A farewell to constituency

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1 Introduction

The goal of this paper is to eliminate constituent nodes from phonological representation and to propose an alternative representation. My motivation for this lies in the metatheoretical assumption of minimal componentiality: the inventory of units in phonological representation should ideally be minimalised. This assumption reflects the recent tendency towards a restrictive framework in the literature. For example, Avery and Rice (1989: 179) claim that 'the burden of explanation in phonology should be in the representational component rather than rule component'. This claim raises two issues. On the one hand, a rule-based account of a phonological process is too arbitrary to be compatible with a restrictive theory and thus must be excluded; and, on the other hand, the appearance of a unit in phonological representation necessarily predicts a set of processes, so representation must not contain mere informal labels which exercise more expressive power than we would wish. It is the latter issue which I pursue in this paper. This paper aims to contribute to the establishment of a restrictive theory by eliminating informal labels, constituent nodes, from phonological representation.

The constituents under discussion here are the syllable, onset, rhyme, nucleus and coda. The concept of constituency figures prominently in the recent literature on nonlinear phonology, although there is no agreement upon which constituents should be formally incorporated into phonological representation. In spite of the frequent appearance of these constituents, the formal definition of constituency remains surprisingly obscure. This is due to the fact that reference to constituency is made in accounts of two independent phenomena: higher-level prosody and (string-adjacent) phonotactics. The constituents are sometimes referred to as 'prosodic' (or 'suprasegmental') units. This term implies that these constituents, which may comprise more than one melodic unit or position[1], behave as components in a larger domain, or, more precisely, in prosodic structure. However, it is often the case that accounts of higher-level prosodic phenomena refer only to the syllable, rhyme and nucleus. The other constituents, the onset and coda, never play a role. On the other hand, the constituents are also regarded as units which impose phonotactic constraints on melodic units in a string. In this case, the

[1]In this paper, **positions** refers to phonological units which are variously called in the literature **skeletal positions**, **phonological timing units**, etc.

syllable and rhyme logically lose direct access to melodic units, since their sub-constituents, the onset, nucleus and coda, exhaust the association with them. These facts show that only the nucleus among the constituents takes on both the above functions. Even so, it is still possible to assume that constituent status is achieved if at least one of the above characteristics is applicable, but this move is undesirable considering the recent tendency towards a restrictive theory in phonology. Once a constituent node is assigned, its existence raises the expectation, in vain in most cases, that this node may play both the above roles. From the point of view of minimal arbitrariness, this state of affairs is wholly undesirable.

Recent advances in phonology have shown that a relational property, which invokes a head-complement relation, is one of the most crucial concepts in phonology. In this paper, I shall adopt the principles-and-parameters approach and the system of phonological elements of Government Phonology (Charette 1991; Harris[2] 1990, 1992a; Harris and Lindsey 1993; Kaye 1990a, b; Kaye, Lowenstamm and Vergnaud 1985, 1990) and explore the possibility of phonological representation with no constituent nodes, claiming that the mechanism of phonological licensing renders the notion of constituency redundant.

The presentation is as follows. §2 discusses the alleged functions of constituency and shows a degree of inconsistency in this connection. In §3, I establish a formal criterion of constituency, whose effect is to exclude the syllable, onset and coda. In §4, I argue that the rhyme is also irrelevant as a constituent and has to be eliminated from formal representation; I put forward an alternative representation without the rhyme node. Finally, in §5, I claim that the elimination of the nucleus is not only possible but also profitable in terms of representational restrictiveness, and propose phonological representations without any constituent node at all, thus leading to the elimination of the nucleus.

2 Problems

2.0 The role of constituents is generally considered to be a two-fold one. On the one hand, they function as units in prosodic phenomena. And, on the other hand, they impose phonotactic constraints on the melodic units they dominate. The following subsections, however, show that most constituents, as conceived currently of in much of the literature, play only one of the above roles, and that therefore their formal status needs revising.

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[2]References in this paper list John Harris and James Harris. Throughout the paper, 'Harris' refers to John Harris, unless otherwise indicated.

2.1 Prosodic units

As stated in the introduction, there seems to be no evidence for the onset and coda as units functioning in prosodic phenomena. That is, these constituents are not directly motivated by phonological phenomena at this level. For example, the primary motivation for the 'onset-rhyme split' of the syllable constituent is that melodic units in the initial margin of a syllable do not contribute to syllable weight. That is, the onset constituent is a byproduct of the assignment of the rhyme for quantitative purposes. The coda is also complementarily introduced, given the necessity for the presence of the nucleus. Such a 'labelling habit' is explicitly stated by Fudge (1989: 219):

> In order to make a constituent cut, do we need clearly separate criteria for the status of EACH constituent[?]....We need just one motivation for the cut, which then in turn motivates recognition of both constituents.

That is, according to him, once a sub-constituent is assigned to a sequence of positions within a constituent, another sub-constituent is automatically established to deal with the remainder, if any. This view is not always accepted by phonologists. For instance, Levin (1985: 87) says; 'labels like onset and coda....are merely an informal reference to segments preceding the head [i.e. the nucleus] and following the head respectively'. However, Fudge's view has sometimes been taken for granted in the motivation for constituents. His claim is reminiscent of the equipollent distinctive features of *The sound pattern of English* (Chomsky and Halle 1968; SPE, henceforth), in that assigning a distinctive feature with one value (a natural class) entails the existence of the complement value. Such a claim, however, becomes vulnerable if we consider the current tendency towards a preference for privativeness (or monovalency) in melodic components (see Anderson and Ewen 1987; Avery and Rice 1989; Kaye, Lowenstamm and Vergnaud 1985; McCarthy 1988; Schane 1984). A complementarily assigned value in the distinctive feature system may be far from natural, since it cannot be proved to function as a referential unit in any phonological phenomena. The concept of privativeness ensures that formal status is only given to those components which are active in phonological processes. By the same token, regarding constituency, I claim that we do need to have independent criteria for the status of each constituent in phonological representation.

From such a point of view, besides the onset and coda, the syllable too is difficult to justify because of its lack of active participation in prosodic processes (as well as in melodic processes as discussed in the following subsection). There seems to be a strong tendency to assume that the maximal syllabic constituent

should be the syllable itself. In this regard, the framework of Government Phonology is rather radical, in which no syllable constituent is assumed to exist, and what have been regarded as the sub-constituents of the syllable, the onset and rhyme, coexist as the maximal syllabic constituents (see Kaye, Lowenstamm and Vergnaud 1990: 199-202). However, while the inventory of constituents may vary from one theory to another, the syllable node dominates the other constituents in much of the literature, although explicit arguments for this view are rarely given. The latter is often taken for granted. James Harris (1983: 6) says, for instance: 'Consider the word *buey* 'ox' [in Spanish]. This much is clear and uncontroversial: *buey* consists of a single syllable'. This kind of statement is frequently found in the literature, but such a claim always seems to set the criterion of a 'clear and uncontroversial' syllable on the basis of perception or the intuition of native speakers. I would not say that such an intuition should be totally disregarded, but we should not consider only what we can perceive to be real, especially since it is not clear what phonological reality is being so labelled. Depending heavily on intuition may lead us to lose objectivity in our interpretation of phonological phenomena. Halle & Vergnaud (1980: 93) also propose that 'skeleta in all languages are subdivided into subsequences to which the term SYLLABLE has traditionally been attached' but they admit that 'it appears to us that the superordinate unit, the syllable, plays a much more marginal role in phonology'. In fact, prosodic phenomena never seem to refer to the syllable, at least as a unit comprising the rhyme and onset. In all quantity-sensitive languages, for example, the ability to bear stress is determined not by a property of the syllable but by the heavy vs light distinction of the rhyme[3]. Regarding pitch-related phenomena, such as tone, pitch accent and intonation, instrumental data show that characteristic changes in fundamental frequency, giving rise to pitch prominence, are observed at the beginning of a rhyme (or a nucleus), or possibly later than it, but rarely

[3]Davis (1988) claims that there are languages in which stress assignment is sensitive to the weight of the syllable: whether an onset position precedes a nucleus or not. He cites as an example Western Aranda, an Arandic language of Australia, in which stress falls 'on the initial syllable if it begins with a consonant; otherwise stress falls on the second syllable' (1). Due to limited space, I do not explore an alternative account of the stress assignment in Western Aranda, only suggesting that the directionality of phonological licensing, which is discussed later in this paper, should be involved.

before it. It is difficult to find a compelling argument for the syllable as a prosodic unit[4].

