What's all the fuss about 16 words? *
A new approach to Holtzmann's Law

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Abstract

This paper provides a unified analysis for Holtzmann's Law or the Germanic *Verschärfung* (hereafter, GV). This Germanic phenomenon is usually described as the strengthening of the PIE glides $^{+}i̯$ and $^{+}u̯$ to Gothic <ddj> and <ggw> and Old Norse <ggj> and <ggw> respectively. In the present work, I posit plausible sound changes based on the assumption that laryngeals were extant in early Germanic when the accent was still mobile. Furthermore, I contend that the laryngeals rather than glides underwent GV strengthening. The motivation for sound changes, as I assert, can be explained by the preference laws of syllable structure. The analysis provided herein also accounts for parallel phonological developments of GV and non-GV forms from common PIE roots, e.g. ON *snūa* 'to turn' versus ON *snugga* 'to look askance'. Finally, the analysis offers an explanation for the existence of GV reflexes in West Germanic.

0.0 Introduction

Holtzmann's Law has attracted considerable attention from Germanists since its initial "discovery" over a century ago. Also known as the Germanic *Verschärfung* (hereafter GV), this phenomenon has traditionally been described as the purported development of the PIE glides $i̯$ and $u̯$ in the three branches of Germanic. The reflexes of these changes are depicted orthographically by Gothic <ddj> and <ggw> and North Germanic <ggj> and <ggw> respectively. By contrast, the corresponding West Germanic reflexes contain a diphthong plus heterosyllabic glide. The apparent similarity between the Gothic and North Germanic forms has caused many Germanists to postulate a common East-North Germanic development separate from West Germanic. Thus, the potential implication for the genealogy of Germanic explains why this relatively small data set, consisting of approximately sixteen words according to some linguists (cf. Marchand 1973, Collinge 1985:93), has attracted such attention.

Although GV has been analysed from numerous perspectives within a

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*This paper provides a summary of the analysis presented in my MA Thesis, "Holtzmann's Law: Getting to the *hart* of the Germanic *Verschärfung*" submitted at the University of Calgary. The title for this paper is based on a question posed by Dr. Archibald. I am extremely grateful to my advisor, Dr.Robert W. Murray, for his assistance and guidance throughout my research. My thanks also go to Dr. Doug Walker and Dr.John Archibald for feedback on the thesis itself, and to David Restle, Iva Gojmerac and Stephen Laker for input on this version. I would like to especially thank Bruce Nysetvold for his assistance in the transmission of this paper. Nevertheless, all errors are still my own.

multitude of frameworks, no single theory thus far has provided an adequate explanation or motivation for the phenomenon. This paper will provide a brief overview of the analysis presented in L.C. Smith (1997b). Rather than rejecting all past work, this analysis combines a number of features and strengths from past approaches, including variable accent placement, laryngeals and Verner's Law. I will argue that the Preference Laws for Syllable Structure (Murray and Vennemann 1983, Murray 1988, and Vennemann 1988) can account for how these factors, when combined, created the environment for the phenomenon to develop. This approach will attempt to account for the parallel GV and non-GV developments, e.g., ON *snugga* 'to look askance' vs. ON *snūa* 'to turn, twist', as well as the occurrence of sporadic GV forms in West Germanic where GV has traditionally been considered not to have occurred. In order to facilitate discussion of the phenomenon, I now turn to a description of the data cited as evidence for GV.

1.0 Evidence for the Germanic *Verschärfung*

1.1 Evidence from Gothic and Old Norse

Traditionally the GV data have been interpreted as the development of the PIE glides, *i̯* and *u̯*, following a short vowel. These changes resulted in the so-called "geminate" obstruents in Gothic and Old Norse.[1] By contrast, the West Germanic forms contain diphthongs. Data illustrating these developments are provided below in (1).[2]

(1a) PIE *i̯* > Go. <ddj>/ON <ggj>

Gothic	**North Germanic**	**West Germanic**
twaddje 'two (gen.)'	ON *tveggja*	OHG *zweijo*
waddjus 'wall'	OIcel. *veggjar* (gen. sg.)	OS *wei*

[1]In L.C.Smith (1997b: Chapter 2), I provide arguments for my interpretation of the ON and Gothic GV segments based on phonological and orthographic evidence. My interim conclusions are as follows:

Go. <ddj> = [d*i̯*] (or [dd*i̯*]) ON <ggj> = [gg^{i}*i̯*]
<ggw> = [g*u̯*] (or [gg*u̯*]) <ggw> = [gg*u̯*]

[2]Based on the data in (1), GV has traditionally been described in terms of a two stage development, namely the lengthening or gemination of the PIE glides (supposedly evidenced by the West Germanic forms) and stage two as the strengthening of these glides in Gothic and Old Norse.

(1b) PIE $\underset{\sim}{u}$ > Go. <ggw>/ON <ggw>

Gothic	North Germanic	West Germanic
triggws 'true'	OIcel. *tryggver* (nom. pl. masc.)	OHG *gitriuwi*, OE *trēowe*
skuggwa 'mirror'	ON *skuggi* 'shadow'	OHG *scuwo*
glaggwuba 'carefully'	ON *gl̥oggr* 'sharp-minded; clear'	OHG *glouwer* OE *glēaw*

The Gothic reflexes seen in (1a) and (1b) provide clear evidence for GV. However, the GV effects in some Old Norse forms have been obscured by further sound changes which operated before the literary tradition commenced its recording of the language. For example, ON *skuggi* 'shadow' arose following the application of the Old Norse $\underset{\sim}{u}$-deletion rule (i.e., $\underset{\sim}{u}$ > Ø) (Voyles 1992). Nevertheless, since all such deviations from the expected GV output, i.e., *ggj* and *ggw*, can be explained by phonological developments at work elsewhere in the language, then the Old Norse data can still be judged to provide strong evidence for GV.

1.2 Evidence from West Germanic?

From the data in (1) it appears that GV strengthening occurred exclusively in Gothic and Old Norse. However, a closer examination of the incidence of GV throughout Germanic reveals the existence of GV reflexes even in West Germanic. Examples of such reflexes are cited below in (2).

(2)	Gothic	Old Norse	West Germanic
	triggws	*tryggua*	OE (var.) *trugian, trygian* 'to believe'[3]
	----------	*bryggia* 'pier' (cf. *brú* 'bridge')	OS *bruggia*, OHG *brukka*, OE *brycg*, OFris. *bregga*[4] 'bridge'
	----------	*mygg(a)* (OSwe.)	OS *muggia*, OHG *mucca*, MHG *mucke*, OE *mycg(e)*, North Fris. *mech*[5] 'mosquito, midge'

The occurrence of such West Germanic GV forms may be best explained if we assume GV to have operated during Proto-Germanic. Two pieces of evidence

[3]These variant forms of the verb *trūwian* 'to believe' come from Holthausen (1934: 354) who also cites the stem *trug-* as a variation of *truw-*.

[4]Two points should be noted for these examples. First, in Old High German, *gg* often developed to *kk* (also *ck, cc*) (Wright 1907, Ellis 1966). This was the result of the High German Sound Shift. Secondly, the OS and OHG examples are from Lehmann (1952) who reconstructs the root as PIE *+bhreXwa-*. The OE and OFris. data come from Holthausen (1934).

[5]The OS, OHG, MHG and OE data are from Lehmann (1952). The NFris. form comes from Holthausen (1934).

can be cited in favour of this claim. First, if West Germanic's GV-like cognates existed in only one or two dialects, then a case could be made that these forms had been borrowed from Old Norse and Gothic. However, the occurrence of these forms in at least four separate and geographically distinct West Germanic dialects is not so easily explained by borrowing. Moreover, that the dialects would opt to borrow the same lexical items would be more than highly coincidental.[6] Secondly, with the exception of the Old English verb forms for 'believe', the West Germanic data in (2) appear to have undergone West Germanic gemination (WGmc. *C.CG < *C.G)[7] which would point to a common West Germanic etymon for each item prior to gemination.[8] If this were the case, then these etyma would have already contained the sequence *plosive + glide* in West Germanic thereby accounting for the geminate plosives in the dialects. Moreover, if both West Germanic and North Germanic cognates possessed GV obstruents, then we would be inclined to reconstruct the Proto-Germanic etymon from which these items developed as also containing the GV obstruents. This would then point to the operation of GV in Proto-Germanic.

