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Submorphemic iconicity in the lexicon: a diachronic approach to English ‘*gn-* words’¹⁶¹

Dennis Philps¹⁶²

Abstract

By applying a principle of submorphemic invariance to the word-initial segment *gn-* (phonologically /n/) in the heuristic class of English ‘*gn-* words’, I show that this segment functions as a ‘sublexical marker’ (<*gn-*>), defined as a semiologically and notionally invariant submorphemic unit within the subset(s) of words of which it is a formative. I go on to claim, based on evidence provided by phonotactical *GN-/GVN(-)* alternation, that although <*gn-*> must be considered as structurally indivisible in Modern English, <*g*> in <*gn-*> may originally have functioned as a ‘core invariant’ and <*n*> as a variable in the pre-history of English, specifically in Proto-Indo-European. Analysing *gn-* in most ‘*gn-* words’ of Anglo-Saxon origin and some of Greek origin as the surface trace of an underlying notional domain linked to jaw-related phenomena (sound articulation, mastication, manducation, etc.) suggests that there exists an extralinguistically motivated, *causal* relation between <*gn-*> and this domain involving the concept of ‘submorphemic iconicity’.

Keywords: submorphemic iconicity — sublexical marker — ‘*gn-* words’ — invariance — notional domain

Résumé

L’application d’un principe d’invariance submorphémique au segment initial *gn-* (phonologiquement /n/) dans la classe heuristique des ‘mots en *gn-*’ de l’anglais nous permet de montrer que ce segment fonctionne comme un ‘marqueur sub-lexical’ (<*gn-*>), défini comme une unité submorphémique douée d’une invariance tant sémiologique que notionnelle au sein du sous-ensemble de mots dont il est un élément formateur. Nous émettons l’hypothèse, fondée sur l’existence d’une alternance phono-notionnelle *GN-/GVN(-)*, que bien que <*gn-*> semble être structurellement indivisible en anglais moderne, <*g*> dans <*gn-*> a pu fonctionner comme ‘invariant-noyau’ et <*n*> comme variable à date préhistorique, et tout particulièrement en indo-européen commun. En analysant *gn-* dans la plupart des ‘mots en *gn-*’ d’origine anglo-saxonne et dans certains vocables d’origine grecque comme étant la trace en surface d’un domaine notionnel lié aux phénomènes temporomandibulaires (articulation de sons, mastication, manducation, etc.), nous sommes amené à formuler l’hypothèse qu’il existe une motivation extralinguistique, de nature causale, entre <*gn-*> et ce domaine qui intègre le concept d’« iconicité submorphémique ».

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Mots-clés : iconicité submorphémique — marqueur sub-lexical — ‘mots en *gn-*’ — invariance — domaine notionnel

1. Introduction: from phonæstheme to sublexical marker

Phonæstemes (Firth 1930) are frequently recurring, systematic pairings of form and meaning in the lexicons of many languages, including English. Their morphological status is probably best characterized as ‘submorphemic’, if one accepts Crystal’s definition of a submorpheme as ‘a part of a morpheme that has recurrent form and meaning, such as the *sl-* beginning of *slimy*, *slug*, etc.’ (Crystal 2003: 301). It may be argued that phonæstemes have submorphemic status because they do not combine with morphemes to form words, but with submorphemes (e.g. *sn-* + *-iff* > *sniff*), while morphemes either form words themselves, or combine with other morphemes to do so by means of morphological processes such as inflection, derivation, and compounding. However, this status is the subject of ongoing debate (see Bloomfield 1933: 245, Bolinger 1950: 130, Bergen 2004: 290, etc.). The application of principles of invariance to phonæstemes has led me to reanalyse them as ‘sublexical markers’, defined as semiologically and notionally invariant submorphemic units within certain subsets of the word classes in which they occur (‘*sn-* words’, etc., see Philps 2002), and noted between chevrons (<sn->, etc.).

In this paper, I shall start by setting up a heuristic class I call ‘*gn-* words’, on the basis of a structural analysis of the *GNVC(-)* lexical schema assumed to underlie the stems of these words. This class comprises all and only those lexical items that begin with *gn-*, phonologically /n/ in Modern English. I shall then look at phononotational *CR-/CVR(-)* alternation, e.g. *br-/bVr(-)* in *bring* / *bear* (common notion: ‘carrying’), before going on to examine one particular sublexical marker, the analysis of which poses the problem of the link between semiological invariance and phonological invariance, namely <gn->. I use the term ‘phononotational’ to denote frequently recurring, systematic pairings of form and notion at submorphemic level.

Few scholars have attributed phonæstemic status to *gn-* in English ‘*gn-* words’, possibly because it is no longer pronounced as a cluster in Modern English, along with the fact that studies relating to phonæstemes often have a synchronic bias. However, it is empirically verifiable that most ‘*gn-* words’ of Germanic origin and some etymologically unrelated ‘*gn-* words’ of Greek ancestry have meanings referring to jaw-related phenomena such as the manner of articulating sounds (e.g. dial. *gnatter* ‘to grumble, complain’ [*grumble* (v.) ‘to utter dull inarticulate sounds’, *OED*¹⁶³], mastication (e.g. *gnaw* ‘to bite...’), and manducation (e.g. dial. *gnip* ‘to eat’), as shown in fig. 1, which will serve as our corpus.

‘ <i>gn-</i> words’	Meaning(s)	Source
<i>gnag</i>	‘to gnaw, bite hard at something, nibble, tear, bite’	<i>EDD</i> ^{III} 164
<i>gnap</i>	‘to bite in a snapping fashion’	<i>OED</i>
<i>gnarl</i>	‘to snarl’	<i>OED</i>
<i>gnar(r)</i>	‘to growl, snarl, like an angry dog or beast; (<i>fig.</i>) to quarrel’	<i>EDD</i> ^{II}
<i>gnash</i>	‘to strike together or ‘grind’ the teeth; to bite upon’	<i>OED</i>
<i>gnat</i>	‘any of numerous small mostly biting dipteran insects...’	<i>NSOED</i> 165
<i>gnathic</i>	‘of or pertaining to the jaws’	<i>OED</i>
<i>gnatter</i>	‘to gnaw, bite at anything hard, nibble; to grumble, complain’	<i>EDD</i> ^{II}

¹⁶³ *The Oxford Dictionary of English*, 2nd edition, 1989.

