the loss of *-*z* (see above), this led to a merger of the resulting de-nasalized acc. sg. vowel endings with the resulting bare *-*z*-less nom. sg. endings into **i* and **u* for both.

PGmc **gastiz* 'guest (nom. sg.),' **gastį* (acc. sg.) > PWGmc **gasti* (nom./acc. sg.) > OE *ġiest*, OFr *jest*, OHG *gast*; (cf. GO *gasts*, *gast*, ON *gestr*, *gest*)

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.1.11 *-i, *-u > Ø*

Word-final **-i* and **-u* were lost in PWGmc in some particular circumstances. However, we at least know that they remained long enough in some cases (fully stressed disyllabic sequences and in trisyllables) to trigger i-umlaut and play a role in a syncopation process in OE (Ringe 2002:131-43). The loss of these short, word-final high vowels is described by Ringe (2014:55) as having occurred "in third and later syllables if preceded by anything other than a single nonsyllablic which was in turn preceded by a short high vowel." Hence endings such as **-isi*, **-iþi*, **-iþu* survived. There are several cases in which these vowels might have been expected to be lost, but survived due to the fact that they also occurred after stressed syllables.

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.1.12 *-ō(r) > *-ā(r)#*

**-ô(r) > *-ō(r)#*

Word-final (or before word-final **r*) long **ō* became **ā*, and overlong **ô* became **ō*. But in other unstressed syllables, both of them merged to **ō*.

PGmc **fedwōr* ‘four’ > PWGmc **fewwār* > **feuwar* > OE *fēower*, OFr *fiūwer*, OS *fiuwar*, OHG *fior*; (cf. GO *fidwor*)

PGmc **namô* ‘name’ > PWGmc **namō* > OE *nama ~ noma*, OFr *noma*, OS, OHG *namo*

PGmc **armôzô* ‘poorer’ > PWGmc **armōzō* > OE *earmra*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.1.13 *-V̄r# > *-Vr*

Sometime after the above change of **ō* to **ā*, long vowels in unstressed syllables before word-final **-r* were shortened.

PGmc **fadēr* ‘father’ > PWGmc **fader* > OE *fæder*, OFr *feder*, OS *fader ~ fadar*, OHG *fater*; (cf. ON *faðir*)

PWGmc **watōr* ‘water’ > **watār* > **water* > OE *wæter*, OFr *weter*, OS *water ~ water*, OHG *waʒʒer*; (cf. GO *wato*)

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.1.14 *ō > *ū / _n#*

This is a complicated sound change that requires extensive discussion for a complete account. In short, what likely happened is that in the paradigms of n-stems, some parts of the paradigm of this type of noun (acc. sg., gen./dat. sg., and nom./acc. pl.) changed from **-ōn-* to **-ūn-* after word-final high vowels which followed the sequence were lost. The

sound change of course occurred elsewhere, but the n-stem examples are the most characteristic. This could have been either a WGmc sound change or a southern WGmc regular sound change, since North. OE exhibits some potential relics (which of course could also reflect a separate OE change). ON clearly shows *-on-* where the continental WGmc languages show this change. The reader is referred to Ringe (2014:63) for a more in-depth discussion of this change.

$\{\Delta\varepsilon_{WGmc} = 1\} \vee \{\Delta\varepsilon_{OHG} = 1\}$

*C.1.15 *C(C)V > *C(C)V̄*

Vowels in monosyllabic words were lengthened in PWGmc:

PGmc **swa* 'so, thus' > PWGmc **swā* > OE *swā*, OFr *sā*, OS, OHG *sō*; (cf. GO *swa*)

A similar change happened in ON (cf. appx. E.1.31), but that may represent a parallel sound change.

$\{\Delta\varepsilon_{WGmc} = 1, \Delta\varepsilon_{ON} = 1\} \vee \{\Delta\varepsilon_{NWGmc} = 1\}$

*C.1.16 *-jj-, *-ww- > *-ij-, *-uw-*

Whereas Holtzmann's Law (cf. appx. B.1.18) strengthened the geminates **-jj-* and **-ww-* into geminate stops in GO (and possibly ON), in WGmc the first element became a vowel in a diphthong. When the segment preceding the geminate was a vowel identical to the first glide in the geminate, that vowel simply lengthened:

PGmc **trewwaz* 'trustworthy' > PWGmc *(*ga*)*triuwī* > OE (*ġe*)*trīewe*, OFr *triūwe*, OS (*gi*)*triuwi*, OHG *gitriuwi*; (cf. GO *triggws*, ON *tryggr*)

PGmc **skuwwô* ‘shadow’ > PWGmc **skūwō* > OE *sċūwa*, OHG *scūwo*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.1.17 */x/ > *[h] / #_*

The PGmc phoneme **h* was probably realized as *[x]*, but by PWGmc, the segment may have been realized as a proper *[h]* in word-initial position.

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.1.18 *z, *r > *r*

This merger of **z* and **r* to **r* is a very characteristic change within NWGmc, but it seems not to have been a single sweeping change, but rather independent innovations. The WGmc change seems to have happened earlier.

PGmc **wēzun* ‘they were’ > OHG *wārun*, OFr *wēron*, OE *wǣron* (cf. ON *váru*, GO *wesun*)

PGmc **huzdą* ‘treasure’ > OE, OS *hord*, OHG *hort* (cf. GO *huzd*)

$\{\Delta\varepsilon_{NWGmc} = 1\} \vee \{\Delta\varepsilon_{WGmc} = 1, \Delta\varepsilon_{ON} = 1\}$

*C.1.19 *-izd- > *-īd-*

There seems to have been a PWGmc loss of **z* in some words between **i* and **d*, followed by compensatory lengthening of the vowel, and sometimes lowering (Ringe and Taylor 2014:84; Crist 2001:102-3):

PGmc **mizdō* ‘reward’ > PWGmc **mizdu* > OE *meord ~ mēd,* OFr *mēde ~ mīde,* OS *mēda,* OHG *miata*

This seems to be a crosscutting innovation that spread across the post-PWGmc dialect continuum.

$\{\Delta\varepsilon_{WGmc} = 1\}$

### *C.1.20 *-īn > *-ī*

Word-final **-n* was lost after unstressed **ī.* As a result, n-stems in oblique cases of the sg. and in the masc./fem. nom. pl. lost their ending (Campbell 1962:189). This sound change must have spread through the dialects after the breakup of PWGmc (Ringe and Taylor 2014:87-8).

$\{\Delta\varepsilon_{WGmc} = 1\}$

## *C.2 West Germanic Morphological Innovations*

### *C.2.1 *-ī- ~ *-ija- > *-i- ~ *-ija-*

The two PGmc alternations in j-presents with light and heavy root syllables (**-i- ~ *-ja-*, and **-ī- ~ *-ija-*, respectively) merged the **-i-* and **-ī-* of both alternations to **-i-* (yielding **-i- ~ *-ja-*, and **-i- ~ *-ija-*). In other words, the **-i-* which came after light roots spread to the corresponding version in heavy roots, supplanting **-ī-*. The indic. 2sg and 3sg provide evidence for this change (note especially the OHG vs. GO):

PGmc **hauzīsi* ‘you hear,’ **hauzīþi* ‘s/he hears’ > PWGmc **hauzisi*, **hauziþi* > OE *hīerst*, *hīerþ*, OFr *hērth* (3sg.), OS *gihōris*, (*gi*)*hōrid*, OHG *hōris*, *hōrit*; (cf. GO *hauseis*, *hauseiþ*)

Once again, this is a change with a complicated background. Ringe and Taylor (2014:69-71) have much more to say regarding its exact nature and possible origin, but the abbreviated explanation is that the similarity of class I weak presents with strong j-presents probably contributed to learner reanalysis, since this would have made **-ī-* seem even less motivated in comparison to the prevalence of **-i-*.

{$\Delta\varepsilon_{WGmc} = 1$}

*C.2.2 *-i- > Ø / -t/d- _ -d-*

In class I weak verbs, short **-i-* was syncopated between root-final **-t-* or **-d-* and the past tense suffix **-d-*. It was syncopated even after light root syllables, but was restored. Additionally, i-umlaut remains in most cases where these past stems would have had **-i-* at some point, regardless of the restoration of **-i-*. Despite the restoration, there is evidence for the early syncope in PWGmc:

PGmc **satide* ‘set’ > PWGmc **satte* > North. OE *ġe-sætte*, OS *satta*, OE *sette*, OS *gi-setta* (the latter two with i-umlaut), OHG **sazza* > *sazta* (no i-umlaut); (cf. GO *satida*, Early Runic *satido*)

This innovation is most phonetically straightforward if both of the flanking segments are stops, which means this innovation must have followed the strengthening of intervocalic **-[ð]-* to **d*.

{$\Delta\varepsilon_{WGmc} = 1$}

### *C.2.3 *walid- > *waldē*

The syncope situation is further complicated by the fact that some (at least five) class I weak verbs in **al* exhibit the same phenomenon. For example:

PWGmc **taldē* 'counted' > OE *tealde*, OS *talda*, OHG *zalta*

Because syncope in these past tense verbs in **al* is very specific but irregular and abundant in exceptions, the cause is probably lexical analogy (Ringe and Taylor 2014:75), with the confusion of **wiljan* 'to want' and **waljan* 'to choose' serving as the epicenter. The latter changed through analogy with the former, and spread to other class I weak verbs in **al*. The spread of syncope to **wiljan* in the first place must have served as an initial separate innovation. I will treat it as such for the present approach, and consider the syncope in **wiljan* and its subsequent spread to other class I weak verbs in **al* to reflect two innovations.

{$\Delta\varepsilon_{WGmc} = 1$}

### *C.2.4 dat., inst. > dat.*

In only a few paradigms, the dative and instrumental cases have begun to merge. In those few paradigms, the merger has completed in the pl. but is only partial in the sg. (Ringe and Taylor 2014:115). This went to completion later in the daughter languages. Consider the masc. noun 'son':

**suniwi* (*-ō*) 'son (dat. sg.),' **sunu* 'son (inst. sg.)'

**sunum* ‘sons (dat./inst. pl.)’

{$\Delta\varepsilon_{WGmc} = 1$}

### *C.2.5 *-ī*

The existence of the OHG fem. sg. dat./inst. i-stem ending *-i* suggests that this ending may have been reimported from the gen. sg. during PWGmc. Otherwise this ending (< PWGmc **-i* < PGmc **-ī*) should have been apocopated. Therefore, it seems that in this particular instance it was not lost and this is probably due to earlier remodeling (Ringe and Taylor 2014:115).

{$\Delta\varepsilon_{WGmc} = 1$}

### *C.2.6 *ijōz > *sijā*

In the paradigm of the third person pronoun, **s-* spread from the fem. nom. sg. **sī* to the fem. acc. sg. (> *sijā*) and to the nom. and acc. plurals of all genders (Ringe and Taylor 2014:124). A few examples:

PGmc **ijǭ* ‘her (fem. acc. sg.)’ > PWGmc **sijā*

PGmc **ijôz* ‘her (fem. nom. pl.)’ > PWGmc **sijō*

PGmc **ijōz* ‘her (fem. acc. pl.)’ > PWGmc **sijā*

{$\Delta\varepsilon_{WGmc} = 1$}

*C.2.7 *unsiz > *uns, etc.*

In PGmc, the oblique cases of the non-singular personal pronouns had longer forms in **-iz*. These forms were lost in favor of the shorter acc. forms. (Ringe and Taylor 2014:125). For example:

PGmc **unsiz* 'us (dat./inst.),' **uns* (acc.) > PWGmc **uns*

PGmc **unkiz* 'us (dat./inst. du.),' **unk* (acc.) > PWGmc **unk*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.8 *-nVssī*

PWGmc inherited a derivational suffix that forms abstract nouns from PGmc **-assu-* (where the reflex with **-n-* is an abstraction of the final **-n* of attached verbs). However, the exact reflex of the vowel in WGmc is uncertain. It therefore must have been innovative. Consider the word 'similarity,' which is the most solidly reconstructable:

PGmc **galīkaz* 'similar' > PWGmc **galīkanassī* 'similarity, image' > OE *ġelīcnes*, OS, OHG *gilīknessi*[14] (Ringe and Taylor 2014:132)

$\{\Delta\varepsilon_{WGmc} = 1\}$

[14] This ending is still alive and well in the form of mod. EN *-ness*.

*C.2.9 1sg., 3sg. subj. > 3sg. subj.*

The 1sg. and 3sg. of the subjunctive merged into the 3sg. form in PWGmc. There was already no distinction between the two in the past indic. of strong verbs, so that rule was basically extended to the subj. as well (Ringe and Taylor 2014:75-6).

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.10 *-an*

Some preterite-presents took on past participles in **-an* during PWGmc, just like strong verbs (Ringe and Taylor 2014:77-8):

PGmc **witaną* 'to know' > PWGmc **gawitan* > OE *ġewiten* 'known,' OHG *giwiȝȝan*

PGmc **munaną* 'to think, consider' > OE *ġemunan* 'considered'

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.11 *-nd-ija- > *-nd-ijō-*

WGmc pres. participles are inflected as ija-stems (Ringe and Taylor 2014:78), though they were consonant stems in **-nd-* in PGmc. This PWGmc innovation was a backformation of masc. and neut. pres. ptc. endings in **-nd-ija* to the feminines in **-nd-ijō-*.

PGmc **berand-* 'bearing, carrying' > PWGmc **berandī, *-ija* > OE *berende,* OHG *berenti*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.12 inf. + *-ja-*

As a noun, the PGmc infinitive was inflected and treated as a neuter a-stem noun in acc. sg. *-*ą*. PWGmc innovated another stem in *-*ja*-, forming a gen., inst. and dat. sg. For example:

PWGmc *-*anjē* > OS *te faranne*, OHG *zi faranne* 'to go'

The reason for the choice of the form *-*ja*- as the ending for this purpose is a mystery. It has been suggested that it was influenced by different deverbalizing forms in *-*ja*- (Loewe 1933:134).

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.13 *namô (neut.) > *namō (masc.)*

In PWGmc, some deverbal nouns that were realized as neuter singulars in PGmc became reinterpreted as masculine n-stems (Jasanoff 2002:35). The word for 'name' is an example:

PGmc **namô* 'name (neut.)' > PWGmc **namō* (*masc*.) > OE, OFr *nama* ~ *noma*, OS, OHG *namo* (cf. GO *namo*, ON *nafn* (neut. a-stem))

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.14 2sg. *-s*

WGmc weak pasts in the 2sg. took on an innovative *-*s* ending. It must have been based on the 2sg. pres. indic. *-*ōs* (class I) and *-*ēs* (class III), possibly with influence

from the 2sg. pres. subj. in *-*ēs*. It is understandable that speakers would have implemented uniformity across the different paradigms by importing the 2sg. suffixes. {$\Delta\varepsilon_{WGmc} = 1$}

*C.2.15 2sg. past indic. > subj.*

This morphological innovation involved the use of the subjunctive forms in place of the 2sg. strong past indic. In other words, the 2sg. past indic. and subjunctive have merged in form, the change is not one of a spread of an ending (Braune and Reiffenstein 2004:272). This is based off of the facts that the two forms are identical in OE, and that the OHG -*īs* and OS -*is* 2sg. past subj. endings are a later southern WGmc innovation.
PGmc **warst* 'you became' (inf. **werþanǫ*) > PWGmc **wurdī* > OE *wurde*, OS *wurdi*, OHG *inbuti*; (cf. GO *warst*)
PGmc **gaft* 'you gave' > PWGmc **gābī* > OE *ġēafe*, OHG *gābi*; (cf. GO, ON *gaft*)

It is worth mentioning that another possibility is that the innovative form actually takes its form from the aorist indicative (Campbell 1962:298; Brunner 1965:279). However, according to Ringe (2014:68), this explanation is too problematic. Encouraging the subjunctive interpretation is the fact that the same kind of replacements happened later in OHG, though in the form of ending replacements (e.g., pres. indic. 1pl. -*amēs* > subj. -*ēm*; Braune and Reiffenstein 2004:263). Regardless of the exact nature of this morphological innovation, it is still a clear WGmc innovation, and represents a point in our exclusively shared innovation database.
{$\Delta\varepsilon_{WGmc} = 1$}

*C.2.16 *-Ø > *-u/[+heavy] _*

There was a re-extension/levelling of **-u* to heavy stems as well within the category of 1sg. verb endings (e.g., OE *biddu*, OHG *bittu* ‘I ask’).

{$\Delta\varepsilon_{WGmc} = 1$}

*C.2.17 *i (cl. I) > *e (cl. IV/V)*

There was a reinterpretation of the root in **i* of the rare class I zero-grade strong presents (of which only two survived at the time) as the root in **e* of the class IV or V verbs. Because the former was such a rare class, it is suspected to have been caused by analogy with the more common class IV and V verbs in **e*. In one case this happened outside of WGmc. In this change, the underlying forms of **wigidi* ‘fights’ and **stikidi* ‘pierces’ are reinterpreted as */weg-i-/ ~ */weg-a-/* and */stek-i-/ ~ */stek-a-/* (Lloyd 1966:743-4).

PGmc **wiganą* ‘fight’ > PWGmc **wegan* > ON *vega* ‘to kill,’ OHG *ubarwehan* ‘to overcome,’ OE *ġewegan*

PGmc **stikaną* ‘to pierce’ > PWGmc **stekan* > OHG *stehhan*, ME *steken*

{$\Delta\varepsilon_{WGmc} = 1$}

*C.2.18 *mati > *matja- : *sagją-*

At some point there was a reinterpretation of i-stems as ja-stems due to reanalysis on the basis of similar forms in other words. For example, learners would have reinterpreted **mati* 'food' as **matja-* on the basis of **sagi* (nom./acc. sg.), **sagjas* 'retainer (gen. sg.),' which ultimately gave rise to byforms such as OE *mettas* 'foods,' *mete* 'food (sg.).' This reanalysis is reflected in other attested instances, such as OE *bed*, OS *bed*, OHG *betti* 'bed,' and OE *cynn*, OS, OHG *kunni* 'lineage,' because the reinterpretation allowed the **j* to survive in these words and therefore explains their participation in the next sound change (**Cj > *C$^{j}$C$^{j}$*). Note that an identical phenomenon occurred in at least one u-stem as well: PWGmc **skadu > *skadwa* 'shadow' > OS *skado*, OHG *scato*.

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.19 *hehaww > *heuw*

Reduplication was lost in the stems of some past tense class VII strong verbs. The initial consonant of the root was likely dropped, and the two vowels conjoined:

PGmc **hawwaną* 'to chop,' past 3sg. **hehaww* > past 3sg. **heuw* > OE *hēow*, OHG *hio*, OS *giheu*

A smaller number of examples show complete loss of the reduplicating syllable, leaving the root vowel unaltered:

PGmc **aukaną* 'to increase,' past 3sg. **eauk* > **aukan*, **eōk* > ON *auka*, *jók* (cf. GO *ana-aukan, ana-aíauk*)

Regarding the **hehaww* example, an association and consequent generalization may have been made by speakers between the root vowel alternations in these verbs and other verbs with root-initial consonant clusters, since the same alternations of root vowels appear here:

**uzhleupun* 'they jumped up' > **hleup* > OS *ahliopun*, OHG *liof*, OE *hlēop* (cf. ON *hljóp*, since *-jó-* < **-au-*, and not from **-eu-*)

In fact, there were several generalizations regarding the vowel alternations of the class VII strong verb past stems and their roots: throughout WGmc and ON, past tense **ē* corresponded to roots in **ā*; in WGmc, the past-stem-to-root correspondence is **eu* : **ō*; and in OE, **eu* : **alC/*ā*(*w*)*/*anC*, but in all the other languages, **ē* : **alC/*ā*(*w*)*/*anC*.