The West Germanic examples, therefore, may provide evidence that GV occurred in Proto-Germanic prior to the break up of the three Germanic branches. Thus, like Davis and Iverson (1996), I will assume that GV was a common Germanic development rather than one that simply obtained between Old Norse and Gothic. This assumption will facilitate an explanation of the existence of West Germanic GV forms.[9]

With these assumptions in mind, I now turn to the foundation of my analysis.

2.0 From PIE to Germanic

Based on the assumption that GV occurred at some point following the departure of Germanic from IE and before it split into the three branches, namely Gothic, North Germanic and West Germanic, it becomes necessary to examine some of the features which Germanic would (or may) have inherited from PIE. In this

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[6]Arguments can be made against borrowing based on the West Germanic cognates for *bridge*. The Old Norse *bryggia* 'pier' contrasts with the non-GV *brú* 'bridge' (Lehmann 1952: 47). However, all West Germanic GV forms in (2) above mean 'bridge' NOT 'pier'. If this GV form in West Germanic resulted from borrowing, why did the West Germanic dialects not borrow *brú* for 'bridge'? It would appear unlikely that four dialects would all borrow the same word AND would then associate the same new meaning with this borrowed word (where the new meaning was different from the original sense) instead of borrowing the word with the desired meaning in the first place (e.g., ON *brú* 'bridge') (cf. L.C.Smith 1997b).

[7]This is the triggering sequence for West Germanic gemination reconstructed by Murray and Vennemann (1983), Murray (1988) and Vennemann (1988).

[8]Sievers (1903: 155) states that <cg> in Old English, e.g., *brycg, mycg(e)*, originally represented a geminate plosive. Subsequently, these plosives underwent palatalisation and affrication before a palatal vowel (cf. the <e> in OE *mycg(e)*) resulting in the alveo-palatal affricate [ʤ], e.g., *judge*.

[9]The small number of GV forms in West Germanic may be the result of levelling which eliminated the effects of GV in this branch of Germanic.

section, I first explore the possibility that laryngeals were maintained in Germanic before turning to a discussion of mobile accent in IE and Germanic.

2.1 Laryngeals in Germanic?

The phonological system of PIE included a number of consonants which were ultimately lost in later stages of most IE dialects leaving behind no direct reflexes. Nevertheless, these so called laryngeals played an important role particularly in the phonology of the IE vowels. Most notably, laryngeals have been implicated as the cause of ablaut or vowel gradation as found in *sing, sang, sung*.[10] Thus, the effects of laryngeals are ubiquitous throughout the Germanic languages. However, this begs the question as to how long, if at all, laryngeals persisted in Germanic before ultimately being "lost".

Various arguments have been forwarded regarding the maintenance of laryngeals in Germanic. Polomé (1988:384) states that if we adhere to Kortland's (as cited in Polomé 1988) argument that the final loss of laryngeals in Slavic likely occurred by the end of the 8th century AD, then we could suppose that laryngeals persisted "in Proto-Germanic until at least the middle of the first millenium B.C." If we assume with Polomé (1982) and Vennemann (1985a) that Germanic was indeed very conservative, then it would be plausible that laryngeals survived this late in Germanic. Although we are unable to determine the precise time when laryngeals were ultimately lost in Germanic, the likelihood still exists that laryngeals were maintained during at least an early period of Germanic. Furthermore, it has been noted that laryngeals "were maintained relatively late when in the neighbourhood of resonants" in the IE dialects (Lehmann 1993:110, cf. also Lehmann 1952) and in particular that Germanic was exceptionally conservative with regards to the treatment of laryngeals when contiguous to a resonant (cf. Polomé 1988, Lehmann 1952).

Such claims are supported by other linguists who have argued for the maintenance of laryngeals in Germanic (Austin 1946, 1958, Lindeman 1987, Davis and Iverson 1996, Polomé 1949). I will follow suite by assuming that laryngeals were still extant during at least the early stages of Proto-Germanic.

2.1.1 The phonetic identity of the laryngeal series

The laryngeal series which I assume is based on Lindeman (1987) and Cowgill (1965) who define their series of laryngeals as dorsal fricatives. Moreover, I espouse Cowgill's original assumption that laryngeals were voiceless. These laryngeals can be described as follows:

(3) $H_1 = ç$ voiceless dorso-palatal fricative (neutral/non-colouring laryngeal)
$H_2 = x$ voiceless velar fricative (*a*-colouring laryngeal)
$H_3 = x^{\underline{u}}$ voiceless labialised velar fricative (*o*-colouring laryngeal)

An examination of the PIE obstruent inventory reveals that this series of voiceless laryngeals fits well into the inventory as illustrated below.

[10]For a more complete discussion of laryngeals, the reader is directed to Jonsson (1978), Lindeman (1987) and Lehmann (1952, 1993).

(4)	p	t	ḱ	k	k^{w}
	(b)	d	ǵ	g	g^{w}
	bh	dh	ǵh	gh	$g^{w}h$
		s			
			ç	x	x^{w}

First, the series of dorsal fricatives corresponds to the traditionally reconstructed places of articulation for the PIE obstruent system.[11] Secondly, the fricative traditionally reconstructed for the PIE obstruent system is the voiceless dental /s/.[12] A series of laryngeals comprising voiceless dorsal fricatives would therefore appear as a natural extension of a voiceless fricative series in PIE. Thus, the series of laryngeals which I assume is well suited for the PIE obstruent system.

I now turn to a discussion of another crucial factor for my analysis, namely the accent system of PIE and Germanic.

2.2 IE and Germanic accent

2.2.1 Indo-European pitch accent[13]

Throughout the literature, PIE accent has typically been characterised as one of pitch and mobility (cf. Hirt 1931, Prokosch 1938, Bennett 1980, Ramat 1981, Baldi 1983, Szemerenyi 1990, and Beekes 1995). This pitch or musical accent was realised by a high tone on a single syllable within a word (Baldi 1983: 16) and could fall on either the root syllable or affix ending of the word. Because of the variable nature of the accent placement, accent could even vary within a paradigm, e.g. Gk. nom. *patḗr* 'father', acc. *patéra*, but gen. *patrós* (Ramat 1981: 17). Evidence for the musical or pitch accent in PIE comes primarily from Vedic, Greek and Balto-Slavic (especially Lithuanian) (Lehmann 1993: 58, Szemerenyi 1990, Wright 1917). For example, a comparison of Skt. *pā́t*, acc. *pā́dam*, gen. *padás* 'foot' with the corresponding Gk. πούς, πόδα, ποδός reveals a common accent placement. In the genitive case in both Sanskrit and Greek the accent falls on the suffix. By contrast, the accent in the nominative and accusative forms is placed on the root syllable. At times, Balto-Slavic corroborates reconstructions of PIE accent placement where it agrees with Sanskrit and Greek, e.g., Skt. *nábhas*, Gk. *νέφος*, Russ. *nébo* 'heaven, sky' (Szemerényi 1990: 79-80, cf. also Gamkrelidze and Ivanov 1995).

2.2.2 Germanic accent and Verner's Law

By the time the first records of Germanic were written, Germanic, like Romance and Celtic had undergone a change to a fixed stress accent system and therefore provides no direct evidence for PIE accent. However, it has been argued that following its split from IE, Germanic was characterised by a period of accentual

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[11]Various glottalic theories use these places of articulation (cf. Murray 1995:46, Szemerényi 1990:71).

[12]The reconstruction of a single fricative /s/ for PIE is supported by Vennemann (1985a), Szemerényi (1990: 71), Murray (1995: 46), Hopper (1977), etc.

[13]For a more complete discussion of the nature and placement of the PIE accent, the reader is directed to the works cited in this section as well as to D'Alquen (1988) for an overview of the evidence.

mobility similar to the mobile pitch accent of IE (Salmons 1990:141, Bennett 1972). Some scholars have postulated that this period of "free" accent in Germanic lasted anywhere from several centuries to a millennium (Bennett 1972: 100). That Germanic had indeed inherited IE's mobile accent is best demonstrated by Verner's Law. According to this law, voiceless fricatives in a voiced environment (e.g., intervocalically) became voiced when not immediately preceded by the accent (cf. Lehmann 1992: 154). This law is illustrated by the examples based on Lehmann (1992: 154) below in (5).

