The Phonetic Interpretation of Empty Categories in Phonology*

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1. Introduction

In generative grammar, the notion of empty categories has played an important role not only in syntax but also in phonology. Phonological empty categories were first introduced in CV phonology (Clements and Keyser (1983)), where empty onsets were proposed to analyze the phenomenon of *h*-aspiré in French. The notion of empty categories was thereafter extended to nucleus positions, as found in analyses of vowel-zero alternations in various languages such as Moroccan Arabic (Kaye (1990)), French (Charette (1991)), Polish (Gussmann and Kaye (1993)), English (Harris (1994)) and Japanese (Nasukawa (2005)). Analyses employing empty nuclei are typically found in frameworks such as Licensing/Government-based Phonology (Kaye, Lowenstamm and Vergnaud (1990), Kaye (1995)), Element Theory (Harris (1994, 1997, 2005), Harris and Lindsey (2000)) and Strict CV Phonology (Lowenstamm (1996), Scheer (1998, 2004)).

Among the frameworks mentioned above, there is a noteworthy difference between empty onsets and empty nuclei in terms of the phonetic interpretability of featureless positions. It is generally assumed that the former type of empty category could participate in some phonological processes but not manifest itself phonetically; positions in the latter type (featureless nuclei) may be phonetically realized as a vowel. An empty nucleus is deemed to be realized as the most unmarked central vowel in a given vocal space: for example, *a* in English (Charette (1991), Harris (2005)), *i* in Cilungu (Bickmore (2007)) and *u* in Japanese (Nasukawa (2005)).¹ The theory, on the other hand, may allow empty nuclei to be phonetically silent. In order to suppress empty nuclei phonetically, Licensing/Government-based Phonology (LGP: Kaye, Lowenstamm and Vergnaud (1990), Kaye (1995)) and Element Theory (ET: Harris (1994, 1997, 2005), Harris and Lindsey (2000)) employ a principle called Proper Government, which controls the phonetic interpretation of empty nuclei: an empty nucleus may be phonetically silent if it is properly governed by its following melodically-filled nucleus (Kaye (1990), Harris (1994)). Few papers discuss the difference between empty onsets and empty nuclei in terms of phonetic interpretability (cf. Nasukawa (2010)).

This paper argues that featureless nuclei, like empty onsets, may not be interpreted phonetically. Given this, we need to consider the phonological representation of a neutral vowel which has been regarded as the phonetic manifestation of an empty nucleus in LGP and ET. A claim to respond to this is found in Backley (2009, 2011), where the vowel schwa in English is the phonetic manifestation of a particular feature rather than a featureless nucleus. Analyzing the alternation between full vowels and schwa in English, we encounter the fact that low and mid vowels — which include feature [mass] ⟨[A]⟩ — tend to alternate with schwa as compared with those high vowels which consist of only [dip] ⟨[I]⟩ or [rump] ⟨[U]⟩, and it is claimed that English schwa is represented by not an empty nucleus but the presence of a sole [mass] ⟨[A]⟩.

The present discussion does not reject the notion of empty categories immediately in phonological representation, since they are closely related to the prosodic structure with principles such as Onset Licensing and Inter-nuclear Licensing, as discussed in Harris (1994) and Scheer (2004).² Here, I conclude that an empty

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¹ Rather than utilizing the symbols // and [ ] for referring to speech sounds, this paper employs italicized letters in order to avoid implying the notions of phoneme and allophone.

² Harris and Gussmann (2002) argue that the notion of empty nucleus is representationally inevitable in any theory which
nucleus, which is grammatically legitimate, cannot manifest itself phonetically without any melodic properties (Onuma (2011)).

Given that featureless nuclei are not allowed to be phonetically realized, there is no need to refer to Proper Government and the final-empty-nucleus parameter (Harris (1994, 1997)) that prescribe the interpretability of empty nuclei. Eliminating these principles achieves a degree of theoretical restrictiveness and coherence since they are principles which typically refer to precedence relations between (nuclear) positions, rather than to dependency relations in prosodic constituents to which most other principles refer in LGP and ET. Under the present discussion that an empty nucleus does not have its corresponding phonetic exponent, we do not need to assume linearity-sensitive principles in order to explain phonological processes.