2.2 Prosodic licensing and constituentiality

In this subsection, I focus on the relation between constituents and melodic phenomena. In connection with constituency in nonlinear phonology, the following assumptions seem to be taken for granted (see Itô 1986: 2 on (1a) and Anderson and Ewen 1987: 45 on (1b)):

(1) (a) **Exhaustivity**
Positions in phonological representation must be exhaustively associated with constituents in order to receive phonetic interpretation.

(b) **Constituentiality**
Positions recurrently entering into some phonological relation, in particular with respect to phonotactic constraints imposed on sequences of melodic units, must be dominated by the same constituent.

However, among the inventory of constituents, the syllable and rhyme are not motivated by the above assumptions. Regarding (1a), they do not play a role since, as discussed in the introduction, they have no direct access to positions, which are exhaustively associated with the onset, nucleus and coda[5]. Besides, when it comes to (1b), the syllable and rhyme are illicit unless it can be proved that the onset and

[4]Another argument for the phonological reality of the syllable constituent is put forward by Prosodic Morphology, based on reduplication processes (see, for example, McCarthy and Prince 1990; 1992). I believe that the mechanism of phonological licensing introduced later in this paper is able to handle such processes without reference to the syllable constituent, but, due to the limited space here, I have to reserve full discussion on this issue for a future opportunity.

[5]Melodic units may be directly associated with the syllable node in the framework of Prosodic Morphology (McCarthy and Prince 1990; 1992) and Moraic Phonology (Hayes 1989). Also, as shown later in this paper, the rhyme may directly dominate a position in Government Phonology (Kaye, Lowenstamm and Vergnaud 1990). However, with respect to the other problems of constituency I discuss in this paper, the status of the syllable and rhyme as constituents still remains questionable.

rhyme are subject to constraints similar to those operating in the case of the nucleus and coda. In fact, there do not seem to be such general constraints[6].

The exclusion of the syllable and rhyme thus leaves us with the onset, nucleus and coda. However, if we strictly follow (1b), the necessity for another constituent arises, although no phonologist is inclined to present an argument for it. It has been frequently pointed out that a coda and following onset are closely connected. For example, in many languages, a coda position cannot have an independent place of articulation from that of a following onset, or a coda cannot appear unless it shares the same melodic unit with a following onset. Also, phonological processes in a coda position, such as assimilation and deletion, are often conditioned by a following onset. The constituentiality assumption should require these positions to be dominated by the same constituent, but no such claim has ever been seriously put forward; instead, it is often the case that the above constraints are accounted for by stipulating Coda Conditions (see Itô 1986; Yip 1991). This may be because of the strong belief that the maximal syllabic constituent should be the syllable itself. The constituent consisting of a coda and onset results in assigning either another maximal constituent or an ambisyllabic subconstituent. However, the most important reason for this state of neglect is probably the fact that the two positions in question by no means function as an active unit in phonological phenomena at a higher domain. That is, having a constituent node dominating these positions would overpredict prosodic phenomena with respect to a unit comprising a coda and following onset. Such a constituent is of course undesirable, but rejecting it contradicts the constituentiality assumption.

I have thus far shown the difficulties with respect to the currently acknowledged constituents, which arise from their functions in phonological phenomena. In sum, a constituent can have the following faces: a unit in prosodic phenomena; a licenser which enables melodic units to receive phonetic interpretation; a source of constraints imposed on a sequence of positions. The confusion seems to stem from burdening constituents with such functions simultaneously.

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[6]Anderson (1986: 57-58) and Clements and Keyser (1983: 20-21) point out phonotactic constraints between a nucleus and following coda and between an onset and following nucleus. On the latter, however, Fudge (1989) shows that the cases presented by Clements and Keyser are far from general. Although Anderson's and Clements and Keyser's claims may need more careful examination, in this paper, I follow Fudge's view and regard such constraints as being accidental.

3 Constituency

3.1 Introduction

As seen in the previous section, the concept of constituency lacks a coherent definition. In order to establish a criterion of constituency, this section makes the following three assumptions:

(2) (a) The recognition of a constituent node must be motivated by its active participation in prosodic phenomena.
(b) Melodic units are licensed to receive phonetic interpretation not by association with constituent nodes but by the assignment of licensing paths (or head-complement relations) descending from the ultimate licenser of a domain.
(c) Phonological relations between positions should be captured in terms of phonological licensing and not constituency.

By (2a), I reject the custom of labelling which assigns the status of a constituent despite the lack of an active function. I subscribe to the view of Avery and Rice (1989: 179) that 'the burden of explanation in phonology should be in the representational component'. The more important the role played by the representational component, the more pressing it is to ensure that the expressive power of representation must be restricted. The elimination of informal labels forms part of an overall programme in which only attested processes are generated by the theory.

This claim should not be so controversial, considering similar arguments for privativeness and minimal arbitrariness made, whether explicitly or implicitly, in recent studies in phonology. However, one question arises: without a constituent node, how can we encode information concerning melodic constraints? (2b) and (2c) provide an answer to this.

3.2 Phonological licensing

The concept of a relational property governing phonological structure is not new in phonology, however it might be referred to: dependency (Anderson and Ewen 1987), government (Kaye, Lowenstamm and Vergnaud 1990), licensing (Goldsmith 1990; Harris 1992a, b; Itô 1986) and strong vs weak (Kiparsky 1980). It is beyond the scope of this paper to examine the conceptual differences among them; instead,

let me capture the relational property under the notion of licensing, which is defined as follows (Kaye 1990a: 306; see also Harris 1992a: 379):

(3) **Phonological Licensing Principle**
Within a domain, all phonological units must be licensed save one, the head of the domain.

The claims in (2) follow from the above principle. That is, the well-formedness condition in terms of association with constituent nodes claimed by Itô (1986: 2; see (1a)) is now replaced by one expressed in terms of licensing relations. (I shall return to this in the following section.) Autosegments, which I henceforth call 'elements' following Government Phonology (Harris and Lindsey 1993; Kaye, Lowenstamm and Vergnaud 1985), are assumed to be licensed by positions (I henceforth refer to this type of licensing as a[utosegmental]-licensing, following Brockhaus 1992; Goldsmith 1989 and Harris 1992a). Thus, in order to satisfy the Phonological Licensing Principle, these positions have to be the terminal nodes of licensing paths descending from a position which is the ultimate licenser of a domain, so that elements a-licensed by the positions receive phonetic interpretation.

Licensing between positions is subject to the principles of Locality and Strict Directionality (see Kaye, Lowenstamm and Vergnaud 1990: 198ff). Locality ensures that a position may license another only when both are immediately adjacent at some level of projection. The directionality is universally determined for two types of licensing at the null and first (or head) projections. Within a constituent, licensing is left-headed, whereas it is right-headed between two positions of different constituents. At higher projections, directionality is language-specifically determined according to parameter.

As claimed in (2b) and (2c), constraints imposed on a sequence of melodic units are derived from the mechanism of phonological licensing, or, more precisely, the asymmetric status of positions in head-complement licensing relations. The range of melodic oppositions supported by a position is determined by referring to its licensing potential: the ability to license other positions and elements. A licensed position always possesses less licensing potential than its licenser. This concept is generalised by Harris (1992a) as follows:

(4) **Licensing Inheritance Principle**
A licensed position inherits its licensing potential from its licenser.

Melodic constraints are derived from the asymmetric licensing potential of positions. Consider, for example, an initial CC- cluster within the same (onset) constituent of English words. There are fourteen candidates for the first C, whereas

the second C only can be either /j/, /w/, /r/ or /l/ (the data taken from Gimson 1989: 246-247)[7]. Since the directionality of licensing, recall, goes from left to right within a constituent, the first C is dominated by a position which licenses the position dominating the second C. The licenser position, according to the Licensing Inheritance Principle, possesses a greater licensing potential and thus enjoys the ability to support a wider range of melodic oppositions than the second. This is exactly what the above phonotactic patterns show. Consequently, the principles in (3) and (4) derive melodic constraints, and, besides, this account necessitates no reference to constituency, as claimed in (2b) and (2c).