(5)		'brother'	'father'	Grimm's Law: $t > þ$
	Skt.	*bhrắtar-*	*pitár-*	
	Gk.	*phrắtēr-*	*patḗr-*	
	Go.	*brōþar*	*faðar*	
	OE	*brōþor*	ON *faðir*	

The Germanic cognates for 'brother' all contain the voiceless fricative, *þ*, as we would expect from Grimm's Law. However, when the voiced fricatives occurred in place of their expected voiceless counterparts, as in 'father', the accent in Sanskrit and Greek was not found to fall on the immediately preceding syllable.

This correspondence between accent and the occurrence of voiced fricatives evidenced by Verner's Law has also been used to determine the placement of accent on the principle parts of verbs in early Germanic. Typically the effects of Verner's Law can be seen in the plural preterite[14] but not in the present stem nor singular preterite. Middle High German provides examples to illustrate this alternation (listed as pres./sg.pret.~pl. pret.): *zîhen~zigen* 'pull', *slahen~sluogen* 'slay', *wesen~waren* 'be' and *verliesen~verlurn* 'lose' (Pafenberg 1993).[15]

Further evidence for the placement of the PIE accent can be cited from vocalic ablaut grades (Gamkrelidze and Ivanov 1995: 166 and Prokosch 1939). It has been argued that full-grade vowels were accented whereas reduced ablaut grade vowels were not. For example, Go. *steigan, staig, stigum, stigans* 'climb' reveals a reduced ablaut grade in the last two principle parts of the verb, namely the plural preterite and past participle, indicating that the accent fell on the inflectional suffixes and *not* on the root vowels. Such a claim is substantiated by Verner's Law above which also provides evidence for suffixal accent in the last two principle parts of verbs. Likewise, the full grade and *a*-grade vowels in the first two principle parts of the verb would point to root accentuation. Again, this is confirmed by Verner's Law.

With this evidence in mind, I will now provide a brief sketch of the posited

[14]The past participle also tends to reveal the effects of Verner's Law (Prokosch 1939, Voyles 1992). Modern German still provides examples, e.g., *ziehen* (pres.), *zog* (pret.), *gezogen* (p.p.) 'pull'.

[15]The alternation between *s~r* is the reflex of Verner's Law. The alternation would have originally been *s~z*, but through rhotacism, *z* would have developed into *r*. We see this even today in English *was~were*.

accent placements for PIE. I include only those points relevant for my analysis of GV which follows.

2.3 Accent placement

2.3.1 Verbs

As discussed above, strong verbs were accented on the root syllable in the first two principle parts, namely the present indicative stem and the preterite singular, but on the endings of the last two principle parts, namely the preterite plural and the past participle (cf. also Voyles 1992: 20). By contrast, the endings of the weak verbs and aorist present verbs were accented throughout the paradigms.

2.3.2 Nouns and adjectives

Voyles (1992) differentiates between two major groups of nouns and adjectives with regards to accent placement. "[Masculine] and neuter nouns and adjectives of the *a-, wa-, ja-,* and the *az/iz*-class" were accented on the stem in the nominative, accusative and vocative, but on the suffix in the genitive and other remaining cases (pp.19-20) . The second accent pattern applied to all other nouns and adjectives. In this latter group, all case forms were accented on the stem syllable with the exception of the genitive and dative plural forms which took suffixal accent. Although Voyles makes these claims early in his study, the paradigms found in the appendix reveal that the only case which consistently took suffixal accent was the genitive. The IE paradigm for 'two', for which all forms are naturally given in the plural, best illustrates this point (p.243)[16]:

(6)	nom. masc.	*+dwói*	fem.	*+dwās*	neut.	*+dwā*
	gen.	*+dwojōm/?ōm*		*+dwāisōm*		*+dwojōm/?ōm*
	dat.	*+dwóimis*		*+dwāimis*		*+dwóimis*
	acc.	*+dwóns*		*+dwās/?ns*		*+dwās*

2.3.3 Adverbs

Since adverbs were typically derived from the oblique case of nouns and adjectives, they received accent on the suffix (Voyles 1992: 20), e.g., Go. *triggwa* 'covenant' and *triggwaba* 'truly, assuredly'.

In light of these details on IE accent placement, a closer examination of the relationship between accent and GV can now be undertaken.

3.0 Accent and differential syllabification

3.1 Correlating accent and GV

The search for a possible link between GV and PIE word accent is not without precedence. The earliest explanations posited for GV attempted to

[16]Although I subscribe to the reconstruction of this stem with a laryngeal, e.g. *+duoh$_1$* (Beekes 1995: 214) or *+dwoXw* (Lehmann 1952: 45), the paradigm in (6) above from Voyles, nevertheless, serves to illustrate that the genitive case is the most consistent with regard to placement of accent on the inflectional suffix.

implicate accent as the motivating factor behind the phenomenon (Collinge 1985: 94). Holtzmann was the first to hypothesise that the syllable following the GV segments was accented (as cited in Collinge 1985; based on Holtzmann 1870). Later, Kluge (1913: 75) argued that the opposite environment, namely a preceding accented syllable, was responsible for GV. An examination of the paradigms provides insight as to whether accent could have played a role in GV. Of particular interest are the paradigms which include both GV and non-GV forms.[17] These paradigms may shed light onto the original state of affairs at the time of GV before levelling obscured the "conditioning" environment. The paradigm for 'two' is one such paradigm. The potentially high frequency of the word 'two' may have helped this paradigm resist levelling thus enabling better insight into the GV conditioning environment. In light of the plurality/duality denoted by the number 'two', the paradigm only contains plural forms.

(7) 'two'

a. **Gothic** (from Wright 1917: 117)

	Masc.	**Fem.**	**Neut.**
N.	twái	twōs	twa
G.	twaddjē	-----[18]	twaddjē
D.	twáim	twáim	twáim
A.	twans	twōs	twa

b. **Old Norse** (from Noreen 1970: 304)

	Masc.	**Fem.**	**Neut.**
N.	tueir	tuár	tuau
G.	tueggia	tueggia	tueggia
D.	tueim	tueim	tueim
A.	tuā	tuár	tuau

In both the Gothic and Old Norse paradigms, GV is limited to the genitive case. The same restricted occurrence of GV to the genitive case is found in the Old Icelandic paradigm for 'both', i.e., *beggja* (gen.) (cf. Go. *bai* (nom.), *bans* (acc. masc.), *baim* (dat.)) (Lehmann 1986).

This begs the following question: What is the significance of the genitive form with regards to GV? Recall the IE paradigm for 'two' from (6). In that paradigm, the genitive case distinguished itself from the others in that it alone received accent on its inflectional ending.

This link between accent and GV is not restricted to nominal paradigms. The Old Norse verbs *hǫggua* 'to hew' and *búa* 'to live' display both GV and non-GV forms in their principle parts. These verbs are shown below in (8) and (9)

[17]In many cases, GV has been extended through or eliminated from the paradigms by levelling.

[18]No such form has been attested (Wright 1917, Braune and Ebbinghaus 1981).

respectively. The key forms for the discussion are highlighted.[19]

(8)		Root Accent		Suffixal Accent	
		Infinitive	*Sing. Preterite*	*Pl. Preterite*	*Past Participle*
	ON	hǫggua	**hió**	**hiuggom**	**hǫgg(u)enn**
but	OE	hēawan	hēow (preterite)		
	OHG	houwan	hīo (preterite)		
(9)	ON	**búa**	**bió**	**biogg(i)am/biuggom**	búenn
but	OE	būan			gebū(e)n
	OHG	bū(w)an			

The contrast between the (highlighted) GV and non-GV forms in (8) and (9) is correlated with accent placement. Recall from §2.3.1 that the infinitive (present stem) and singular preterite, received root accent. By contrast, the plural preterite and past participles were accented on their inflectional endings. The highlighted items in (8) and (9) provide another illustration of the link between GV and suffix accent.