¹⁶⁴ *The English Dialect Dictionary* (Wright 1898-1905).

¹⁶⁵ *The New Shorter Oxford English Dictionary*, 1993 edition.

<i>gnaw</i>	‘to bite (something) persistently...’	<i>OED</i>
<i>gnibble</i>	‘to take little bites of (a thing)...’	<i>OED</i>
<i>gnip</i>	‘to eat; to complain constantly about’	<i>EDD^{II}</i>

Fig. 1: English ‘gn- words’ denoting jaw-related phenomena

The fact that some ‘gn- words’ do not denote jaw-related phenomena may be explained in part by what Bolinger (1949) calls ‘cross-influence’, i.e. analogically driven blending, as in the case of *gn-* and *sn-* words from Proto-Germanic onwards, e.g. *gnarl* ‘to contort, twist...’ < **g(e)n-* ‘to compress into a ball’ (Watkins 2000: 26) / *snarl* ‘tangle, twist together confusedly’ < *(*s*)*ner-* ‘to wind, twist’ (Pokorny 1959: 975), and in part to the fact that they derive from PIE roots which do not convey jaw-related notions (e.g. *gnosis* < Gk. *gnôsis* < PIE **gneh₃-* ‘to know’).

Finally, I shall attempt to determine whether <gn->, like <sn-> (Philps 2002), contains a core invariant, and will invoke the concept of ‘submorphemic iconicity’ (see Bottineau 2003 for that of ‘semantic iconicity’) to account for the invariant notional domain apparently vectored by *gn-* in the subset of ‘gn- words’ in question.

2. Phonototal CR-/CVR(-) alternation

If words beginning with *gn-* are set up heuristically as a ‘class’, and if derivational phenomena are set aside (e.g. *gnag* > *gnaggle* ‘to gnaw, bite at anything hard’, *EDD^{II}*), then the members of this small class may be represented schematically as having an underlying *GNVC(-)* structure (where *V* = any possible vowel, *C* = any possible consonant, and (-) = suffixable), since all ‘gn- words’ have stems that conform to this schema. In the various realizations of *GNVC(-)*, *-V-* can be long, e.g. in dial. *gneep* ‘a foolish fellow’ (*EDD^{II}*), short, e.g. in *gnat*, or a diphthong, e.g. in *gneiss*; if *-V-* is long, *-C* can be \emptyset , e.g. in Standard English *gnaw*.

It may then be posited that any formal difference attested by the ‘rime’ (Bolinger 1950) results from a transformation operating on the variable segment of the *GNVC(-)* lexical schema (*-VC*) when realized, while *GN-* remains invariant insofar as it is the defining condition of the class. The segment *-VC* is analysed as a variable segment in *GNVC(-)* on the basis that when *gnap* and *gnip*¹⁶⁶ for instance, are opposed, the transformation in question modifies *-V-*; when *gnat* and *gnap* are opposed, it modifies *-C*, and finally, when *gnat* and *gnip* are opposed, it modifies both *-V-* and *-C* (see fig. 2 below).

¹⁶⁶ *Gnap* (v.) ‘to gnaw, bite at, nibble, snap at’; *gnip* (v.) ‘to eat’ (*EDD^{II}*).

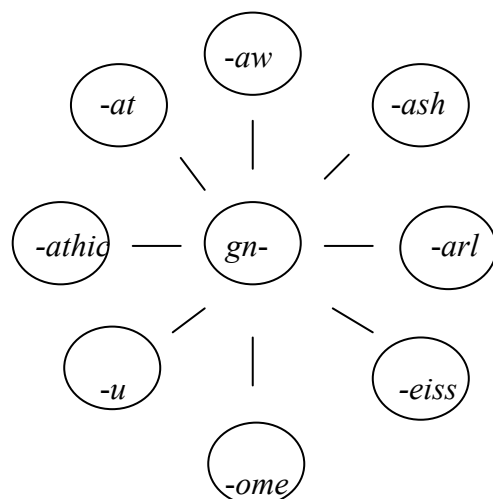


Figure 2: Structural invariance and variability in ‘gn- words’

In word-initial position, there are two major types of consonant segments considered to be phonæsthemes in English: *SC-* segments (*sl-*, *sn-*, *sp-*, *sw-*, etc.),¹⁶⁷ and *CR-* segments (*br-*, *fl-*, *gl-*, *tr-*, etc.).¹⁶⁸ Now I have shown elsewhere (Philps 2002) that in certain subsets of the phonæstheme *sn-*, *C-* functions as a ‘core invariant’, defined as the smallest structural unit within a given subset of a given class of words to which a common notion may be attributed, and *s* as an initial variant. This analysis is based on the fact that the presence ([+s]) or absence ([−s]) of *s-* in phonosemantic ‘*sn-/n-* doublets’ such as *sneeze* / *neeze* (dial.) or *sniff* / *niff* (fam.) does not modify the basic meaning, as may be seen in fig. 3 below.