This paper is organized as follows. Section 2 overviews the notion of empty categories in phonology. Section 3 shows how empty nuclei are phonetically realized in relation to the final-empty-nucleus parameter and Proper Government. Section 4 discusses differences between two weakening processes: Proper Government for vocalic weakening and dependency relations for consonantal lenition, and then exhibits some problematic aspects of the former. In Section 5, I claim that English schwa should be regarded as the phonetic realization of a single [ʌ] rather than an empty nucleus. Section 6 offers an alternative analysis of vowel alternations in English and French by referring to only dependency relations holding between prosodic constituents in order to achieve a degree of theoretical restrictiveness. Finally, Section 7 concludes the discussion.

2. Empty categories in phonology

2.1. Empty onsets

Phonological empty categories were originally introduced by Clements and Keyser (1983: 107-113) in order to analyze words exhibiting *b*-aspiré. Such words phonetically begin with a vowel but phonologically behave as if they began with a consonant. In the literature (Tranel (1981)) before Clements and Keyser (1983), *b*-aspiré words are assumed to be lexically vowel-initial, and their phonological behavior is analyzed by exploiting some arbitrary rules and ad hoc features such as \([-\text{context Consonant Insertion}]+\) and \([-\text{context Consonant Elision}\])

Clements and Keyser (1983), on the other hand, assume that the words exhibiting the process in question begin with a silent consonant: a C-position which is associated with no element on the segmental tier.

2.2. Empty nuclei

In Moroccan Arabic (MA), consonant sequences such as *kl* behave like a hetero-syllabic constituent (since an intervening vowel *i* appears conditionally), rather than a genuine constituent (onset) cluster (which is typically observed in languages such as English). In order to account for this, Kaye, Lowenstamm and Vergnaud (1990) and Kaye (1995) assume that an empty vowel (nucleus) is present between the consonants comprising the sequence (i.e. *kəl̪*). In addition, they provide some insightful accounts for some phonological processes such as vowel-zero alternations. The *i*-zero alternation in MA is explained by assuming an interaction between empty nuclei and the notion of Proper Government. Charette (1991) also employs empty nuclei and adopts Proper Government in order to analyze the distribution of schwa in French: a ban on a sequence of two empty nuclei (which are phonetically realized as two schwas) at the level of nuclear projection.

3. The phonetic interpretation of empty nuclei

Among the analyses mentioned above, there is a notable difference between empty onsets and empty nuclei in terms of phonetic interpretability of featureless positions. It is generally assumed that the former type of empty categories could participate in phonological processes but not manifest itself phonetically, while positions in the latter type (melodically-empty nuclei) may be phonetically realized as a vowel. Few papers discuss the difference between empty onsets and empty nuclei in terms of phonetic interpretability (cf. Nasukawa (2010)).

In LGP and ET, an empty nucleus is deemed to be realized as the most central vowel in a given vocal space: for example, *ə* in English (Charette (1991)).
(2005)), \(i\) in Cilungu (Bickmore (2007)) and \(u\) in Japanese (Nasukawa (2005)). On the other hand, an empty nucleus may also be phonetically silent. In order to suppress an empty nucleus phonetically, LGP and ET employ Empty Category Principle (Kaye (1990: 314)), which controls phonetic interpretation of empty nuclei: an empty nucleus may be phonetically silent if it is p-licensed by some constraints such as (1) and (2).^3

(1) Final-empty-nucleus parameter (Harris (1994: 162))

Final-empty nucleus licensed: [OFF]/ON

A domain-final empty nucleus is p-licensed to be phonetically silent if the setting of the final-empty-nucleus parameter in (1) is ON. Examples are found in languages such as English, French and Luo. On the other hand, if the setting of the parameter is OFF which indicates the default value, a final empty nucleus is not phonetically licensed; consequently, the position must receive phonetic interpretation. This is observed in languages such as Zulu, Italian and Telugu, in which the central vowel in the relevant language usually serves as the realization of the unlicensed final empty nucleus (Archangeli (1984), Kaye (1990), Charette (1991), Harris (1994), Nasukawa (2005)).