Such a claim of suffix accent is not new. As stated above, various scholars, including Holtzmann himself, have founded their explanations on the correlation between GV and suffixal accent (cf. Austin 1946, 1958, Mikkola 1924, Polomé 1949, and H. Smith 1941). In particular Mikkola (1924: 267-8) meticulously details the position of accent in non-Germanic GV cognates to illustrate that the accent would have immediately followed the GV segments:

> Ich will im Folgenden zeigen, daß der Übergang von intervokalischem *j* zu *ddj* im Gotischen und zu *ggj* im Altnordischen und von intervokalischem *w* zu *ggw* bzw. *ggv* im Gotischen und Altnordischen unmittelbar vor einer ursprünglichen betonten Silbe stattfindet. . . .Altnord. *egg* (G. pl. *eggja*), krimgot. *ada*, das *ad'a* zu lesen ist, „Ei". Die Endbetonung wird durch gr. *ᾠόν* und slav. **jāje* bezeugt.[20]

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[19]ON *hǫggua* and *búa*, as well as their West Germanic cognates, show strong similarities across the principle parts in (8) and (9). However, *hǫggua* also displays GV segments in the present stem. This GV form may be the result of later levelling. The argument for levelling is supported by the fact that *hiogga* has also been noted as a possible singular preterite form in some dialects (Noreen 1970: 338). Thus, the GV segments may have been levelled throughout this verb's principle parts in some dialects. By contrast, the past participle *búenn* in (9) does not display GV where expected in comparison to *hǫggua*. Since these forms are anomalous within their paradigms, I will not discuss them further.

[20]"I want to show in the following, that the transition of intervocalic *j* to *ddj* in Gothic and to *ggj* in Old Norse as well as of intervocalic *w* to *ggw* or rather *ggv* in Gothic and Old Norse takes place immediately before an original accented syllable. . . . Old Norse *egg* (gen. pl. *eggja*), Crimean Go.

For the accent to have followed the GV obstruents, then GV must have operated prior to the Germanic accent shift when the accent was still mobile. However, since correlations do not equate with causes, then the following question arises: What role did this accent play in the Germanic *Verschärfung*?

In order to determine the role of accent in GV, I now turn to an examination of the impact of accent on the syllabification of the sequence *V̆CGV* in Germanic.

3.2 Differential syllabification

It is well documented that accented or stressed syllables attract segments into their heads and codas. Evidence from phonological studies, psycholinguistic experiments and historical documents support the reality of differential syllabification based on accent. I will now briefly highlight the evidence from these three sources.

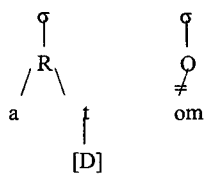
3.2.1 Phonological evidence: Borowski (1990)

Borowski (1990) bases her analysis of flapping and palatalisation in American English on resyllabification. She claims that "not only does [resyllabification] draw onset consonants into the coda of stressed syllables, it must also draw coda consonants into stressed onsets" (p.337). To illustrate Borowski's argument, I provide an example from her explanation of flapping.

(10) a. á[D]ŏm but a[t]ómic
b. mór[D]ăl but mor[t]álity
c. butter [bʌDɾ]; writer [ráyDɾ]; party [párDiy]

As evident from (10), "flapping occurs obligatorily in the environment v́_v̆" (p. 268). Borowski assumes an initial syllabification of V.C v̆ which undergoes. subsequent resyllabification when the accent precedes the plosive as shown in (11).

(11)



(R=rhyme, O=onset) (from Borowski 1990: 269)

Once located in the syllable final position, the *t* or *d* is in the critical position of weakening and thus lenites to the flap [D] (p. 269). Flapping in English, therefore, provides an example of differential syllabification based on accent placement.

3.2.2 Psycholinguistic evidence from English

Psycholinguistic experiments testing the intuitions of English native speakers with regards to syllable structure have revealed small yet reliable effects of

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ada, which is to be read *ad'a*, 'egg'. The suffix (ending) accent is evidenced by Gk. *φόν* and Slav. **jāje*" (translated by L.C. Smith).

accent where a stressed syllable is "more likely to attract an extra consonant than [is] an unstressed syllable" (Treiman and Zukowski 1990: 72). Studies have also revealed that the consonantal strength of a (simplex) segment affects the "resyllabification" of onset consonants into the coda of a preceding stressed syllable (Treiman 1984, Treiman and Danis 1988, Treiman and Zukowski 1990, Derwing and Neary 1991). In sum, the weaker the consonantal strength of a segment, the more likely it will be syllabified into the coda of the preceding stressed syllable.

Thus, we see again that intervocalic segments and clusters can be differentially syllabified based on accent placement. I now briefly summarise one final piece of evidence for differential syllabification, namely word divisions in Old English manuscripts.

3.2.3 Old English manuscripts

Citing evidence from word divisions in Old English manuscripts compiled by Lutz (1985, 1986), Vennemann (1988: 59) states, "Evidently an accented first syllable tends more strongly to attract part of the cluster toward itself than an unaccented first syllable, and the resulting difference in syllabication is reflected in the different division ratios". These conclusions are based on the tendencies for word division as exemplified by (12).[21, 22]

(12)	a.	*nædrV-* (-́–x)	d/r 12x	/dr 1x
	b.	[xx]–́–xx	d/r 4x	/dr 7x

When the accent immediately preceded a cluster as in (12a), then the cluster was typically heterosyllabified. However, when the accent did not fall on the vowel immediately preceding the cluster, then the cluster tended to be tautosyllabified in head position of the second syllable as in (12b). Thus, according to the word division of Old English manuscripts, accent played a role in the differential syllabification of intervocalic clusters.

3.3 Differential syllabification in Early Germanic and GV

As I have attempted to show above, differential syllabification of medial clusters can result from variable accent placement. If we recall that Germanic experienced a period of mobile accent following its departure from IE, then it may be possible that differential syllabifications of word medial clusters may have arisen during the early stages of Germanic. Since the occurrence or non-occurrence of GV appears to be correlated with accent placement, then it appears possible that two separate syllabifications arose in the etymon from which the GV and non-GV developments proceeded, namely one based on suffix accent (GV producing), the

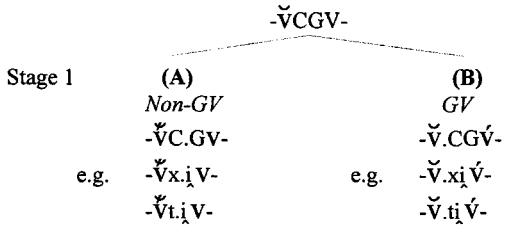
[21]I cite Vennemann's (1988: 59) format for the presentation of the data in (12). In (12a), the accent immediately precedes the cluster. By contrast, although the accent precedes the cluster in (12b), it does not do so in the immediately preceding syllable, e.g., *wéredre* and *unfulfrémedre*.

[22]Gothic is another language where word divisions in manuscripts have been cited as providing insight into the syllabification of a language (cf. Hechtenberg Collitz 1906, Vennemann 1985b).

other based on root accent (non-GV producing).

We must next determine which sequence could have produced the differential syllabifications implicated in GV according to the hypothesis above. A number of linguists have argued that GV arose when the implicated glide was preceded by a laryngeal as in the cluster *-HG-* (H. Smith 1941, Austin 1946, 1958, Polomé 1949). This claim is supported by reconstructions for the PIE roots of the GV reflexes, e.g., Go. *glaggwō* < PIE * *ghleHu̯-*, Go. *daddjan* < PIE **dhoHi̯*, etc. Moreover, since GV purportedly occurred following a short vowel (cf.§1.1), then the relevant sequence for our purposes is *v̆CGV*, and in particular *-v̆HGV-*. A possible output of the differential syllabification of these sequences is illustrated below in (13).[23]

(13)



H represented by [x]; non-laryngeal segment represented by [t]; G represented by [i̯]

The syllabifications (A) and (B) would have arisen during what I will refer to as Proto-Germanic Stage 1 when accent was still mobile prior to the Germanic accent shift. When the accent preceded the medial cluster, $-C_1C_2-$, as in (A), it attracted the first consonant of the cluster, C_1, into the coda of the previous syllable (cf. §3.2). By contrast, when the accent followed the cluster as in (B), then C_1 was attracted into the head position of the second syllable. Thus, the accent pulled medial consonants into the accent bearing syllable. These syllabifications are in harmony with Polomé's (1949: 183) original analysis in which he contends "that the laryngeal regularly belongs to the syllable which bears the stress."