Phonosemantic ‘ <i>sn-</i> doublets’	Principal meaning of [+s] form	Principal meaning of [−s] form
<i>snag/nag</i>	<i>snag</i> (v. ²): ‘to snap, bite’ (EDD ^V)	<i>nag</i> (v.) ‘to gnaw, nibble’ (OED); ‘to bite’ (EDD ^{IV})
<i>snar/narr</i>	<i>snar</i> (v.) ‘of a dog: to snarl, growl’ (OED)	<i>narr</i> (v.) ‘of dogs, etc.: to snarl or growl’ (OED)
<i>sneeze/neeze</i>	<i>sneeze</i> (v.) ‘to drive or emit air or breath suddenly through the nose and mouth...’ (OED)	<i>neeze</i> (v. dial.) = <i>sneeze</i> (v.) (OED)
<i>sniff/niff</i>	<i>sniff</i> (v.) ‘to draw air through the nose with short or sharp audible inhalations’ (OED)	<i>niff</i> (v.) ‘to have a disagreeable smell’ (OED)
<i>snob/nob</i>	<i>snob</i> (n. ¹) ‘one who wishes to be regarded as a person of social importance’ (OED)	<i>nob</i> (n. ³) ‘a person of some social distinction’ (OED)

¹⁶⁷ Where *S* = *s* and *C* = voiceless occlusive [an older word for ‘plosive’, Trask (1996)], or resonant.

¹⁶⁸ Where, simplifying a little, *C* = voiced occlusive, voiceless occlusive, voiceless fricative, or \emptyset (/g/ in /gn/ or /k/ in /kn/ in Modern English), and where *R* = resonant.

<i>snuzzle/nuzzle</i>	<i>snuzzle</i> (v. dial.) ‘of a dog: to sniff or poke with the nose’ (<i>OED</i>)	<i>nuzzle</i> (v. ¹) ‘to poke or push with the nose’ (<i>OED</i>)
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Figure 3: Dictionary definitions of phonosemantic ‘sn-/n- doublets’
Sources: *OED*, *EDD*

The above analysis is inspired by the French linguist Gustave Guillaume (1883-1960), who hypothesized that ‘the various contextual senses of a morpheme arise as actualized meanings from a single potential meaning’ (Hirtle, in Guillaume 1984: XII; see also Hirtle 2007: 21-22). Guillaume saw the causal distinction between condition and consequence as the universal principle governing the construction of all languages: “[T]he linguistic sign establishes an invariant condition in tongue [Fr. ‘langue’] from which there develops an infinite number of consequences” (1964: 150, my translation).

Transposing these hypotheses to the submorphemic level allows one to show that invariant word-initial phonæstemes such as *sn-* in ‘*sn-* words’ and, as I argue here, *gn-* in ‘*gn-* words’, are endowed with a *potential* for meaning. This potential can only be realized linguistically once the underlying notion vectored by the invariant submorpheme, e.g. jaw-related phenomena in one subset of ‘*gn-* words’, is particularized by submorphemic accretion to such a degree that it attains meaningful status, e.g. *gn-* + *-aw* → *gnaw*. *CR-* segments, on the other hand, require an approach which differs in one respect from that applied to *SC-* segments, in that they display phononotational *CR-/CVR(-)* alternation rather than phonosemantic *SC-/C-* alternation, as may be observed in fig. 4 below.

CR-segments	Doublets / Common notion
<i>bl-</i> (/bl/)	{ <i>blare</i> / <i>bawl</i> (v./v.), shouting}
<i>br-</i> (/br/)	{ <i>bring</i> / <i>bear</i> (v./v. ¹), carrying}
<i>cl-</i> (/kl/)	{ <i>clamour</i> / <i>call</i> (v. ¹ /v.), shouting}
<i>cr-</i> (/kr/)	{ <i>crêpe</i> / <i>curl</i> (v./v. ¹), curling}
<i>dr-</i> (/dr/)	{ <i>drab</i> / <i>dark</i> (adj./adj.), (absence of colour)}
<i>fl-</i> (/fl/)	{ <i>flame</i> / <i>fulgent</i> (n./adj.), brilliance}
<i>fr-</i> (/fr/)	{ <i>front</i> / <i>fore</i> (n./n.), anteriority}
<i>gl-</i> (/gl/)	{ <i>glut</i> / <i>gullet</i> (n. ² /n.), swallowing}
<i>pl-</i> (/pl/)	{ <i>plane</i> / <i>pallet</i> (n. ³ /n. ³), flatness}
<i>pr-</i> (/pr/)	{ <i>prime</i> / <i>paramount</i> (adj./adj.), superiority}
<i>tr-</i> (/tr/)	{ <i>tree</i> / <i>tar</i> (n./n. ¹), wood}

Fig. 4: Phononotational CR-/CVR(-) alternation
Source: *OED*

By envisaging sublexical markers as surface traces of general underlying notions, one is able to attribute a ‘notional’ value to these markers within the subsets in which they occur, e.g. {(s)n-, nasality} in that subset of ‘*sn-* words’ including *snaffle*, *sneeze*, *sniff*, *snob*, *snore*, etc., or {gr-, prehension} in that subset of ‘*gr-* words’ including *grab*, *grapple*, *grip*, *grope*, *grub*, etc. Within the present framework, a ‘notion’ is envisaged as a conceptual space which

may be defined as a set of complex mental representations resulting from the mind's attempts to categorize experience, notably the formal, functional and compositional properties of the latter. These attempts are necessarily conditioned by human subjectivity, culture and convention.

Seen in this light, notions may be analysed following principled cognitive criteria into 'notional domains', noted between slashes (e.g. /nasality/), to which a metric may be applied (Culioli 1990: 69). Such domains are topologically constrained, insofar as they can be identified interactively in terms of an interior (I) and an exterior (E) separated by a boundary (B) which is flexible and permeable. Furthermore, they may be organized hierarchically on the basis of dimensional, meronymic, and other relational criteria. For instance, a notional domain may be a superordinate conceptual space (Σ_{sup}) including several subordinate spaces ($\Sigma_{suba...n}$), while Σ_{sup} itself may be subordinated to a superordinate space (Σ_{SUP}).