The generalizations likely happened after PWGmc, but the innovation that set these changes in motion was a PWGmc one, namely the loss of reduplication in class VII past verbs. Cf. Ringe and Taylor (2014) for a full discussion.

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.20 *hehēt > *heht*

Another treatment of these reduplicating past tense verbs was to preserve the reduplication, but 'syncopate' the root vowel. Though, the root vowel loss is in fact a change on the model of a few inherited zero-grade past stems, **lelt-* 'let go' and **rerd-* 'advised' (Bammesberger 1980:7-8; Jasanoff 2008:244; Ringe and Taylor 2014:92). These only survived in Angl. OE:

PWGmc **hehēt* 'was called (3sg.)' > Angl. OE *heht*

{$\Delta\varepsilon_{WGmc} = 1$}

*C.2.21 *-i- > Ø*

Another less sweeping change was the creation of another group of class I weak verbs without **-i-* before the past suffix. They all had roots ending in **-k-* and most had root vowels of **a* (Ringe and Taylor 2014:97-8). For example:

OE *þeċċan, þeahte, þeaht* 'cover,' OFr **thetsa,* ptc. *thacht,* OS *bi-thekkian* (cf. OHG *decken, dahta ~ dacta, gideckit ~ gidaht-*)[15]

Not all class I verbs in **-k-* underwent this change:

WS *wleċċan* 'to warm,' with attested past participles of *wlæht, wleht, wleċed*

This was therefore not a regular sound change, and probably not a PWGmc one. Using 'wake,' the history of the change was likely:

PGmc **wakjaną, *wakidē, *wakidaz* > PWGmc **wakjan, *wakidē, *wakid* > **wakjan, *wahtē, *waht* > OE *weċċan, weahte, weaht,* OS *wekkian, wahta*

{$\Delta\varepsilon_{WGmc} = 1$}

*C.2.22 *-dēs*

Similar to a southern WGmc innovation, in northern WGmc, the 2sg weak past ending was remodeled to take a final **-s* on the model of the pres. indic. It is difficult to

[15] It is unclear if the OHG examples illustrate the same change, because such syncope happened separately in OHG (see OHG).

say whether it happened at the same time or a later date (Ringe and Taylor 2014:77), though it is probably an extension of the southern innovation and not a separate one.

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.23 *-st*

The pres. indic. 2sg. ending **-st* spread to preterite presents with roots in **n*, yielding e.g., OE *canst*, OHG, OS *kanst* 'you know how,' etc. This must have happened after the northern WGmc pre-fric. nasal loss (cf. appx. D.1.1.1), since the sequences **ans* were not affected. The specific nature of this change reduces the likelihood that it was a series of parallel innovations (Ringe and Taylor 2014:101).

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.24 *-ik*

Most of the WGmc languages show extended forms of the non-singular acc. personal pronouns with the additional suffix **-ik*. Ringe (2014:125) states that this is likely a parallel innovation because it did not trigger i-umlaut in any of these forms, as would be expected from an inherited form. However, it could be a post-WGmc innovation that could have spread across the WGmc dialect continuum, since the odds of such a specific innovation (that targets an even more specific area of the paradigm) happening numerous times independently seem low. These ultimately were lost in favor of the short forms.

OHG *unsih* 'us (acc. pl.),' *iuwih* 'you (acc. pl.)'

OE *ūsiċ* 'us (acc. pl.),' *ēowic* 'you (acc. pl.)'

OS *unsik* ‘us (acc. pl.)’

$\{\Delta\varepsilon_{WGmc} = 1\} \vee \{\Delta\varepsilon_{OHG} = 1, \Delta\varepsilon_{OE} = 1\}$

*C.2.25 *-CijV- > *-CjV-*

The vowel **-i-* was syncopated in the sequence **-CijV-*. The change happened in OHG and northern WGmc after the breakup of WGmc, so this can represent either a parallel or shared post-WGmc innovation. At any rate, it would have to have happened after the northern WGmc remodeling of the class II weak present stem vowel **-ō-* became replaced with **-ō- ~ *-ōja-* (modelled off of class I; Ringe and Taylor 2014:156). PWGmc **sōkijan* ‘to seek’ > **sōkjan* > OE *sēċan*, OFr *sēka ~ sētsa*, OS *sōkian*, OHG *suohhen*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.2.26 [-voice] > [+voice]*

Whether it was during the PWGmc period or after the split, WGmc seems to show an innovation levelling the voiced Verner’s Law alternants in past stems of strong verbs (Ringe and Taylor 2014:100).

OE *hliehhan ~ hlihhan*, *hlōg*, *hlōgn* ‘laugh’

OHG *huob* ‘(s)he lifted,’ *huobun* ‘they lifted’ < PGmc **hōf, *hōbun*

$\{\Delta\varepsilon_{WGmc} = 1\}$

## *C.3 West Germanic Lexical Innovations*

### *C.3.1 *sī > *si(j)u*

A series of changes to the 3sg. and pl. pronouns occurred in WGmc. The PGmc fem. nom. 3sg. **sī* took on the fem. ending **-u*, becoming **si(j)u*. The masc. nom. and acc. 3pl. also took on an a-stem ending (> nom. **ijē*, acc. **ijq̄*).

$\{\Delta\varepsilon_{WGmc} = 2\}$

### *C.3.2 *wilī*

By regular sound change, word-final long **-ī* should have become PWGmc **-i*, but in the WGmc reflex for 'want (2sg.),' we may have evidence for what appears to be **-ī*. This may be due to levelling (Ringe and Taylor 2014:110).

$\{\Delta\varepsilon_{WGmc} = 1\}$

### *C.3.3 *þits/*þitt(i)*

Though the exact form of the reflex is unclear, all of the daughter WGmc languages show an innovative **i* in the root of the deictic 'that,' creating a new proximal deictic 'this.' It is difficult to reconstruct the ending confidently since there are no other examples of inherited word-final **-ts*. It may reflect **þat-si* (Ringe and Taylor 2014:102). OE *þis*, OFr, OS *thit*, OHG *diz*

This happened in an apparent series of stages: 1. 'this' took the same form as fully inflected 'that' + a clitic, 2. regular endings were added to these, producing doubly

inflected forms, and 3. one form of the stem was generalized (thus losing the internal inflection). The use of *-*i*- in the last stage cannot have been very old. At any rate, the fact that this took place in stages suggests it was a shared innovation that permeated the post-WGmc dialects.

$\{\Delta\varepsilon_{WGmc} = 1\}$

### *C.3.4 *sa > *siz*

**sū > *si(j)u*

The stem vowel of the 3sg. pronoun, **i ~ *e*, spread to the demonstrative 'that.' Thus, the masc. nom. sg. **sa* became **siz*, and the fem. nom. sg. **sū* became **si*(*j*)*u*. This means there was a merger of 'that' and the 3sg. pronoun in the latter case.

$\{\Delta\varepsilon_{WGmc} = 1\}$

### *C.3.5 *þrīz*

It seems that in WGmc, the numeral 'three' has analogically taken on the usual strong adj. gender endings (Ringe 2006:128, 131; Ringe and Taylor 2014:388). This could either be a late, shared innovation, or a series of parallel innovations (Ringe and Taylor 2014:121).

PGmc **þrīz* > OE *þrīe*, OHG *drīe*

$\{\Delta\varepsilon_{OHG} = 1, \Delta\varepsilon_{OE} = 1\} \vee \{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.6 *twō + *n*

The masc. nom./acc. pl. forms of the word ‘two’ take on an ending or series of endings having some realization of **n*. The exact realization of the word varies across the cognates, so they are not easily reconstructable (Bammesberger 2010). The examples are:

OE *twēġen* (< **twō-jVn-?*; Ross and Berns 1992:568-9)

ME *tweȝȝenn* (< **twaj(j)Vn-?*; Seebold 1968)

OFr, OS *twēne* (< **twainē*)

OHG *zwēne* (poss. also < **twainē*)

Bammesberger (2010) proposes that this reflects a relic form of an oblique of an old, pre-OE n-stem **twegan-* ‘pair.’

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.7 *dēdē > *dādī*

The 2sg. past for the word ‘did’ became reanalyzed on the model of the strong past. This constitutes a lexical analogy which caused this word to be unaffected by the levelling of past endings below (Ringe and Taylor 2014:76).

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.8 *þar > *þār; *hʷar > *hʷār*

Lengthening in the words ‘there’ and ‘where’ are not part of a regular lengthening of *a* under any circumstance; their cause is attributed to lexical analogy with to PWGmc **hār* (< PGmc **hēr*), which was already lengthened. The vowel in these forms was *a* in

PGmc and once the change of PGmc **ē* > PNWGmc **ā* occurred, the door was opened for this analogy to take place. This is a pair of lexically-specific sound changes that affected the whole of the PWGmc area. However, in the northern WGmc languages only, the vowel was additionally fronted in OE, ultimately in different ways in different dialects. Since these are two instances of irregular sound change, they constitute two separate innovations and therefore contribute two points to the collection of exclusively shared innovations.

OHG *dār*, OS *thār* (< PGmc **þar*; cf. GO, ON *þar*)

OHG *wār*, OS *hwār* (< PGmc **h$^{w}$ar*; cf. GO *ƕar*, ON *hvar*)[16]

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.9 *þē*

An uninflected relative particle **þē* (later > **þe*, likely under weak stress; Ringe and Taylor 2014:81) seems to have been formed in PWGmc:

OE *þe*, OFr, OS *thē*, OHG *de*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.10 *baum*

This word for 'tree' is attested primarily in WGmc from the following:

OE *bēam*, OFr *bām*, OS *bōm*, OHG *boum*

[16] The northern WGmc attestations are missing here because they quickly underwent a further fronting of these reflexes, discussed below.

In the other languages, we find ON *baðmr* and GO *bagms*, but as Ringe (2014:126) notes, the sound correspondences are not regular, so if there is any connection between them, it is far from direct.

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.11 *obat*

WGmc shows a distinct word for 'fruit' (Ringe and Taylor 2014:127).

OE *ofet*, OHG *obaʒ*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.12 *rindā*

This word for 'bark (of a tree)' appears exclusively in WGmc.

OE *rinde*, OS *rinda*, OHG *rinta*

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.13 *waskan*

The word for 'to wash' seems innovative.

OE *wascan*, OS *wōsk* (past), OHG *waskan* (ON *vaska* may have been borrowed from WGmc; Seebold 1970:539; Ringe and Taylor 2014:127)

$\{\Delta\varepsilon_{WGmc} = 1\}$

*C.3.14 *wolkn*

The PWGmc word for ‘cloud’ may constitute a lexical innovation.

OE *wolcen*, OFr *wolken*, OS, OHG *wolkan*

{$\Delta\varepsilon_{WGmc} = 1$}

*C.3.15 *gagang(?) > *gang*

Unlike the merging of vowels described above, simple dropping of the reduplication best explains the past tense of ‘(s)he went’ (e.g., OE *gang* ‘(s)he went’). According to Ringe and Taylor (2014:91), this is the only way to account for loss of reduplication in this verb.

{$\Delta\varepsilon_{WGmc} = 1$}

*C.3.16 *waht*

Ringe (2014:99) suggests that the form **waht* was originally stative (< **waken* ‘to be awake’), but became causative via analogy with paradigms like **bugjan* ‘to buy’ : **bohtē* ‘bought,’ and verbs of similar form to **wakjan* began to be pulled under its influence, much like **waljan* ‘choose’ had done. Most evidence is in OE.

{$\Delta\varepsilon_{WGmc} = 1$}

# APPENDIX D: NORTHERN WEST GERMANIC DEVELOPMENTS

## *D.1 Ingvaeonic Developments*

The term *Ingvaeonic* (Ingv) is used here to refer to all of northern WGmc (OE, OFr, and OS).

### *D.1.1 Ingvaeonic Phonological Innovations*

#### *D.1.1.1 [+nasal] > Ø*

One classic sound change is that of pre-fricative nasal loss. In all of the northern WGmc area, nasals that immediately preceded fricatives were lost, followed by compensatory lengthening and nasalization. This would have happened *before* the extension of the 2sg. indic. pres. ending **-st* (cf. appx. C.2.23; Ringe and Taylor 2014:101).

PGmc **gans* 'goose' > **gą̄s* > OE *gōs*

PGmc **tanþ-* 'tooth' > **tą̄þ* > OFr *tōth,* OE *tōþ*

PGmc **fimf* 'five' > **fį̄f* > OE, OFr, OS *fīf*

$\{\Delta\varepsilon_{Ingv} = 1\}$

#### *D.1.1.2 *e > *i / _m*

There was a raising of **e* to **i* before **m* in the northern WGmc area. This was technically a merger, but inherited stressed **im* was rare (Ringe and Taylor 2014:141).

PGmc **neman* 'to take' > OE, OS *niman,* OFr *nima ~ nema* (cf. OHG *neman,* ON *nema*)

$\{\Delta\varepsilon_{Ingv} = 1\}$

*D.1.1.3*a, *o > [+front]*

Most of the stressed low vowels which were not subject to the above conditional change became fronted. In OE, fronting did *not* happen before **w* (that was not followed by a high vowel), but it seems that it did in OFr. Again, the OS evidence is not clear, but there are some reflexes of *e* for **a* (Ringe 2006:125; Ringe and Taylor 2014:146-7). I am inclined to suspect that this change was also only partially realized in OS.

PGmc **h$^{w}$at* 'what?' > OE *hwæt*, OFr *hwet* (cf. ON *hvat*, OS *hwat*, OHG *waʒ*)

PWGmc **awal* 'hook, fork' > **awæl* > OE *awel* (where fronting does not occur in OE)

PWGmc **klāwō* 'claws' > OE *clāwa*, OFr *klēwe* (where fronting *does* occur in OFr)

PWGmc **jār* 'year' > OE *ġēar*, OFr *jēr*, OS *gēr* (where fronting occurs in OS)

Unstressed low vowels also became fronted, but OS *did* take part in this part of the fronting. They were fronted everywhere, even before nasals, but the nasal could not be in the same syllable (Ringe and Taylor 2014:152). The OS result is a varying spelling of *-a ~ -e*.

PWGmc **watar* 'water' > OE *wæter*, OFr *weter*, OS *watar ~ water*

PWGmc **gebā* 'gift (acc.)' > OE *ġiefe*, OFr *ieve*, OS *geƀa ~ geƀe*

$\{\Delta\varepsilon_{Ingv} = 1\}$

*D.1.1.4*-lþ- > *-ld-*

Word-medial **-lþ-* became **-ld-* in northern WGmc[17]. While this sequence appears as *-ld-* in southern WGmc as well, it is due to a later, regular OHG sound change of the segment **þ* (Ringe and Taylor 2014:155).

PWGmc **gulþīn* 'golden' > **guldīn* > OE *gylden*, OFr *gelden*, OS *guldin* (cf. GO *gulþeins*, ON *gullinn*)

$\{\Delta\varepsilon_{Ingv} = 1\}$

*D.1.1.5*sl > *ls*

There may have been a northern WGmc metathesis of **sl* to **ls* between unstressed vowels (de Vaan 2012). This may be partly shared with ON, since the same is observable in many words, even monosyllables (Noreen 1903:197), but there is little to support that other than the fact that northern WGmc and ON have been observed to share some innovations before.

PWGmc **smirwisl* 'ointment' > OE *smierels* (> WS *smyrels*), ON *smyrls*

$\{\Delta\varepsilon_{Ingv} = 1, \Delta\varepsilon_{ON} = 1\} \vee \{\Delta\varepsilon_{NNWGmc} = 1\}$

*D.1.1.6*ā, *ē > *ē*

This merger happened in the northern dialects of PWGmc during the PWGmc period. It is worth mentioning that this makes it impossible to tell whether there was syncretism

[17] Apparent exceptions, such as byforms like OE *feld* 'field' and *-felth* may reflect Verner's Law alternations (< **felþu- ~ *feldaw-*), and others may be due to paradigm levellings (Ringe and Taylor 2014:155-6).

of the 1sg past ending **-dō* to the rest of the paradigm in **-dē* (Ringe and Taylor 2014:76), or if it became the latter through this regular sound change.

$\{\Delta\varepsilon_{Ingv} = 1\}$

*D.1.1.7*h > Ø / _CC*

After the syncope of **i* in the sequence **-CijV-*, the segment **h* became lost before two consonants. OHG shows a few rare instances of participation in this change (Ringe and Taylor 2014:157). There seem to be some cases where OS did not undergo the change, and even OE shows some variance, which suggests that this innovation was not exactly regular:

PWGmc **niuhsijan* 'to spy' > *niuhsjan* (syncope) > **niusjan* > OE *nēosan* 'to seek out,' OS *niusian* 'to try,' OHG *niusen* 'to try' (cf. GO *bi-niuhsjan*, ON *nýsa*)

PWGmc **sehstō* ~ **sestō* 'sixth' > North. OE *sesta*, but WS *siexta* (cf. OS, OHG *sehsto*)

$\{\Delta\varepsilon_{Ingv} = 1\}$

*D.1.1.8*-z > Ø*

In the northern WGmc dialects, the reflex of word-final **-z* was lost in monosyllables, but was retained in southern WGmc:

PGmc **wiz* ~ **wīz* 'we' > PWGmc **wiz* > OE *wē*, OFr, OS *wī* (cf. OHG *wir*, GO *weis*, ON *vér*)

Due to similarities with changes in French, it has been suggested that this innovation may have originated as a substratum innovation from native speakers of Celtic languages (Brøndal 1917).

$\{\Delta\varepsilon_{Ingv} = 1\}$

*D.1.1.9*VfV, *VbV > *VbV*

Merger of intervocalic **f* and **b* to **[v]* (Ringe and Taylor 2014:100).

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.2 Ingvaeonic Morphological Innovations*

*D.1.2.1**-iw- > *-aw-

The sequence **-iw-* likely became **-aw-* in u-stem endings in northern PWGmc, as evidenced by the OE and OFr paradigms for the word 'son,' which show a strange merger of the dat. sg. and gen. sg. with the nom. pl. The first two are understandable, but the involvement of the latter is unusual. This is dated to before the loss of **-z* (Ringe and Taylor 2014:58) because the parallel PWGmc pattern of gen. sg. **-aw-z*, dat. sg. **-iw-i* and nom. pl. **iw-iz* would have been clearest during that time, opening the door for the extension of one realization to the rest of the pattern. The subsequent loss of **-i* eventually sealed the deal for the homophony and thus complete merger of these of these endings, resulting in the attested OE/OFr paradigms. The evolution would therefore have been:

dat. sg. *suna* < **sunau* < PWGmc **sunawi* < PGmc **suniwi*

gen. sg. *suna* < PWGmc **sunō* < **sunau* < PGmc **sunawz*

nom. pl. *suna* < **sunau* < **sunawi* < PWGmc **sunawiz* < PGmc **suniwiz*

This change therefore represents a very early Ingvaeonic innovation. This change is also partly attested in GO (Ringe 2006:272).