3.3 The criterion of constituency

(2a) claims that a constituent must play an active role in prosodic phenomena, and (3) prescribes that all the units in phonological representation must be involved in some licensing relation. These two assumptions ensure that a position must be legitimised not by virtue of being dominated by a constituent node but of being involved in a licensing relation. That is, in the framework I am developing here, a well-formed phonological representation may contain a position which does not belong to any constituent. This is not compatible with the condition of Prosodic Licensing in (1a) or the constituentiality assumption (1b). As long as (3) is satisfied, a constituent-free position enables its melodic unit to receive phonetic interpretation, and thus this undermines the notion of Prosodic Licensing. Also, the constituentiality assumption becomes untenable since a phonological (or licensing) relation does not necessarily invoke constituency unless positions entering into this relation show an active participation as a unit in prosodic processes.

Regarding the connection between a licensing relation and constituency, Government Phonology (Kaye, Lowenstamm and Vergnaud 1990) makes an interesting claim. (Government Phonology refers to a relational property as 'government', but I shall continue using 'licensing' throughout in the present discussion in order to avoid unnecessary confusion.) In this framework, only left-to-right licensing ('constituent licensing') invokes constituency[8]. This enables

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[7]I exclude /s/ from a possible first C, since this melodic unit does not seem to occupy an onset position in a word-initial consonant cluster. On this argument, see Kaye, Lowenstamm and Vergnaud (1990: 203ff).

[8]Regarding the relation between licensing and constituency, one question may well arise: which comes first? Is constituency conditioned by licensing, or vice versa? This may lead to a circular argument. Considering the lack of evidence for the onset being an active constituent, my discussion will be shown to favour licensing.

us to avoid the problem of a coda-onset relation described earlier: a licensing relation between a coda and following onset position is right-headed ('interconstituent licensing') and thus does not invoke constituency. The implicit assumption is that a constituent subsumes a licensing relation, but not vice versa. I extend this assumption and tentatively suggest the following criterion of constituency (the discussion in this paper ultimately leads to the elimination of constituency, so this criterion, in due course, will be unnecessary; see §5.1):

(5) Constituency subsumes phonological licensing: a constituent is assigned to a licensing domain only when positions in the licensing domain play an active role in some process as a unit.

Note that (5) invokes the difference between a 'constituent' and 'domain'. The former is established by positions not only entering into a licensing relation but also functioning as a unit, while the latter only refers to positions connected by licensing paths. Consider the following configurations:

(6) (a) $[x \rightarrow x]$ (b) c / \ $[x \rightarrow x]$

In both (6a) and (6b), the left position licenses the right, as shown by arrows. Such licensing relations motivate domains, represented by square brackets. However, differing from (6a), (6b) ensures that the two positions together function in prosodic processes as an active unit, which is represented by the constituent node 'c'. Note that, as shown in (6a), (5) creates the possibility of constituent-free positions appearing in phonological representation.

In the light of the criterion of constituency above, the syllable, onset and coda lose the status of a constituent in phonological representation (see §2.1). In fact, the recent literature argues that these three constituents are only informal labels (see, for example, Clements and Keyser 1983; James Harris 1983; Hayes 1989; Kaye, Lowenstamm and Vergnaud 1990; Kenstowicz and Rubach 1987; Levin 1985). As a result of the elimination of the three constituents, there remains the rhyme and nucleus. In the following section, however, I show that the distinction between these constituents is redundant, which leads to claiming that only the nucleus satisfies the criterion of constituency.

4 The elimination of the rhyme

4.0 As mentioned earlier, the rhyme and nucleus are active units in prosodic phenomena. The issue to be discussed in this section is the difference between these constituents, and I argue that, once we posit the Phonological Licensing Principle, the distinction between the rhyme and nucleus is redundant. In the following subsections, I first discuss arguments that the rhyme vs nucleus distinction is necessary in order to deal with certain phonological processes, and I give alternative accounts of such processes without recourse to constituency. Then I propose phonological representations without the rhyme or nucleus node, in which the directionality of licensing plays a crucial role.

4.1 Phonological weight

4.1.0 One of the arguments for the necessity of the distinction between the rhyme and nucleus recurrently refers to phonological weight. It is often claimed that languages in which the placement of stress is determined by phonological weight are divided into two types. On the one hand, there are languages in which the determining factor of the ability to bear stress is the light vs heavy distinction of a rhyme: a non-branching rhyme, -V$ ('$' represents a syllable boundary), is light while a branching one, -VV$ or -VC$, is heavy. Latin is a well-known example, and English also belongs to this type. On the other hand, there is a group of languages which 'treats a syllable whose rime has a short (or lax) vowel as light and a syllable whose rime has a long (or tense) vowel as heavy - but, independently of whether the syllable is closed by a consonant or not' (Hyman 1984: 5). In such languages, phonological weight crucially depends on whether a nucleus, not a rhyme, is branching or non-branching. That is, -VC$ functions in the same way as -V$, but not -VV$.

Although the different types of weight sensitivity above are accepted in much of the literature (for example, see Hyman 1984; Katamba 1989; Tranel 1991; Zec 1989), it is questionable whether a group of languages sensitive to the weight of a nucleus exists or not. In the following, I cite two languages in which stress is allegedly sensitive to the weight of a nucleus, and present an alternative account of stress assignment for each language, making reference only to the weight of a rhyme.

4.1.1 Huasteco stress. According to Katamba (1989: 178-179), the Mexican language Huasteco is one of the languages in which stress assignment refers to the

weight of a nucleus. Consider the following data, which are taken from Larsen and Pike (1949):

(7) (a) **Disyllabic words**

/ʔá'em/	'salt'	/cálam/	'shade'
/bú:c'iʔ/	'coward'	/ʔé:jal/	'boss'
/cijó:k/	'chin'	/ʔamú:l/	'rubbish'
/ʔi:lá:b/	'seed'	/ʔya:nf:l/	'many times'

(b) **Trisyllabic words**

/hflk'oma/	'leftovers'	/ʔá:ulom/	'field of garlic'
/kwahf:lom/	'window'	/hu:ú:k'ik/	'blisters'
/ʔalabé:l/	'pretty'	/bf:nomac/	'one who gave'
/ʔuba:t'lá:b/	'game, plaything'		
/ʔe:la:wá:j/	'(they) surely find each other'		

Katamba claims that stress in this language is sensitive to the weight of a nucleus, not a rhyme. (see also Hyman 1984: 5-6) For example, /ʔé:jal/ and /ʔamú:l/ are both disyllable words terminating with the same melodic unit /l/: that is, they may be considered to contain a branching rhyme word-finally. However, the distribution of stress shows that only the rhyme with a branching nucleus attracts stress. Going through the above data, stress assignment certainly seems to follow the generalisation that stress falls on the rightmost heavy nucleus. However, if we regard the last consonant in a word, if any, as being somehow independent of an immediately preceding nucleus, it becomes possible to deal with the stress assignment of the language in question only by referring the weight of a rhyme. The idea that a word-final consonant does not count in prosodic phenomena is well-established as the notion of 'extrametricality' in the framework of Metrical Phonology (Hayes 1982; Hogg & McCully 1987: 106ff) and is adopted with varying degrees of modifications by others (see, for example, Halle and Vergnaud 1987; Itô 1986). This concept is approached differently within Government Phonology (Kaye 1990a), in which the last consonant is assumed to belong to an onset followed by an empty nucleus: a nucleus without melodic content. By reanalysing Huasteco stress with either of these insights, the mechanism of stress assignment is expressed only in terms of the weight of a rhyme: it is always the rightmost heavy rhyme which attracts stress.