The constraint in (2) also restricts the phonetic interpretability of empty nuclei. Languages (e.g. French and English) which exhibit vocalic syncope are often referred to as examples. In French, for example, as mentioned earlier, a vowel can only be suppressed if it is followed by a vowel which is itself not p-licensed.

(2) Proper Government (Kaye (1990: 313), Harris (1994: 191))

a. a proper governor and its proper governee are adjacent at the level of nuclear projection,

b. a proper governand stands to the right of proper governee,

c. a proper governand is not itself p-licensed.

The \(a\)-zero alternation in French is explained by governing relations between nuclei, as shown in (3).

(3) a. \(\text{devenir} \rightarrow \text{venir} \) (to become')

b. \(\text{ensevelir} \rightarrow \text{envoiler} \) (to bury')

In (3a), \(V_2\) is phonetically silent since the position meets all of the conditions in (2); \(V_2\) (proper governor) and \(V_3\) (proper governee) are adjacent at the level of nuclear projection; \(V_3\) stands to the right of \(V_2\); and \(V_3\) is not itself p-licensed. With respect to the relation between \(V_1\) and \(V_2\), they are adjacent in the nuclear projection, but \(V_2\) fails to p-license its preceding position \(V_1\) since \(V_2\) is p-licensed by being properly governed by \(V_3\). As a result, the vowel \(a\) is phonetically realized in the initial vocalic position \(V_1\). As for \(V_4\), it is p-licensed to be silent because of the ON setting of the final-empty-nucleus parameter in (1).

In the case of (3b), on the other hand, the ON setting of the final-empty-nucleus parameter in (1) p-licenses the final position \(V_5\) to be phonetically silent. Since \(V_3\) is p-licensed by \(V_4\), it receives no phonetic interpretation and fails to properly govern its preceding position \(V_2\). As a result, \(V_2\) must be phonetically realized as \(a\).

4. Proper Government and dependency relations

Up to this point, Proper Government provides the account for suppression (weakening) of the phonetic manifestation of empty nuclei. Note that Proper Government looks at only a particular level of categorical projection, the level of nuclear projection, rather than the other levels of projections. However, LGP and ET refer to any kind of prosodically defined structural dependency in order to explain processes such as consonantal lenition (Harris (1994, 1997)). The target of lenition is deter-
mined in terms of dependency relations in a given prosodic structure. This makes contrast with vocalic weakening which is often analyzed by means of Proper Government functioning at the nuclear projection.

According to Harris (1994), English exhibits the effects of Proper Government. As illustrated in (4a), \( V_2 \) remains silent because it is \( p \)-licensed by being properly governed by the following \( V_3 \).

(4) a. *family

\[
\begin{array}{cccccc}
V_1 & C & V_2 & C & V_3 \\
\text{P-licensed by PG} & \text{f} & \text{r} & \text{m} & \text{l} & \text{i} \\
\end{array}
\]

b. *accident

\[
\begin{array}{cccccccc}
V_1 & C & C & V_2 & C & V_3 \\
\text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} \\
\end{array}
\]

In (4b), \( V_3 \) manifests itself as \( a \) since it is not \( p \)-licensed by being properly governed by \( V_4 \) which is itself \( p \)-licensed domain-finally. Both of the examples in (4) exhibit Proper Government which refers to precedence relations between nuclei rather than dependency relations in prosodic hierarchical structure.