$\{\Delta\varepsilon_{Ingv} = 1\}$

*D.1.2.2*-ō*

Northern WGmc shows some alternative endings in the u-stems. The appearance of **-aw-* is discussed above, but an additional innovative ending **-ō* also appears for the dat. sg. and nom. pl. (Ringe and Taylor 2014:115): e.g., **suniwi* (**-ō*) 'son (dat. sg.).' Presumably, this arose around the same time.

$\{\Delta\varepsilon_{Ingv} = 1\}$

*D.1.2.3*-i- ~ *-ija- > class II*

The PWGmc-innovated alternation of **-i-* (in present stems) with **-ija-* in class I weak verbs was extended to class II weak verbs in northern WGmc to create similar patterns in **-ō- ~ *-ōja-* on the basis of class I verbs (Ringe and Taylor 2014:156). (Ringe and Taylor 2014:161). OS shared this innovation, but later lost it due to the strong influence of OHG.

PWGmc **ardōn* 'to dwell' > **ardōjan* > OE *eardian* (cf. OHG *artōn*)

It is possible that the pattern was even further extended to class III (producing **-ē- ~ *-ēja-*), but the evidence is only in OE:

PWGmc **wakē-* ‘to be awake’ > **wake-* ~ **wakēja-*? > Merc. OE *wæċċan*

The rest of northern WGmc seems to have merged class III into class II (e.g., OS *wakon* ~ *wacogean*, OFr *wakia*), which would suggest a possible exclusively continental northern WGmc innovation.

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.2.4 hund-*

A number of innovations affected the decad numerals in Northern WGmc. The PGmc suffix **-hund* in the decad numerals from seventy and above shows reanalysis as a prefix in both OE and OS (Ringe and Taylor 2014:122).

OE then spread the suffix *-tiġ* from the decads below seventy through the rest of them. OS shows the suffix *-ta* (it is unclear if it is related to OHG *-zo*).

OE *hundeseofontiġ*, OS *antsiƀunta, siƀuntig*, OHG *sibunzo, -zug* ‘seventy’ (cf. GO *sibuntehund* < PGmc **sibuntēhundą*)

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.2.5 3pl.*

In northern WGmc, there was much conflation of pl. forms with the 3pl. There was a merger of all of the plural inflections of finite verbs into the form of the 3pl. form, plus the 2pl. imp. merged with the form of the 3pl. indic. Consider OS vs. OHG as an example (Ringe and Taylor 2014:159):

| ‘to become’ | OHG | OS |
|---|---|---|

| | | |
|---|---|---|
| 1pl. | *wedumēs* | *werđađ* |
| 2pl. | *werdet* | *werđađ* |
| 3pl. | *werdant* | *werđađ* |

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.2.6 *-ōs*

Ringe and Taylor (2014:162-3) suggest that the *-*s* of northern WGmc masc. a-stem nom. pl. *-*ōs* might have been imported from the clitic found in the near-deictic 'this,' but this is uncertain. At any rate, an *-*s* was imported from somewhere during northern PWGmc.

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.2.7 *-ô* > *-a*

The PGmc adverb-forming derivational suffix *-*ô* shows reflexes in *-*a* in some archaic forms in the northern WGmc languages (Ringe and Taylor 2014:164). ON shows some examples too, suggesting a shared change with ON as well.

OE *sōna* 'immediately,' ON *víða* 'widely,' *-liga* '-ly'

$\{\Delta\varepsilon_{NNWGmc} = 1\}$

### *D.1.2.8 -ianne*

Innovative class II weak verbs in *-ianne* arise in Ingvaeonic (Ringe and Taylor 2014:79). This is a reflection of levelling from the *-*ja* inflection on nominal infinitives.

{$\Delta\varepsilon_{Ingv} = 1$}

*D.1.2.9 *-nō- ~ *-na- > class III*

In the northern dialects and ON, the few surviving fientive verbs in **-nō- ~ *-na-* appear in weak class II, while in OHG they belong to class III:

PGmc **liznō- ~ *lizna-* 'to learn' > OE *liornian*, OFr *lirnia*, OS *līnon*, OHG *lirnēn*

{$\Delta\varepsilon_{NNWGmc} = 1$}

D.1.2.10 **a, *o > [+nasal] / _ [+nasal]*
**a > [+round] / _ [+nasal]*

In stressed positions, low vowels became nasalized immediately before a nasal. In the case of **a*, this only happened when the following nasal was in the syllable coda, but not when followed by an intervocalic nasal. This was an Ingv innovation, and the subsequent rounding of nasalized stressed low vowels seems to have been as later consequent innovation (Ringe and Taylor 2014:142).

PGmc **fanhaną* 'to catch' > OE *fōn*, OFr *fā* (cf. OHG, OS, GO *fāhan*, ON *fá*)

PGmc **þanhtē* '(s)he thought' > OE *þōhte*, OFr *thōgte* (cf. OHG *dāhta*, OS *thāhte*, GO *þāhta*)

We occasionally find OS examples of the rounding (e.g., OS *rōmon* 'to strive'), confirming that the nasalization did happen in OS, but the rounding was only partially shared by OS.

{$\Delta\varepsilon_{Ingv} = 2$}

### *D.1.3 Ingvaeonic Lexical Innovations*

#### *D.1.3.1 *lagdun : *satte*

Whereas WGmc experienced syncope of **i* between flanking dental segments, there was an analogical extension of this syncope to an exception of this environment in the word 'lay' in northern WGmc, and it is not reflected in OHG:

PGmc **lagid*(*ēd*)*un* 'they laid' > PWGmc **lagidun* > **lagdun* > Merc. OE *læġdun*, OFr *leiden*, OS *lagdun*

Note that the same fate befell **-a-* in the passive fossilized form **haitadē* 'is called' (> **haittē* > OE *hātte*), which would mean that the syncope represents a regular syncope of short vowels between dental stops. On the one hand, this could have happened later; on the other, examples with **-i-* are way more abundant than **-a-*. These facts make it difficult to tell if this innovation was general to short vowels in that environment and not just **-i-*. It could therefore represent one single innovation, or a series of two similar innovations. ON *lagðu* shows the same innovation, though it is not entirely clear that this is shared.

$\{\Delta\varepsilon_{Ingv} = 1, \Delta\varepsilon_{ON} = 1\} \vee \{\Delta\varepsilon_{NNWGmc} = 1\}$

#### *D.1.3.2 *sindi*

Northern WGmc shows a merger of the 1pl., 2pl., and 3pl. of the present indicative of 'to be' into the form of the 3pl. Though the result appears to be a few varying forms, they are all based on the PGmc 3pl. **sindi*:

PGmc **sindi* 'they are' > OE *sind, sindon, sint*, OS *sind, sindun, sindon*, OFr *send*; 'are'

{$\Delta\varepsilon_{Ingv} = 1$}

### *D.1.3.3 **sek, *siz* > *Ø*

The northern WGmc languages all lost the third person reflexive pronoun. In OHG, only the dat. form **siz* was lost.

The reflexive possessive **sīn* has been shifted in meaning to the masc. 3sg. possessive 'his' in OFr, OS and OHG. This may have been from the influence of the latter (Ringe and Taylor 2014:165), in which case we would have further potential evidence for a 'continental' WGmc innovation, after the breakup into northern and southern.

{$\Delta\varepsilon_{Ingv} = 1, \Delta\varepsilon_{CWGmc} = 1$}

### *D.1.3.4 **Þ- + *-s*

The creation of a new proximal deictic 'this' by replacing the initial consonant of 'that' with **þ*, and the addition of **-s* to the end is a characteristic northern WGmc change (Ringe and Taylor 2014:102). Consider OE:

| | 'that' | 'this' |
|---|---|---|
| masc. nom. sg. | *sē* | *þē-s* |
| fem. nom. sg. | *sīo* | *þīo-s* |
| masc./neut. inst. sg. | *þȳ* | *þȳ-s* |
| nom./acc. pl. | *þā* | *þā-s* |

{$\Delta\varepsilon_{Ingv} = 1$}

### *D.1.3.5 **hi- ~ *he-*

In PGmc the reflex of the proximal deictic ‘this’ was an alternating byform. In harmony with the above innovation, it shifted meaning to become the 3rd person pronoun in northern WGmc (Ringe 2006:289).

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.3.6 **stā-*

The northern WGmc languages seem to have levelled the **ā*-variant of ‘stand,’ since OFr, OS show *stān* (< PGmc **stā- ~ *stai-*), whereas OHG shows both *stān* and *stēn* (< **stai-*; Ringe 2006:135).

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.3.7 **lais- ~ *laiz-*

Northern WGmc shows an innovative form for ‘less’ (Ringe and Taylor 2014:165): OS, OFr *lēs*, OE *læs*

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.3.8 **i- ~ *e- > *hi- ~ *he-*

Lexical replacement of the 3sg pronoun with the old word for ‘this.’

$\{\Delta\varepsilon_{Ingv} = 1\}$

### *D.1.3.9 **nigun*

Northern WGmc innovated a new reflex for 'nine' in place of the inherited **ne(w)un*. It is not clear where this innovative lexeme originated (Ringe 2006:87).

OE *nigon*, OFr *niugen*, OS *nigun*

$\{\Delta\varepsilon_{Ingv} = 1\}$

## *D.1.4 Ingvaeonic Syntactic Innovations*

### *D.1.4.1 *h$^{w}$at*

Scholarship on the semantics and syntax of OE *hwæt* (and its OS and ON cognates) in certain uses is extensive. Consider the first line of *Beowulf*:

| | | | | | |
|---|---|---|---|---|---|
| *Hwæt we* | *Gardena* | *in* | *geardagum* | *þeodcyninga* | *þrym* |
| hw. we | Spear-Danes.GEN | in | year-days.DAT | nation-kings.GEN | power.ACC |
| *gefrunon hu* | *ða* | *æþelingas* | *ellen* | *fremedon* | |
| heard how | then/those.NOM | princes.NOM | valor | performed | |

*"We truly know about the might of the nation-kings in the ancient times of the Spear-Danes how princes then performed deeds of valor."* (*Beowulf* 1-3; Bammesberger 2006)[18]

It has traditionally been classified as merely an interjection (Grimm 1837), but this may not be accurate. To sum up a long discussion, Walkden (2014) proposes that OE *hwæt* and its OS and ON cognates represent an innovative 'underspecification,' whereby

[18] Note the translation of *hwæt* here as 'truly.' Walkden (2014) likens its meaning to mod. EN *how*, as in *"How you've changed!"*

the word is understood to take different meanings depending on the formulaic structure or meaning of the utterance, tantamount to, e.g., understanding EN *what* to mean 'why' as in an utterance like **What did you do that?*

Walkden classifies this as a Northern WGmc innovation that may have spread to ON. Therefore, it may reflect a possible northern NWGmc innovation, if it is an innovation at all.

$\{\Delta\varepsilon_{NNWGmc} = 1\}$

### *D.1.4.2 *h$^{w}$aþeraz*

Walkden (2014) addresses a third stage of syntactic form that represents a second shift following the one that characterizes NWGmc (cf. appx. A.4.1). In OE, OS and ON, indirect questions that arose as a result of the shift in the syntax of questions with reflexes of PGmc **h$^{w}$aþeraz* became reanalyzed as direct questions (Walkden 2014:155). Consider OE:

> *Hwæðer ic mote lybban oð þat ic hine geseo?*
> *whether I may live until that I him see*
> *'Might I live until I see him?'* (Walkden 2014:148)

$\{\Delta\varepsilon_{NNWGmc} = 1\}$

## *D.2 Anglo-Frisian Developments*

### *D.2.1 Anglo-Frisian Phonological Innovations*

#### *D.2.1.1 *a > [+front]*

This is related to the first innovation listed for PWGmc as mentioned above, which described the analogical lengthening of **þar* to **þār* and **hʷar* to **hʷār* (cf. appx. C.3.8). In AF, the reflex of this sound was fronted in these forms. The fronting later took different forms in the subsequent dialects; in WS OE, it was a fronting of PWGmc **ā* to **ǣ*, while in OFr and other OE dialects, it was a change of PWGmc **ā* to **ē* (Ringe and Taylor 2014).

$\{\Delta\varepsilon_{AF} = 1\}$

#### *D.2.1.2 *ō > *ā / [-stress]*

Unstressed **ō* became unrounded in OE, OFr, and, only diallectally in OS (Klein 1977:479-87; Ringe and Taylor 2014:154).

PWGmc **ahtō* 'eight' > **ahtā* > OE *eahta*, OFr *achta*

$\{\Delta p_{AF} = 1\}$

### *D.2.2 Anglo-Frisian Morphological Innovations*

#### *D.2.2.1 *-an*

There is much uncertainty about the development of the inflectional paradigm of the n-stems in northern WGmc. What can be said with confidence is that masc. acc. sg. **-an*

was extended throughout the paradigm and to the fem. in Anglo-Frisian (Ringe and Taylor 2014:117).

{$\Delta\varepsilon_{AF} = 1$}

### *D.2.2.2 *-w-*

Throughout WGmc, the dialects have taken different courses of action to treat vowel hiatus in strong verbs with roots ending in vowels. Both OE and OFr use *-*w*- in these instances (Ringe and Taylor 2014:150-1).

OFr *grōwinge* 'growth, swelling'

North. OE *sāwa* 'to sow' < PNWGmc **sāaną* (cf. OHG *sāhen*, OS *sājen*)

{$\Delta\varepsilon_{AF} = 1$}

### *D.2.2.3 *-ē*

As mentioned in the section on Ingvaeonic (cf. appx. D.1.2.7) there were PGmc adverb-forming derivational suffixes in *-*ô* > northern WGmc *-*a*. In OE and OFr it appears as -*e*, reflecting PGmc *-*ē* (Ringe and Taylor 2014:164).

{$\Delta\varepsilon_{AF} = 1$}

### *D.2.2.4 -s, -þ, -aþ*

OE shows a systematic generalization of the voiceless Verner's Law alternates in the indic. pres. and weak past (e.g., 2sg. -*s*, 3sg. -*þ*, and 3pl. -*aþ*; Ringe and Taylor 2014:160). OFr shows the same, suggesting a common AF levelling.

{$\Delta\varepsilon_{AF} = 1$}

### *D.2.3 Anglo-Frisian Lexical Innovations*

#### *D.2.3.1 *þaizō, *þaimi*

In the word ‘that’ in PGmc, there was syncretism of the gen. pl. and dat./inst. pl. across all the genders. OE and OFr have further syncretized the nom. pl. and acc. pl. across the genders of that word (Ringe and Taylor 2014:123). Consider OE:

| | | |
|---|---|---|
| Nom. Pl. **þai* (masc.), **þū*? (neut.), **þōz* (fem.) | > | OE *þā* |
| Acc. Pl. **þą̄z*? (masc.), **þū*? (neut.), **þōz*?, *þāz*? (fem.) | > | OE *þā* |
| Gen. Pl. **þaizō* (masc./fem./neut.) | > | OE *þǣra* |
| Dat./Inst. Pl. **þaimi* (masc./fem./neut.) | > | OE *þǣm* |

{$\Delta\varepsilon_{AF} = 1$}

#### *D.2.3.2 *hwa-*

The paradigm for the interrogative ‘what?’ in PWGmc shows a mix of stems, with some in **hwa-* and some in **hwi- ~ *hwe-*. OE and OFr have mostly generalized the stem in **hwa-* (Ringe and Taylor 2014:125).

{$\Delta\varepsilon_{AF} = 1$}

### *D.2.3.3 *hū*

Anglo-Frisian has used this inherited inst. sg. version of the interrogative **hwa-* to take on the meaning of ‘how?’ (Ringe and Taylor 2014:166):

PGmc **hwō* ‘by what?’ > PWGmc **hū* > OE, OFr *hū* ‘how?’

{$\Delta\varepsilon_{AF} = 1$}

# APPENDIX E: OLD NORSE DEVELOPMENTS

## *E.1 Old Norse Phonological Innovations*

### *E.1.1 *-ô, *-ō > -ō*

Merger of word-final bimoraic and overlong vowels (Nielsen 2000:89). This merger never happened in WGmc (Ringe and Taylor 2014:60).

{$\Delta\varepsilon_{ON} = 1$}

### *E.1.2 *ār > er > ir / [-stress]*

Early runic inscriptions show a shortening and raising of the unstressed sequence **ār* (Noreen 1903:101; cf. Proto-Norse **swestār* > ON *systir*).

{$\Delta\varepsilon_{ON} = 1$}

### *E.1.3 *eu, *iu > i > e*

In unstressed syllables, **eu* and **iu* became *i* (later *e*; Noreen 1903:102).

ON *syner* 'sons' < PGmc **suniwiz* (cf. GO *sunjus*)

{$\Delta\varepsilon_{ON} = 1$}

### *E.1.4 *ai > ei*

ON changed the diphthong **ai* to *ei*. It must have happened relatively early, since it is already attested in very early runic inscriptions (Noreen 1903:42). There were a few environments that caused a different result. For example, the diphthong became

monophthongized to *ǽ* before **w* (Noreen 1903:78).

ON *heiti* < PGmc **haitē* 'I am called'

ON *heill* 'whole' < PGmc **hailaz* (cf. GO *hails*)

ON *einn* 'one' < PGmc **ainaz* (cf. GO *eins*, OE *ān*)

ON *hrǽ* 'body, carcass' < PGmc **hraiwą*

{$\Delta\varepsilon_{ON} = 2$}

*E.1.5 ǫ > u; a > e*

Short *ǫ* (and the *ǫ* that resulted from shortening of long *ǭ*) became raised to *u* in unstressed syllables. Later sound change turned this *u* into *o* (Noreen 1903:107; cf. the masc. given name *Ǫndoþr*, with the second element < *-hǫþr* 'war'). Similarly, *a* became *e* under the same conditions (cf. stressed *aptir* vs. unstressed *eptir* 'after').

{$\Delta\varepsilon_{ON} = 1$}

*E.1.6 *ai > á/ _ r/h*

When it found itself before *r*, the diphthong **ai* was monophthongized to long *á* (Noreen 1903:42).

ON *ár* 'early' (cf. GO *air*) < PGmc **airi*

ON *ár* 'messenger' (cf. GO *airus*) < PGmc **airuz*

ON *fár* 'shimmering' (cf. GO *faihs*) < PGmc **faihaz* 'colored'

{$\Delta\varepsilon_{ON} = 1$}

*E.1.7 e > i*

Early Runic *e* (< **ē* < **ai*), apparently in unstressed syllables, became *i* (Noreen 1903:101).