Modern English provides parallels to this accent-based differential syllabification. For example, the pair *a.ttráctive* and *át.rophy* illustrates the effects of accent placement on syllabification. A preceding accent results in the heterosyllabification of clusters as in *át.rophy*. .Conversely, clusters are tautosyllabified in the onset of a following accented syllable, e.g., *a.ttráctive*. Thus,

[23]Although I note that the relevant sequence for our purposes contains a short vowel as in (13), the sequence v̄HGV would also have been syllabified as v̄.HGV regardless of accentuation since word medial clusters were generally syllabified in the onset of the following syllable when the preceding vowel was long (cf. Treiman and Zukowski 1990:76). We could then expect that this sequence may have also undergone GV as Kluge (1913) first suggested. However, I am unaware of any such examples at this time.

the differential syllabification proposed in (13) is supported by modern English.[24]

Further support for the (A) syllabification in (13) comes from Murray and Vennemann (1983) and Murray (1988, 1991, 1993). This syllabification,-V̆C.Gv-, is precisely what they reconstruct for Proto-Germanic to provide a cogent analysis of some of the major phonological developments, including Gothic glide strengthening, West Germanic gemination, North Germanic resyllabification and Sievers' Law. However, this syllabification is reconstructed for the period of Germanic following the accent shift to the root syllable vowel and therefore cannot account for the syllable structure of (13B) which could only have arisen during the period of mobile accent in Germanic (cf. §6 for an overview of the development of Proto-Germanic syllable structure based on the development of the accent system in Germanic). Nevertheless, Murray and Vennemann concede that the syllabification of Germanic was very marked. The differential syllabification in (13) would further prove this to be the case.

I now turn to my analysis of the sound changes involved in the development of both GV and non-GV forms. I will show how the differential syllabification of *-v̆HGV-* set up the conditions for the variable development of GV and non-GV items. All sound changes which I will propose will be based on the Preference Laws for Syllable Structure. I will commence my analysis by examining the GV sound changes before turning to a discussion of how the non-GV forms developed from the (13A) syllabifications.

4.0 The development of GV forms

That the GV forms may have potentially developed from the syllabified sequence *-v̆.HGv́-* correlates with the fact that the PIE accent appears to have fallen on the inflectional suffix in the GV forms. The analysis which I propose in this section, therefore, will assume this syllabification. The sound changes which I will implicate are simple: first, voicing of the laryngeal by Verner's Law and secondly, subsequent slope steepening as a means to improve a less than preferred syllable onset in accordance with the Head Law (cf §4.3 (15)). I will contend that it was the laryngeal and NOT the glide which strengthened as has generally been claimed. However, before I commence my analysis of the GV strengthening, I will first differentiate between the sequences *-v̆HGv́-* and *-v̆Hv́-* to eliminate any question as to why this latter sequence did not also undergo GV.

4.1 Laryngeals and GV[25]

Although laryngeals were arguably maintained during at least the earliest stages of Germanic before being ultimately "lost", they were not maintained equally in all environments. It is believed that laryngeals persisted longer when contiguous to a glide than when they were not (cf. §2.1). Consequently, laryngeals would have been maintained longer in the sequence *-VHGV-* than in *-VHV-* where no resonant was present. This maintenance represents a type of strengthening since the

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[24]Thanks to Robert Murray who brought my attention to these examples.

[25]Laryngeals will be represented in examples as the voiceless velar fricative [x].

laryngeal was for some reason able to resist loss in this environment. It may then be plausible that GV operated following the loss of laryngeals in the string *-VHV-*, but while laryngeals were still extant when contiguous to glides. I now turn to a discussion of GV from this latter sequence.

4.2 Verner's Law and GV

During the period of mobile accent in Germanic, Verner's Law caused the voicing of all voiceless fricatives in a voiced environment which were not directly preceded by an accent. Consequently, all word medial voiceless fricatives of the (13B) syllabification became voiced, e.g. PIE *+pəté́r* 'father' > *+faþár* (Grimm's Law)[26] > Go. *faðar* (Verner's Law). If we assume that laryngeals were voiceless fricatives, we would then also expect them to have undergone the voicing of Verner's Law as shown below in (14):

(14) -V̆.xi̯V́- > -V̆.ɣi̯V́- (voicing due to Verner's Law)

Thus, we would expect the laryngeals to have behaved as the other voiceless fricatives by also undergoing voicing in this environment.[27]

Two issues arise at this point. First, why was the sequence *-v̆.ɣi̯v́-* alone responsible for GV? And secondly, how did this sequence produce the GV forms? These issues can be resolved following upon examination of the relevant Syllable Preference Laws and the Consonantal Strength Scale of Murray and Vennemann (1983).

4.3 GV as a syllable structure motivated sound change

By virtue of its composition, the sequence *-v̆.ɣi̯v́-* is subject to the Head Law found in (15).

(15) *Head Law*: A syllable head is the more preferred: (a) the closer the number of speech sounds in the head is to one, (b) the greater the Consonantal Strength value of its onset, and (c) the more sharply the Consonantal Strength drops from the onset toward the Consonantal Strength of the following syllable nucleus.

The Consonantal Strength of the segments in *-v̆.ɣi̯v́-* can be determined from the Consonantal Strength Scale in (16).

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[26]Grimm's Law is responsible here for *p>f* and *t>þ*.

[27]This line of argumentation would not be undermined if there were voiced laryngeals in Germanic. The voicing of the voiceless laryngeals would simply have rendered them identical to the voiced series in precisely this environment. Thus, it could be argued that the voiced laryngeals, whether inherited or derived by Verner's Law, subsequently underwent the same developments from this stage forward.

(16)

glides	r	l	nasals	voiced fricatives	voiced stops	voiceless fricatives	voiceless stops
1	2	3	4	5	6	7	8
Weak							Strong

An examination of part (c) of the Head Law in (15) reveals that the syllable head $\gamma_{\hat{i}}$ forms the least preferred of the *obstruent+glide* onsets (cf. §4.3.1). This aspect of the Head Law refers to Slope, the difference in the Consonantal Strength of A-B where .AB form an onset cluster. According to the Head Law, the greater the slope of a cluster the more preferred the syllable head will be. Thus, the onset, $.t_{\hat{i}}$, would be more preferred than $.\gamma_{\hat{i}}$.

4.3.1 Determining the preference of $.\gamma_{\hat{i}}$

The relative strength of [γ] and therefore the relative preference of $.\gamma_{\hat{i}}$ with regards to other *obstruents+glide clusters* can be determined more precisely based on place of articulation. Gamkrelidze (1981) claims that the voiced velar plosive [g] is more marked and therefore weaker than both [d] and [b]. His conclusions are based on the universal distribution of these phonemes such that the more marked a segment is, the less likely it will occur in the world's languages.

Foley (1977) approaches this question from a different perspective. He claims that the relative strength of segments can be determined based on their tendency towards lenition across languages. Focussing specifically on the tendency of Germanic and Romance segments to lenite, Foley arrives at the following conclusions:

(17a) *Relative strength of consonants in Germanic based on place of articulation*

velars	labials	dentals
1	2	3
weaker		stronger

(17b) *Relative strength of consonants in Romance based on place of articulation*

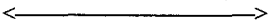
velars	dentals	labials
1	2	3
weaker		stronger

(Based on Foley 1977: 145)

In both Romance and Germanic, the velar articulation is found to be the weakest place of articulation. This concurs with Gamkrelidze's findings. These conclusions support claims of the professed weakness of laryngeals in comparison to other

obstruents (cf. Footnote 37).[28, 29] Assuming that the velar articulation is the weakest articulation, we can determine the preference of the onset .*ɣi* relative to the other possible .*Ci* clusters. These clusters can be placed on preference continua illustrating their relative preferences within their natural classes as in (18) below.[30] The depictions account for possible overlap between members of one natural class with segments of the next natural class.

(18) a. ɣi vi zi — voiced fricatives

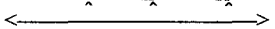


Less preferred — More preferred

b. gi bi di — voiced plosives

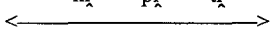
Less preferred — More preferred

c. xi fi si — voiceless fricatives



Less preferred — More preferred

d. ki pi ti — voiced plosives



Less preferred — More preferred

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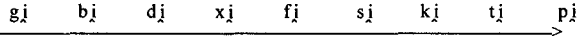
[28]Without expressing what he considers the laryngeals to have been, Greg Iverson (p.c.) also assumes that laryngeals were (relatively) weak consonants.