The domain of particular interest to us here, that of jaw-related phenomena, has been set up heuristically on the basis that it is a salient conceptual space located within the superordinate domain of the human body, and encompasses several subordinate domains, e.g. the jaws, the chin ['the front of the lower jaw'], the mouth and the teeth, as well as the topological, functional and expressive properties—both articulatory and gestural—associated with these subordinate domains. As Ladefoged recalls, movements of vocal organs, which he conceives of as gestures, are controlled and purposeful; in particular, the movements of jaw and tongue are interlinked:

The principal muscle of the tongue is the genioglossus, which pulls the back and root of the tongue towards the front of the mandible (the jawbone). The net effect of contracting the genioglossus muscle is that the tongue gets compressed within the jaw. (Ladefoged 2005: 125)

3. The sublexical marker <gn->

While the orthographical forms of word-initial *SC-* segments always correspond to the word-initial phonological structure /SC/ in English (e.g. *sn-* = /sn/, *sp-* = /sp/, *sw-* = /sw/), this is not always the case with *CR-* segments, since although *bl-* corresponds to /bl/ and *gr-* to /gr/, for instance, the orthographical form *gn-* no longer corresponds to the word-initial phonological structure /gn/ as it did in earlier stages of the language (Dobson 1968: 977-978), but to /n/: the form *gnaw*, for example, is pronounced /nɔ:/ in late Modern English. Indeed, Jespersen has referred to initial *gn-* as a 'consonant group' which has become 'lightened' (1994: 4), while other linguists have examined the reduction of initial *kn* and *gn* to /n/, e.g. Kökeritz (1945), Dobson (1968), and Lutz (1992). A distinction must therefore be maintained between the synchronic and the diachronic status of these markers.

As seen above, it is possible to bring into focus relations between certain members of the class of '*gn-* words' and '*gVn(-)* words' which would otherwise remain unobserved or appear fortuitous, by adopting a more abstract representation of these classes. This is accomplished by setting up underlying lexical schemas, e.g. *GNVC(-)* and *GVN(-)*, remembering that different phonetic and phonological constraints (initial consonant reduction, vowel length, diphthonging, absence of a final consonant, variations due to rhoticity, etc.) apply to their respective realizations. One such relation is that between '*gn-* words' and '*gVn(-)* words' denoting jaw-related phenomena (mastication, manducation, manners of speaking, expressive gestures, etc.). Two schemas are involved here: *GNVC(-)*, as in *gnathic* (adj.) 'of or pertaining to the jaws', and *GVN(-)*, as in *genial* (adj.² in *OED*) in the anatomical sense of 'of

or pertaining to the chin'. The 'gn- words' of Anglo-Saxon stock concerned, most of which are probably late analogical innovations, are often described as 'onomatopœic' and are of uncertain etymology. They may be assumed to continue Proto-Germanic *gn- roots', the Indo-European forms of which are usually given as 'hypothetical', e.g. *gh(e)n- > Proto-Germ. *gnagan (> OE gnagan > Mod. Eng. gnaw, Watkins 2000: 29).

It should be noted that <gn-> must, in certain circumstances, be analysed in conjunction with the sublexical marker <kn->, represented semiologically by kn-, which is also realized as /n/ in Late Modern English (e.g. knee: /ni:/). This is because certain English 'kn- words' continue *gn- clusters in PIE, e.g. knee < OE cnēo < Germanic *knewam < PIE *ǵneu-, base II of *ǵenu- 'knee'. This root is also continued in English, via Latin, by genuflect, reflecting the lexical schema GVN(-), but additionally by knop 'the rounded protuberance formed by the front of the knee or the elbow-joint' and knuckle (< Germ. *knapp- and *knuk- respectively), both of which appear to derive from, or at least to be modelled on, the hypothetical *g(e)n-.

As previously mentioned, the phonetic realization of G in the lexical schema GNVC(-) may not be instantiated in a given state of the language, due to the consequences of phonetic change. In 'gn- words' of Anglo-Saxon origin, for instance, the devoicing and eventual loss of the word-initial voiced velar occlusive appears to have begun during the Middle English period, judging by the dates of the earliest attestations provided by OED. For instance, gnāt (< OE gnæt(t)), one of the rare 'gn- words' of Old and Middle English not to have undergone s- accretion (Philps 2003), was spelt knatt(e) in the course of the 14th century. This reduction affected educated speech as early as the 16th century, according to Dobson:

Initial [gn] had two developments which affected educated speech in the sixteenth and seventeenth centuries. In the first the [g] was lost by a direct process of assimilation to [n] [...]. In the second, [gn] by dissimilation becomes [kn] [...]; thereafter it develops with original kn- through [χn] and [hn] to [n*] and [n]. (1968: 977-8)

To exemplify the first development ([gn] > [n]), Dobson quotes sources of the period ('homophone' pairings, etc.) which suggest that gnash had become nash, gnāt > nat, and gnaw > naw, while the second development ([gn] > [kn] > [n]) is testified to by lists or pairings including gnāt > knat and gnaw > knaw.

4. Core invariance and English <gn->

One consequence of the phonotactically-driven reduction of /gn/ to /n/ for the diachronic analysis of <gn-> is that, contrary to <n> in <sn->, <n> in <gn-> cannot be analysed as a core invariant, since gnag, knag, and nag, for example, are diachronic evolutions of the same word, whereas sneeze and neeze, for instance, are different words (sneeze is first attested c1493 as replacing OE fnese, while neeze, from ON hnjósa, is attested earlier, c1340, indicating that it is not the result of consonant reduction affecting sn-). Hence phonosemantic gn-/kn-/øn- alternation cannot be equated with phonosemantic sn-/øn- alternation. Also, there is no '*g-mobile' alternation in Indo-European comparable to the morphophonological '*s-mobile' alternation on which the phonosemantic sn-/øn- 'doublets' in English (sniff / niff, etc.) and other Germanic languages are modelled (Southern 1999: 70-71). Phonosemantic

‘doublets’ such as *gnar(r)* (v., dial.) ‘to snarl, growl’ / *narr* (v., dial.) ‘of a dog: to snarl, growl’ must therefore have a different structural origin.