ON *heiti* 'I am called' < Early Runic *haite* < PNWGmc *haitē

ON *þeirri* 'that (fem. dat.)' < PGmc **þaizōi* (cf. GO *þizai*)

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.8 *eu, *iu > iu*

ON first changed **eu* to *iu* before a following syllable with *u*, but the shift later bled into all instances of **eu* (Noreen 1903:44).

Runic *liubu* 'dear' < PGmc **leubaz*

$\{\Delta\varepsilon_{ON} = 2\}$

*E.1.9 V > Ø / _(C)#*

Early in ON, every short, unstressed, unnasalized vowel was syncopated (Noreen 1903:111). It apparently took effect in a series of stages. In its early stages, it syncopated unstressed syllable-flanked vowels and unstressed vowels that followed unstressed vowels. It affected *a* the earliest, then *i*, followed by *u*. Later, unstressed, short root-initial vowels/unstressed short (ante)penultimate vowels and short vowels in word-final syllables were syncopated. Also syncopated were the vowels of unstressed monosyllabic enclitics (e.g., *mćltak* < *mćlta ek* 'I spoke,' Noreen 1903:116).

Runic *fatlaþʀ*[19] ‘equiped’ < **fatil-*

ON nom. sg. *-wulafʀ* (< **wulfaʀ*) vs. acc. sg. *-wulafa* (< **-wulfa* with nasalized **a*)

ON *granne* ‘neighbor’ (cf. GO *garazna*)

ON *dagr* ‘day’ < PGmc **dagaz*

ON *augna* ‘eyes (gen. pl.)’ < PGmc **auganǫ̂*

ON *mikellar* ‘big (gen. pl.)’ < **mikileʀōʀ*

The glides *j* and *w* became their respective high vowels when syncope of vowels that followed them caused them to stand alone (Noreen 1903:145).[20]

ON *Hari-* ‘army (given name element)’ < *Harja-*

ON *Aun*(*n*) ‘Edwin (masc. given name)’ < **auwinn* < **auðwinʀ*

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.10 i-umlaut*

This innovation is essentially identical to that attested in other early Gmc languages (e.g., OE). In fact, the presence of i-umlaut in each of the NWGmc languages suggests the possibility that it is a shared post-split change, and its complete absence in GO seems to support this. The pattern is simple: back vowels are fronted before *i* or *j* in a following syllable (which in some cases has since been lowered to *e* or apocopated altogether).

ON *søner* ‘sons’ (< *sonr* ‘son’), beside *syner* (< *sunr*)

ON *hýse* ‘houses’ < *hús* ‘house’

[19] Note that *ʀ* reflects the ON reflex of PGmc **z* which had begun to rhotacize.
[20] Not only is it common, but this seems like a practically unavoidable result of apocope after *j*/*w*, so I hesitate to treat it as a separate innovation.

ON *øþle* < **ǫðli* < **aðuli*

ON *hløpe* ‘(s)he walked’ vs. *hliópom* ‘(1pl.)’

ON *yke* ‘(s)he increased’ vs. *iukom* ‘(1pl.)’

ON *sýke* ‘sick’ vs. *siúkr*

ON *h(i)øgge* ‘(3sg. pret.)’ (beside *hygge*) vs. *hioggom* ‘(1pl. pret.)’

ON *døma* (cf. GO *dōmjan*)

Additionally, *y* became *i* when the following syllable contained *i*:

ON *ifir* ‘over’ (unstressed) vs. *yfir* (stressed)

After the period of i-syncope (ca. 700-850 AD), i-umlaut seems to have ceased to be a productive rule. Some words that did not undergo i-umlaut show apparent i-umlauted stem vowels from analogy with words that were i-umlauted (Noreen 1903:51).

$\{\Delta\varepsilon_{WGmc} = 1\} \vee \{\Delta\varepsilon_{ON} = 1\}$

*E.1.11 $\bar{V} > V$ / [-stress]*

Long vowels in unstressed syllables were shortened in ON (Noreen 1903:109):

ON *Ingemarr* (masc. given name) < **-mārr* (cf. Tacitus’ transcription *Inguiomērus*)

ON *hvatvetna* ‘whatever’ < *-véttr* ‘thing’

ON *tungu* ‘tongue (acc. sg.)’ (cf. OHG *zungūn*) < PGmc **tungōnų*

This included shortening of diphthongs:

ON *báðir* ‘both’ < **bá-þair*

ON *ok* ‘and’ < PGmc **auk*

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.12 ʀ-umlaut*

There was an apparent fronting of back vowels before *ʀ*, similar in effect to that of i-umlaut, though it occurred later.

ON *gler* ‘glass’ < PGmc **glasą*

ON *þær* ‘they (nom. pl. fem.)’ < **þaʀ* < PGmc **þōz*

ON *dýr* ‘animal’ < **diúʀ* < PGmc **deuzą*

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.13 u-umlaut*

Vowels of various heights and degrees of frontedness became rounded when unstressed *u*, *w* or *o* followed. A few examples

ON *mǫgr* ‘boy’ < PGmc **maguz* (cf. GO *magus*)

ON *møgom* ‘we can’ < *mega* ‘to be able’

ON *ykkr* ‘you (du.)’ < **ikkuʀ* < **inkwiʀ* < PGmc **inkwiz*

ON *øx* (~ *ǫx*) ‘axe’ < **ækus* < PGmc **akwisī*

ON *hjǫrtum* ‘hearts (dat. pl.)’ < **hiartum*

ON *Vǫlundr* ‘Wayland (mythological character)’ < PGmc **wēlandaz*

ON *mjǫl* ‘meal, flour’ < PGmc **melwą*

In what seems to be the same innovation, the rounding effect of labiovelars survives in the form of a rounded stem vowel:

ON *song* ‘(s)he sang’ < PGmc **sang*$^{w}$

In what also might be considered a branch of the same innovation, ON nouns with *-uðr* (< **-ōþuz*) show a raising of **ō* to **ū* before endings that contain **u* (Ringe and Taylor 2014:64). It also shows umlaut of nasalized labials as in the word for 'night' (e.g., **nahtų* > *nótt*; Ringe 2006:216).

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.14 *e > *ea > ja; *e > *eu > jo*

Breaking of **e* occurred in heavy syllables that did not begin with sonorants or *v* (Crawford 2017). If the syllable was followed by *a*, the result was *ja*. If the following vowel was *u*, the result was *jo*. However, often *jǫ* appears via analogy with u-umlauted stems (Noreen 1903:73).

ON *hjálpa* 'to help' < **helpan* < PGmc **helpaną*

ON *hjarta* 'heart' < **herta* < PGmc **hertô*

ON *jǫrð* 'earth' < **jǫrðu* < **erðu* < PGmc **erþō*

ON *Jamtaland* 'Jämtland (province of Sweden)' < PGmc **ematalandą*(?)

Before velars, however, **eu* became *jú* (Ringe and Taylor 2014:88-9):

ON *mjúkr* 'soft, meek' < PGmc **meukaz*

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.15 *au > ó*

The diphthong **au* was monophthongized to *ó* before later syncopated **h* (Noreen 1903:79).

ON *hór* ‘high’ < **hóhaʀ*(?) < PGmc **hauhaz*

{$\Delta\varepsilon_{ON} = 1$}

*E.1.16 iu > jú / f, g, k, p*

The diphthong *iu* (< PGmc **eu*) became lengthened before *f, g, k,* and *p*. Elsewhere it became *jó* (Noreen 1903:80).

ON *sjúkr* ‘sick’ < PGmc **seukaz*

ON *ljúfr* ‘beloved’ < PGmc **leubaz*

ON *þjóð* ‘a people, folk’ < PGmc **þeudō*

{$\Delta\varepsilon_{ON} = 1$}

*E.1.17 V > $\bar{V}$*

Short vowels became long following the loss of an immediately following consonant or vowel (Noreen 1903:91).

ON *nár* ‘corpse’ < **nauʀ* < **nawiʀ*

ON *fár* ‘few’ < PGmc **fawaz*

{$\Delta\varepsilon_{ON} = 1$}

*E.1.18 V > V̄ / _ CC*

Vowels were lengthened before serveral types of consonant clusters, including the sequences *ht* (later assimilated to *tt*), *rh*, *lh* (later simplified to *r* and *l*), and before essentially any *l* + consonant cluster.

ON *dótter* 'daughter' < PGmc **duhtēr*

ON *átta* 'eight' < PGmc **ahtōu*

ON *fýre* 'pine, fir' < PGmc **furhō*

ON *Váler* 'Celts' < PGmc **walhōz* 'foreigners' (cf. EN *Wales, Welsh*)

ON *hálfr* 'half' < PGmc **halbaz*

In another similar innovation, vowels were lengthened before tautosyllabic *r* (< ʀ < **z*; Noreen 1903:93).

ON *úr*/*ór*/*ýr* 'out (of)' < PGmc **uz*

{$\Delta\varepsilon_{ON} = 2$}

*E.1.19 V̄ > V / _CC*

Before other consonant clusters, originally long vowels became shortened (Noreen 1903:93).

ON *hann* 'he' < **hānaʀ*

ON *þinn* 'your(s)' < PGmc **þīnaz* (cf. OE *þīn*, OHG *dīn*)

ON *brullaup* 'wedding' < earlier *brúþlaup*

This also included a diphthong:

ON *ekki* 'nothing' < **eitt* 'one' + *-gi* '(neg. suff.)'

{$\Delta\varepsilon_{ON}$ = 1}

*E.1.20 *ht > tt*

The sequence **ht* became geminate *tt* via assimilation (e.g., ON *átta* ‘eight’ < PGmc **ahtōu*). Aside from this change and the shift to *k* before *s*, word-medial and word-final instances of *h* were otherwise lost in ON (Noreen 1903:147):

Runic *wīju* ‘consecration’ (cf. OHG *wīhiu*)

ON *þó* ‘though’ < PGmc **þauh* (cf. OHG *thoh*, OE *þēah*)

{$\Delta\varepsilon_{ON}$ = 2}

*E.1.21 *j > Ø / # _*

Word-initial **j-* was lost in ON (Noreen 1903:148):

ON *ungr* ‘young’ < PGmc **jungaz* (cf. OHG *jung*)

ON *ostr* ‘cheese’ < PGmc **justaz* (cf. Finn. *juusto*, Lat. *ius*)

{$\Delta\varepsilon_{ON}$ = 1}

*E.1.22 w > Ø / # _*

Word-initial *w-* was lost in a few circumstances. It was lost before rounded (long and short) vowels *o*, *u*, *ø*, and *y*, before *r* with a following rounded vowel, and before *l* (Noreen 1903:150; Crawford 2017):

ON *Óðinn* ‘Odin’ < PGmc **wōdanaz*

ON *orð* ‘word’ < PGmc **wurdą*

ON *róta* ‘to root, dig’ < PGmc **wrōtaną*

ON *litr* ‘color’ < PGmc **wlitiz* ‘appearance’

In a similar effect, *w* is also lost *after* rounded vowels, or after consonants that were preceded by rounded vowels (Noreen 1903:150 notes that loss of *w* after consonants other than *k* or *g* always involved a proceeding rounded vowel that was long). Personal names provide plentiful examples:

ON *Hróaldr* < *Hrōðwaldʀ* < PGmc **hroþ* + **walþuz*

ON *ótta* ‘pre-dawn morning’ (cf. GO *ūhtwō*)

{$\Delta\varepsilon_{ON} = 1$}

*E.1.23 þ > Ø / _ l*

The interdental *þ* was lost before *l* in ON (Noreen 1903:152):

ON *mál* ‘language’ < PGmc **maþlą* (cf. GO *maþl*)

ON *nál* ‘needle’ < PGmc **nēþlō* (cf. OHG *nadala,* OE *nǣdl*)

{$\Delta\varepsilon_{ON} = 1$}

*E.1.24 *z, *r > *r*

As mentioned (cf. appx. C.1.18), this is an ON innovation that is probably independent from the identical WGmc change. The ON version seems to have been later, since the two sounds are preserved by the Early Runic period, and a distinct ON innovation (**ai > á/_r*) happened before it (Noreen 1923; Ringe and Taylor 2014:82).

PGmc **aiz* ‘bronze’ > ON *eir* (cf. GO *aiz*)

PGmc **maizan* ‘more’ > ON *meiri* (cf. GO *maize*)

$\{\Delta\varepsilon_{ON} = 1\} \vee \{\Delta\varepsilon_{NWGmc} = 1\}$

*E.1.25 *kj, *gj > kkj, ggj*

A gemination of stops before **j*, similar to the PWGmc innovation, seems to have occurred in ON. In ON, however, it appeared later and affected only velar stops (Noreen 1923; Ringe and Taylor 2014:52).

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.26 bera*

In PGmc, **e* became **i* when the following syllable contained **i*. In ON, however, this rule has been dropped (Ringe 2006:220-1). Consider the verb ‘to carry,’ where *e* has been levelled throughout the paradigm:

ON *berið* < PGmc **biridi* ‘carries’

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.27 *i > *e*

Similar to the post-PNWGmc lowering of **u* to **o*, there was a lowering of **i > *e* in ON and not in WGmc, with the exception of two words: OE, OS, OHG *wer* (< PGmc **wiraz*, poss. **weraz*), and OE, OHG *nest* (< PGmc **nistaz*, poss. **nestaz*; Ringe and

Taylor 2014:34). This is therefore probably an ON innovation, though a similar one happened in southern WGmc, almost certainly unrelated. Noreen (1903) lists the cases as being before a lost *h* or nasal, and before *ʀ*.

ON *drekka* ‘to drink’ < PGmc **drinkanǫ*

ON *mér* ‘me (dat.)’ < PGmc **miz* (cf. OHG *mir*, GO *mis*)

{$\Delta\varepsilon_{ON} = 1$}

*E.1.28 á, ǫ > ǫ*

It is claimed that ON merged *ǫ* and *á* into the orthographic form <*á*>, but it is understood to have actually been more like *ǫ* phonetically (Noreen 1903:82; e.g., ON *sár* ‘wound’ vs. earlier *sǫr*).

{$\Delta\varepsilon_{ON} = 1$}

*E.1.28 *d > ð / *r _*

ON exhibits allomorphy of inherited **d* as a fricative after the reflex of **r*. GO and WGmc show the reflex of **d* as a stop in this position. It may be an ON innovation.

{$\Delta\varepsilon_{ON} = 1$}

*E.1.29 *zd, *zn > dd, nn*

Clusters with reflexes of **z* followed by an alveolar/dental consonant resulted in an assimilated gemination of the latter (Noreen 1903:144).

ON *hodd* ‘treasure’ < PGmc **huzdą* (cf. OE *hord*)

{$\Delta\varepsilon_{ON} = 1$}

*E.1.30 mn > fn*

The inherited cluster *mn* changed its first element to /*v*/ (<*f*> (< **b*)) in ON (Noreen 1903:145).

ON *nafn* ‘name’ < PGmc **namô* (it seems ON has actually abstracted the form **namn*- of the pl. into the sg.; cf. OE *nama*, OHG *namo*)

ON *Fáfner*/*Fáfnir* (mythological dragon) < **faðmnir*

{$\Delta\varepsilon_{ON} = 1$}

*E.1.31 sá*

ON shows lengthening of PNWGmc short monosyllabic words (e.g., *sá* ‘that (nom. sg. masc.)’ < PNWGmc **sa*). As mentioned in Appendix C (cf. appx. C.1.15), it could be shared with WGmc.

{$0 \leq \Delta\varepsilon_{ON} \leq 1$}

*E.1.32 -r > C / [+alveolar] _*

Word-final -*r* is assimilated to the preceding consonant provided it is alveolar:

ON *himinn* ‘heaven’ < **himinr*

{$\Delta\varepsilon_{ON} = 1$}

*E.1.33 *w > v*

It is worth considering that this may have had some influence on the same change later in continental WGmc.

{$\Delta\varepsilon_{ON}$ = 1}

*E.1.34 ðt > tt*

Sequences of *d*, *ð* followed by *t* assimilated into *tt*. This is primarily evident in neuter adjective inflection (e.g., *breiðr* 'wide (masc.)' vs. *breitt* (neut.); Noreen 1903:257). In a similar effect, *n* before *t* became assimilated, and the sequence simplified (e.g., *heiðenn* 'heathen (masc.)' vs. *heiðet* (neut.).

{$\Delta\varepsilon_{ON}$ = 1}

*E.1.35 Ø > t*

An epenthesis of *t* occurs in a number of cases between two adjacent alveolars of different types. In particular, *ll* + *s* > *lts* (<*lz*>), *nn* + *s* > *nts* (<*nz*>), and *s* + *r* > *str* (Noreen 1903:196, 328). Similarly, *d*, *ð* became *t* before *s*, yielding *z*, as in many mediopassive examples (e.g., *kvað* 'spoke (1, 3sg.)' + -*s*(*k*) > *kvaz*(*k*)). GO shows a similar effect in some inflectional endings, but it is probably unrelated.

{$\Delta\varepsilon_{ON}$ = 1}

*E.1.36 berið*

In PGmc, **e* became raised to **i* when the following syllable contained **i*. This ultimately led to an alternation between the two in the same environment. In ON, that alternation has been levelled entirely to **e* (Ringe 2006:221). The verb 'to carry' is a classic example:

PGmc **beranᾳ* 'to carry,' **birid* 'you carry' > ON *bera, berið*

$\{\Delta\varepsilon_{ON} = 1\}$

*E.1.37 *ī*

As mentioned in the section on GO (cf. appx. B.1.3), ON and GO exhibit **ī* for PGmc **iji* after heavy syllables (Ringe 2006:224), which means that this might be a shared innovation between NGmc and EGmc.

$\{\Delta\varepsilon_{NEGmc} = 1\} \vee \{\Delta\varepsilon_{ON} = 1, \Delta\varepsilon_{GO} = 1\}$

*E.1.38 *hnut > hnot*

Stressed **u* in root-nouns became lowered to *o* in ON:

PGmc **hnut-* 'nut' > ON *hnot* (cf. OHG *nuʒ*, OE *hnutu*)

PGmc **burg-* 'fort' > ON *borg* (cf. OE, OS, OHG *burg*)

$\{\Delta\varepsilon_{ON} = 1\}$

## *E.2 Old Norse Morphological Innovations*

### *E.2.1 *sezō, etc.*

In reduplicating class VII verbs, there was a reinterpretation of sequences in past tenses as a suffix. For example, ON *sera* 'I sowed' < **sezō* (**ō* via analogy with typical past endings) < **sezu*, and *rera* 'I rowed' < **rerō*, where ON *-a* has been reinterpreted as a 1sg. suffix, leading to the creation of 2sg. *serir, rerir* and 3sg. *seri, reri*. After the deletion of the word-final vowel, the sequence *-er-* has been reinterpreted as a suffix, yielding *grer-* : *gróa* 'to sprout,' etc. Thus, these represent two ON innovations. A similar process to the latter yielded an infix in OHG (Ringe and Taylor 2014:92).

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.2.2 *-nnz > -ðr*

ON apparently changed the nom. sg. ending **-nnz* to *-ðr*. The word 'man' is a prime example:

ON *maðr* 'man' < PNWGmc **mannz*

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.2.3 3sg., 2sg. > 2sg.*

The distinct inherited verbal inflection for the 3sg. pres. indic. was lost via syncretism with the 2sg.:

ON *telr* 'tell(s) (2sg., 3sg.)' < PGmc **talisi* (2sg.), **taliþi* (3sg.)