[29]Since the laryngeal series I assume is a series of dorsal fricatives, we could assume that [ç] and [x^{ʷ}] would also be judged as weak. Thus, the labial and dental places of articulation would contrast with this weaker "dorsal" articulation. This claim is substantiated by models of underspecification where contrasts for place of articulation are between [coronal], [labial], and [dorsal] (cf. Clements and Hume 1996; Archibald and Vanderweide 1997; L.C. Smith 1997a). Furthermore, the models adopted by both L.C. Smith (1997a) and Archibald and Vanderweide (1997) indicate that [dorsal] would be the most marked place of articulation among consonants.

[30]Simply breaking down the Consonantal Strength Scale by places of articulation, as shown below would present a misleading depiction of these relative preferences.

ɣi vi gi bi di xi fi si ki ti pi



Less preferred — More preferred

Although generally speaking voiced fricatives are weaker than voiced plosives which in turn are weaker than voiceless fricatives, etc., these divisions are not strict. For instance, some overlap exists between classes when place of articulation is considered, e.g., *x* may actually be weaker than or equal to the consonantal strength of *d* although voiceless fricatives are considered stronger than voiced plosives. Thus, at either end of the continua related to individual natural classes, there may be overlap with members of the "next" natural class.

Since voiced fricatives comprise the weakest natural class of obstruents with regards to consonantal strength, then it follows that its weakest member, namely the voiced velar fricative *ɣ*, would be the weakest obstruent. As the weakest obstruent, therefore, it would form the least preferred slope in the cluster. *ɣi̯* as depicted in (18). By contrast, *ti̯* would form that most preferred onset where *t* has the greatest consonantal strength of the Germanic obstruents.

According to the Diachronic Maxim, the less preferred structures are the first targeted to undergo improvements or changes.

(19) *Diachronic Maxim*: Linguistic change on a given parameter does not affect a language structure as long as there exist structures in the language system that are less preferred in terms of the relevant preference law (Vennemann 1988: 2).

As the least preferred onset cluster, . *ɣi̯* would be expected to be the first targeted for changes. This answers the first question: Why were the sequences with the laryngeal reflexes the only sequences to undergo GV? This leaves the last question: how was the slope of the *.HG* sequence improved?

4.4 Slope steepening

Complex syllable heads can be improved by means of several possible repair strategies. These include deletion of one of the cluster consonants, anaptyxis, vowel prothesis and slope steepening. The only process that neither deletes nor adds segments to the structure is slope steepening. This process simply ameliorates a poor slope by either strengthening the first consonant of the cluster, C_1 or weakening the second consonant, C_2.

The Romance languages provide numerous examples of slope steepening. Here the slope of either word initial or medial clusters is augmented by the weakening of the second consonant.

(19)	Lat. plānum	It. pi̯ano	'floor'
	Lat. tem.plum	It. tem.pi̯o	'temple'
	Lat. placēre	Por. prazer	'to please'

When the slopes of the examples in (19) are placed on a preference continuum, then it becomes apparent as to how the slope has been ameliorated in each case.

(20)

.pl	.pr	.pi̯
<----------		---------- >
less preferred		more preferred

Since C_1 was already the strongest consonant, namely a voiceless bilabial plosive (cf. (17b)), then the only means of improving the slope was to weaken the C_2..

The converse is found in Germanic. In one example, the C_2 in the Standard Norwegian cluster *hu* underwent unconditional strengthening from *u̯* > *v* in West Norwegian dialects. The resulting cluster, *hv*, would have been a very poor onset

cluster thereby necessitating the strengthening of the first consonant, C_1. This change of *hu̯* > *kv* is illustrated in (21).[31]

(21) WNor. kvat StNor. huat 'what'
kvítur huítr 'white'

Thus, the strengthening of *h* > *k* would have improved the slope of the onset cluster.

This example from West Norwegian provides an excellent parallel to the situation in early Germanic. The slope *ɣi̯* could only be improved by strengthening the C_1 since as a glide the C_2 could not be weakened further without becoming vocalic. Thus, the only means of ameliorating the slope of this cluster was to increase the consonantal strength of the voiced velar fricative, [ɣ], to that of a voiced velar plosive, [g].

(22) ɣi̯ > gi̯ Slope Steepening

Although slope steepening only augmented the Consonantal Strength of C_1 by one step on the Consonantal Strength Scale, this increase would have resulted in a sufficient slope improvement thereby rendering it a more preferred syllable onset than its etymon.

4.5 A sample derivation

The development of the GV forms can thus be summarised as follows:

(23) a. -V̆.xi̯V́-
b. -V̆.ɣi̯V́- Verner's Law
c. -V̆.gi̯V́- Slope Steepening — Head Law

As shown in (23), GV can be traced back to the sequence -V̆.xi̯V́-. The series of changes can be summarised simply as follows: First, voiceless laryngeals were voiced by Verner's Law. Since the resulting voiced velar fricative + glide onset cluster formed the least preferred according to the Head Law, the slope of this cluster was improved through slope steepening whereby the consonantal strength of C_1 was increased. The sum result were the GV clusters, namely [gi̯] and [gu̯].[32] A

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[31]The same slope steepening is evidenced today in Modern Icelandic, e.g., *hvað* 'what' commonly [kvaðð], less commonly [xwað] (Glendening 1993).

[32]These results can be reconciled with my interpretation of the GV segments (cf. Footnote 1):

Go.	<ddj> = [d d̯] (or [dd d̯])	ON	<ggj> = [gg^{i} i̯]
	<ggw> = [gu̯] (or [ggu̯])		<ggw> = [ggu̯]

In Gothic, the velar plosive in [g d̯] could have assimilated to the palatal glide resulting in either [d d̯] or [ɟ d̯] which would correspond to Wulfila's <ddj>. In the event that the pronunciation was indeed [ɟ d̯], the palatal plosive may have been perceived as an allophone of /d/ since no palatal series existed in Gothic. The cluster [gu̯] may then have simply been adapted without any further developments. In Old Norse, the velar plosive would have undergone velar gemination producing the geminates found there as in [gg d̯] and [ggu̯]. This gemination was responsible for the velar geminates

sample derivation of Go. *bluggwans* is shown in (24).

(24)	PIE	+bhliHw - ón[33]	Root+past participle ending — Suffix accent
		----------	Loss of laryngeals when no contiguous glide
		bhlV.xu̯v́n	Syllabification (B) (H=x)
		blV.xu̯v́n	Germanic Consonant Shift (*bh* > *b*)[34]
		blV.ɣu̯v́n	Verner's Law
		blV.gu̯v́n	Slope steepening
		blV.gu̯v́ns	Miscellaneous developments
		[bluguans]	<bluggwans>

The derivation in (24) is based on a reconstructed PIE stem and inflectional ending. Since the accent fell on the suffix in the past participle, the cluster *xu̯* would have been tautosyllabified in the onset of the accent bearing second syllable. Next, since the accent was not directly preceding the laryngeal, then the laryngeal would have undergone voicing due to Verner's Law. The lenition of *xu̯* to *ɣu̯* would have thus rendered the cluster the least preferred syllable onset. As such, the onset would have been the first to be targeted for improvement, whereby the slope was increased by strengthening the velar fricative to a voiced velar plosive. The output of this series of changes was ultimately Holtzmann's Law.

4.6 *A question of chronology*

One question could be posed at this stage as to whether the sequence of changes *x>k>g,* rather than *x>ɣ>g,* could have been responsible for the development of the GV segments? This alternative series of changes would presuppose the chronology slope steepening followed by voicing. Although at first blush, this chronology seems another possible explanation of events, one particular problem causes me to discard this as a likely alternative.