In fig. 5 below, I have set up a class of ten lexical items (‘*gVC(-)* words’), based on the heuristic criteria that all correspond to the lexical schema *GVC(-)* subsuming *GVN(-)*, and that all have meanings referring to jaw-related phenomena in either their nominal or their verbal uses, or both: parts of the anatomy (mouth, teeth, jaws, chin, gums...), expressive facial activities (opening the mouth, showing the teeth, gaping...), functional activities (biting, swallowing, breathing...), etc., in human and non-human animates. Within this class, three items correspond to the schema *GVN(-)*: *gan*, *gen* and *gen(-)* in *genial*, while the others correspond respectively to *GVB(-)* (*gob*), *GVL(-)* (*gill*), *GVM(-)* (*gam*, *gum*), *GVP(-)* (*gape*), and *GVR(-)* (*gur-* in *gurgitate*). Given that the invariant segment in this class appears to be *G-*, since *-V-* and *-C-* are both variables, I will hypothesize that *G-* functions as a core invariant (<g>) here, as it corresponds to the smallest structural unit within the class of ‘*gVC(-)* words’ in fig. 5 to which the jaw-related notional domain common to all its members may be attributed.

Support for this analysis is provided indirectly by the fact that substituting other possible consonants for *g-* in the class of ‘*gVn(-)* words’ (e.g. : *p-*: *pen*, *t-*: *tan*, *l-*: *line*, *m-*: *man*, etc.), does not allow one to identify a common notional domain other than fortuitously (e.g. *dental* (adj.) ‘of or pertaining to the teeth...’ (*OED*) and *mental* (adj.²) ‘pertaining to the chin’ (*OED*), but *tan* and *pan*, *den* and *men*, *fin* and *sin*, etc.). It can however be seen that much depends on the criteria used to establish this kind of class. For instance, if a criterion of semantic identity rather than notional identity were used, it is clear that the meaning of ‘mouth’, ‘the opening in the head of a person or animal through which food is ingested and vocal sounds emitted’ (*gam*) and ‘throat’, ‘the front of the neck beneath the chin and above the collar-bones’ (*gan*) would not allow these two items to be grouped together on the basis of semic commonality, unless evidence provided by polysemy were also taken into account (e.g. *gam* (n.) ‘large teeth, tusks, the mouth, the lips’), *gan* (n.) ‘the mouth, the throat, (*pl.*) the gums, the jaws’).

‘ <i>gVC(-)</i> words’	Meaning(s) referring to jaw-related phenomena (n.)	Meaning(s) referring to jaw-related phenomena (v.)	Etymology
<i>gam</i>	1. <i>pl.</i> Large teeth, tusks 2. The mouth (<i>OED</i>) The lips (<i>EDD</i> ^{II})	To cause teeth to grow crooked and overlapping each other (<i>EDD</i> ^{II})	? (cf. PIE * <i>ǵembh-</i> ‘tooth, nail’)
<i>gan</i>	The mouth (<i>OED</i>) The throat; <i>pl.</i> the gums, also the jaws (<i>EDD</i> ^{II})	To stare, gaze vacantly (<i>EDD</i> ^{II})	(n.) cf. Sw. (dial.) <i>gan</i> , ‘the inner part of the mouth, the mouth, the gill of a fish’ (<i>EDD</i> ^{II}) (v.) cf. Sw. (dial.) <i>gana</i> ‘to stand and wonder at anything’ (<i>EDD</i> ^{II}), cf. ON <i>gan</i> ‘yawn; cry’ <PIE * <i>ǵheh₄-</i>
<i>gape</i>	The act of opening the mouth; a yawn (<i>OED</i>)	To open the mouth wide, esp. in order to bite or swallow anything (<i>OED</i>)	(v.) ON <i>gapa</i> ‘to open the mouth’ < PIE * <i>ǵheh₂i-</i> ‘to yawn, gape’ (<i>AHDIER</i>)
<i>gen</i>	∅	To open, gape; grin, to show the teeth like	OE <i>geonian</i> (<i>ginian</i>) ‘to open the mouth’ (<i>EDD</i> ^{II}) < PIE * <i>ǵheh₂i-</i>

		a dog (<i>EDD</i> ¹⁶⁹)	‘to yawn, gape’ (<i>EIEC</i>)
<i>gen-</i> in <i>genial</i>	(adj. ²) Of or pertaining to the chin (<i>OED</i>)	Ø	Gk. <i>genus</i> ‘jaw, chin’ < PIE * <i>ǵenu-</i> ‘jawbone, chin’ (<i>AHDIER</i>)
<i>gill</i>	The lower jaw, the flesh under the chin or ears; the mouth, throat (<i>EDD</i> ¹⁷⁰); the organ of respiration in fishes... (<i>OED</i>)	1. To gut or clean (fish) 2. To handle the gills of, take hold of by the gills (<i>OED</i>)	(n.) Middle Eng. <i>gile</i> , <i>gill</i> , from a Scandinavian source akin to ON * <i>gil</i> , gill of a fish < Germ. * <i>geliz</i> < PIE * <i>ǵhel-unā-</i> ‘jaw’ (<i>AHDIER</i>)
<i>gip</i>	The point of the jaw of a fish (<i>EDD</i> ¹⁷⁰)	To open the mouth for want of breath (<i>EDD</i> ¹⁷⁰); to clean (fish) for curing (<i>OED</i>)	(n.) Compare Sw. (<i>mun</i>) <i>gipa</i> , corner of the mouth (<i>EDD</i> ¹⁷⁰) (v.) Origin unknown (<i>OED</i>)
<i>gob</i>	The mouth (<i>OED</i>) A beak (<i>EDD</i> ¹⁷⁰)	To spit (<i>OED</i>)	(n.) OF <i>gobe</i> , <i>goube</i> ‘mouthful, lump’ < <i>gober</i> ‘swallow, gulp’ (? < Celt. * <i>gobbo</i> ‘mouth, beak’, whence prob. Sc. and north. Eng. <i>gob</i> mouth, <i>ODEE</i>)
<i>gum</i>	The firm fleshy integument of the jaws and bases of the teeth (<i>OED</i>)	To deepen and enlarge the spaces between the teeth of (a worn saw) (<i>OED</i>)	OE <i>gōma</i> ‘palate, jaw’ < Germ. <i>gō-ma</i> < PIE * <i>ǵhēu-</i> ‘to yawn, gape’ (<i>AHDIER</i>)
<i>gur-</i> in <i>gurgitate</i>	(<i>gurgitation</i>) ‘swallowing; guzzling’ (<i>OED</i>)	To swallow greedily or immoderately (<i>OED</i>)	Lat. <i>gorges</i> ‘throat’ < PIE * <i>ǵ^wrǵ-</i> <i>g-</i> < * <i>ǵ^werh₃-</i> ‘to swallow’ (<i>AHDIER</i>)