{$\Delta\varepsilon_{ON} = 1$}

### *E.2.4 *-usi/*-isi > -r*

ON replaced the nom. sg. ending of PNWGmc fem. nouns in **-usi/*-isi* with *-r* (< i-stem ending **-iz*; Noreen 1923; Ringe and Taylor 2014).

{$\Delta\varepsilon_{ON} = 1$}

### *E.2.5 góðir*

ON has imported the final consonant of nominal inflections into the masc. nom. pl. of strong adjectives, as exemplified by *góðir* 'good' (cf. OHG *guote,* OS, OE *gōde* < PGmc **gōdai*; Ringe and Taylor 2014:25).

{$\Delta\varepsilon_{ON} = 1$}

### *E.2.6 koma*

ON has levelled out the u-umlauted stem vowels of 1sg. pres. verbs throughout the paradigm. We therefore find *o* in place of expected *u* in, e.g., *koma* 'to come' (cf. OE *cumu*, OS *kumu*, OHG *quimu*).

{$\Delta\varepsilon_{ON} = 1$}

*E.2.7 cl. IV weak verbs > cl. II*

ON inflected PGmc class IV weak verbs entirely like class II weak verbs (e.g., originally class IV *vakna* ‘to wake (up)’ takes all the same endings as class II *kalla* ‘to call’; Ringe 2006:176; 2014:38).

$\{\Delta\varepsilon_{ON} = 1\}$

*E.2.8 -u(-)*

As mentioned (cf. appx. A.2.8), the appearance of the ending *-u(-)* in fem./neut. n-stems may have been shared, but its spread throughout their respective paradigms was not. In the case of ON, it spread unconditionally throughout the paradigm. In WGmc, it seems that the distribution was restricted to before *-n-* (Ringe and Taylor 2014:62).

$\{\Delta\varepsilon_{NWGmc} = 1, \Delta\varepsilon_{ON} = 1, \Delta\varepsilon_{WGmc} = 1\}$

*E.2.9 -ar*

The gen. sg. ending *-s* has been replaced by the ending *-ar* in many a- and i-stem words (Noreen 1903:218), and shows variation in many others. The two seem to have been in competition for some time

ON *hlátrar* ‘of laughter’ < PGmc **hlahtras*

$\{\Delta\varepsilon_{ON} = 1\}$

*E.2.10 -inn*

The definite article *enn*, *inn* became suffixed to nouns in ON by 1100 AD (Noreen 1903:280-1; cf. *dag* 'day' > *dagenn* 'the day').

$\{\Delta\varepsilon_{ON} = 1\}$

*E.2.11 -sk*

A characteristic ON innovation is the creation of the so-called 'mediopassive.' Other pronouns show the same type of encliticization, such as *-mk* (< *mik*) and *-m* (< **-mʀ*).

$\{\Delta\varepsilon_{ON} = 1\}$

*E.2.12 a-stems*

In the a-stems, the *-r* of the acc. pl. ending *-ar* is dropped, neutralizing the acc. and gen. pl. endings.

$\{\Delta\varepsilon_{ON} = 1\}$

*E.2.13 i-stems*

The i-stem shows dat. sg. ending *-i* in some words, apparently imported from the a-stems (Noreen 1903:234). The i-stems also regularly show acc. pl. ending *-ir* in the fem. inflection, a deviation from PGmc.

$\{\Delta\varepsilon_{ON} = 2\}$

### *E.2.14 Cons. stems*

The only apparently regular change in inflection of the consonant stems is the analogical extension of the nom. pl. ending *-r* to the acc. pl. (e.g., nom./acc. pl. *bækr* 'books').

{$\Delta\varepsilon_{ON}$ = 1}

### *E.2.15 an-stems*

The pl. of the an-stems has taken on the inflection of the a-stems (Noreen 1903:242).

{$\Delta\varepsilon_{ON}$ = 1}

## *E.3 Old Norse Lexical Innovations*

### *E.3.1 muga*

ON derived a weak verb *muga* 'to be able' from **mag* '(s)he can' (Ringe 2006:231), though *mega* seems to have prevailed (> IC *mega*).

{$\Delta\varepsilon_{ON}$ = 1}

### *E.3.2 nafn, vatn*

The ON n-stems 'name' and 'water' have been remodeled as a-stems (*nafn* < PGmc n-stem **namô*; neut. *vatn* < PGmc r/n-stem **watōr*; Ringe 2006:275, 276).

{$\Delta\varepsilon_{ON}$ = 2}

### *E.3.3 lifa*

According to Ringe and Taylor (2014:94), the verb ‘to live’ has “been shifted into the majority class III pattern.”

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.3.4 þrettán*

The reflex for ‘thirteen’ seems to reflect a different form of ‘three’ in OHG, ON, and OE. Ringe (2006:288) suggests that the original was probably PGmc **þri-*, and each daughter language innovated. In OE, the form used was that of the masc. acc.

$\{\Delta\varepsilon_{ON} = 1, \Delta\varepsilon_{OHG} = 1, \Delta\varepsilon_{OE} = 1\}$

### *E.3.5 þér*

A new 2pl. was formed through importation of the 2pl. verb ending to the inherited pronoun *ér* (i.e., *-ð + ér > þér*).

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.3.6 vega*

The ON word *vega* ‘to fight’ took on its form via lexical analogy with *vega* ‘to move’ (Ringe 2006:103).

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.3.7 sé*

Ringe (2006) notes that earlier ON *sjá* may reflect a remodelling of the subj. of 'to be' on the basis of the thematic 1sg. pres. opt. (like GO *sijau*). The later ON reflex of the 1sg. subj. was remodeled to *sé* on the basis of the 3sg. (< **sijē*). The same happened in OHG and possibly in OE (Ringe 2006:149). These probably represents independent innovations.

$\{\Delta\varepsilon_{ON} = 1, \Delta\varepsilon_{OE} = 1, \Delta\varepsilon_{OHG} = 1\}$

### *E.3.8 hann*

ON shows an apparently innovative lexeme *hann* (< PNGmc **hānaʀ*) for 'he.'

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.3.9 nǫkkurr*

Early in the history of ON, a new form of the word 'some' was formed from a contraction of PNGmc *ne-wait-ek-hwarjaʀ* 'I know not who' > *nǫkkurr*

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.3.10 gøra*

The word 'do' (**dōną*) was replaced in ON with its reflex of **garwijaną* 'to prepare' > *gøra*.

$\{\Delta\varepsilon_{ON} = 1\}$

*E.3.11 ugga*

The word for ‘to fear’ may be an ON lexical replacement.

$\{\Delta\varepsilon_{ON} = 1\}$

*E.3.12 gamall*

ON innovated a lexical replacement of inherited **aldaz* ‘old’ with the new form *gamall* (Ringe 2006).

$\{\Delta\varepsilon_{ON} = 1\}$

*E.3.13 karl*

The word for ‘man (adult male)’ is *karl* in ON. Besides a few traces in other varieties, it is predominant in NGmc.

$\{\Delta\varepsilon_{ON} = 1\}$

*E.3.14 eigi*

ON *eigi*/*ekki* ‘not’ replaced the inherited word for ‘not’ early in the history of ON (Starostin 2016).

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.3.15 kjǫt*

The word for ‘meat’ was replaced early in the history of ON with a replacement *kjǫt* (Starostin 2016).

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.3.16 eldr*

The word for ‘fire’ (**fō-n ~ *fū-r*) was replaced with a reflex of *eldr* early in the history of NGmc (Starostin 2016).

$\{\Delta\varepsilon_{ON} = 1\}$

### *E.3.17 margr*

ON has innovated a new positive adjective *margr* ‘big’ alongside its inherited comparative *meiri* and superlative *mestr* (Ringe 2006:284).

$\{\Delta\varepsilon_{ON} = 1\}$

## *E.4 Old Norse Syntactic Innovations*

### *E.4.1 V2*

According to Walkden (2014), V2 and V3 syntactic structures were probably both prevalent and varied depending on information structure in PNWGmc. It is likely that both ON and OS (as well as later OHG) innovated a V2 syntactic structure as a result of a reanalysis of ‘accidental’ V2 constructions as ‘necessarily V2.’ Evidence for the

plausibility that such an innovation can be spread through language contact is provided by the fact that northern Middle English is a more strongly V2 variety than its southern counterparts as a result of contact with the NGmc variety spoken by Scandinavian settlers.

$\{\Delta\varepsilon_{ON\text{-}OS\text{-}OHG} = 1\} \vee \{\Delta\varepsilon_{ON} = 1\}$

# APPENDIX F: OLD HIGH GERMAN DEVELOPMENTS

## *F.1 Old High German Phonological Innovations*

### *F.1.1 *p, *t, *k > pf, ʒ, hh*

One of the most famous and sweeping sound changes within OHG also happens to be one of the earliest. Popularly known as the High German Consonant Shift, it is comprised of a series of changes (Wright 1888; Braune and Reiffenstein 2004):

The voiceless stops became weakened to fricatives in medial or word-final position.

PWGmc **slāpan* 'to sleep' > OHG *slāfan* (cf. OE *slāpan*)

PGmc **etanǫ* 'to eat' > OHG *eʒʒan* (cf. OE, OS *etan*, GO *itan*)

PGmc **ek* ~ **ik* 'I' > OHG *ih* (cf. OE *ic*, OS *ec*)

In initial position, in medial position after sonorants, and when geminate, the same plosive segments became affricates:

PWGmc **applu* 'apple' > OHG *apful* (cf. OE *æppel*, OS *appul*)

PWGmc **tehuni-* 'ten' > OHG *zehan* (cf. OE *tīen*, OS *tehan*)

PWGmc **wakjanǫ* > OHG *wehhan* ~ *wechhan* (cf. OS *wekkian*)

The voiced stops became devoiced:

PGmc **beranǫ* 'to carry' > OHG *peran* ~ *beran* (cf. OE *beran*)

PGmc **bidjanǫ* 'to request' > PWGmc **bid$^{j}$d$^{j}$an* > OHG *bitten* (cf. OE *biddan*, OS *biddian*)

Treatment of the voiced stops was generally not uniform across the OHG dialects, except for the shift of geminate **gg* to *kk*, which remained uniform (cf. Braune and Reiffenstein 2004:88; e.g., *rucki* 'back' < PWGmc **hrug$^{j}$g$^{j}$a* < PGmc **hrugjaz*).

{$\Delta\varepsilon_{OHG} = 3$}

*F.1.2 *w > Ø / _ r, l*

Sequences of initial **wl-* or **wr-* became simplified to *l-* and *r-* respectively (Braune and Reiffenstein 2004:108).

OHG *rëhhan* 'to pursue' < PGmc **wrekanǫ* (cf GO *wrikan* 'to persecute,' OS, OE *wrecan* 'to expell')

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.3 joh*

Rounded *o* in place of expected *a* is found in some short, unstressed words in OHG (cf. OHG *joh* 'and' vs. GO *jah*, OHG *oh* 'but' vs. GO, OS *ak*; Braune and Reiffenstein 2004:27).

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.4 *e > i / _ u*

According to Ringe and Taylor (2014:36), in discussing strong class I presents, it is mentioned that there was a raising of **e* to *i* before syllables containing *u*. This change is restricted to OS and OHG.

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.5 *CC > C*

Geminates were simplified in a number of circumstances. Word finally, before other consonants, and after long vowels:

PGmc **swimmaną* 'to swim' > OHG *swimman*, pret. sg. *swam*

PGmc **kunnaną* 'to know, be able to' > OHG *kunnan*, pret. sg. *konda*

OHG *slāfan* 'to sleep' ~ *slāffan*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.6 *h- > Ø / # _ C*

Initial **h*- was lost before consonants, and **h*$^{w}$- became simplified to *w*- (Braune and Reiffenstein 2004:147):

PGmc **hlahjaną* 'to laugh' > OHG *lahhan* (cf. OE *hliehhan*, GO *hlahjan*)

PGmc **h*$^{w}$*ar* 'where' > OHG *wār* (cf. OS *hwār*, OFr *hwēr*)

PGmc **hnappōną* 'to pluck' > OHG *naffezzen* 'to fall asleep' (cf. OE *hnappian*)

PWGmc **hrugi* 'back (body part)' > OHG *rucki* (cf. OE *hryċġ*, OFr *hregg*)

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.7 *-hw-, *-h- > -h-*

Medial **-hw*- and **-h*- merged into *-h*- (Wright 1888:35; e.g., PGmc **seh*$^{w}$*aną* 'to see' > PWGmc **sehwan* > *sehan* (cf. GO *saihwan*)). The same appears to have happened in OE (cf. appx. G.1.10) and OS, but it is unclear if this is a WGmc innovation or separate innovations.

$\{\Delta\varepsilon_{OHG} = 1, \Delta\varepsilon_{OE} = 1\} \vee \{\Delta\varepsilon_{WGmc} = 1\}$

*F.1.8 *-i- > Ø*

Identical to a (post-)WGmc innovation mentioned above (cf. appx. C.2.21), *-*i*- was lost before the past suffix in class I verbs with roots in *-*k*-, but in OHG they were lost after **p*, **t*, as well as **k* (Kiparsky 2009; Ringe and Taylor 2014:98).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.9 Ø > -h-*

Between two vowels, it was not uncommon for *h* to be epenthesized as a remedy for vowel hiatus. This was primarily prevalent in verbs in *ā* and *ou* (Bremer 1886; Braune and Reiffenstein 2004:147):

OHG *sāhan* 'to sow' < earlier *sāan*

OHG *blouhan* 'to bloom' < ealier *blouan*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.10 i-umlaut*

OHG shows i-umlaut in only the inherited vowel **a* (Wright 1888:11). The other vowels apparently began to show its effect later (i.e., *u* being written as <*iu*>), but this was sporadic in very late OHG (Braune and Reiffenstein 2004:55).

PGmc **gastīz* 'guests' > PWGmc **gastī* > OHG *gesti*

PGmc **harjaz* ‘army’ > PWGmc **hari* > OHG *heri*

In what may be considered the same innovation, unstressed *-a-* often became completely assimilated to *-i-* (Braune and Reiffenstein 2004:70).

$\{\Delta\varepsilon_{WGmc} = 1\} \vee \{\Delta\varepsilon_{OHG} = 1\}$

*F.1.11 *ē > ie*

PWGmc long **ē* was broken into the diphthong *ie*. According to Wright (1888:13-14), the orthography shows a series of stages within the change (**ē > ea > ia > ie*).

PGmc **hir* ‘here’ > PWGmc **hēr* > OHG *hier*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.12 -e > -ea, -ia > -a*

The ending *-e* in the strong jō-stems seems to have changed to *-ea, -ia* by the 8th century (allegedly via analogy with ō-stems like *geba* ‘gift’; Braune and Reiffenstein 2004:198). It then further shifted to *-a* in the 9th century.

Early OHG *sunte* ‘sin (nom.)’ > *suntea* > *sunta*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.13 *au > ou; *ai > ei; *eu > iu*

Diphthongs in OHG underwent a minor assimilation of the first vowel to the second (Braune and Reiffenstein 2004:58-9). In the case of **ai* and **eu*, the vowel was raised. In

contexts other that before coronal consonants, the diphthong **au* raised and rounded the first vowel to *ou*. In certain environments, **ai* and **au* became completely monophthongized.

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.14 *ō > uo*

Long, stressed **ō* was broken into the diphthong *uo*, with apparent intermediate stages of *oa* and *ua* (Wright 1888:14; Braune and Reiffenstein 2004:39-43).

PGmc **fōts* 'foot' > OHG *fuoʒ*

PGmc **gōdēmaz* 'good (dat. pl.)' > OHG *guotēm* (cf. GO *godaim*)

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.15 *au > ō*

Before coronal consonants, PWGmc **au* became monophthongized to *ō* in OHG. Otherwise, it became *ou* (Wright 1888:15; Braune and Reiffenstein 2004:47-9). OS seems also to have produced *ō*, making this a potentially shared innovation.

PGmc **raudaz* 'red' > OHG *rōt* (cf. GO *rauþs*, OS *rōd*, ON *rauðr*)

PGmc **auk* 'also' > OHG *ouh* (cf. GO, ON *auk*, OS *ōk*)

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

*F.1.16 V > Ø / _(C)#*

PWGmc unstressed, word-final short vowels (or those in closed final-syllables) in disyllabic words became syncopated in OHG (Wright 1888:16)[21]:

PGmc **gastī* 'guest (dat.)' > PWGmc **gasti* > OHG, OS *gast*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.17 -w > -o*

Word-final *-w* became *-o*. After a long vowel, *-o* later became dropped altogether in the nom. (Braune and Reiffenstein 2004:109, 225).

OHG *sē* 'sea' < earlier *sēo* < PGmc **saiwiz*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.18 ao > ō*

Forms in earlier *ao* (< *aw*) became monophthongized to *ō* (e.g., *frō* 'merry' < *frao*; *strō* 'straw' < *strao*, etc.; Braune and Reiffenstein 2004:48, 225). The same seemed to affect OS (cf. OS *stro*, but OE *strēaw*)

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

[21] Note the difference from the post-unstressed syllable syncope of high vowels in PWGmc.

*F.1.19 CR# > CVR#*

OHG seems to have implemented an epenthesis innovation in a similar way to OE (cf. appx. G.1.20), but is clearly different in that it uses a different vowel. Namely, *a* was epenthesized into consonant clusters that became stranded word-finally. The observable examples involve CR clusers. Wright (1888:18) describes the phenomenon as occurring between voiceless consonants and sonorants[22]. OS seems to show evidence of sharing this innovation:

PGmc **fuglaz* 'bird' > PWGmc **fugl* ~ **fogl* > OHG *fogal*, OS *fugal*

PGmc **ebnaz* 'even' > PWGmc **ebn* > OHG, OS *eban*

PGmc **akraz* 'field' > PWGmc **akr* > OHG *acchar*, OS *akkar*

Perhaps as an offshoot of this innovation, an epenthetic *-u-* appears in some words before *m* (e.g., *ātum* 'breath' < PGmc **ēƀmaz*; Braune and Reiffensten 2004:68).

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

*F.1.20 Ø > V / l/r _ h/w*

After *l*, *r*, or (rarely) *s*, OHG allowed for an optional insertion of a medial vowel before *h* or *w* (Braune and Reiffenstein 2004:71):

OHG *felhan ~ felahan* 'to preserve, entrust' < PGmc **felhanǫ*

OHG *forhta ~ forahta* 'fear' < PGmc **furhtī*

OHG *farwa ~ farawa* 'color' < PGmc **farwō*

[22] Yet, strangely, two of the three examples that he proceedes to provide feature *voiced* obstruents.

The same change is likely responsible for C_w insertions in wa-stems as well:

PWGmc **skadu* ‘shadow’ > OHG *scato* (nom. sg.), *scat*(*a*)*we* (gen. sg.)

