1. Introduction

In an influential paper, Steriade (2000) argues that noncontrastive details are relevant for the evaluation of paradigm uniformity, thus showing the role of noncontrastive phonetic properties on phonological patterning. As Steriade (2000:314) says, her argument is part of "a larger agenda" that claims that "the distinction between phonetics and phonological features is not conducive to progress and cannot be coherently enforced." This is reflective of a functional approach to phonology developed in the works of the UCLA group (e.g. Flemming 1995, Jun 1995 Kirchner 1997, Silverman 1997, Steriade 1999, and Zhang 2000) which maintains that phonology is reducible to general properties of human motor behavior and perception, and this entails explicitly incorporating low-level phonetic machinery into the synchronic phonological grammar. Such a position can be contrasted with the one espoused by Ladefoged (1983) who specifically emphasizes the importance of abstract units in phonology such as the phoneme commenting that (p. 8) "...some of the really interesting linguistic phenomena are precisely those for which there are no general phonetic explanation."

In her paper, Steriade (2000) draws on English and French data in arguing for the role of noncontrastive phonetic properties on phonological patterning. The French data and their interpretation are critically discussed by Raffelsiepen (this volume). Here, I focus on Steriade's main example from English for the role of noncontrastive phonetic properties on phonological patterning. Her example comes from the difference in American English between the flapped /t/ at the beginning of the third syllable of "capiṭalístic" vs. the unflapped /t/ at the beginning of the
third syllable of "mili\text{\textendash}taristic". The judgment is robust. As originally pointed out by Withgott (1982), the /t/ seems obligatorily flapped in c\textipa{\textael}tal\textipa{\textendash}istic" whereas in "mili\textipa{\textendash}taristic" the /t/ not only seems unflapped, but aspirated as well. Given that the metrical patterns of these two words appear the same (i.e. an initial dactylic sequence followed by a syllable with primary stress), why would there be a difference in the nature of the /t/ at the beginning of the third syllable of these two words? The nonflapped /t/ of "mili\textipa{\textendash}taristic" is the more problematic case under the view held by Steriade (and going back to Kahn 1976) that the /t/ should be flapped before a stressless vowel (as in "wr\textipa{\textael}ting" or "c\textipa{\textael}tal"). Steriade's (2000:323) explanation for the unflapped /t/ in "mili\textipa{\textendash}taristic" revolves around paradigm uniformity with respect to durational equivalence: "The principle at work is paradigm uniformity: the paradigm of \{military, militar(-istic)\} becomes less variable phonologically if the stop t [as opposed to the flap \textipa{\textael}t] is generalized to the stressless syllable....nonflapping maintains to a greater extent the durational equivalence" [of the third syllable in "mili\textipa{\textendash}taristic" with the third syllable of "mili\textipa{\textendash}ary"]. Durational equivalence in this context is specifically argued by Steriade to be a (non-contrastive) phonetic property. That is, in the example of "mili\textipa{\textendash}taristic", the paradigm uniformity effect aims for the /t/ of the third syllable to have the same (closure) duration as the /t/ in "mili\textipa{\textendash}ary". Duration is meant by Steriade to mean duration in precise milliseconds and so would not be considered a standard phonological feature. Consequently, according to Steriade, the paradigm uniformity effect of "mili\textipa{\textendash}taristic" with "mili\textipa{\textendash}ary" involves a noncontrastive phonetic property.

In this paper, I argue for a different view than Steriade's of the paradigm uniformity effect with respect to the distinction between "capitalistic" vs. "militaryistic". I will contend that the nonflapping of the /t/ in the third syllable of "mili\textipa{\textendash}taristic" reflects a general pattern in American English and need not be a paradigm uniformity effect. This is evidenced by the
metrically comparable monomorphemic words such as "Mèdierránean" and "Nàvraţilóva" both of which also have a nonflapped /t/ at the beginning of the third syllable. Rather, what needs to be explained is the flapped /t/ in the third syllable of "càpiţálístic". Here I maintain that the flap can be explained by paradigm uniformity with "cápital". However, I argue that the uniformity effect involves uniformity of foot structure with "cápital". Consequently, the paradigm uniformity effect with "cápital" does not specifically involve a noncontrastive phonetic feature as Steriade has argued.