Fig. 5: English ‘gVC(-) words’ referring to jaw-related phenomena
Sources: *ODEE*¹⁶⁹, *OED*, *EDD*, *AHDIER*¹⁷⁰, *EIEC*¹⁷¹

It may be noted in passing that colloquial and dialect French also has a small number of etymologically unrelated ‘*gn-* words’ denoting jaw-related phenomena, in which *gn-* is pronounced /ɲ/, e.g. *gnaquer* (v.) ‘to bite (into)’, *gnaques* (n. *pl.*) ‘the teeth (of a dog)’, *gnagne* (n.) ‘(large molar) tooth’, *gnigue-gnaque* (n.) ‘said of the movement of the teeth when chewing’, and *gnac* (n.) ‘bite’ (cf. metaphorical uses such as ‘*avoir du gnac*’ or ‘*avoir la gnaque*’), all late, onomatopœic formations. Modern French also has a few ‘*gn-* words’ whose meanings do not seem to be jaw-related, in which *gn-* is pronounced /gn/. These are either borrowings, e.g. from Italian, *gnocchi* (1864) or, from Hottentot, *gnu* (1778), or of Greek and/or Latin origin, e.g. *gnome* (1583), built to Gk. *gnōmé*, and (also Lat.) *gnomon* (1547). This paucity is scarcely surprising since, as Ernout & Meillet state (2001: 278) with reference to *gnārus*, *gn-* was not preserved in Latin, while in Ancient Greek, apart from a few derivatives, one only finds *γνάθος* ‘jaw’ (< PIE **ǵenu-* ‘jawbone, chin’) and *γνάμπτω* ‘to curve, bend’, of uncertain etymology (Chantraine 1999: 230). As for the lexical schema *GVN(-)*, Modern French has *ganache* (< Ital. *ganascia* ‘jaw’) ‘±lower jaw (of a horse)’, *gencive* (n.) ‘gum’, and *gingival* (adj.) ‘relative to the gums’. While *ganache* appears to be related to Gk. *γνάθος* ‘jaw’ (but cf. *γένυς* ‘jaw’, also derived from PIE **ǵenu-* ‘jawbone, chin’), *gencive* and *gingival* can be traced back to Lat. *gīnīva*, whose form may display a trace of reduplication (**gen-g-īua*) according to Ernout & Meillet (2001: 275).

¹⁶⁹ *The Oxford Dictionary of English Etymology* (Onions 1966).

¹⁷⁰ *The American Heritage Dictionary of Indo-European Roots* (Watkins 2000).

¹⁷¹ *Encyclopedia of Indo-European Culture* (Mallory & Adams 1997).

5. Core invariance in Proto-Indo-European

As seen above, data furnished by *EDD* and *OED* provide evidence of a notional link between the class of ‘*gn-* words’ denoting jaw-related phenomena such as mastication (e.g. *gnaw*), manducation (e.g. *gnip*), manners of speaking (e.g. *gnap*) and expressive gestures with bared teeth (e.g. *gnarl*) and that of ‘*gVn(-)* words’ denoting jaw-related phenomena. In the lexical schema underlying the ‘*gn-* words’ in fig. 1, i.e. *GNVC(-)*, *GN-* has been identified as a core invariant, while in that underlying the ‘*gVn(-)* words’ in fig. 5, i.e. *GVN(-)*, *G-* seems to function as a core invariant. Now if one accepts Benveniste’s reconstruction of the canonical form of the IE root as C_1eC_2 with two alternating *thèmes* or ‘bases’ (1935: 170), then it becomes apparent that English ‘*gVn(-)* words’ denoting jaw-related phenomena are modelled on base I (full grade) of the root ($*CVC-$), while ‘*gn-* words’ referring to the same notional domain are modelled on base II (zero grade, $*CCV-$). Also, the derivatives of one and the same PIE root form may be represented by both schemas in English, e.g. *GVN(-)* in *genial* ‘of or pertaining to the chin’, and *GNVC(-)* in *gnathic* ‘of or pertaining to the jaws’ (*OED*), both reflexes of $*\hat{g}enu-$ ‘jawbone, chin’, via Greek $\gamma\acute{\epsilon}\nu\epsilon\iota\omicron\nu$ ‘chin’ and $\gamma\nu\acute{\alpha}\theta\omicron\varsigma$ ‘jaw’ respectively.

Furthermore, according to one of the principles set out in Grimm’s Law, initial /g/ devoices to /k/ between Indo-European and Proto-Germanic (Szemerényi 1999: 17), while normally remaining voiced in Latin and Greek (Beekes 1995: 110). This helps to explain why the two lexical schemas corresponding to PIE $*g^{\wedge}enu-$ ‘knee’, namely *GVN(-)* (base I) and *GNVC(-)* (base II), are in complementary distribution in Eng. *genuflexion* (n.) and *knee* (n.): whereas the former continues, via late Latin, the *GVN(-)* base I schema, the latter continues, via Germanic, the *GNVC(-)* base II schema, becoming *KNVC(-)* in Late Modern English.