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.21 ga- > gi-*

By the time of late OHG, a number of prefixes and prepositions in *-a-* underwent an identical vowel reduction to *-i-*. For example, the prefix *ga-* became *gi-* (later *ge-*) in all dialects. Other examples include, the preposition *za* > *zi* (later *ze*), the prefix *fur-* > *fir-*, the prefix *ant-* > *int-*, the preposition *aʒ* > *iʒ*, and the prefix/preposition *ur*(-) > *ir*(-) (Braune and Reiffenstein 2004:73-8).

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.22 *i > *e / _ [+lab./+vel.] [+voc., -hi]*

In southern WGmc, there was a lowering of **i* to *e*, unrelated to the similar change in ON. This one was more phonologically constrained. In this change, the lowering was typically before labial and velar obstruents that were followed by non-high vowels (Braune and Reiffenstein 2004:33-4):

OE *spiċ*, OHG *spek* < PGmc **spika-* ‘bacon’

OE *libban*, OFr *libba*, OS *libbian*, OHG *lebēn* < PGmc **libja-* ~ **libai-* ‘live’

There are a few exceptions, but this innovation otherwise seems to exhibit the distribution of a regular sound change.

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.23* $V_1 > V_2 / \_ CV_2(C)$

OHG seems to show an assimilation of vowels to final vowels beyond that encompassed by i-umlaut, typically appended inflectional material:

OHG *keisar* 'emperor' > *keiseres* (gen. sg.)

OHG *wuntar* 'wonder (n.)' > *wuntorōn* 'to wonder' (Wright 1888:18-9)

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.24* $*i > e / [-high]\ C_0 \_$

After i-umlaut and the later levelling out of i-umlaut from certain morphosyntactic categories, it is possible that **i* could have been lowered to *e* following syllables containing a low or lower mid vowel (Ringe 2006:126). For example, an OHG n-stem variant masc./neut. gen. sg. and dat. sg. ending *-en* can reflect lowering of *-in* in unstressed syllables after lower vowels (which were reimported via levelling; Ringe and Taylor 2014:118).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.25* $*\text{-}\bar{o} >$ *-u*

The raising of word-final **ō* to *u* caused preceding **e* to raise to *i* in OHG (Ringe 2006:221). Consider the verb 'carry':

OHG *biru* < PGmc **bērō* 'I carry'

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.26 eo > io*

According to Wright (1888:69), using the class VII preterites as examples, the earlier diphthong *eo* became *io* by the 9th century.

OHG *liof* 'ran (sg.),' *riof* 'called (sg.)' < earlier *leof* (?), *reof* (?)

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.27 -m > -n*

By later OHG, final *-m* became *-n* across several ending types (Braune and Reiffenstein 2004:120).

PGmc **dagamaz* 'days (dat. pl.)' > PNWGmc **dagumaz* > OHG *tagum* > *tagun*

OHG *habēn* 'I have' < *habēm*

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.28 iu > [ȳ]*

Very late in the OHG period, the inherited diphthong *iu* (< **eu*) became monophthongized to *[ȳ]* (Braune and Reiffenstein 2004:52; though they refer to the phone as *[ǖ]*). The spelling as <*iu*> remained into MHG.

{$\Delta\varepsilon_{OHG} = 1$}

*F.1.29 sk*

While the shift of the cluster *sk* to the palatoalveolar fricative *[ʃ]* did not reach completion until the MHG period, it is believed that the shift began by late OHG with the palatalization, or at least some degree of weakening, of *k* (Braune and Reiffenstein 2004:140).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.30 -V > -e*

Quite late in the history of OHG, around the 11th/12th century, nominal endings such as *-o* and *-a* began to be reduced to *-e* (Braune and Reiffenstein 2004:207):

Late OHG *hane* 'rooster' < earlier OHG *hano* < PGmc **hanō*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.1.31 *þ > [t]*

PWGmc **þ* became *[t]* in all instances. When exactly this happened is difficult to say, but it seems to have occurred relatively later in the histoy of OHG (Braune and Reiffenstein 2004:84, 162). While this innovation ultimately spread throughout the continental NWGmc area long after the early languages began had developed, it did not achieve this until centuries after its first appearance in OHG.

$\{\Delta\varepsilon_{OHG} = 1\}$

## *F.2 Old High German Morphological Innovations*

### *F.2.1 *-dē > *-dō*

This morphological change replaced the 3sg. weak past ending with the 1sg. ending **-dō* in southern PWGmc. The 1sg. and 3sg. were already identical in the strong past indic. The situation involved a chain of levelling (Ringe and Taylor 2014:76):

| | 1sg. | 2sg. | 3sg. |
|---|---|---|---|
| Stage 1 | **-dō* | **-dē* | **-dē* |
| Stage 2 | **-dō* | **-dē* | **-dō* |
| Stage 3 | **-dō* | **-dōs* | **-dō* |

Long **ō* was ultimately further levelled into the pl. forms as well in some OHG dialects, supplanting **u*. At any rate, the spread of **-dō* represents a clear PWGmc innovation that had to have occurred before the unrounding of **ō* discussed below. It is worth noting that the opposite may have happened in northern WGmc; that is, **-dō* > **-dē*, resulting in a merger of all of the sg. forms into **-dē*. However, it is impossible to tell if that morphological merger happened, since later regular sound changes turned word-final **-ō* into **-ā* (see below), and then merging **ā* into **ē*. For the time being, it shall be regarded as an early southern PWGmc innovation.

$\{\Delta\varepsilon_{OHG} = 1\} \vee \{\Delta\varepsilon_{Ingv} = 1\}$

### *F.2.2 *-dum > *-dōm, etc.*

In addition to the PWGmc morphological syncretism of sg. past markers **-dē* > **-dō* discussed above, the pre-OHG varieties innovated further by extending the reflex **ō* to

the plural forms. Note that this must have occurred before the PWGmc levellings because then it would have been unrounded **ā* that became levelled.

$\{\Delta\varepsilon_{OHG} = 1\}$

### *F.2.3 *-anu*

In the masc. nom./acc. sg. and pl., OHG and OS show endings in *-on* (< **-anu*; Ringe and Taylor 2014:163-4), possibly a shared innovation:

OS *namon* (~ *-an*) 'name (masc. acc. sg.),' OHG *namon* (~ *-un*) (cf. OE *naman*, OFr *noma*)

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

### *F.2.4 -īs*

OHG *-īs* and OS *-is* reflect an innovative subj. 2sg. ending which probably dates back to southern PWGmc (Grønvik 1998; Ringe and Taylor 2014).

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

### *F.2.5 1sg. -m*

OHG seems to have spread a suffix *-m* throughout the 1sg. indicative. It is alleged to have spread from *tuom* 'I do' (Cowgill 1959).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.6 *-zz- > -zt-*

Sometime after the OHG consonant shift, OHG re-introduced the past ending *-t-* into forms that would have fricated it away (e.g., *sazta* '(s)he set' < **sazza* < PWGmc **sattē*).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.7 -amu ~ -emu*

OHG seems to have innovated a dat. sg. strong adj. ending *-amu ~ -emu*, probably replacing inherited **-ēm*, assuming *-um* did not spread to that particular category, as it did in northern WGmc and ON (Ringe and Taylor 2014:37).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.8 *-u > Ø / [+light] _*

In PWGmc, unstressed final **-u* was lost after heavy syllables, but retained after light ones (e.g., OE *grasu* 'grasses,' but *land* 'lands'). In a-stem nom./acc. nouns, OHG and OS extended the loss to light syllable stems as well (e.g., *gras, lant*; Ringe and Taylor 2014:15).

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

*F.2.9 Ø > -u / [+heavy] _*

In the a-stem inst. sg., the ending *-u* was re-extended to heavy syllable stems in OHG and OS (e.g., OS *wordu*, OHG *wortu* 'word'; Ringe and Taylor 2014:15).

{$\Delta\varepsilon_{OHG\text{-}OS} = 1$}

### *F.2.10 zi ērist*

Some adverbial superlatives were strengthened by the addition of the prepostions *zi* or *aʒ* (e.g., *zi ērist ~ aʒ ērist* ‘first,’ *zi jungist* ‘last,’ etc.; Braune and Reiffenstein 2004:233).

{$\Delta\varepsilon_{OHG} = 1$}

### *F.2.11 Abstracts in -ī*

The inflection of the historically separate classes of adjectival abstract nouns and verbal abstract nouns fell together in OHG, into the class of fem. abstracts in *-ī*, though some sources show *-īn* (Braune and Reiffenstein 2004:211-3).

{$\Delta\varepsilon_{OHG} = 1$}

### *F.2.12 habēta*

In some weak verbs, namely *habēn* ‘to have,’ *sagēn* ‘to say,’ and *lebēn* ‘to live,’ the long *ē* of the inf. and pres. is extended to the preterite via analogy, yielding e.g., *habēta* ‘gave,’ *sagēta* ‘said,’ and *lebēta* ‘lived’ (Braune and Reiffenstein 2004:302).

{$\Delta\varepsilon_{OHG} = 1$}

*F.2.13 u-stem > i-stem*

Most u-stem nouns were reanalyzed as i-stem nouns (Wright 1888:41; Ringe and Taylor 2014). The transfer seems to have been quite regular, though some u-stems were transferred to the a-stem declension. It seems to have been due to some conflation between obliques in the two paradigms (Braune and Reiffenstein 2004:206).

PGmc **fōts* 'foot' (cons.-stem) > OHG *fuoʒ*

PGmc **tanþs* 'tooth' (cons.-stem) > OHG *zand ~ zan*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.14 -ēs*

There was an addition of an obscure ending to the 1pl. Wright (1888:63) attributes it to analogy from the 1pl. subj. pres. and pret. indic. and pret. subj.

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.15 *þrīz > drī*

A mentioned above, though OHG did not regularly lose word-final **-z* in monosyllables as the result of a sound change, it did lose a few instances of it. **þrīz* (or **þrinz*) 'three' > *drī* (masc. nom./acc.) could have taken on the unstressed ending of i-stem nouns, or it could be a pre-z-loss shift of the sequence **-inz* into **-į̄* (Ringe and Taylor 2014:87).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.16 -ōnne, -ēnne*

In OHG, there arises an adjustment of the **-ja* of inflected nominal infinitive verbs, producing weak class II *-ōnne* and class III *-ēnne*, and a Sievers' Law variant with **-nj-* after a long vowel (Ringe and Taylor 2014:79).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.17 *-ai-*

According to Ringe (2006:179), in OHG, the **-ai-* alternant (< PIE e-grade) of the class III weak stative verb suffix **-ai- ~ *-ja-* was generalized as **-ai-*.

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.18 *-es-*

In OHG (and GO; cf. appx. B.2.16), the a-stem gen. sg. ending shows a reflex of **-es-* instead of the expected **-as-*. This is apparently due to analogy; in both GO and OHG the strong adj. gen. sg. ending shows **-es*, plus the gen. sg. demonstrative shows **þes*. Ringe (2006:201) proposes that the a-stem gen. sg. ending may have been imported from the strong adj. ending, and that in turn from the demonstrative.

The ending is known not to be inherited since 1. the expected PIE antecedent is not attested anywhere else, and 2. it escaped OHG raising to *i* which would have to have happened if it were inherited (Ringe 2006:201). Ringe classifies these innovations as having occurred within the separate histories of OHG and GO.

$\{\Delta\varepsilon_{OHG} = 1, \Delta\varepsilon_{GO} = 1\} \vee \{\Delta\varepsilon_{OHG\text{-}GO} = 1\}$

*F.2.19 nom. pl., acc. pl. > acc. pl.*

In OHG the nom. pl. and acc. pl. a-stem inflections merged under the form of the acc. pl. For the most part, the nom. and acc. sg. merged throughout OHG as well (Braune and Reiffenstein 2004:182; Ringe and Taylor 2014:115).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.20 -er-*

According to Ringe (2006:249), OHG shows an occasional infix *-er-* in the past of some strong class VII verbs. Ringe notes that it probably stems from a generalization and reinterpretation of the (phonologically merged) sequences **-e-r-* and **-e-z-*.

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.21 -o*

For the masc. and fem. nom. pl. and acc. pl. adjectives, OHG generalized the nom. pl. suffix *-o*, merging the inflection of the two (Ringe and Taylor 2014:120).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.22 1sg., 3sg. indic. > 3sg.*

As mentioned (cf. appx. C.2.9), PWGmc apparently lost the overt distinction between the 1sg. subj. and the 3sg. subj., both past and pres., merging the two into the form of the

3sg. Additionally, in OHG and OS, the two persons were merged in the past indic. as well. Consider the OHG paradigm of the verb ‘to save’ (Walkden 2014:198-9):

| | Past Indic. | Pres. Subj. | Past Subj. |
|---|---|---|---|
| 1sg. | *nerita* | *nerie* | *neriti* |
| 2sg. | *neritōs(t)* | *neriēs(t)* | *neritīs(t)* |
| 3sg. | *nerita* | *nerie* | *neriti* |

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

*F.2.23 2sg. -s > -st*

By the 9th century, the indic. pres. 2sg. ending appended a *-t* to create the ending *-st*. It is believed that the origin of this ending is from encliticization or frequent co-occurrence with the 2sg. pronoun (Braune and Reiffenstein 2004:261). This later spread to the opt. pres. as well.

Early OHG *nimis du* ‘you take’ > later OHG *nimist (du)*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.24 -ōno*

OHG and OS spread the gen. pl. ending of n-stems to ō-stem nouns (e.g., OHG *gebōno,* OS *geƀono,* ‘of gifts (gen. pl.),’ OHG *zungōno* ‘of tongues (gen. pl.)’; Braune and Reiffenstein 2004:196; Ringe and Taylor 2014:59).

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

*F.2.25 dual > ∅*

Dual pronouns eventually fell out of use in OHG at the expense of the other numbers (Braune and Reiffenstein 2004:241; Walkden 2014).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.26 -u > -o*

In the strong ō-stems, the dat. sg. ending is *-u* in early OHG, but seems to be replaced with *-o* by around the 10th/11th century (Braune and Reiffenstein 2004:195). According to Braune and Reiffenstein (2004:205), the same happened in the u-stems by the end of the 9th century, probably reflecting the same change.

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.27 -in > -en*

According to Braune and Reiffenstein (2004:201), there was a shift of the *-i-* in the i-stem dat. pl. ending to *-e-* by the 10th/11th century (e.g., *gestin* 'guests (dat.)' > later *gesten*).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.28 fem. jō-stems ~ ī-stems*

There appears to be some occasional conflation between feminine jō-stems and feminine ī-stems, so that feminine nouns in both endings appear (e.g., *wunna* ‘bliss’ alongside *wunnī*; Braune and Reiffenstein 2004:199-200).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.29 ō-stems*

By the mid-9th century, the OHG ō-stems and jō-stems become merged (Braune and Reiffenstein 2004:194).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.30 n-stems*

A few changes happened in the OHG n-stems. OHG seems to have replaced the inherited n-stem neut. nom./acc. pl. ending in **-ōn* with a form in a short vowel, as indicated by *-un* (Braune and Reiffenstein 2004:207-8; Ringe and Taylor 2014:118).

OHG has generalized the fem. suffix of the in the pl. of the oblique cases (replacing **-an-* with **-um-*; Braune and Reiffenstein 2004:197; Ringe and Taylor 2014:118).

$\{\Delta\varepsilon_{OHG} = 2\}$

*F.2.31 *CReC- > class IV*

In OHG, verbs of the structure consonant-sonorant-*e*-consonant were largely shifted into weak class IV (Ringe 2006:245-6).

PGmc ***drepanǫ*** 'to kill' > OHG past ptc. *gitroffan* (cf. the ON class V past ptc. inflection *drepinn*)

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.2.32 -ta*

As mentioned in appx. D.1.2.4, the decads show the suffix *-ta* in OHG where OE shows *-tiġ*. It is not completely clear whether OS *-to* is related.

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

*F.3 Old High German Lexical Innovations*

*F.3.1 *þi- ~ *þe-*

OS and OHG have innovated a form of the word 'that' using the third person pronoun **i- ~ *e-* (which was replaced by **hi- ~ *he-* in Northern WGmc). This happened before the spread of **-i-* throughout the paradigm, but OHG still shows **-e-* from analogies.

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

### *F.3.2 *hwi- ~ *hwe-*

The paradigm for the interrogative ‘what?’ in PWGmc shows a mix of stems in the masc./fem., with some in **hwa-* and some in **hwi- ~ *hwe-*. OE and OFr have mostly generalized the stem in **hwa-*, but OS and OHG have generalized **hwi- ~ *hwe-*, with the exception of the neut. nom./acc. (Ringe and Taylor 2014:125).

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

### *F.3.3 sīn*

According to Wright (1888:78), the infinitive *sīn* ‘to be’ (> GE *sein*) is an innovative OHG formation. It is unclear if it has its origin in the PGmc 3pl. subj **sīn*, or was formulated by some other means.

$\{\Delta\varepsilon_{OHG} = 1\}$

### *F.3.4 wellen*

In PWGmc there was apparently some confusion between the verbs **wiljan* ‘to want’ and **waljan* ‘to choose.’ The result in OHG was a new subjunctive *wellen* (< **waljan*) alongside indic. *willen*. Additionally, the pl. of ‘want’ has taken on the form of ‘choose’ (Wright 1888:80).

$\{\Delta\varepsilon_{OHG} = 2\}$

### *F.3.5 imu*

OHG has replaced the dat. sg. ending of ‘him/it’ **immai* with that of the instrumental, yielding *imu* (< PGmc inst. **hinō*; Ringe 2006:141). The same seems to be reflected in OS *imu*.

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

### *F.3.6 sāhun*

OHG levelled in *h* to the past pl. of ‘they saw’ from the sg. (Ringe and Taylor 2014:11).

$\{\Delta\varepsilon_{OHG} = 1\}$

### *F.3.7 fateres, fatere, etc.*

The gen. sg., dat. sg., and plural forms of the r-stem word ‘father’ have been remodeled on the basis of the a-stem declension (Wright 1888:45).

OHG *fateres* ‘father (gen. sg.)’ (cf. PGmc **fadurz*)

OHG *fatere* ‘father (dat. sg.)’ (cf. PGmc **fadri*)

OHG *faterā* ‘fathers (nom. pl.)’ (cf. PGmc **fadriz*)

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.8 *drī + o*

This innovation is related to one mentioned as potentially having occurred in PNWGmc (cf. appx. A.3.1). If it did not, the OHG evidence is the best proof; the nom. acc. fem. *drīo* 'three' is apparently formed from the addition of the adjective ending onto the inherited form **drī.*

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.9 zi*

The inherited preposition *aʒ* (later *iʒ*) 'at, to' (cf. GO, EN, ON *at*) became lost and replaced by *zi* by the mid-9th century (Braune and Reiffenstein 2004:76).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.10 ir(-)*

The prefix/preposition *ir*(-) 'out' (cf. GO *us*, ON *ur*) became lost and fully replaced by *ūʒ* by late OHG (Braune and Reiffenstein 2004:76).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.11 doret*

OHG apparently innovated a new form of 'there' from *dor* (< *dār*) + *-et* (poss. < *wert*).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.12 inan > in*

The 3sg. acc. masc. pron. *inan* 'him' exhibited a shortened form *in*. By the 11th century, this form became predominant (Braune and Reiffenstein 2004:244).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.13 drīzehan*

The reflex for 'thirteen' seems to reflect a different form of 'three' in OHG, ON, and OE. Ringe (2006:288) suggests that the original was probably PGmc **þri-*, and each daughter language innovated. In OHG, the form used was that of the masc. nom./acc.