With regard to consonantal processes, in accordance with Harris (1994), r-tapping (typically found in North American English), a type of consonantal lenition, takes place in a foot-internal onset which is widely recognized as prosodically weak (Harris and Kaye (1990), Harris (1994, 1997), Nasukawa (2005)). The weakness of foot-internal onsets is formally described by the dependency relations in (5):

(5) *city \( \rightarrow \) sri

\[
\begin{array}{cccccccc}
V_1 & C & C_2 & V_3 \\
\text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} \\
\end{array}
\]

The foot-initial syllable is prosodically strong and perceptually prominent. In such a configuration, as illustrated in the above, \( V_1 \) is regarded as the head of the foot domain and other positions are all dependents of the domain head. Among the dependents, the weakest position is the foot-internal onset \( C_2 \) since it is the only indirect dependent (licensee) of the head nucleus \( V_1 \). In lenition processes such as English r-tapping, single element expressions such as \( r \) are typically assumed to be found. (As we will see in Section 6, the tap is considered to be the phonetic manifestation of a sole element \( [l] \) as a result of suppressing the other elements (\( [j] \) and \( [H] \) which consist of \( r \) with \( [l] \).)

In LGP and ET, dependency relations are often implied by referring to the term 'licensing.' An example is given below:

(6) *city \( \rightarrow \) sri

\[
\begin{array}{cccccccc}
V_1 & C & C_2 & V_3 \\
\text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} & \text{C} \\
\end{array}
\]

In (6), the first nucleus \( V_1 \) (\( i \) which receives primary stress) is regarded as the ultimate head of a given domain. The head nucleus directly licenses two constituents: the preceding onset \( C_1 \) (\( i \) and the final nucleus \( V_2 \) (\( i \)). The former relation forms a constituent often called syllable while the latter forms foot. In the latter case, furthermore, the final nucleus with \( V_2 \) licenses its preceding onset \( C_2 \) (\( i \) to form the other syllable. In this configuration, the foot-internal onset is typically regarded as prosodically weak since it is the most deeply embedded position in the licensing path; \( C_2 \) is the only position which is indirectly licensed by the ultimate head \( V_1 \).

Thus there are two different analyses for weakening processes: Proper Government for vocalic weakening and dependency relations for consonantal weakening. Proper Government and the final-empty-nucleus parameter in fact fail to explain why a word-final empty nucleus phonetically manifests itself as schwa in words such as 'kemara 'camera', 'sufoa 'sofa' and 'a'rouma 'aroma', all of which are deemed to end with an empty nucleus. As depicted in (7), we may have the output form *kemar for 'camera' since the final empty nucleus \( V_3 \) remains itself silent by the request of the ON mode of the final-empty-nucleus parameter in English. However, since the structure in (7) violates the parameter and is phonetical-
ly interpreted as 'kemora, an additional explanation must be provided.4

(7) *kemər 'camera'

In the following part of this paper, I will only employ the dependency-based analysis in order to analyze both vocalic and consonantal weakening processes under a single mechanism, and show an advantage of dependency relations over the Proper Government analysis. Before going into this in detail, the next section will discuss the proposition that, unlike Harris (1994, 2005) and others, English schwa is not represented by an empty nucleus but by a single element [A], as Backley (2009, 2011) and Onuma (2011)5 proposed.

5. Representing English schwa

5.1. Element Theory

In order to represent intrasegmental structure, the rest of this paper calls upon Element Theory (Harris and Lindsey (1995, 2000), Harris (2006), Nasukawa and Backley (2008, 2011)) where three resonance ‘elements’ [A] ([mass] in terms of acoustic pattern), [l] ([dip]) and [u] ([rump]) are utilized for describing vowels; these three elements are independently interpretable and phonetically manifest themselves roughly as a, i and u respectively.

The elements can also combine to form melodic compounds: [A l] and [A u], for example, may be phonetically interpreted as e and o respectively. In addition to the simple combination of elements, some compound expression may show an asymmetric relation expressed by the predominance of one element over the other(s). The tense vowel e and o, for instance, are represented as [A l] and [A u] (dominants underlined), while the lax counterpart as [A l] and [A u] (no dominant) respectively. In Backley (2009), the following representations are proposed as the short full vowels of the RP dialect.