4.1.2 Selkup stress. In the Huasteco case above, the concept of extrametricality or an empty nucleus is sufficient to derive an alternative account of stress assignment which does not refer to the weight of a nucleus. In this language, it is

always a word-final consonant which gives rise to necessity for the nucleus-sensitive stress assignment. As far as the data in (7) are concerned, we do not have to worry about whether the -VC$ rhyme word-internally patterns with -V$ or -VV$. In /hflk'oma/, for example, stress falls on /hfl/, regardless of its weight, because the rhymes to its right fail to attract stress. In this regard, however, stress in Selkup, a West Siberian language, seems to be more challenging. Consider the following data taken from Halle & Clements (1983: 189)[9]:

(8)	(a)	k´ə	'winter'	s´ərі	'white'
		kipó:	'tiny'	qó:kitilʸ	'deaf'
		pünakis´ə:	'giant!'	kanaŋmf:	'our dog'
		qúmmin	'human being' (gen.)	ilisó:mit	'we lived'
		qúmim	'human being' (acc.)	s´æ:qi	'black'
		qúminik	'human being' (dat.)	kárman	'pocket'
		qumó:qi	'two human beings'	ú:ciqo	'to work'
		qúmit	'human beings'	ú:cak	'I work'!
		qúmmi	'my friend'	u:có:mit	'we work'
		qummf:	'our friend'	ú:citilʸ	'working' (part.)
		qumo:qlllf	'your two friends'	ú:cilæ	'working' (gerund)
		u:cikkó:qi	'they two are working'		
	(b)	ámirna	'eats'	´ühhinti	'wolverine'
		qólʸcimpati	'found'	ú:cikkak	'I am working'

The stress assignment proposed for Huasteco applies to the words in (8a); stress falls on the rightmost heavy rhyme, given the word-final consonant is extrametrical or an onset followed by an empty nucleus. However, as pointed out by Tranel (1991: 294), 'in its right-to-left scan seeking the first heavy syllable [i.e. rhyme], stress skips CVC syllables [i.e. a rhyme of the -VC$ type in the word-internal position]', as in (8b). Neither extrametricality, the application of which is usually

[9]Due to the availability of symbols, some transcriptions are modified and stress is sometimes indicated by placing '´' before a vowel bearing stress.

restricted to a word-final position[10], nor the concept of a word-final empty nucleus, can any longer accommodate a satisfactory mechanism of stress assignment. On the face of it, this fact would seem to motivate the claim that Selkup stress is nucleus-sensitive.

However, it is still possible to give an alternative account which only refers to the weight of a rhyme. The first step towards such an alternative account is to doubt whether this language truly allows a rhyme to branch (-VC$). Many words in the above data contain sequences of consonants such as /-mm-/ and /-kk-/, and this may seem to suggest that such geminate consonants are the manifestation of 'coda-onset' dependency. That is, a word such as /qúmmin/ may be claimed to be syllabified as /qúm.min/. Nevertheless, the sequence of consonants in /kaŋanmf:/ shows that two concatenative consonants may lack such a typical phonotactic dependency of 'coda-onset' sequence.

The alternative account of Selkup I will outline here incorporates the notion of empty nucleus already invoked in the analysis of Huasteco. There is no reason to assume that the occurrence of such a position should be restricted to word-final position. Government Phonology, in fact, proposes that an empty nucleus may occur word-internally under certain conditions, as follows (from Kaye 1992: 305, with modifications):

(9) (a) Properly licensed (word-internal) empty nuclei receive no phonetic interpretation.

(b) **Proper licensing**
a properly licenses b if
(i) a and b are adjacent on the relevant projection,
(ii) a is **not itself** licensed, and
(iii) no licensing domain separates a from b.

There is a body of empirical evidence supporting the occurrence of word-internal empty nuclei (see Charette 1991; Kaye, Lowenstamm and Vergnaud 1990). I argue, incorporating the proposal in (9), that a rhyme never branches in Selkup, and that apparent contiguous consonants are always separated by a properly licensed

[10]The application of extrametricality is extended to the word-initial position in Halle & Vergnaud (1987: 48-50), but Davis (1988: 4) criticises this: 'such application of extrametricality is apparently otherwise unprecedented in stress system'. Considering that McCarthy & Prince (1990: 227) also suggest that an initial consonant should be extrametrical in prefixation in Tagalog, the validity of initial consonant/syllable extrametricality in phonological processes need be discussed further in empirical terms. However, it seems in any way difficult to claim that extrametricality should be applicable to the word-internal position.

empty nucleus. Accordingly, I assume that words such as /qúmmin/ and /kanaŋmɬ:/ contain an empty nucleus: /qúm@min/, /kanaŋ@mɬ:/. ('@' represents an empty nucleus.) In either case, the empty nucleus is properly licensed by the following nucleus at the nuclear projection, satisfying the conditions in (9b): the licenser (/i/ in /qúm@min/ and /ɬ:/ in /kanaŋ@mɬ:/) itself is not properly licensed, and no licensing domain exists in the proper-licensing relation (that is, /m/ flanked by /@/ and /i/ in /qúm@min/ or /@/ and /ɬ/ in /kanaŋ@mɬ:/ licenses no other position). This assumption explains why the /-ŋm-/ sequence in /kanaŋ@mɬ:/ lacks phonotactic dependency: each of the two consonants independently belongs to two different onset-positions. As a result, in Selkup, the patterns of a rhyme is either -V$ (light) or -VV$ (heavy), but never *-VC$.

Bearing this assumption in mind, I reanalyse the problematic words in (8b) as /ámir@na/, /qólʸ@cim@pati/, /ˊüŋ@ŋin@ti/ and /ú:cik@kak/. Stress in these words now follows the general principle: stress falls on the rightmost heavy rhyme, if any, and otherwise on the first.

The concept of an empty nucleus enjoys an advantage over that of extrametricality, since the latter is not applicable to the case of Selkup stress. If this type of analysis can be successfully extended to other allegedly nucleus-sensitive cases, then we are in a position to make the claim that phonological weight is exclusively a rhymal phenomenon. The apparent behavioural differences in stress assignment observed from one group of languages to another are attributed to whether a language allows the occurrence of an empty nucleus which receives no phonetic interpretation but which may participate in stress assignment.

4.2 The distribution of melodic units

Another argument for the distinction between the rhyme and nucleus constituents comes from the distribution of melodic units in the complement position of branching constituents. That is, the second position of a branching rhyme (a rhymal complement) possesses a different characteristic from that of a branching nucleus (a nuclear complement). In terms of phonological weight, a long monophthong or diphthong in a branching nucleus (-VV$) and a sequence of a short monophthong and consonant in a branching rhyme (-VC$) agree in that both are heavy. However, from the melodic point of view, a melodic unit associated with a nuclear complement position differs from that associated with a rhymal

complement in that the former is non-consonantal while the latter is consonantal[11]. Clements and Keyser (1983) represent such a difference by introducing the CV-tier, which indicates phonological timing as well as the difference in the distribution of melodic units. For Clements and Keyser, the primary motivation for introducing CV-slots is to distinguish 'the functional category syllable peak from syllable margin and thus determine the locus for the association of prosodic properties such as pitch and stress. In addition, these elements characterise timing units' (136). However, considering their claim that some languages may have a syllable containing two V-slots (12), the above remark makes little sense. It is difficult to find empirical evidence which shows that one syllable can possess two loci (-VV$) for the association of stress in any language. Although they deny that CV-slots are equivalent to consonants and vowels (see, for example, 67ff), CV-slots seem primarily to encode the information subsumed under the feature label [consonantal]. Lowenstamm and Kaye (1986) and Levin (1985) claim that such CV information is inferable and thus unnecessary, once we establish some kind of hierarchical prosodic structure. The peak vs non-peak information is provided by the head-complement relation within both the rhyme and nucleus constituents. Also, the distinction between the rhyme and nucleus is derived from syllable structure formation rules (Levin 1985), or from melodic information: whether a syllable is 'closed' or not (Lowenstamm and Kaye 1986). This move replaces CV-slots on the CV-tier with X-slots, which only show phonological timing.

Besides, different types of phonotactic dependency shown by the rhyme and nucleus offer further support for the distinction of these two constituents. The distribution of a melodic unit in a nuclear complement position, on the one hand, is solely determined by that of the preceding position, regardless of what melodic material follows. On the other hand, a rhymal complement, a 'coda' position, shows significant dependency on a following onset-head (see §2.2; Clements 1985; Itô 1986; Kaye 1990a; Yip 1991).