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.14 (h)we-*

OHG has levelled the form (*h*)*we-* throughout the masc. paradigm of 'who/what' where antecedents of PGmc **h$^{w}$a-* are expected (Ringe 2006:290).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.15 sī*

The OHG reflex of the 1sg. subjunctive of 'to be' (< PGmc **sijǭ* 'I would be') may have been remodeled to *sī* on the basis of the 3sg. (< **sijē*). The same later happened in later ON and possibly in OE (Ringe 2006:149).

{$\Delta\varepsilon_{OHG} = 1$}

*F.3.16 gitar*

In the 3sg. '(s)he dares,' the OHG reflex of the inflected form, *gitar*[23], reflects the levelling of *-*rz*- from the pl. into the sg. (the sg. in PGmc was *(*ga*)*dars*, with *-*rs*-; cf. GO *gadars*; also cf. PGmc 1pl. **durzum*). OE apparently shows the same innovation (Ringe 2006:153). These are probably parallel innovations.

{$\Delta\varepsilon_{OHG} = 1$}

*F.3.17 bim*

OHG added a prefix *b*- to a few inflections of **wesaną* 'to be' via analogy with the perfective present **beuną* (Kluge and Seebold 1995; Ringe 2006:141):

PGmc **immi* 'I am' > OHG *bim*, GE *bin* (cf. PGmc **beuną* 'to be')

PGmc **izum* 'we are' > OHG *birum*

PGmc **izud* 'you (pl.) are' > OHG *birut*

{$\Delta\varepsilon_{OHG} = 1$}

[23] Though 'dare' is not generally considered core vocabulary, it has historically been used as a semimodal verb in the Germanic languages, and is therefore an important part of the Germanic lexicon.

*F.3.18 habēt*

The OHG and OS reflexes for 3sg. '(s)he has' (OHG *habēt*, OS *haƀed*) reflect a voiced ending due to analogy (Ringe and Taylor 2014:25).

$\{\Delta\varepsilon_{OHG\text{-}OS} = 1\}$

*F.3.19 gisehan*

The segment **h* has been levelled into the past ptc. for 'see' (where the regular reflex would otherwise be *gisewan*; Wright 1888:32).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.20 sluog*

The segment **g* was levelled into the pret. sg. of 'hit' from the pret. pl. (Wright 1888:32).

$\{\Delta\varepsilon_{OHG} = 1\}$

*F.3.21 stuont, stuontun, gistantan*

The past forms of 'to stand' show importation of the *-n-* of the pres. forms (cf. OE *stōd* 'stood (sg.)', GO *stōþ*; Braune and Reiffenstein 2004:287).

$\{\Delta\varepsilon_{OHG} = 1\}$

## *F.4 Old High German Syntactic Innovations*

### *F.4.1 werdan, wesan*

According to Wright (1888:83), by the 9th century, a syntactic distinction was made whereby *werdan* was used to express imperfect aspect, and *wesan* to express perfect aspect:

*wirdit ginoman* 'is taken' vs. *ist ginoman* 'has been taken'

$\{\Delta\varepsilon_{OHG} = 1\}$

### *F.4.2 blint man*

In the strong adjective inflection, OHG seems to have innovated a distinction between 'a pronominal inflected form (e.g., *blintēr* 'blind') and a shorter, nominal inflected (endlingless) form (e.g., *blint*)' (Braune and Reiffenstein 2004:218). The latter is mistakenly labeled as 'uninflected.' The two forms are not distinguished much in function. Both forms are common in attributive use (e.g., *blintēr man* = *blint man*), though the 'nominal' form is more preferred in predicative use (*der man ist blint* 'the man is blind'; Braune and Reiffenstein 2004:219).

$\{\Delta\varepsilon_{OHG} = 1\}$

### *F.4.3 V2*

OHG shows a generalization of V2/V3 ordering to V2, similar to that in ON and OS, but later (Walkden 2014). That is, the position of the matrix verb was generalized to

second position within the sentence. It is unclear whether this may be a result of contact with OS.

$\{\Delta\varepsilon_{ON\text{-}OS\text{-}OHG} = 1\} \vee \{\Delta\varepsilon_{OHG} = 1\}$

# APPENDIX G: OLD ENGLISH DEVELOPMENTS

## *G.1Old English Phonological Innovations*

### *G.1.1 *[awʲwʲ] > *[auj]*

This is a pre-OE 'reversal' of the gemination of **w* before **j* in WGmc to a **w* (*u*) + **j* sequence (Ringe and Taylor 2014:173):

PGmc **awjō* 'island' > PNWGmc **awju* > PWGmc **[awʲwʲ]* > **auju* > **ēaju* > WS *īeġ*

$\{\Delta\varepsilon_{OE} = 1\}$

### *G.1.2 *w > Ø / _ i*

In early OE, instances of **w* that were not word-initial and that fell before unstressed **i* were lost (Ringe and Taylor 2014:258):

PWGmc **garwiþi* '(s)he prepares' > **ġærwiþi* > OE **ġearwiþi* > WS *ġiereþ*

$\{\Delta\varepsilon_{OE} = 1\}$

### *G.1.3 *a > *æ*

In northern WGmc, there was a fronting of stressed **a* (if it was not nasalized or followed by **w*). In the dialect ancestral to OE, this was taken a step further to include all instances of short **a*. It is unclear if OFr also applied the fronting to this degree (Ringe and Taylor 2014:148-9).

$\{\Delta\varepsilon_{AF} = 1\} \vee \{\Delta\varepsilon_{OE} = 1\}$

*G.1.4 *ai > ā*

PWGmc **ai* shows up as *ā* in OE, having lost the **i*. This led to a merger with the surviving *ā* before *w*, but remained distinct from the pre-nasal *ą̄* (Ringe and Taylor 2014:170-1):

PGmc **haimaz* 'native place' > OE *hām* (cf. ON *heimr*, OHG *heim*, OS, OFr *hēm*)

PGmc **snaiwaz* 'snow' > OE *snāw* (cf. ON *snær ~ snjór*, OS, OHG *snēo*)

PGmc **stainaz* 'stone' > OE *stān* (cf. ON *stein*, OS *stēn*, OHG *stein*)

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.5 ā > o / [-stress]*

When the vowel *ā* (< PWGmc **ai*) fell in an unstressed position, it became rounded to *o* (Ringe and Taylor 2014:171):

PWGmc **arbaiþi* > **ærbāþ* > OE *earfoþ* 'hardship'

In addition, some reflexes of PWGmc **a* that were fronted to **æ* became *o* in unstressed positions as well, in some cases even raising to *u* (Ringe 201:202):

PWGmc **ab ~ *aba* 'from' > **æb* > **ab* > OE *of*

PWGmc **werald*(*i*) 'world' > **weræld*(*i*) > **werald* > OE *weoruld ~ weorold*

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.6 *au > ēa*

OE shows *ēa* as the reflex of PWGmc **au* (Ringe and Taylor 2014:172). There are countless examples:

PGmc **daudaz* ‘dead’ > OE *dēad* (cf. OFr *dād*, ON *dauðr*, GO *dauþs*, OHG *tōt*, OS *dōd*)

PGmc **lausaz* ‘free’ > OE *lēas* (cf. OFr *lās*, ON *lauss*, OS, OHG *lōs*, GO *laus*)

PGmc **audawakrs* (given name, cf. the 5th century Italian king *Odoacer*) > OE *Eadwacer*

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.7 [+front] > $V_1V_2$*

In OE, there was a breaking of all short front vowels before inherited **h*, including **æ > ea*, **e > eo*, and **i > io*:

PNWGmc **wahsanǫ* ‘to grow’ > **wæhsan* > OE *weaxan*

PGmc **fehu* ‘livestock’ > **feh* > OE *feoh*

PWGmc *sihhwā* ‘sieve’ > OE **siohhæ > seohhe* (Ringe and Taylor 2014:176-8)

Long **ī* was also broken:

PWGmc **wrīhan* ‘to cover’ > OE **wrīohan > wrēon*

Additionally, breaking of these vowels occurred before RC sequences (sonorant + consonant), namely **rC* and **lC*, except when that consonant was **j*:

PWGmc **farr* ‘bull’ > **færr* > OE *fear*

Finally, there was breaking of **e* and **i* before **w* and **lw*:

PGmc **trewa-* ‘tree, wood’ > OE *treow-*

PWGmc **giwē-* ‘to desire’ > OE *ġiowian*

PGmc **melwą* ‘meal’ > OE *meolu*, *meolw* (Ringe and Taylor 2014:187)

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.8 *hs > x*

The sequence **hs* became strengthened to */ks/*, spelled *x*, in OE. One piece of evidence for the plosive quality of **h* here is the appearance of *x* in instances of metathesis of */s/* and */k/* (e.g., WS *axan* < *ascan*). The same change is observed in ON (Noreen 1903:143).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.9 *k, *g > [+palatal]*

The velar stops **k* and **g* became palatalized in the presence of front vowels. This encompassed various environments, including following front vowels and preceding front vowels, though in the case of preceding front vowels, **k* was only palatalized by preceding **i/ī*. In some cases the palatalization was the result of the new diphthong *ea*. This new palatalized **k*$^{j}$ ([c]) later became the affricate *[ʧ]*, and the result of palatalized **g*$^{j}$ ([ɟ]) later merged with inherited **j*. Geminate **g*$^{j}$*g*$^{j}$ later became the affricate *[dʤ]*. For a more comprehensive discussion and list of examples, see Ringe (2014:203-14).

Further, the palatalized inherited **sk* (<*sċ*>) came to appear word-initially before all vowels, front or otherwise.

PWGmc **kinn*(*u*) 'jaw' > OE *ċinn* 'chin' (cf. OFr *tsin-bakka* 'jaw')

PGmc **gīslaz* 'hostage' > OE *ġīsl*

PGmc **skipą* 'ship' > OE *sċip* (cf. OFr *skip*)

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.10 *-kw- > -k-*

There was a loss of **w* after velars that were not word-initial (Ringe and Taylor 2014:214):

PWGmc **þikkwī* 'thick' > OE *þicce*

Further, it appears from a few examples that OE seems to have lost intervocalic *h*:

PWGmc **sehwan* 'to see' > **seohąn* > OE *sēon* (cf. OHG, OS *sehan*)

PWGmc **līhwan* > **līohąn* > OE *līon* (cf. OHG, OS *līhan*)

$\{\Delta\varepsilon_{OE} = 1\} \vee \{\Delta\varepsilon_{WGmc} = 1\}$

*G.1.11 i-umlaut*

Back vowels in stressed position became fronted following a high vowel or palatalized geminate. In addition, **æ* became raised to *e* in these environments. This sound change was expansive and complex, but I treat it as one blanket innovation since it all traces back to a single psychological source. For a full discussion and list of details, Ringe and Taylor (2014) is probably the best reference on the subject. A few examples:

PGmc **mūsiz* 'mice' > OE *mȳs*

PGmc **rugiz* 'rye' > OE *rygė* (cf. ON *rugr*)

PWGmc **wunʲnʲu* 'joy' > OE *wynn* (cf. OS, OHG *wunnia*)

PWGmc **dohtri* 'daughter' > OE **dœhtri* > *dœhter* (cf. OHG *tohter*, OS *dohter*)

PGmc **matiz* 'food' > **mæti* > OE **meti* > *mete* (cf. GO *mats*, ON *matr*, OFr *mete*, OS *meti*, OHG *maʒ*) > EN *meat*

$\{\Delta\varepsilon_{NWGmc} = 1\} \vee \{\Delta\varepsilon_{OE} = 1\}$

*G.1.12 /f, þ, s/ > [v, ð, z] / [+stress]$_{\sigma}$ _*

In OE, the voiceless fricatives *f, þ,* and *s* became voiced in voiced environments after a stressed syllable. Amongst the evidence for this change is the fact that past suffix **-d-* assimilated in voicing to preceding consonants; in some cases we see *-p* + *-d-* > *-pt-*, but in others, we find *-pd-* (Ringe and Taylor 2014:261).

{$\Delta\varepsilon_{OE}$ = 1}

*G.1.13 V > ∅ / C_C*

Nonhigh vowels were syncopated with no connection to syllable weight. In addition, different results ensued depending on the nature of the consonants involved in the syncope environment. For a full discussion, see Ringe and Taylor (2014).

PWGmc **þaisimō* 'yeast' > **þāsimā* > **þǣsimā* > OE *þǣsma*

PWGmc **haitadē* '(s)he is called' > **hātædǣ* > OE *hātte*

{$\Delta\varepsilon_{OE}$ = 1}

*G.1.14 *i, *u > ∅ / _ #*

Word-final **i* and **u* were apocopated after heavy syllables and after unstressed syllables preceded by a stressed light syllable (Ringe and Taylor 2014:285).

PNWGmc **marku* 'boundary, border' > **mærku* > OE *mearc*

PGmc **haljō* 'hell' > PWGmc **halʲlʲu* > **hælʲlʲu* > OE *hell*

PWGmc **luginu* ‘lie (n.)’ > **lygi̇nu* > OE *lygi̇en*

PWGmc **burgi* ‘town (gen.)’ > **byrgi̇* > OE *byrgi̇*

PWGmc **twaimi* ‘two’ > **twāmi* > OE dat./inst. pl. *twǣm*

PWGmc **þaimi* > **þāmi* > OE dat./inst. pl. *þǣm* ‘those’

PWGmc **ahu* ‘river’ > **æhu* > **eahu* > OE *ēa* (note that apocope did not occur due to the preceding light syllable)

As a result of apocope and syncope, unstressed long vowels became short word-finally and within closed syllables:

PWGmc **arbaiþ* ‘hardship, hard labor’ > **ærbāþ* > OE *earfoþ*

PWGmc **wāzī* ‘you were’ > **wǣrī*, **wērī* > **wǣri*, **wēri* > WS *wǣre*, Merc. *were*

{$\Delta\varepsilon_{OE} = 1$}

*G.1.15 *þs > *ss*

Sequences of interdental **þ* followed by **s* became assimilated to **ss*:

Ingv **blīþisi* ‘happiness’ > **blīþsi* > **blīþs* > *bliss* > OE *bliss*

{$\Delta\varepsilon_{OE} = 1$}

*G.1.16 *b > f / _ #*

The fricative **b* became devoiced and ultimately merged with **f* in word-final position. This is a common change, and the same seems to have happened independently in many of the other daughters:

PGmc **gab* ‘(s)he gave’ > **gæb* > WS *ġeaf* (cf. GO, OS, ON *gaf*, OHG *gab*)

{$\Delta\varepsilon_{OE} = 1$}

*G.1.17 *h > Ø*

Inherited **h* was lost between voiced sounds with compensatory lengthening (Campbell 1962).

PNWGmc **leuhmô* 'light' > **lēohmā* > WS, Merc. OE *lēoma*

Northern WGmc **stahlī* 'steel weapon' > **stæhlI* > OE **steahlī* > **stiehī* > **stīele* > WS *stȳle* (Ringe and Taylor 2014:305-6)

{$\Delta\varepsilon_{OE} = 1$}

*G.1.18 *æ > a / _ $C_1$ [+back]*

Instances of stressed **æ* that were not broken, and were followed by one or more consonants plus a back vowel, were backed to *a* (Campbell 1962; Ringe and Taylor 2014). It seems that unstressed **æ* was not backed.

PGmc **makōn* 'to make' > **mækōjan* > OE *macian*

PWGmc **dagē-* 'dawn' > **dægōjan* > OE *dagian* (cf. OE *dæġ* 'day')

PWGmc **gabulu* 'fork' > **gæbulu* > OE *gafol*

{$\Delta\varepsilon_{OE} = 1$}

*G.1.19 i > io*

*e > eo*

*æ > ea / _ C [+back]*

Commonly referred to in the literature as 'back umlaut,' this innovation backed several front vowels into back diphthongs when a back vowel followed (Ringe and Taylor 2014:323-27):

PGmc **silburą* 'silver' > OE **silbur* > WS *siolfor*, Merc. OE *seolfur*

PGmc **sebun* 'seven' > WS *seofon*, Merc. OE *seofen*

Additionally, when there was a *w* before the *i*, it was completely backed to *u*:

PWGmc **widu* 'forest, woods' > OE *widu* > *wudu*

This is apparently distinct from the above backing of **æ*.

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.20 CR# > CVR#*

Word-final consonant-liquid clusters acquired an epenthesized vowel. Different consonant clusters show different degrees of adherence to the rule (e.g., *Cl* usually does not show epenthesis[24], etc.), but the general process is apparent (Ringe and Taylor 2014:327):

PGmc **murþrą* 'murder' > PWGmc **morþr* > OE *morþor*

PGmc **wintruz* 'winter' > PWGmc **wintru* > **wintr* > OE *winter*

$\{\Delta\varepsilon_{OE} = 1\}$

[24] Where *C* was a coronal obstruent.

*G.1.21 æ, i > e*

There was a merger in OE of unstressed *æ* and *i* to *e*.

PGmc **watōr* 'water' > PWGmc **water* > **wætær* > OE *wæter*

PGmc **gōdai* 'good (masc. nom. pl.)' > PWGmc **gōdē* > OE **gōdæ* > *gōde*

PGmc **-ag*(-) (deriv. suff.) > **æġ*(-) > **-eġ*(-) > *-iġ*(-) (e.g., *mōdiġ* 'brave')

A result of this is that the inst. sg. and dat. sg. cases merged in form (Ringe and Taylor 2014:374-5).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.22 *-azd- > *-ezd-*

Similar to the above sound change, the reflex of sequence **-azd-* was raised, usually to *-erd-*, but all the way to *i* in North. OE.[25]

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.23 *C(l/r) > *CC(l/r)*

This represents yet another change in OE that coincidentally happens to be identical to the one that occurred in PWGmc (cf. appx. C.1.19). OE 'better' had three variants: *betera ~ betra ~ bettra*. The latter represents a later gemination as a result of syncope.

[25] This is a complicated sound change with many difficulties. See Ringe (2014:84-5) for further discussion.

This must have been well within the OE time frame, so it certainly represents a distinctive OE innovation (Brunner 1965:187).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.24 *i > Ø / CV.C _ l*

In an additional case of syncope, OE lost inherited **i* between a light syllable and *l*. The completion of this change seems to have occurred at different times for different preceding consonants (e.g., the syncope in *w_l* was earlier than in *-r_l*; Ringe and Taylor 2014:276).