(8) English short full vowels

\[
\begin{align*}
|l| & |u| & i & o \\
[A l] & [A u] & e & o \\
[A] & & & \\
\end{align*}
\]

5.2. Schwa as a single [A]

In the literature of LGP and ET (Kaye, Lowenstamm and Vergnaud (1990), Kaye (1995), Charette (1991), Harris (1994, 2005), Harris and Lindsey (1995, 2000)), schwa is considered as exceptional (the most unmarked) in the English vocalic system. Its special status is often captured by a vocalic expression which contains no melodic material: in other words, it has no specification of phonologically significant information in its segmental structure. In this approach (Anderson and Ewen (1987), Harris (1994), Harris and Lindsey (1995), Kaye, Lowenstamm and Vergnaud (1985), van der Hulst (1988)), schwa is represented by, for example, ‘centrality component’, ‘neutral element’, ‘cold vowel’ and so forth.

From the phonetic point of view, so-called vowel reduction is viewed as a process where a full vowel alternates with a reduced vowel in unstressed position, that is to say, a case of qualitative alternation. In LGP and ET, this alternation is considered to be a compositional interchange of elements. For example, Harris (2005) employs empty nuclei in his research and assumes that vowel reduction (to schwa) is suppression of all elements which belong in a nuclear position.

Backley (2009, 2011) and Onuma (2011), on the other hand, claim that English schwa carries significant information in its representation in the same way as other vowels. This is depicted in (9) where schwa is represented by a single element [A].
(9) English schwa ə
   V
   ə

Onuma (2011) maintains that vowels that contain [ə] alternate with schwa but those vowels which consist of only [I] or [U] are difficult to alternate with schwa. The following examples display a typical vowel reduction to schwa.

(10) Verb-Noun/Adjective pairs
a. Short vowels
i.e. ə
   frequent  [friˈkwent] V ~ [ˈfriːkwənt] Adj
   segment  [ˈsɛgˈmənt] N ~ [ˈsɛgˈmənt] N
   add detriment  [ˈdetrəmənt] N
   traverse  [trəˈvɜːs] V ~ [ˈtrəvɜːs] N/Adj
   subject  [ˈsəbjəkt] V ~ [ˈsəbjəkt] N/Adj
   suspect  [ˈsəspekt] V ~ [ˈsəspekt] N/Adj
   compound  [ˈkəmpəund] V ~ [ˈkəmpəund] N/Adj
   object  [ˈəbˈdʒekt] V ~ [ˈəbˈdʒekt] N

b. Long vowels/diphthongs
i.e. ə
   survey  [ˈsərvər] V ~ [ˈsərvər] N
   perfect  [ˈpərˈfɛkt] V ~ [ˈpərˈfɛkt] N/Adj
   digest  [ˈdaɪˈdʒest] V ~ [ˈdaɪˈdʒest] N
   progress  [ˈprərəɡres] V ~ [ˈprərəɡres] N
   protest  [ˈprərəɡtest] V ~ [ˈprərəɡtest] N

Notice that the vowels corresponding to their alternant ə include [ə] in their elemental composition. The same is true for the examples illustrated below.

(11) Affixation
a. Short vowels
Sixə
   academic  [əkəˈdemɪk] ~ [əˈkədemɪk]
   magic  [ˈmædʒɪk] ~ [ˈmædʒɪk]
   product  [ˈprədʌkt] ~ [ˈprədʌkt]

b. Diphthongs
Sixə
   admire  [ədˈmaɪər] ~ [ədˈmaɪər]

(12) a. Verb-Noun/Adjective pairs
   iː ə ~ ə
   i.e. ə
   increase  [ˈɪnˈkuːr] V ~ [ˈɪnˈkuːr] N
   decrease  [ˈdɪkrəs] V ~ [ˈdɪkrəs] N
   regress  [ˈrɛŋɡrəs] V ~ [ˈrɛŋɡrəs] N

   b. Affixation
   uː ə
   beauty  [ˈbjuːti] ~ [ˈbjuːti]
   wood  [wʊd] ~ [ˈwʊd]