Now there is structural evidence in PIE which suggests that in certain ‘root doublets’, the consonant occupying the C_1 slot in the canonical root structure C_1eC_2 functions as a core invariant, and C_2 as a variable. This evidence comes in two forms. The first of these is root-final $*-r-/*-l-$ alternation (Benveniste 1964: 25) that does not correlate with a change in the underlying notion conveyed by the root, as in $*gal-/*gar-$ ‘to call, shout’, $*\hat{g}hel-/*\hat{g}her-$ ‘to shine’, $*ghel-/*gher-$ ‘to call (out)’, $*pel-/*per-$ ‘to strike’, $*(s)kel-/*(s)ker-$ ‘to cut’, $*wel-/*wer-$ ‘to turn’, etc., while the second is root-final voiced/voiceless alternation that, like $*-r-/*-l-$ alternation, does not correlate with a change in the underlying notion, e.g. $*peig-/*peik-$ ‘to cut, mark’, or $*\hat{g}ebh-/*\hat{g}eph-$ ‘jaw, \pm eat’, etc.

If the consonants occupying the C_1 slot in the abovementioned PIE ‘root doublets’ with initial $*\hat{g}h-$, $*gh-$, $*\hat{g}-$ or $*g-$ function as core invariants, and those occupying the C_2 slot ($*-r-/*-l-$, $*-g-/*-k-$, $*-bh-/*-ph-$) as variables, then it is conceivable that the root-final consonants in other roots with initial $*gh-$, $*\hat{g}h-$, $*\hat{g}-$ or $*g-$ whose derivatives denote jaw-related phenomena also function as variables, since they too enter into a relation of alternation which does not correlate with a change in the underlying notion conveyed by the root. Examples include $*\hat{g}embh-$ ‘tooth, nail’ (> Eng. *comb*), $*\hat{g}heh_2i-$ ‘to yawn, gape’ (> Eng. *gape*), $*ghel-un\bar{a}-$ ‘jaw’ (> Eng. *gill*), the hypothetical roots $*g(e)n-$ ‘to compress into a ball’ (> Eng. *gnarl*) and $*gh(e)n-$ ‘to gnaw’ (> Eng. *gnaw*), $*\hat{g}enu-$ ‘jawbone, chin’ (> Eng. *gnathic*), and $*gheh_a(u)-mr-$ ‘interior of mouth (e.g. gums, palate)’ (> OE *gōma* ‘inside of mouth or throat’, Mod. Eng. *gum*).

6. Conclusion: submorphemic iconicity in English ‘*gn-* words’

To account for the dyadic relation {<gn->, /jaw-related phenomena/} that can be traced back, through Germanic or Hellenic, to Proto-Indo-European, two types of explanation are possible. One holds that since the linguistic sign has no natural connection with the referent, acquiring its value solely as a result of the differential, language-internal relations it maintains simultaneously with other, like signs in the system, it is senseless to identify possible links between the extralinguistic and the linguistic: as conceived by Saussure, the linguistic sign is, by definition, arbitrary. A second type of explanation has it that the sign has *become* arbitrary, implying that it enjoyed, at some emergent stage in the evolution of language, a partly natural relation with the extralinguistic. Of course, this stance has its problems, insofar as it is neither demonstrable nor falsifiable; furthermore, much depends on what is meant, exactly, by ‘natural’. Whatever the case, the hypothesis proposed below provides a possible account of this relation.

The sublexical marker <g> assumed to function as a core invariant in the C_1 slot of the above-mentioned PIE ‘root doublets’ and other roots with initial **gh-*, **ǵh-*, **ǵ-*, or **g-* whose derivatives have meanings referring to jaw-related phenomena such as sound articulation, mastication and manducation, is realized phonetically as a voiced velar occlusive, whether aspirated, e.g. **gh-* in **gh(e)n-* ‘to gnaw’, aspirated and palatalized, e.g. **ǵh-* in **ǵheh₂i-* ‘to yawn, gape’, palatalized, e.g. **ǵ-* in **ǵenu-* ‘jawbone, chin’, or not, e.g. **g-* in **geh₁i-* ‘to sing’.

By reanalysing this root-initial occlusive as a gesture of occlusion (Browman & Goldstein 1992: 156), and hypothesizing that it originally served, because of its occlusive quality, as an articulatory unit around which forms with meanings related to the goal-orientated, occlusive (open-close) mandibular movements involved in oral activities such as gnawing and primitive calling could be constructed, we may trace it back to a possible scenario of the emergence of human speech similar to that described by MacNeilage in his “Frame-Content Theory” (1998, cf. also MacNeilage 2008: Part V). MacNeilage sees the open-close mandibular cycle as the main articulatory ‘building block’ of speech production, and the evolution of the open-close alternation of the mouth for purposes of speech as “the tinkering of an already available motor cyclicity into use as a general purpose carrier wave for time-extended message production.” (1998: 506).