My question with respect to the above argument is whether both the information regarding the peak vs non-peak positions and that relating to the distribution of melodic units have to be dealt with under the notion of constituency. It is true that a distinctive feature such as [syllabic], the value of which depends on its relation with surrounding melodic units, gives rise to difficulty if it is

[11]It is a matter of debate whether a nuclear complement may contain a consonantal melodic unit or not. For example, Zec (1989: Chapter 2) shows that, in Lithuanian and Kwakwala, CVV$ and CVS$ ('S' indicates a sonorant) pattern together in phonological processes, contrasting with CV$ and CVO$ ('O' indicates a obstruent). This fact may lead one to assume that a sonorant (consonantal) can occupy a nuclear complement position, but, in the above discussion, I assume that consonantal melody units only occur in a non-nuclear position. Although the Lithuanian and Kwakwala cases are worth detailed re-examination, I reserve it for a future study.

included in a single feature matrix, since doing so obscures the relational nature of syllabic status. In this respect, it may seem preferable to encode the relational function in constituency rather than in features. The function of such a feature in a higher unit is based on relations between melodic units in a sequence. However, once we establish the concept of a relational property such as licensing, it is natural to assume that the licensing mechanism should be more suitable for handling a relational characteristic such as peak vs non-peak. As Kaye & Lowenstamm (1986) and Levin (1985) claim, such a characteristic is the manifestation of a head-complement relation: the ultimate licenser of a domain is the peak (or [+syllabic]) and licensees are non-peak. Here we do not have to refer to constituency at all. By the same token, we may well expect that the distributional constraints of melodic units stemming from relations with other positions should be explained in terms of licensing relations. The following subsections will elaborate this concept, which leads to the elimination of the rhyme vs nucleus distinction.

4.3 Phonological representation without the rhyme node

4.3.1 Rightward and leftward licensing. The core concepts in the following discussion are the Phonological Licensing Principle (see (3)), the Licensing Inheritance Principle (see (4)) and the directionality of licensing. As said earlier, in the framework of Government Phonology, the directionality of licensing determines constituency: the left-to-right licensing (rightward licensing, henceforth) invokes constituency while the right-to-left one (leftward licensing, henceforth) does not. Since this concept is crucial to the following discussion, let me first illustrate it in more detail.

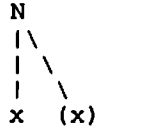
Although I have now rejected the syllable, onset and coda, to begin with, let us assume for the sake of argument that the rhyme, onset and nucleus make up the exhaustive inventory of constituents, in order to lay out the framework of Government Phonology. According to the principle of Locality and Strict Directionality, the three constituents are maximally binary: either branching or non-branching (see Kaye, Lowenstamm and Vergnaud 1990). If they branch, rightward licensing is required: the first position licenses the second. The difference between these constituents arises from different types of leftward licensing, which are defined by the following principles (see Harris 1992a: 380 on (10a), and Kaye 1990a on (10b)):

(10) (a) **Onset Licensing Principle**
An onset-head position must be licensed by a following nuclear head position at the head projection.

(b) **'Coda' Licensing Principle**
A rhymal complement position must be licensed by a following onset-head position.

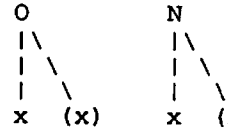
The nucleus is the only constituent independent of the others. The onset and rhyme, on the other hand, are characteristically dependent on a following nuclear and onset-head, respectively. The following configurations depict the above conditions, with examples of English words which stand for the patterns of words for each representation ('N', 'O' and 'R' represent the nucleus, onset and rhyme constituents, respectively; the head and complement positions of a constituent are respectively represented by vertical and slanting lines)[12]:

(11) (a)



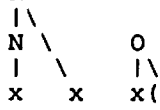
awe

(b)



tree

(c)



entry

The licensing relations are represented by the constituent nodes in (11) are shown in (12) below (the arrows represent asymmetric licensing relations between positions):

[12]The nucleus dominated by the branching rhyme in (11c) cannot branch. It is assumed that the head of a rhyme constituent is its nuclear head position, and that a rhymal complement must be licensed by a preceding nuclear head. Thus, if the nucleus branches, its head position cannot license the rhymal complement since this results in the violation of Locality.

(12) (a) x'
|
x(-> x)

(b) x' <—— x'
| |
x(-> x) x(-> x)

(c) x' x' <—— x'
| | |
x -> x <- x(-> x) x(-> x)

In §4.2 I have mentioned the different kinds of phonotactic dependency shown by rhymal and nuclear complements. (12a) and (12c) provide an explanation for this. (12a) shows that the nuclear complement is singly licensed by the preceding nuclear head, while the rhymal complement in (12c) is doubly licensed by the preceding nuclear head and following onset-head. Taking into consideration the Licensing Inheritance Principle, the latter inherits extra licensing potential which the former does not, and thus can enjoy a wider range of melodic oppositions.

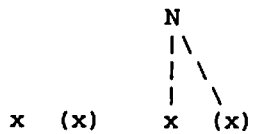
Now let me return to the main purpose in this paper: the elimination of constituent nodes from phonological representation. I take the representations in (11) as my targets, and start the present discussion with the onset constituent, which is merely an informal label according to my criterion of constituency (see (5)). First, the Onset Licensing Principle needs revising. I propose (13) below, which is to replace (10a):

(13) **Prehead Licensing Principle**
A nuclear head position licenses a preceding prehead position. This prehead-licensed position inherits licensing potential to license a complement position to its right, if any.

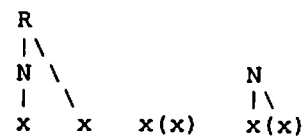
The above principle incorporates the concept of 'government-licensing' developed by Charette (1990; 1991: Chapter 5; 1992). According to her, in order for a non-nuclear position to govern another position, it has to be government-licensed by a following nuclear head position. Government-licensing is originally introduced to account for the phenomenon of vowel-zero alternation in, for example, French, Mongolian, Polish and Tangali. In this paper, I interpret this concept as a constraint imposed on licensing relations. That is, I assume that the Prehead Licensing Principle is the condition of 'licence-licensing', in which a non-nuclear position is required to be licensed by a following nuclear head to license its complement.

Now that we regard 'onset' as an informal label, I refer to what has been an 'onset'-head as a prehead, which is distinguished from a nuclear head, the ultimate head of a domain. The onset constituents in (11) are now removed from the representation, as shown in the following configurations:

(14) (a)



(b)



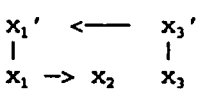
The above representations should not result in any loss of information obtained from (11a) and (11b). With the Prehead Licensing Principle, we still infer the licensing paths shown in (12b) and (12c) from (14a) and (14b) respectively. If neither a rhyme nor nucleus dominates a position preceding a nucleus as in

(15)

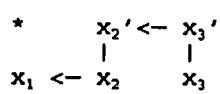
this position has to be a prehead. On the other hand, if in the same context there are two constituent-free positions as in

(16) (a)

(b)

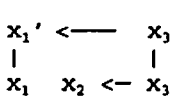


(c)



then the leftmost position x_1 must be licensed to be a prehead by a following nuclear head, and it in turn licenses x_2 to be a complement. (16b) indicates this licensing relation. The licensing relation in (16c) is ruled out, since the Prehead Licensing Principle only allows a prehead to license its complement to its right. No principle is available to enable x_2 to license x_1 to its left. However, in connection with (16a), there arises the possibility of constructing the alternative licensing relation shown in (17):

(17)



In (17) the nuclear head x_3 licenses two preheads, implying the possibility of a nuclear head licensing an unconstrained number of prehead positions. The problem here is that the Prehead Licensing Principle does not restrict the number of prehead

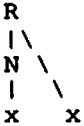
positions a nuclear head can license. So (17), which violates neither Locality nor Strict Directionality, should be legitimate. In Government Phonology, a configuration such as (17) is ruled out by the Minimality Condition: a complement position 'dominated by the immediate projection of a head' cannot be governed by the head of another constituent because 'this immediate projection acts as a barrier protecting the complement from being governed from outside' (Charette 1989: 182). In the case of (11b), this condition certainly works, but, without the onset node, it no longer constrains the licensing relation shown in (17). Instead, I propose the following general constraint:

(18) Up to the first projection, a position universally may license another position only once in each direction.

In (12), no position licenses two positions in one direction: that is, the condition in (18) holds for all positions. If we apply this to (16b) and (17), only the former meets the requirement of this condition, and thus (17) is ruled out. (However, I will show that, with the representations proposed in §5.1, this condition is unnecessary.)