In contrast to (10) and (11), in (12a) the vowel iː corresponding to its alternant ə by no means includes [ə]; instead iː has a single element [I]. In (12b), the vowel uː also has no element [ə]. Traditionally, vowel reduction has been merely treated as vocalic alternation with a different segment ə. In fact, unreduced vowels mutually relate to the reduced vowel in terms of representation. This suggests the predictability of the quality of reduced reflexes: a segment never alternates with another segment which has entirely different melodic composition. For instance, the vowel v consisting of [ə] and [U] regularly reduces to ə, not to iː, and the vowel iː consisting of [I] never alternates with ə. This shows that the alternation with ə is attributed to the melodic composition of a given segment.

In the model which regards ə as the phonetic realization of a single [ə], in contrast to a classic ET literature (Harris (1994, 2005)) just illustrated in the above, I assume that an empty nucleus is phonetically silent. This is consistent with the phonetic interpretation of empty onset which is typically considered to be unpronounceable (Clements and Keyser (1983), Charette (1991), Harris (1994)).

6. An alternative analysis of vowel alternations
6.1. Vowel-schwa alternations in English

Assuming that English schwa is the phonetic manifestation of a single element [ə] (not an empty nucleus), this section presents an account of vowel alternations

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Involving schwa without referring to Proper Government and the final-empty-nucleus parameter. In the framework of LGP and ET, the notion of dependency — which prescribes asymmetric relations between phonological categories — plays an important role not only for melody but also prosody. In prosody, dependency relations are found between constituents while melody shows dependency relations between elements within a segment. In this way, in a phonological representation, every unit must be involved in dependency relations (Harris (1994)).

Such dependency relations between prosodic constituents, which are often described by the notion ‘licensing’, are essential in explaining phonological phenomena such as consonantal lenition; in particular licensing relations between nuclei determine the context where t-tapping takes place. As discussed in Section 4, the process is often observed in the foot-internal onset which is typically regarded as prosodically weak since it is indirectly licensed by the head of a given domain. This is depicted by using an English word ‘fotography’ (in which Elements [?] and [H] stand for stopness and noise/voicelessness, respectively) as follows.

\[ (13) \]

\[ a. \text{fotography} \rightarrow \text{fotography} \]

\[ b. \text{fotography} \]

In (13a), the nucleus \( V_1 \) (\( \text{ou} \) which receives the primary stress) and its following nucleus \( V_2 \) (\( \text{a} \)) form a foot, where the former licenses the latter which further licenses its preceding onset \( C_2 \). In this configuration, \( C_2 \) is considered to be prosodically weak since it is indirectly licensed by \( V_1 \), the head (ultimate licensor) of the domain. Because of this prosodic strength, \( t \) in \( C_2 \) is typically lenited to \( r \). On the other hand, \( t \) of \( \text{fotography} \) ‘photography’ in (13b) is not subject to consonantal lenition since it is the position which is directly licensed by the ultimate head of the domain (foot). The same explanation applies to the phenomenon found between \( \text{akadomi} \) ‘academy’ and \( \text{akademik} \) ‘academic’ as in (14).

\[ (14) \]

\[ a. \text{akadomi} \rightarrow \text{akadomi} \]

\[ b. \text{akademik} \]

I claim that vocalic weakening should be analyzed in the same fashion. As illustrated in (14a), a so-called ‘weak’ vowel \( \text{a} \) belongs to the nucleus \( V_3 \) which is regarded as prosodically weak since it is licensed at the foot level by its preceding nucleus \( V_2 \), the head of the domain. As a result, only a single element can be licensed to appear in the position. Given [\( \text{A} \)] and [\( \text{l} \)] are lexically specified in \( V_3 \) in (14a) as in (14b), we may assume that [\( \text{l} \)] being suppressed, only [\( \text{A} \)] (phonetically interpreted as \( \text{a} \)) remains intact.