The principle weakness of the alternative chronology lies in the second phase of the change, *k* > *g*. Voicing of the plosive cannot be attributed to Verner's Law since it applied strictly to fricatives. Although the intervocalic environment is a typical voicing environment, this particular change is not commonly found in Germanic. More to the point, however, is that the direction of change, *k* > *g,* is not attested in Germanic. According to Noreen (1970), Old Norse *g* has only two sources, Proto-Germanic *ʒ* and *g*. By contrast, Old Norse *k* has a number of sources including *g* from Proto-Germanic. All things being equal (ie., if we disregard the laryngeals as a potential source of either phone), then the expected direction of

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elsewhere in Old Norse such as in the words *leggia* (Go. *lagjan* 'to lay down'), *huggia* (Go. *hugjan* 'to think'), and *bekkr* 'stream' (Noreen 1970: 203). Subsequently, the palatal glide would have triggered palatalisation of the velar further producing [gg^{j}j].

[33]The reconstruction of the root, +bhliHw is based on Schrijver (1991). The past participle ending is found in Voyles (1992). To avoid any possible dispute regarding the chronology of vocalic changes, I will use V to represent the vowels until the output of the derivation.

[34]The exact position of Grimm's Law is inconsequential as long as it precedes Verner's Law.

change would be $g > k$, not the requisite $k > g$ for this alternative series of changes. Even if Proto-Germanic *k* could be argued to be the source of GV *g*, it could not explain why numerous examples of *kG* did not also develop into *gG* in the dialects, e.g., Go. *brakja* 'struggle' beside OIcel. *brakan* 'creaking'; Go. *us-wakjan* 'wake up', OIcel. *vekja*, OS *wekkian*, OGH *wecchen* and OE *weccan* 'to cause to wake up'. In light of the evidence against $k > g$, I am not convinced that this development could serve as a preferable alternative to the chronology suggested and argued for earlier in this paper. I therefore continue to assume the GV development $x > \gamma > g$.

Having accounted for the GV developments, I now turn to an examination of the non-GV developments.

5.0 Non-GV developments[35]

Parallel developments have in some cases produced both GV and non-GV reflexes. Examples below in (25) illustrate these parallel developments.

(25) Parallel developments

GV	Non-GV	WGmc.
Go. *triggwa* 'covenant'	*trauan*** 'to trust'	OE *trūwian* OHG/OS *triuwi* 'trust' OHG *trū(w)ēn* 'to believe'
ON *tryggua* 'to make calm'	*trū* 'belief' *trūa* 'to trust'	
Go. ----------	*hawi* [36] 'hay'	OHG *houwan* OFris. *hāwa* 'to hew' OS *gi-ho(u)wan* 'hewn' (p.p.)
ON *hǫggua* 'to cut'	*hey* 'hay'	

In §3 I argued that the principle difference between the non-GV and GV forms in paradigms such as 'two' was accent placement, and by consequence the differential syllabification of the medial cluster *HG*. Since the accent in the non-GV forms appear to have fallen on the preceding root vowel, I proposed that the non-GV forms developed from the (A) syllabification, namely *V̆H.GV*. In what follows I will present an analysis for the development of the non-GV forms based on a similar change in Proto-Germanic.

5.1 Accounting for the non-GV developments: Assimilation

An explanation of the non-GV forms must be able to account for the two possible non-GV outputs, namely those containing geminate glides and those

[35]In some cases, non-GV cognates may have developed from a different ablaut grade. However, I will focus primarily on the non-GV cognates which may have developed from the same root. Evidence of differing development from one common IE form, one need only look at the paradigm 'two' (cf. (7).

[36]The exact explanation for the Gothic short vowels is unknown. Perhaps these forms developed from a different ablaut grade or from different stem allomorphy.

containing long vowels:

(26)	*Geminate glides*	*Long vowels*
	OHG *zweijo* (i̯i̯) 'of two'	OE *būan,* 'to dwell'.
	OHG *glouwer* (u̯u̯) 'clear'	OHG *bū(w)an,*
	OHG OS *triuwi* (u̯u̯) 'trust'	ON *būa*

One possible explanation which could be cited would be coda weakening due to the inherent weakness of the laryngeals.[37] However, this does not take into consideration the poor syllable contact, *H.G*, according to the Contact Law, which states:

(27) A syllable contact A.B is the more preferred, the less the Consonantal Strength of the offset A and the greater the Consonantal Strength of the onset B; more precisely — the greater the characteristic difference CS(B)-CS(A) between the Consonantal Strength of B and that of A (Vennemann 1988: 40)

Moreover, coda weakening would not necessarily guarantee that the laryngeal would weaken to the same glide as what appears in the following onset.

Assimilation offers a more plausible solution to the problem. The syllable contact in the sequence *V̆H.GV* is poor. Although the laryngeal is weak, its Consonantal Strength is still slightly greater than that of the following glide (cf. (16)). Assimilation would repair the poor contact by removing any difference in Consonantal Strength between the two segments.

(28) -V̆H.GV-
-V̆G.GV- complete, regressive, adjacent assimilation

Assuming assimilation as the primary means of repairing the contact and eliminating the laryngeal is supported by the Strength Assimilation Law which states that "if Consonantal Strength is assimilated in a syllable contact, the Consonantal Strength of the stronger speech sound decreases" (Vennemann 1988:

[37]The series of lenitions, $k > x > \chi > h > \emptyset$ underscores the relatively weak Consonantal Strength of these phones. The change *x>h>Ø* has been attested in Germanic (e.g., OE *hwæt* > Eng. *what*, OE *sēon* 'to see' beside OHG *sehan* and Go. *saih an*) and elsewhere (OSpa. [x]*ablar* 'to speak' > Spa. ablar (adapted from Murray 1995)). There is then reason to place the phones [h] and [χ] between the glides and liquids on the Consonantal Strength Scale based on the weakness of these phones (Robert Murray, p.c.). If we employ Foley's (1977) criteria that relative strength is based on the relative tendency to lenite, then the laryngeals would be extraordinarily weak. Moreover, the basic assumption of the laryngeal theory is that these segments were ultimately lost by some means in the daughter languages of IE (cf. Lehmann 1952, Jonsson 1978, Beekes 1988, etc.). That the laryngeals were so "easily" lost in all IE dialects would further support the notion of a very weak Consonantal Strength.

35). Moreover, this change is in harmony with similar changes at work elsewhere in Proto-Germanic. Numerous examples of other occurrences of assimilation in the pre-history of Germanic can be cited from Vennemann (1988: 38-9):

(29) a. **⁺d.l > l.l, ll, l**
⁺mad.la- > ⁺mal.la-;
Grm. and Lat. *mallus* 'law court', *mallare* 'to accuse, prosecute';
⁺stad.la- > +stal.la;
ON *stallr*, OE *steall*, OHG *stal, stalles* 'stall, stable'

b. **⁺z.l > l.l, ll, l**
⁺hruz.lan > ⁺hrul.lan;
OIcel. *hrolla* 'to tremble, shiver'

c. **⁺z.m > ⁺m.m, mm, m**
⁺ez.mi > ⁺em.mi;
Goth. *im* '(I) am'

Thus, complete regressive adjacent assimilation was already in operation elsewhere as a means of repairing poor contacts. Such a proposal for the non-GV data is then in harmony with explanations of other phenomena in Proto-Germanic.

A derivation of the OHG *bliuwan* 'to strike' illustrates the development.

(30) ⁺bhlíH.u̯an[38]

blíH.u̯an	First Germanic Consonant Shift (Grimm's Law)
blíu̯.u̯an[39]	Complete, regressive assimilation
<bliuwan>	

This derivation provides evidence against loss of the laryngeal through lenition. Since this loss would have triggered compensatory lengthening as has been noted in Indo-European, then it could not account for the appearance of the <u> in this and other similar examples.[40] Only by assuming the complete assimilation of the

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[38]Reconstruction of the root +bhliH-w comes from Schrijver (1991). I have employed the infinitival ending commonly found in Old English, Old High German, Old Saxon, etc. for ease of explanation.

[39]This verb may have undergone a further step where the coda glide was vocalised. Such a development would not detract from this explanation, but in fact could help provide support since the appearance of the vowel [u] could not be explained by any theory of straight laryngeal deletion.

[40]To illustrate the advantage of an explanation based on assimilation rather than compensatory lengthening, we need only examine the derivation of ⁺bhliH.u̯an based on compensatory lengthening.