The second constituent to be eliminated is the rhyme. Let us recall the difference between the rhyme and nucleus. The discussions from §4.1 to §4.2 have led to the conclusion that, as far as prosodic phenomena are concerned, no motivation to distinguish the rhyme from the nucleus seems to exist. Also the information achieved by such a distinction amounts to nothing more than whether the complement position of a branching constituent is consonantal or non-consonantal. In this regard, the following two configurations are almost equivalent[13]:

(19) (a)



(b)

Both (19a) and (19b) indicate that the complement position is directly attached to the rhyme node and thus different from a nuclear complement. Recall that a rhymal complement is necessarily 'coda'-licensed by a following prehead position

[13]Notice that (19b) does not result in allowing the rhyme to branch. If the rhyme branches, its complement cannot be licensed by the nuclear head without violating Locality. See Footnote 10.

while a nuclear one is not; if the purpose of having the rhyme in the inventory of constituents is only to contrast the different melodic distribution in its complement position from that in a nuclear complement, what must be clearly indicated with respect to the rhyme and nucleus in representation is whether the complement position of a constituent is 'coda'-licensed or not. That is, one active constituent in prosodic terms is divided into two types according to the presence or absence of 'coda'-licensing. From this point of view, having both the constituents enriches representation more than is necessary. Therefore, if we can find an alternative way, other than the rhyme vs nucleus distinction, to encode the information regarding 'coda'-licensing, the rhyme constituent can be eliminated from phonological representation.

4.3.2 The directionality of licensing and catalysis. Following the Licensing Inheritance Principle, the presence or absence of 'coda'-licensing should be reflected in the way the relevant position a-licenses elements contained in a melodic unit. In other words, a rhymal complement position, as a result of 'coda'-licensing, should exhibit ability to a-license extra elements which a nuclear complement position cannot. Thus, in seeking an alternative representation without the rhyme, it is essential to compare the composition of melodic units appearing in rhymal and nuclear complement positions, and to find out what elements the 'coda'-licensed position characteristically a-licenses.As stated earlier, I follow Government Phonology (Harris 1990; Harris and Lindsey 1993; Kaye, Lowenstamm and Vergnaud 1985) and assume that melodic oppositions are expressed in terms of elements. They are either present or absent in phonological representation: that is, melodic oppositions are characterised as being privative. Phonological processes stem only from the linking and/or delinking (or composition and/or decomposition) of such privative elements. All the elements are individually realisable, and their phonetic contents are determined by one salient property possessed by each element (see Kaye, Lowenstamm and Vergnaud 1985 for a detailed explanation on the analogy of distinctive feature matrices)[14]. The exception is the 'neutral' element (or 'cold vowel'). This element is characterised

[14]It should be noted that elements are not just shorthand representations of distinctive feature matrices. Although Kaye, Lowenstamm and Vergnaud (1985), together with other literature related to primitive melodic units, often make use of distinctive features as a matter of convenience in order to give an idea of their phonetic interpretation, it is explicitly stated that elements are non-decomposable.

as having no salient property. Below is a list of the elements relevant in the present discussion, with their salient properties[15]:

(20) **Phonological elements**

[A]	open	[?]	occluded
[I]	palatal	[h]	aperiodic noise
[U]	labial	[N]	nasal
[@]	none	[R]	coronal

While each element, a simplex expression, can receive phonetic interpretation individually, two or more elements may combine, or fuse, to form a complex expression[16]. In such a fusion operation, two or more elements do not equally contribute their properties to the resulting expression. One of them functions as a head and the others as operators; the operator only gives its salient property to the resulting expression, and all the other properties are supplied by the head. A complex expression is represented as $[E_1, E_2]$, $[E_1, E_2, E_3]$ and so forth ('E' represents an element), in which the rightmost element is always the head of the expression. So when [A] and [I] fuse, the outcome is different according to which of these functions as a head. With [I] as the head, [A, I], the complex expression is interpreted phonetically as [e]; on the other hand, if [A] is the head, [I, A], the melodic unit is realised as the lax counterpart of [e][17]. On the basis of autosegmental analysis of melodic processes, various melodic units are represented in the following way[18].

---

[15]The definition of elements may seem incoherent since their salient properties are described in either articulatory or acoustic terms. This is a theory-internal controversy, the details of which I do not go into in the present paper. On this issue, see Harris and Lindsey (1993) and Lindsey and Harris (1991), who propose a definition of elements strictly in acoustic terms.

[16]On the constraints on the combinatory patterns of elements in a complex expression, see Kaye, Lowenstamm and Vergnaud 1985, 1990).

[17]In Government Phonology, [I, A] is assumed to be [æ] (see Harris and Lindsey 1993; Kaye, Lowenstamm and Vergnaud 1985). It is beyond the scope of this paper to discuss the phonetic interpretations of complex expressions. See, for a similar view to mine, the literature on Dependency Phonology (Anderson and Ewen 1987, for example).

[18]The choice of the head element for each type of melodic unit in (21) does not follow the assumptions maintained by government phonologists. A discussion of this issue is irrelevant in the present paper. For different views, the readers are referred to Harris and Lindsey (1993); Kaye, Lowenstamm and Vergnaud (1985).

(21) **(Semi)vowels:** simplex and complex expressions made of [A], [I] and [U]
Non-lateral liquids: [R]
Lateral liquids: [?, R/I] (coronal/dorsal)
Nasals: [U/R/@, ?, N] (bilabial/coronal/dorsal)
Fricatives: [h] (glottal fricative); [U/R/@, h] (labial/coronal/dorsal)
Plosives: [?] (glottal stop); [U/R/@, ?] (labial/alveolar/dorsal)

Now let me examine the different distribution of melodic units in rhymal and nuclear complement positions. A nuclear complement position either is empty (part of a long monophthong), to which the vowel a-licensed by a preceding head position spreads, or a-licenses a glide (the second part of a diphthong), while a rhymal complement a-licenses one of the remainder (except for vowels) in the list (21). In terms of the above system of elements, a nuclear complement may a-license [A], [I], [U] and/or [@][19]: in the case of long monophthongs, as a result of spreading, it a-licenses the same elements as its head position does; in the case of diphthongs, it a-licenses either [I] (/j/), [U] (/w/) or [@] (/ə/). On the other hand, a rhymal complement position may a-license not only [A], [I], [U] and/or [@] but also [R], [N], [?] and/or [h]; this latter group I tentatively call 'coda'-elements, which are never a-licensed by a nuclear complement. This fact leads me to assume that a prehead position, through 'coda'-licensing, provides a rhymal complement position with the a-licensing potential for the 'coda'-elements.

This assumption, however, encounters difficulties with respect to the Licensing Inheritance Principle: where does the a-licensing potential for the 'coda'-elements come from? A licensed position, recall, inherits licensing potential from its licenser. That is, all licensing potential should originate from the ultimate licenser of a domain: a nuclear head. If so, a nuclear head itself must possess the a-licensing potential for the 'coda'-elements, but somehow this position as well as its complement position never a-licenses them. Considering that this is universally true, it is difficult to support the claim that the absence of the 'coda'-elements from a nuclear position is accidental.

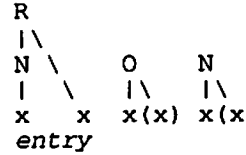
In fact, the above problem is not only limited to the 'coda'-elements. Regarding a sequence consisting of a prehead followed by a nuclear head, for example, the Licensing Inheritance Principle predicts that the number of elements

[19]One question is how to represent nasal vowels and rhotacised vowels. I assume that such vowels result from the language-specific phonetic interpretation of two contiguous positions one of which is a non-nuclear position a-licensing [N] or [R]. For example, a nasal vowel [õ] may be represented as the sequence of a nucleus a-licensing [A, U] and an following prehead or 'coda' a-licensing [N]. Phonetically, they may be interpreted as the sequence of [o] and a nasal consonant in some languages, but, in other languages, they may give rise to the phonetic effect of coalescence, manifesting themselves as [õ].

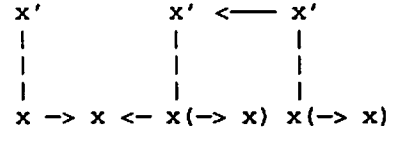
(or complexity) of a melodic unit in the former position does not exceed that of the latter, since, according to this principle, the former possesses less licensing potential than the latter. However, this prediction is untenable: the number of elements a-licensed by a prehead position typically exceeds that a-licensed by a following nuclear head, in spite of the latter licensing the former. There are many languages in which /a ([A]), i ([I]), u ([U]), e [A, I], o ([A, U])/ exhaustively make up the vowel inventory. In such languages, a nuclear head a-licenses at most two elements. Accordingly, the Licensing Inheritance Principle should prohibit the occurrence of a nasal or a plosive (except for a glottal stop) in this language, since the elements of either type of melodic unit necessarily outnumber those of a vowel (see the expressions in (21)). However, there is, of course, no empirical support for this.