In (14b), on the other hand, concatenating a root-level suffix -\( \text{ik} \) ‘-ic’ with the word \( \text{akadomi} \) ‘academy’ brings about stress shift, and makes another lexical representation \( \text{akademik} \). In this representation, \( e \) in \( V_3 \) is the head of the word-domain and also the nucleus of the foot-initial syllable. In such a position, vocalic weakening is never found since it is the ultimate head of the domain and is viewed as being in the prosodically strong position.

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6.2. The schwa-zero alternation in English

English exhibits a further phenomenon concerning schwa: the \(a\)-zero alternation. Strength relations between prosodic constituents are also involved in the process. As already discussed in Section 4, English shows the effect of Proper Government, and it gives an account of the \(a\)-zero alternation. For example, the alternation between 'faenali' and 'faenlai' 'family' involves \(a\)-suppression/deletion which is caused by the request of Proper Government. In this process, \(a\) in the penultimate empty nucleus is phonetically suppressed since the empty nucleus is properly governed by the word-final filled nucleus (1).

The aforementioned dependency-based analysis, on the other hand, straightforwardly captures the phenomena in question, such as 'def\(a\) nat' 'definite', 'sep\(a\) rat' 'separate' and 'tfb\(a\) bt' 'chocolate'. They would be more simply explained by dependency relations at the level of foot than by Proper Government.

(15)

a. \(\text{def\(a\) nat} \text{ 'definite'}\)

b. \(\text{sep\(a\) rat} \text{ 'separate'}\)

c. \(\text{tfb\(a\) bt} \text{ 'chocolate'}\)

All examples in (15) exhibit the \(a\)-zero alternation which takes place in \(V_2\). In terms of prosodic strength, the position \(V_2\) is typically regarded as weak since the position is licensed by the preceding nucleus at the foot level. In such positions, weakening processes seem to occur.

6.3. The schwa-zero alternation in French

In this subsection, I claim that the \(a\)-zero alternation in French may also be analyzed in terms of dependency relations between nuclei. According to Charette (1991: 146), it is assumed that a French word contains a right-dominant binary foot. It consists of the rightmost nucleus (which is melodically filled) and its preceding nucleus.

Though French has a head-final foot, like English, the \(a\)-zero alternation in French may be accounted for by seeing dependency relations at the foot level. In words such as \(\text{ap\(a\) le} \text{ 'appeler (to call)'}\) and \(\text{sul\(a\) ve} \text{ 'soulever (to lift up)'}\), the positions in which the \(a\)-zero alternation takes place are prosodically weak since they are licensed by the following filled nucleus which is the head of the domain.

(16)

a. \(\text{ap\(a\) le} \text{ 'appeler (to call)'}\)

b. \(\text{sul\(a\) ve} \text{ 'soulever (to lift up)'}\)

In addition, the words mentioned in Section 3 could be reanalyzed without Proper Government as follows.

(17)

a. \(\text{dovunir} \text{ 'devenir (to become)'}\)
In both examples in (17), the final empty nucleus cannot be the head of a foot, and the penultimate nucleus is the head of a foot with its preceding nucleus (antepenultimate nucleus). Each nucleus of V₂ in (17a) and V₃ in (17b) is prosodically weak because it is licensed by its following nucleus at the foot level.

7. Conclusion

In this paper, I have argued that the most unmarked vowel schwa is the phonetic manifestation of feature [mass] ([A]) rather than an empty nucleus, and claimed that an empty nucleus cannot manifest itself phonetically without any melodic properties. As a result, we do not need to refer to Proper Government and the final-empty-nucleus parameter (Harris (1994, 1997)) that control the interpretability of empty nuclei. In place of these principles (which typically refer to precedence relations between nuclei rather than dependency relations), this paper analyzed phonological processes such as vowel-schwa alternations in English and schwa-zero alternations in English and French by referring to only dependency relations holding between phonological categories in order to achieve a degree of theoretical restrictiveness.

Further research will be required to analyze other types of vowel-zero alternation found in languages such as Moroccan Arabic and to investigate whether other types of weakening processes can be analyzed according to the same dependency-based mechanism of prosody-melody interaction.

References