In other words, I posit that the naturally occlusive properties of the various phonetic realizations of <g> originally endowed it with the capacity to *refer back* to the jaws, both metonymically—the (articulated) sound for the articulators—and iconically, in that the sign thus created partakes in the character of its object (Peirce 1991: 251). Evidence from Indo-European languages suggests that this putative self-referential capacity may have been extended, again by metonymical association (part/whole, interior/exterior, contiguity, etc.), to signs denoting the jaw’s physiological environment (chin, mouth, cheeks, teeth, gums, palate...), its movements (biting, gnawing, eating, swallowing...), and its expressive connotations (to gape [‘an open-mouthed stare’], to gaze [to stare (at)], to stare [‘to gaze fixedly and with eyes wide open’]...), etc. The evolution of occlusions from the non linguistic to the linguistic, via the prelinguistic, may be modelled schematically as follows:

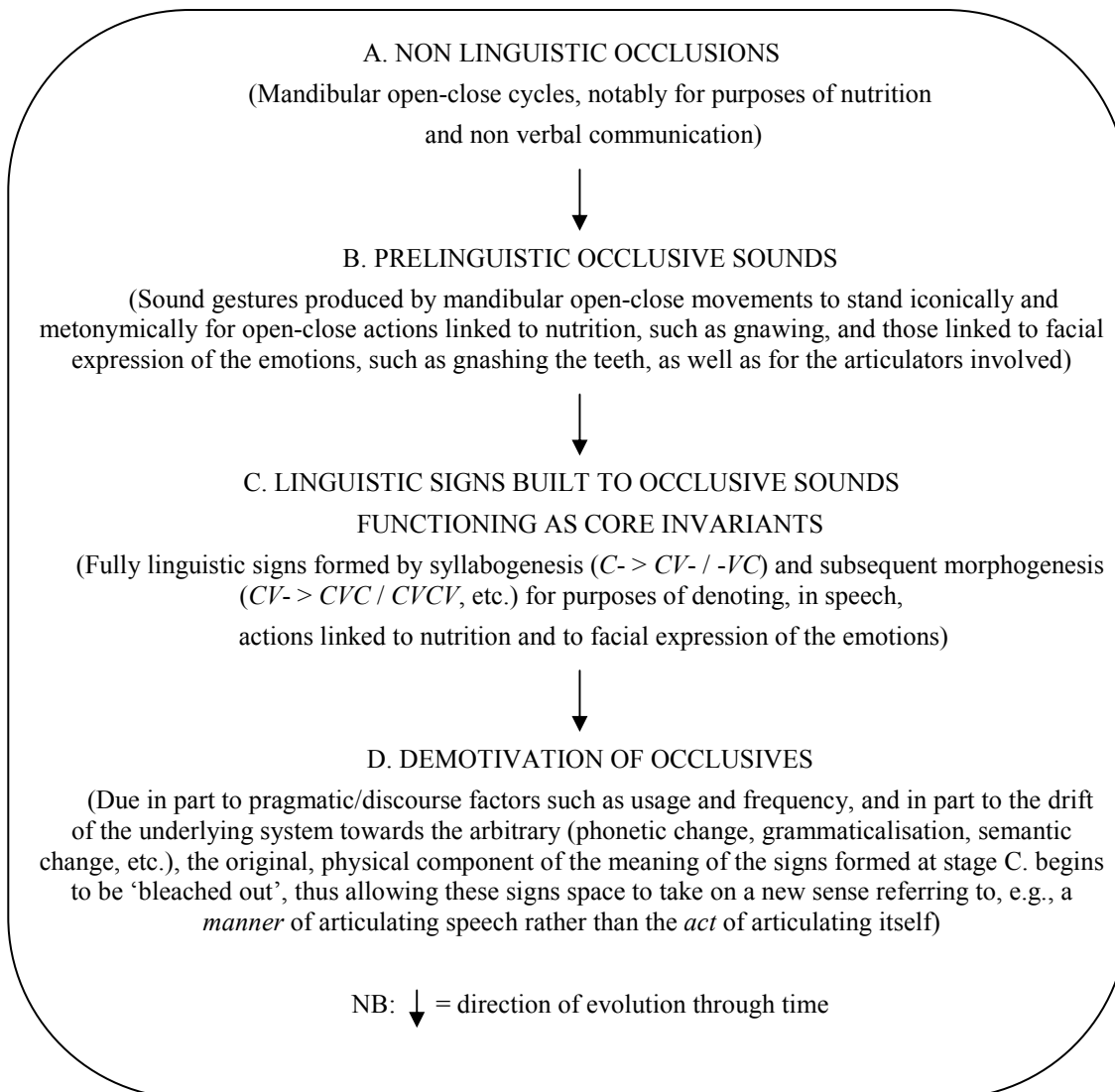


Fig. 6: Modelling the emergence and evolution of the sign

Hence, several millennia later, the meanings of English 'gn-' and 'gVn(-)' words referring to jaw-related phenomena (and also words having undergone affrication such as *jowl*, < OE *cēafl* 'jaw, cheek' < Germ. **kēfalaz* < PIE **ĝebh-/*ĝeph-* 'jaw, ±eat' and *chin*, < OE *cin(n)* < Germ. **kinnuz* < PIE **ĝenu-* 'jawbone, chin') would to some extent be predetermined by this causally based, self-referential capacity. However, this does not imply that such a possibility is necessarily materialized in any language, or that any realization of <g>, irrespective of its position, must actualize this potential. In Indo-European, for instance, **-ĝh-* may function as a root extension (e.g. **bhelĝh-* 'to swell' < **bhel-*, Rix et al. 2001: 73-74), irrespective of the notion conveyed by the root in which it occurs.

While reconciling these two types of explanation appears impossible, it may nevertheless be adduced that whereas English 'gn- words' and 'gVn(-) words' with jaw-related meanings are arbitrary at the morphemic level, they may be partially non-arbitrary at the submorphemic level. This would be so if the words in question were construed as being built to a core invariant (<g>) which originally possessed an inherent, self-referential value that gradually became more and more arbitrary as linguistic processes such as phonetic change (recall that

/g/ in words beginning with *gn-* is no longer realized phonetically in Late Modern English) and structural evolution (*gn-* no longer appears to be functionally divisible in English) modified the original, semiogenetic conditions of the transformation of the sign from prelinguistic to linguistic status. If this postulate is admitted, then it may be concluded that a trace of submorphemic iconicity persists in English ‘*gn-*’ and ‘*gVn(-)*’ words denoting jaw-related phenomena.

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