The key to a solution to this problem lies in the fact that it is only nuclear positions which cannot a-license the 'coda'-elements. Consider the following configurations (repeated from (11c) and (12c)):

(22) (a)



(b)



If we trace licensing paths from a nuclear head to those positions which a-license the 'coda'-elements, we always find leftward licensing. A nuclear head itself is unlicensed, and a nuclear complement is only rightward licensed. I propose that a nuclear head does possess the a-licensing potential for the 'coda'-elements, and other positions may inherit it, but that this potential is frozen unless it goes through what I call Catalysis, which is defined as follows:

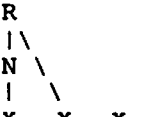
(23) **Catalysis**
The a-licensing potential for the 'coda'-elements is released through leftward licensing.

That is, unless a position itself or its licenser is leftward licensed, the a-licensing potential for the 'coda'-elements is frozen and not available for use. The 'coda'-elements can be a-licensed only when its a-licenser position inherits licensing potential through leftward licensing. This explains why a nuclear head position fails to display more melodic oppositions than a preceding prehead: although a nuclear head possesses greater licensing potential than a prehead, with the a-licensing potential for the 'coda'-elements frozen, the melodic oppositions in

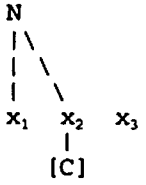
a nuclear head position are only derived from [A], [I], [U] and [@], whereas, in a prehead position, which is necessarily leftward licensed by a following nuclear head, the 'coda'-elements are also available in addition to the above elements to construct a melodic unit. The catalysed a-licensing potential for the 'coda'-elements may be passed on to rhymal and/or onset complement positions and be exploited to support a range of melodic oppositions subject to the constraint imposed by the Licensing Inheritance Principle.

In the above discussion, I have made the assumption that 'coda'-licensing results in providing a rhymal complement with the a-licensing potential for the 'coda'-elements. In other words, the appearance of a 'coda'-element implies that its a-licenser position inherits the catalysed a-licensing potential for the 'coda'-elements. Bearing this in mind, consider the following representations ('[C]' represents a 'coda'-element):

(24) (a)

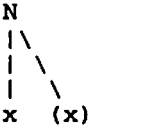


(b)



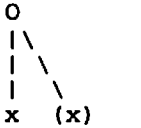
If x_2 in (24b) were singly licensed by the preceding nuclear head x_1, the a-licensing potential for the 'coda'-element would remain frozen and the 'coda'-element could not be a-licensed by this position. Thus the appearance of the 'coda'-element in (24b) necessarily stems from the fact that x_2 is licensed not only by x_1 but also x_3. Accordingly, both the rhyme node in (24a) and the 'coda'-element in (24b) show that x_2 is 'coda'-licensed by x_3. Without the rhyme node, (24b) does not suffer from any loss of information obtained from (24a), so I argue that the representation in (24b) should replace (24a), thus eliminating the rhyme. A preference for (24b) over (24a) in phonological representation is supported by the fact that a rhyme node does not play an active role independently of a nucleus node in prosodic terms (see §4.1). As a consequence of the discussions thus far, the configurations presented in (11) as the initial stimuli (repeated in (25)) come to be represented without the onset or rhyme as shown in (26):

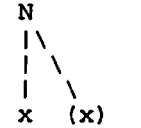
(25) (a)



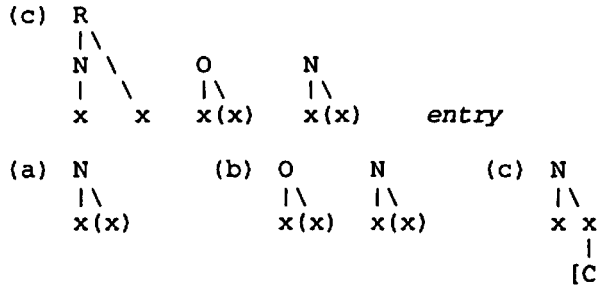
awe

(b)

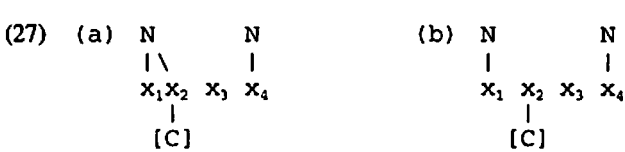




tree



Note that a prehead may a-license a 'coda'-element according to the definition of Catalysis. However, this should give rise to no indeterminacy with respect to the status of a non-nuclear position a-licensing a 'coda'-element. Compare the following configurations:



The presence of the association with the preceding nucleus in (27a) explicitly indicates that x_2 is 'coda'-licensed, and thus x_3 must be a prehead. On the other hand, in (27b), the lack of such association implies that x_2 is a prehead which licenses its complement x_3.

5 And then there is no constituent

5.0 The nucleus is the only constituent in phonological representation, now that we have eliminated the 'onset' and 'rhyme'. Although this constituent may seem to be indispensable as a unit corresponding to a grid position in Metrical Phonology and as the locus of pitch and stress, it is possible to assume that the head of a nucleus takes on such burdens, and this is what I assume here along with the minimal componentiality assumption. Then the framework developed in this paper achieves maximal cohesion, in which all phonological processes are uniformly accounted for by the mechanism of phonological licensing. However, there remains one hurdle to negotiate. As mentioned several times thus far, in stress assignment, phonological weight refers to a unit comprising a nuclear head and its complement. An alternative view of phonological weight is called for. I propose

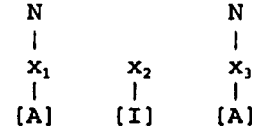
that the light vs heavy distinction of phonological weight should refer to the type a nuclear head: it is heavy if it licenses a position to its right while it is light if it does not. In other words, in representation, if a nuclear head position is followed by a position which is not a prehead, this nuclear head is regarded as heavy.

The elimination of all the constituent nodes from representation leaves us only with positions of three types: nuclear head, prehead and complement positions. We may well call the first just 'head', but I retain the term 'nuclear head' as a synonym for 'the ultimate head of a domain', reserving the word 'head' for general use. Without the nucleus node, the type of representation in (26) is untenable since it fails to distinguish the above position types. As an alternative, we may well consider representing every licensing relation as in (12); however, this type of representation is not only cumbrous in visual terms but also, for the reason described in the following subsection, undesirable. In the same way that the representation of 'coda'-licensing has been elaborated, an alternative representation, which provides sufficient information regarding the status of positions, has to be considered in order to complete the elimination of constituency.

5.1 Phonological representation with no constituent nodes

As stated above, the alternative representation to be proposed here has to deal with the following three pieces of information: nuclear head, prehead and complement positions. The distinction between nuclear and non-nuclear complements is unnecessary since it is inferable from the occurrence of two types of heads. However, preheads have to be distinguished from nuclear heads. Consider the following configuration:

(28)



Let me, for the time being, represent the status of a nuclear head by the presence of N nodes. (28) depicts the case in which two nuclear head positions flank a non-nuclear position which does not a-license a 'coda'-element. This position may be either a prehead licensed by the second nuclear head x_3 (transcribed as /a.ja/), or a complement licensed by the first x_1 (transcribed as /aɪ.a/). This time, we cannot rely on the type of elements appearing in this position, since both prehead and nuclear complement positions may a-license a 'non-coda'-element such as [I] or [U].

According to the claim which follows, I place the burden of indicating information concerning the types of positions onto the positions themselves in phonological representation. This may seem a somewhat retrogressive step, since it may be reminiscent of the CV-tier in Clements and Keyser (1983) or even SPE. Before I elaborate on the nature of representation, let me describe the motivation for this move.

The argument by Levin (1985) and Lowenstamm and Kaye (1986) that CV information is redundant, once we establish a hierarchical prosodic structure, leads to the replacement of CVs with Xs, which are only supposed to represent phonological timing. Although their arguments are reasonable in their own right, representation with X-slots leaves a problem related to the principle of Structure Preservation. As discussed by Harris (1992a), there are at least two possible interpretations of this principle: either resyllabification is allowed or not. For example, Selkirk (1980: 368) defines Structure Preservation as follows:

(29) **The Principle of Syllabic Structure Preservation**
The derived syllable structure produced by rules of resyllabification must conform to the syllable template of the language.