2. The third syllable of nonfinal dactylic sequences

Steriade (2000) maintains that a paradigm uniformity effect accounts for the non-flapped (and aspirated) nature of the /t/ closure of the third syllable of the word miliţarístic. According to her, the /t/ is not flapped in order to more closely approximate the closure duration of the corresponding non-flapped /t/ in miliţáry. Steriade assumes that a paradigm uniformity effect is at issue with respect to the first /t/ closure in miliţarístic since she is assuming that without paradigm uniformity the /t/ should be flapped with a very short closure duration. It is important to keep in mind that paradigm uniformity can only be at issue when the occurrence of an allomorph in a paradigm is phonologically unexpected or unjustified. Thus, Steriade assumes that the unflapped /t/ in miliţarístic is phonologically unexpected. Consequently, if we are to be convinced that miliţarístic is a case of paradigm uniformity in "durational equivalence" with the nonflapped /t/ of "miliţáry", then non-derived words of the same stress pattern should have the /t/ flapped in this environment. In this section, however, I will argue that the unflapped /t/ in the
third syllable of "mili\-t\-ar\-íst\-ic" reflects a general pattern in American English and thus does not reflect a paradigm uniformity effect.

To see why a paradigm uniformity effect may not be at issue with respect to the unflapped (and aspirated) /t/ in the third syllable of "mili\-t\-ar\-íst\-ic", consider the monomorphemic words with an initial dactylic sequence preceding the primary stress given in (1) and where the transcribed stop is underlined.

(1) Monomorphemic words with a dactylic preceding the primary stress

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>[tʰ] Mèdi-terr-ánee-n Nàvra-t-í-ó-va</td>
</tr>
<tr>
<td>b.</td>
<td>[pʰ] lòlla-pal-óo-za  pèri-paté-t-ic  Winnepes-áu-kke Wìnne-peg-ó-sis</td>
</tr>
<tr>
<td>c.</td>
<td>[kʰ] àbra-ça-dá-bra  Nèbuchadnézz-a</td>
</tr>
</tbody>
</table>

The data in (1) have not been typically considered in earlier discussions on English stop allophony. They are neither discussed by Kahn (1976) nor by Selkirk (1982). On the other hand, both Jensen (2000:209) and Pater (2000:270) have recently discussed the pattern in (1a-c) and specifically refer to these voiceless stops as being not only unflapped in the case of (1a), but as being aspirated. Such data suggest that the unflapped (and aspirated) nature of the /t/ of the third syllable of "mili\-t\-ar\-íst\-ic" is phonologically expected and thus paradigm uniformity would not be at issue.

While Steriade (2000) does not seem to be aware of the range of data in (1), in a footnote to her article (p. 334) she indeed observes (based on Withgott 1982) that the non-derived word "Mèdi\-terr\-ánee\-n" with an unflapped /t/ poses a problem for her analysis of the paradigm uniformity effect of "mili\-t\-ar\-íst\-ic" with "mili\-t\-ár\-y". In order to preserve the paradigm uniformity analysis of "mili\-t\-ar\-íst\-ic" Steriade (2000) maintains that the word "Mèdi\-terr\-ánee\-n" is simply an exception. She says (p. 334) "I attribute the unflapped [t] in this unique form [Mediterranean] to the orthographic geminate 'rr', which is interpreted by speakers as an indication of secondary
stress on the preceding vowel". However, "Mèditerránean" does not seem to be an exception as evidenced by the range of data in (1). Moreover, it is odd to claim that the vowel of the third syllable of "Mèditerránean" is interpreted as having a secondary stress since it is clearly reduced.

Steriade views "Mèditerránean" as an exception since she follows Kahn (1976:57) as having /t/ being flapped in the environment before a stressless vowel when the preceding vowel is also stressless. However, Kahn only considered words like 'cápital' and 'obésity' where the /t/ is flapped in the last syllable of the word. He did not consider words like in (1) where an initial dactylic sequence precedes the syllable with primary stress. The two cases are not identical. The footing possibilities for the third syllable of the dactylic sequence in words like in (1) are different from the third syllable in a dactylic sequence in words like 'cápital' and 'obésity' where that syllable is word-final and so can be only incorporated into the preceding foot. In other words, the /t/ at the beginning of the third syllable of the dactylic sequences in 'cápital' and 'obésity' is in a foot-internal environment, but the /t/ at the beginning of the third syllable of a word like "Mèditerránean" need not be foot-internal.