⁺bhliH.u̯an	
blíH.u̯an	First Germanic Consonant Shift
blí.u̯an	loss of laryngeal
blíi.u̯an	compensatory lengthening
*blīu̯an **blīwan*	

laryngeal to the following glide can this <u> receive a proper explication. Other examples of non-GV items which can be accounted for based on this change include among others OHG *zweiio* 'of two', *glouwer* 'intelligent', *triuwi* 'trust', *triuwa* 'faith', *eigir* [ejjir] 'egg, pl.', MHG *riuwe* 'sadness, worry', *briuwen* 'to brew', OS *gibreuuan* 'brewed', and ON *hey* 'hay'.

This analysis can also be extended to account for items such as ON *būa* and OE *trūwian*. The appearance of long vowels in these forms could be the result of the subsequent coalescence of *u̯u̯* > *ū*. Prokosch (1939: 105) states that the first element of a diphthong tended to absorb the glide when the diphthong was stressed. Since stress was indeed on the resulting diphthong, then the environment existed wherein this coalescence could occur.[41] The example OHG *bū(w)an* 'to dwell' in (31) illustrates this non-GV development and coalescence.

(31)	*bheH.u̯an	'to live, dwell'
	bhuH.u̯an	Vowel gradation due to laryngeal
	buH.u̯an	First Germanic Consonant shift
	buu̯.u̯an	Complete regressive assimilation
	bu:.u̯an	Coalescence
	<būwan>	

The long vowels in the non-GV forms can thus simply be explained as resulting from two simple changes: complete assimilation of the laryngeal to the glide and subsequent coalescence of the glide to the preceding vowel. This explanation can therefore be used to account for the forms OE *twēġ(e)a*[42] 'of two', *snōwan* 'to hurry', OHG *scūwo* 'shadow', MHG *brûwen* 'to brew', MDu. *brūwen* 'to brew', *blūwen* 'to deal blows', ON *snūa* 'to turn, twist', *brū* 'bridge', etc.

Thus, complete, regressive, adjacent assimilation of the laryngeal to the following glide provides a cogent account of the development of the non-GV forms. It can account for the two sets of non-GV items, namely those containing diphthongs, e.g., OHG *zweiio*, etc, and those containing long vowels, e.g., ON *būa*. Rather than assuming these to be the result of two separate processes, they can be considered different stages of the same development. The examples containing diphthongs would be conservative forms maintaining the geminate glides which arose from the assimilation of the laryngeal to the glide. The second set of non-GV forms containing long vowels would be innovative with regards to their vowels. Rather than simply maintaining the geminate glides, *VG.G*, the first glide located in the coda of the first syllable coalesced with the preceding vowel. The result was the

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At times, derivation by compensatory lengthening creates incorrect forms and therefore could not account for the "geminate" glides in OHG *zweiio, glouwer, gitriuwi*, etc.

[41]Although coalescence is a type of compensatory lengthening in that it maintains the mora count following the coalescence of the two vowels (Robert Murray, p.c.), this is not identical to that which occurs as the result of segmental loss, such as the loss of a laryngeal.

[42]In Old English, <ġ> often represented the palatal glide [j] when followed by a palatal vowel.

long vowel found in ON *snūa*. In Middle High German, both stages of development are evidenced in its pair of forms for the verb 'to brew', *briuwen* and *brūwen*. The existence of both the conservative and innovative forms underscores the relationship between the long vowels and diphthongs in the non-GV forms. This example could be cited as support for the proposal that the long vowels simply arose as a subsequent development to the diphthongs from the assimilation.

6.0 Putting the pieces together — The development of Germanic

Although the discussion in this paper has focussed on the GV and non-GV sound changes, these developments figure into a more comprehensive development, that of Germanic. This larger development is illustrated in (32). As I proposed earlier, the parallel GV and non-GV developments took place during Stage 1 when accent was still mobile. However, when the Germanic accent shift fixed stress on

(32)

	-V̆CGV-	
Stage 1	A (Non-GV)	B (GV)
	-V̆C.GV-	-V̆.CGV́-
e.g.	-V̆x.i̯V- (> -V̆i̯.i̯V-)	-V̆.xi̯ V́- > -V̆.ɣi̯ V́- > -V̆.gi̯V́-
	-V̆t.i̯V-	-V̆.ti̯V́-

Stage 2	-V̆C.GV- ◄	
e.g.	-V̆x.i̯V-	
	-V̆t.i̯V- ◄	
	-V̆g.i̯V- ◄	**Germanic accent shift fixes accent on root syllable **(B) forms conflate with (A) forms due to change in stress and therefore syllabification

the root syllable of words, the (1B) forms underwent a resyllabification to that of the (A) forms such that the initial segment of the second syllable onset was attracted into the coda of the preceding syllable. This conflation precipitated by the Germanic accent shift resulted in Proto-Germanic Stage 2. Syllabification for this second stage is supported by Murray (1988, 1993), Murray and Vennemann (1983) and Vennemann (1988) who have shown that the syllabification in Proto-Germanic Stage 2 was characterised by a very marked system cross-linguistically. Subsequent dialect specific developments such as Gothic glide strengthening, Old Norse velar

gemination and West Germanic gemination would have been a means of ameliorating this marked system.

Two points should be noted here. First, the non-GV developments could have occurred at any time during Stage 1 or early Stage 2 since the conditions for the assimilation of the laryngeal to the glide existed in both stages. By contrast, the operation of GV was limited to Stage 1 when accent was still variable. This may account for the limited number of GV forms in comparison with the more common non-GV cognates. According to the second point of chronology, laryngeals would have been completely lost either through assimilation or strengthening before the split of the dialects.

7.0 Summary

The analysis I have presented in this paper comes to the following results for both the GV and non-GV developments. First, the mobile accent which persisted during the early stages of Germanic may have led to the differential syllabification of the sequence *VHGV*. GV may have developed from the syllabification *V.HGV* which would have arisen when the accent fell on the vowel following the cluster, *HG*. The GV segments could then have resulted from two attested changes: Verner's Law (e.g., xG> *ɣG*) and slope steepening in accordance with the Head Law (*ɣG>gG*). By contrast, the non-GV forms may have developed from the syllabification *VH.GV* when the accent fell on the preceding vowel. As stated by the Strength Assimilation Law, the laryngeal could then have completely assimilated to the weaker consonantal strength of the following glide, producing forms such as MHG *briuwen*. In some cases, the resulting glide coalesced with the preceding vowel resulting in a long vowel as in MHG *brūwen*.

This analysis has three significant strengths. First, it accounts for the parallel developments of GV and non-GV forms Germanic which have typically been ignored in the preponderance of earlier theories. Secondly, it accounts for the "loss" of laryngeals in Germanic following its departure from PIE by either assimilation or strengthening. And finally, this analysis combines various documented factors and changes such as mobile accent, Verner's Law and slope steepening, in a novel way to explain this old problem.

A number of implications fall out from the analysis presented in this work. First, this analysis assumes that GV took place at an intermediate stage between the split of Germanic from PIE and the fixing of the Germanic accent on the root syllable. Consequently, this means that the syllable structures reconstructed by linguists such as Murray and Vennemann to account for subsequent dialect specific changes can only account for the stage of Germanic following the accent shift to the root syllable. This raises the question as to where other changes such as Siever's Law and the Germanic sound shifts fit into the puzzle. Further study will be necessary to provide answers to these queries.

One further implication regarding the genealogy of Germanic may be cited. Whereas the traditional assumption has held that only Gothic and North Germanic underwent GV, my analysis states the opposite. Like Davis and Iverson (1996), I claim that the occurrence of GV was not restricted to Gothic and Old Norse.

According to the analysis presented in this work, GV occurred during an early stage of Proto-Germanic. Despite past claims that West Germanic did not undergo the strengthening of GV, I have attempted to provide evidence for GV reflexes in this branch, e.g., OE *trugian,* OE *mycg,* OS *muggia,* OHG *mucca,* OS *bruggia* and OHG *brukka.* These examples appear to support the claim that GV operated before West Germanic parted company with the other branches of Germanic. The paucity of GV data in West Germanic may be the result of levelling out the majority of GV forms or derivation of new lexical items in favour of the non-GV stems.

It appears, thus, that the "fuss" over sixteen words is no fuss after all. With the genealogy of the Germanic languages at stake, GV has a lot to say.

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