According to the above definition, resyllabification is applicable, and associations between positions and constituent nodes may be altered in the course of derivation. On the other hand, Harris (1992a: 372) proposes a more restrictive interpretation of Structure Preservation, denying any process of resyllabification[20]:

> The most restrictive interpretation of Prosodic Structure Preservation is that (a) it relates to all conditions on prosodic structure and melodic association, whether these be universal or result from language-particular parametric settings, and (b) it holds throughout derivation....Generalising beyond this principle to all principles governing the well-formedness of prosodic structure, we conclude that Prosodic Structure Preservation, restrictively interpreted, rules out any form of resyllabification whatsoever.

Harris' claim is certainly preferable in order to achieve minimal arbitrariness. However, the constraint stated by Harris is no more than stipulative as long as we retain the type of representation with X-slots. The characteristic of X-slots is essentially neutral, and their status is determined only by means of association with some constituent node in lexical representation. The problem arising from Harris'

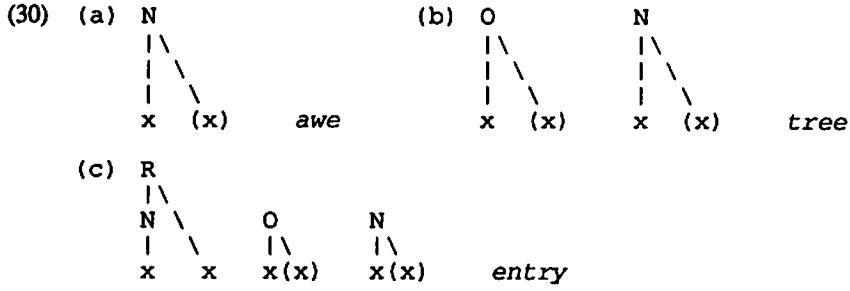
[20]See also Kaye, Lowenstamm and Vergnaud (1990: 221ff), in which the authors reject resyllabification processes by the Projection Principle.

interpretation of Structure Preservation is that the intrinsic nature of phonological representation cannot derive the condition which prohibits alteration of the status of X-slots determined in lexical representation. Regarding melodic structure, as emphasised in §4.3.1, melodic processes are accounted for by linking and delinking of elements, but this operation must be ruled out in prosodic structure.

If the status of a position as a licenser or licensee is established in lexical representation and Structure Preservation never allows any change of status throughout derivation (and, besides, as claimed earlier, if the burden of a prosodic unit can be placed only on the ultimate head of a domain), there seems to be no strong argument for restricting the function of positions to neutral terminal units in prosodic structure. Rather, I argue that positions in phonological representation themselves should be responsible for the information regarding licensing relations, rejecting two independent levels of representation - one of which shows phonological timing and the other of which superimposes prosodic characteristics.

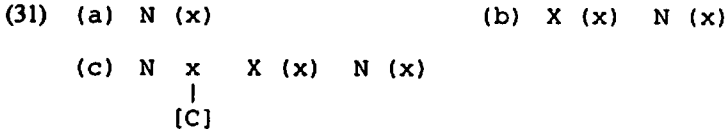
Recall again the configurations in (11) (repeated in (30) below), which are the initial stimuli of the preceding discussions:

(30)



Following the line of argument above, I propose, incorporating what has been discussed thus far regarding constituency, that the configurations in (30) should be replaced with those in (31):

(31)



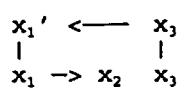
Given the Prehead Licensing Principle (see (3)), the 'Coda' Licensing Principle (see (10b)) and the concept of Catalysis (see (23)), (31) indicates at least four pieces of information: the source of licensing potential in a domain, rightward licensing and

two kinds of leftward licensing (prehead-licensing and 'coda'-licensing), and this is enough to derive the licensing relations in (12). 'N' represents a nuclear head, the source of licensing potential in a domain. Other positions, shown either 'X' or 'x', inherit licensing potential from a nuclear head. These positions are divided into two types. 'X' (upper case) is a prehead licensed by a following nucleus according to the Prehead Licensing Principle (see (13)), while 'x' (lower case) is a complement, the direct licenser of which is either a preceding nuclear head or prehead. In (31c), the leftmost nuclear complement a-licenses a 'coda'-element, '[C]', which shows that this position is 'coda'-licensed by the following prehead.

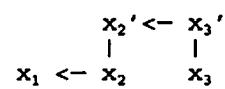
Let me emphasise that the representation in (31) is not a mere alternative representation of (30), but the former is more profitable than the latter. First, the former contains the minimal information necessary in lexical representation, thus achieving the minimal componentiality assumption. Secondly, recall the condition that a position universally may license another position only once in each direction (see (18)). This stipulative condition is no longer necessary, because the representation which explicitly indicates the three types of positions allows us only to infer possible licensing relations. The motivation for stipulating the condition in (18) is to derive from (32a) the licensing relations in (32b), but not (32c):

(32) (a)

(b)



(c) *



Solely on the basis of the type of representation proposed in this section, (32a) is potentially interpreted either as (33a) or (33b) below:

(33) (a) X x N (b) * x X N

(33b) above is ill-formed since the complement position does not have its direct licenser to its left, so (32a) must be interpreted as (33a), from which only the licensing relations in (32b) are derived. Thus the stipulative condition in (18) can be dispensed with. Another advantage the constituent-free representation in (31) enjoys over (30) is that the former representationally prohibits any resyllabification process from taking place. Given that we cannot commute phonological units in an arbitrary fashion, the status of positions, determined in lexical representation as either 'N', 'X' or 'x', must be retained throughout derivation. Thus the restrictive

interpretation of Structure Preservation is no longer stipulative, but is a natural consequence derived from the nature of the representation.

(31) may seem to create a problem regarding Locality. (30) shows, for example, that an onset node and its licenser, a following nucleus node, are adjacent, but such adjacency is not read off from (31). However, recall that Locality is satisfied if a licenser and licensee are adjacent to each other at a level of projection. The above problem does not arise if we take into consideration a higher level of projection. Consider (34) below:

(34)
```
X' --- N'
|      |
X(x)   N(x)
```

As shown by the dotted line, a prehead and a following nuclear head are always adjacent at the head projection (or the licenser projection). Furthermore, by assuming that a licenser is always projected onto one level of projection higher, nuclear head positions are expected to be projected onto the next level of projection, so that they should be able to 'see each other' at this nuclear head projection as follows:

(35)
```
N''---------- N''
|             |
N'      X'    N'
|       |     |
N(x)    X(x)  N
```

On the manifestation of licensing relations between nuclei such as above, the reader is referred to Charette (1990; 1991; 1992) and Kaye (1990a, b).

6 Conclusion

In the first half of this paper, I have pointed out problems in connection with constituency, and have established a criterion of constituency based on the mechanism of phonological licensing; this criterion results in the rejection of the syllable, onset and coda. In the latter half, I have shown that, although the rhyme and nucleus may seem to satisfy this criterion, their difference only amounts to the presence or absence of 'coda'-licensing, or, in other words, whether a complement position can a-license a 'coda'-element or not; otherwise, their functions are identical. Via the notion of Catalysis, I have claimed that such a difference is adequately demonstrated by the appearance of 'coda'-elements in a complement

position, and thus does not have to be attributed to constituency. This claim leads to the elimination of the rhyme. The nucleus node can be retained in the light of the criterion of constituency. However, I have proposed an alternative phonological representation with no constituent node, which instead distinguishes three kinds of position - nucleus, prehead and complement. My representation does not suffer from loss of informativeness because of the absence of the nucleus node. Information obtained by the presence of this node in constituent representation is equally achieved by referring to the directionality of licensing. Besides, I have argued that the move towards constituent-free phonological representation is desirable, since the indication of headship (which is determined at the lexical level by means of three kinds of positions rather than by constituent nodes) makes representation more restrictive, thus ruling out any process of resyllabification; Structure Preservation is now representationally motivated. The framework developed here, having the Phonological Licensing Principle as the core concept, achieves (a) minimal componentiality by excluding constituent nodes from representation and (b) minimal arbitrariness by enhancing component-driven constraints.

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