The same change seems to have occurred before *s* in the same environment:

Pre-OE **tąmisōjan* 'to sift' > OE *temesian ~ temsian*

It also is observed before clusters beginning with *s*:

PGmc **batistaz* 'best' > **bætist* > OE *betest* > *betst*

$\{\Delta\varepsilon_{OE} = 1\}$

*G.1.25 $\bar{V}$ > V / _CC(C)*

Long vowels and diphthongs became short in a number of similar environments. This was primarily before three-consonant clusters and geminates, and in at least one case, it occurred before clusters of two consonants, provided at least two syllables followed (Ringe and Taylor 2014:281):

OE *gōdspell* 'good news, gospel' > *godspell*

pre-OE **blōdisōjan* ‘to consecrate with blood’ ult. > Merc. *bledsian*, WS *bletsian* (> EN *bless*)

PNWGmc **ainiŋǭ* ‘one’ > **ānināe* > **ænine* > *enne*

{$\Delta\varepsilon_{OE}$ = 1}

*G.1.26 a = u*

There is some evidence that the unstressed back vowels *a* and *u* were probably being reduced to *[ə]*. In many cases, there are words or morphemes that vary in spelling between the two; e.g., -the class II past marker *ad*(-) ~ *-od*(-) ~ *-ud*(-). At any rate, the contrast between the two was beginning to be lost in late OE (Ringe and Taylor 2014:335-6).

{$\Delta\varepsilon_{OE}$ = 1}

*G.1.27 -sr- > -ss-*

There are a few instances of *r* assimilating to a preceding *s*:

OE *ūser* ‘our’ > WS *ūssum* ‘ours (neut. dat. sg.)’

OE **þisra* ‘this (gen. pl.),’ **þisre* (fem. gen./dat. sg.) > *þissa*, *þisse* (Ringe and Taylor 2014:339-40)

{$\Delta\varepsilon_{OE}$ = 1}

*G.1.28 io, īo > eo, ēo*

In all the OE dialects, the diphthongs *io* and *īo* merged with *eo* and *ēo* (Ringe and Taylor 2014:247).

$\{\Delta\varepsilon_{OE} = 1\}$

## *G.2 Old English Morphological Innovations*

### *G.2.1 *-ēja- > *-ejV-*

The WGmc class III weak present suffix **-ēja-* was apparently shortened to **-ejV-*. This must have been early since it underwent syncope (Ringe and Taylor 2014:258).

$\{\Delta\varepsilon_{OE} = 1\}$

### *G.2.2 *-iz*

The ending **-iz* was levelled in the nom. sg. of the z-stems, resulting in a reinterpretation as i-stems (e.g., *hete* 'hatred' (< PGmc **hataz*)).

$\{\Delta\varepsilon_{OE} = 1\}$

### *G.2.3 hettend*

In OE, a form of noun based on earlier nominalizations of PWGmc pres. ptc. *ija-stems became a productive nominalizing formation (e.g., *hettend* 'enemy,' *wealdend* 'ruler,' etc.; Ringe and Taylor 2014:386).

{$\Delta\varepsilon_{OE} = 1$}

*G.2.4 wæter, wæteres*

OE shows levelling of innovative suffixes with vowels into -CR- endings which previously did not feature them, with the idea having been to create invariant endings (e.g., the gen. sg. of *wæter* 'water' shows *wæteres* alongside *wætres*; Ringe and Taylor 2014:387).

{$\Delta\varepsilon_{OE} = 1$}

*G.2.5 -CC-, -rġ-*

OE should show inherited ja-stems with a nom./acc. sg. in -*Ce* and -*CC*- or -*rġ*- elsewhere, but the nom./acc. sg. form in -*Ce* seems for the most part to have been levelled out entirely by -*CC*- or -*rġ*- (e.g., *cynn* (rather than expected **cyne*), *cynn*- 'lineage'; Ringe and Taylor 2014:387).

{$\Delta\varepsilon_{OE} = 1$}

*G.2.6 *haubud, etc.*

Despite its origin in PWGmc **haubid*, OE *hēafod* 'head' shows **u* instead of **i*. The reason might be influence from a following back vowel in the pl., creating *-*ud*, which was then levelled into the sg. in the early prehistory of OE (Ringe and Taylor 2014:257). This and other examples may hint at another innovation:

It seems that unstressed **i* became **u* when followed by a back vowel. Apparently, a voiced consonant would not interrupt this process, but a voiceless one would (e.g., **strąngiþu* ‘strength’ and not **strąnguþu*).

{$\Delta\varepsilon_{OE} = 1$}

### *G.2.7 þā*

OE pronouns have merged the pl. of all genders into the form of the masc. (Ringe and Taylor 2014:389). This is a further development to the lesser syncretism that occurred in AF (cf. appx. D.2.3.1).

OE *þā,* ‘they’ < PGmc **þai* (masc.), **þôz* (fem.), **þō* (neut.)

{$\Delta\varepsilon_{OE} = 1$}

### *G.2.8 Abstracts in *-u*

In fem. abstract nouns, there was a minor replacement of nom. sg. **-i* (< PGmc **-īn*) with **-u* (from the fem. nom. sg. ō-stem), and subsequent spread to the remainder of the sg. and nom./acc. pl., ultimately becoming more frequent than **-i* (Ringe and Taylor 2014:380).

After this happened, the vowel *-u* also began to appear in the fem. abstract nouns with suffix *-þ* (< PGmc **-iþō*; Ringe and Taylor 2014:381).

{$\Delta\varepsilon_{OE} = 1$}

*G.2.9 -i*

There are examples of an inst. sg. in *-i* in masc./neut. a-stems and some ō-stems in early OE (e.g., *geabuli* 'by means of debt,' *ġitīungi* 'by preparation,' etc.). Ringe (2014:379) suggests that it may have spread from the ending of the demonstrative *þȳ* 'that (inst.),' either with subsequent unrounding, or reflecting a pre-rounding spread of **-ī*.

{$\Delta\varepsilon_{OE} = 1$}

*G.2.10 -æs, -æ, -um*

In early OE, a number of endings spread across other inflectional classes. The a-stem gen. sg. ending *-æs* (later > *-es*) was spread to masc. consonant stems (except n-stems), the ō-stem gen. sg. ending *-æ* (later > *-e*) was spread to fem. root-nouns, and the mainly a/u-stem ending *-um* was spread to all instances of the dat./inst. pl. (Ringe and Taylor 2014:378). I count these as three separate innovations.

{$\Delta\varepsilon_{OE} = 3$}

*G.2.11 *-æ-*

The stem vowel **-æ-* of the pres. subj. was apparently levelled into the past subj. (Ringe and Taylor 2014:356).

{$\Delta\varepsilon_{OE} = 1$}

*G.2.12 heardra*

Given the lack of i-umlaut in examples like the pattern of the adjective ‘hard,’ it seems that there may have been a reinterpretation of comparative adjectives as simply taking the suffix *-r-* without an underlying vowel (i.e., *heard, heardra, heardest*).

$\{0 \leq \Delta\varepsilon_{OE} \leq 1\}$

*G.2.13 *-z- ~ *-s-; *-d- ~ *-þ-*

OE seems to have largely generalized the voiceless fricatives in Verner’s Law alternations in the voicing of some strong verb personal endings (Ringe 2006:182). ON and GO seem to have generalized the voiced alternants.

OE seems to have done the same for indic. pres. and weak past endings (e.g., 2sg. *-s*, 3sg. *-þ*, 3pl. *-aþ*; Ringe and Taylor 2014:160).

However, it seems to have generalized the voiced alternant for the 2sg. of the strong past and for all subjunctives (< *-*z*).

$\{\Delta\varepsilon_{OE} = 3\}$

*G.2.14 -e*

The past. subj. pl. ending *-e* (ult. < PGmc *-*īn*) was levelled into the pres. subj. This was later supplanted by *-æ* into the singular and *-æn* into the plural, effectively restoring the contrast (Ringe and Taylor 2014:340).

$\{\Delta\varepsilon_{OE} = 2\}$

*G.2.15 1sg. subj.*

There was apparently a merger of all persons of the sg. subjunctive into the form of the 1sg. Consider the OS vs. OE present paradigms for 'to save' (Walkden 2014:198-9):

| OE | Pres. Indic. | Pres. Subj. | OS | Pres. Indic. | Pres. Subj. |
|---|---|---|---|---|---|
| 1sg. | *ner-ie* | *ner-ie* | 1sg. | *nēri-u* | *nēri-e* |
| 2sg. | *ner-est* | -- | 2sg. | *nēri-s* | *nēri-es* |
| 3sg. | *ner-eþ* | -- | 3sg. | *nēri-ēd* | *nēri-e* |

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.16 acc. pl., nom. pl > nom. pl*

A series of stages of syncretism between the acc. pl. and nom. pl of nouns of many stem types took place during the period between WGmc and OE, but OE shows an apparent further merger between the nom. pl. and acc. pl. of u-stems under the form of the nom. pl. (Ringe and Taylor 2014:375-6).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.17 -u*

In the a-stem neut. nom./acc. pl., the earlier alternation *-u* ~ *Ø* began to favor *-u*, partly due to the results left by regular sound changes. (e.g., we find *rīċu* 'kingdom' where we would expect **rīċ*, due to reinstallment of the overt ending; Ringe and Taylor 2014:378).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.18 *-st*

OE further spread the PWGmc development of the 2sg. ending **-st*. In PWGmc, this ending was abstracted from the strong past and imported into the pres. indic. (e.g., **warst* 'you became'), supplanting **-s* in a few verbs, such as **kanst* 'you can' (cf. OS, OHG *kanst*, OE *canst*; Ringe and Taylor 2014:353-4). OE spread this new ending **-st* to many more verbs in the pres. indic., though different OE dialects spread it to varying degrees. OHG did the same, but that innovation is clearly parallel for obvious geographical reasons.

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.19 hæbbe wē*

Forms of verbs with *-e* endings when followed by pronouns *wē* 'we,' *ġē* 'you (pl.),' *ġit* 'you (du.),' or *wit* 'we (du.)' appear in OE (e.g., *hæbbe wē* 'have we'). Ringe and Taylor (2014), citing Brunner (1965), state that this may reflect an importation of the subjunctive form into indicative usage.

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.20 -tl > -ld*

In an apparently unrelated, but seemingly regular sound change, the cluster *tl* became metathesized word-finally (e.g., *botl* > *bold* ‘dwelling,’ *setl* > *seld* ‘seat’; Ringe and Taylor 2014:341).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.21 hrēaw(-), fēawe*

These two words reflect a levelling of *-*w*- despite a PWGmc change that turned *-*awa*- into *-*au* in nom./acc. sg. forms (Ringe and Taylor 2014:172). I count this as a single change.

PWGmc **hraw*-, **hrau* ‘raw’ > OE **hrēa*, **hraw* > OE *hrēaw*(-)

PWGmc **fau* ‘few (neut. nom./acc. pl.),’ **faum* (dat. pl.) > OE *fēa*, *fēam* > OE *fēawe*

A similar change in PWGmc changed *-*ewa*- to **eu*, leading to a similar case of levelling in OE:

PWGmc **treu*, **trew*- ‘tree, wood’ > OE *trēo* > OE *trēo*(*w*)

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.22 dohtur*

In r-stem kinship terms with back stem vowels, an ending -*ur* instead of expected -*er* occurs (Ringe and Taylor 2014:382).

OE *dohtur* ‘daughter’ < PGmc **duhtēr*

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.23 u-stems*

The masc. u-stems have largely been shifted into the a-stems, and the fem. u-stems into the ō-stems (Ringe and Taylor 2014:385).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.24 gen. prons.*

Genitive pronouns appear to have undergone an interesting development in OE: they are reportedly realized as adjectives in that they take adjectival agreement (Caha 2009:273-82; Walkden 2014:206). This seems to be a uniquely OE development amongst the early Gmc languages.

$\{\Delta\varepsilon_{OE} = 1\}$

*G.2.25 -tiġ*

As mentioned in appx. D.1.2.4, OE spread the suffix *-tiġ* from the decads below seventy to the rest.

$\{\Delta\varepsilon_{OE} = 1\}$

## *G.3Old English Lexical Innovations*

### *G.3.1 þȳ*

The demonstrative *þȳ* ‘that (inst.)’ shows remodeling on the basis of the interrogative *hwȳ* (Ringe and Taylor 2014:379).

{$\Delta\varepsilon_{OE} = 1$}

### *G.3.2 þrīora*

If the above proposed WGmc application of the strong adj. endings does not reflect a shared change (cf. appx. C.3.5), OE would have to have innovated a strong adj. ending to ‘three’ independently (Ringe and Taylor 2014:121).

{$\Delta\varepsilon_{OE} = 1$}

### *G.3.3 *ni wi- > ny-*

There was apparently a contraction of ‘not’ + initial **wi-* to yield forms in *ny-*. Consider the following phrases:

pre-OE **ni willan* ‘not to want’ > *nyllan*

pre-OE **ni witan* ‘not to know’ > *nytan* (Ringe and Taylor 2014:340)

{$\Delta\varepsilon_{OE} = 1$}

*G.3.4 ēode*

The originally strong past suppletive ‘went’ shows a normal weak past ending in OE (Ringe 2006:194).

{$\Delta\varepsilon_{OE} = 1$}

*G.3.5 þreotīene*

The reflex for ‘thirteen’ seems to reflect a different form of ‘three’ in OHG, ON, and OE. Ringe (2006:288) suggests that the original was probably PGmc **þri-*, and each daughter language innovated. In OE, the form used was that of the neut. (< PGmc **þrijō*).

{$\Delta\varepsilon_{OE} = 1$}

*G.3.6 hwæs*

The gen. sg. of ‘who/what’ may be innovative, as it does not agree with PGmc gen. sg. **h$^{w}$es* (Ringe 2006:290).

{$\Delta\varepsilon_{OE} = 1$}

*G.3.7 wilt*

The 2sg. of ‘to want’ was **wilī* in PWGmc, but it has been changed to *wilt* in OE via influence from *sċealt* ‘shall, must’ (Ringe and Taylor 2014:110).

{$\Delta\varepsilon_{OE} = 1$}

*G.3.8 *ar-*

OE replaced the inherited 2sg. of **wesanǫ* ‘to be’ with an innovative form in **ar-* (Ringe and Taylor 2014:113):

OE *eart*, Merc. *earþ*, North. *arþ*

{$\Delta\varepsilon_{OE} = 1$}

*G.3.9 eam*

OE 1sg. *eam* ‘am’ shows importation of the vowel of the 2sg. *eart* ‘are’ (Ringe and Taylor 2014:113).

{$\Delta\varepsilon_{OE} = 1$}

*G.3.10 guma*

The inherited word for ‘man’ underwent some remodeling in OE, namely the extension of *-an* into the gen. sg., dat. sg., and gen. pl. (Campbell 1962:158-9; Ringe and Taylor 2014:154).

OE *guman* (gen. sg.) < PWGmc **gumini*

OE *guman* (dat. sg.) < PWGmc **gumini*

OE *gumena* (gen. pl.; the result of dissimilation) < PWGmc **gumanō*

{$\Delta\varepsilon_{OE} = 1$}

*G.3.11 cwom > com*

The word for ‘come’ shows levelling of the past stem *c*(*w*)*ōm*- into the 1sg and 3sg indic. (Ringe and Taylor 2014:346).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.3.12 *hes > his*

**her- > hir-*

The vowel of inherited masc./neut. gen. sg. **hes* ‘his’ and of inherited **her*- have taken on *i* (Ringe and Taylor 2014:391).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.3.13 ēow*

If the 2pl. acc./dat. pron. *īow* (> *ēow*) did not lose its final vowel from apocope in unstressed words in PWGmc (see above), then it may be attributable to analogy in OE with *ūs* ‘us’ (Ringe and Taylor 2014:391).

$\{0 \leq \Delta\varepsilon_{OE} \leq 1\}$

*G.3.14 *gā-*

The development of the verb ‘go’ is complicated, but the simplest explanation for the difficulties is that a stem **gā*- was levelled throughout the verb’s paradigm (Ringe and Taylor 2014:370-1).

{$\Delta\varepsilon_{OE} = 1$}

*G.3.15 ūre*

OE shows an innovative form of inherited *ūser* ‘our’ (cf. OHG *unsēr*, GO *unsar*).

{$\Delta\varepsilon_{OE} = 1$}

*G.3.16 miklǣ*

The nom. pl. of ‘big’ shows syncope, possibly the result of lexical analogy with ‘little’ (Ringe and Taylor 2014:275). Otherwise it was the result of the pre-*l* syncope described above:

PGmc **mikilai* (nom. pl.) > OE **miċilǣ* > **miċlǣ* (: **lȳtlǣ* ‘little’) > *micle*

{$0 \leq \Delta\varepsilon_{OE} \leq 1$}

*G.3.17 sīe*

The OE reflex of the 1sg. subjunctive of ‘to be’ (< PGmc **sijǭ* ‘I would be’) may have been remodeled to *sīe* on the basis of the 3sg. (< **sijē*). The same happened in OHG and in ON (cf. appx. E.3.7; Ringe 2006:149).

{$\Delta\varepsilon_{OE} = 1$}

*G.3.18 dearr*

In the 3sg. '(s)he dares,' the OE reflex of the inflected form, *dearr*, reflects the levelling of *-*rz*- (> -*rr*-) from the pl. into the sg. (the sg. in PGmc was *(*ga*)*dars*, with *-*rs*-; cf. GO *gadars*; also cf. PGmc 1pl. **durzum*). OHG apparently shows the same innovation (cf. appx. E.3.16; Ringe 2006:153). These are most likely separate innovations.

$\{\Delta\varepsilon_{OE} = 1\}$

*G.3.19 hæbbe*

In inflections of OE 'have' which contain *hæbb*- (e.g., 1sg. *hæbbe*), i-umlaut has been eliminated via analogy (replacing expected **hebb*-; Ringe 2006:164; 2014:363-4; cf. e.g., *þæc* 'covering' > *þeccan* 'to cover').

$\{\Delta\varepsilon_{OE} = 1\}$

*G.3.20 tū*

This alternative word for 'two' appears in OE only, thus it must be innovative (Cowgill 1985:19; Ringe and Taylor 2014:120).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.3.21 dæġ*

The appearance of endingless dat. sg. ‘day’ may be due to analogy with *niht* ‘night,’ which lost its PWGmc dat. sg. ending **-i* via regular sound change prior to this analogy. It seems that this null ending could have spread to other words like *morgen* ‘morning,’ amongst others (Ringe and Taylor 2014:380).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.3.22 dōm, dōð, etc.*

The pres. 1sg., participle, and the pres. pl. of ‘do’ show no i-umlaut, where other forms, such as 2sg. *dǣs* do show it. The simplest explanation is that i-umlaut was simply levelled out of these forms, but the pres. pl. could have been separately remodeled to **dōanþ*, ultimately taking its attested form via sound change (Ringe and Taylor 2014:369).

$\{\Delta\varepsilon_{OE} = 1\}$

*G.3.23 dyde*

The past tense ‘did’ shows *y* in its stem, which has to be from earlier past subj. **dudī*. There was therefore a replacement of the basic past of this verb with the past subj. As for the origin of the form in **u*, it is possible that **u* was brought into the subj. on the basis of the preterite-present verbs, and then levelled (Ringe and Taylor 2014:369).

$\{\Delta\varepsilon_{OE} = 1\}$