Furthermore, preliminary phonetic work reported in Van Dam and Weaver (2001) shows a clear difference in aspiration between the bolded voiceless stops in the words in (2) and those in (3). (We cite this preliminary study because we know of no other acoustic work that examines the stops in words like those in (1). Pater (2000) and Jensen (2000) who cite words like in (1) as having an aspirated stop at the beginning of the third syllable do not actually cite any acoustic study in support, but base it on impressionistic data. Steriade (2000), too, does not cite any independent phonetic study for her view that those same stops would not be aspirated.)

(2) Winnepegósís, Mèditerránean, Nèbuchadnézzar

(3) múppets, móccasins, búttter
The stops in (3) are unaspirated having short voice onset times (VOT) in Van Dam & Weaver's study (less than 20 milliseconds on average for the non-coronal stops; the coronal flap is briefer). On the other hand, the stops in (2) were shown by Van Dam & Weaver to have an average VOT of over 50 milliseconds which made them almost as aspirated as the bolded stops in (4) which occur immediately before a stressed vowel, an environment well-known to favor aspiration (e.g. Selkirk 1982).

(4) appéals, attáck, Chicágo

Further, Van Dam and Weaver report that the bolded stops in (2) are also more aspirated than the bolded stops in (5) where the stop is at the beginning of the last syllable of a word-final dactyl.

(5) Oédipus, Américan, Samáritan

Essentially, the preliminary study by Van Dam and Weaver supports the impressionistic data from Pater (2000) and Jensen (2000) in (1) and also points to a difference between a voiceless stop at the beginning of the last syllable of a word-final dactyl as in (5) and one at the beginning of a nonfinal dactyl as in (2). While the preliminary study needs to be replicated, it does suggest that Pater (2000) and Jensen (2000) are correct in considering the beginning of the third syllable of a (non-final) dactylic sequence as an environment for aspiration. Consequently, the unflapped (and aspirated) /t/ of "militarístico" reflects the expected regular pattern in (1) and need not be a paradigm uniformity effect with "militàry"

An important issue that arises from the aspirated nature of the stops in (1) and (2) is why those stops would be aspirated at all. The beginning of a non-initial stressless syllable, as in the third syllable of "Mediterranean", is not one of the environments mentioned in the traditional generative works discussing English aspiration (e.g., Kahn 1976, Selkirk 1982). Aspiration normally occurs with a voiceless stop, either at the beginning of a word or at the beginning of a
stressed syllable (or foot-initially as in Kiparsky 1979, Nespor & Vogel 1986, Iverson & Salmons 1995). Consider the typical cases of aspiration given in (6).

(6) Environments of aspirated stops in American English

<table>
<thead>
<tr>
<th>Word</th>
<th>Initial</th>
<th>Penultimate</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>póny</td>
<td>[pʰ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pacific</td>
<td>[pʰ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>appéar</td>
<td>[pʰ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chéspéake</td>
<td>[pʰ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>térrible</td>
<td>[tʰ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tomáto</td>
<td>[tʰ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>atómic</td>
<td>[tʰ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atáscadéro</td>
<td>[tʰ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cánódy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cánóñum</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The first two columns in (6) show that voiceless stops are aspirated word-initially whether at the beginning of a stressed syllable or a stressless one. The last two columns in (6) show that a voiceless stop is aspirated at the beginning of a non-initial stressed syllable, be it a syllable with primary stress or secondary stress. The third syllable of a word like Mediterranean in (1) does not seem to match any of the environments in (6) since it is neither word-initial nor at the onset of a stressed syllable. In fact, it appears to be at the onset of a syllable with a reduced vowel.

In order to understand why the voiceless stops in the onsets of the third syllables in (1) are aspirated we must consider the foot structure of words with dactylic sequences. There are different proposals regarding such words in the early metrical phonology literature as well as in the more recent literature. Consider the foot structure of the initial dactylic sequence shown in (7) for the word "Wìnnepesáukee", a structure that I will argue against.

(7) Winnipesáukee (Fₛ = superfoot, F = foot, σₛ = stress syllable, σₓ = stressless syllable; a final syllable is shown incorporated into foot structure, the word tree is not shown)

```
  Fₛ
     / \ 
    F   F
       / \ / \ 
     σₛ σₓ σₓ σₛ σₓ
        | | | | | |
       wɪ  nə pʰə sa  ki
```

In (7), the initial dactylic sequence comprises a superfoot. This reflects the analysis of English found in Hayes (1981) and McCarthy (1982) in which a superfoot consists of a binary foot followed by an adjoined single syllable. These researchers assumed a similarity of environments.
between a word-final dactylic sequence as exemplified by the trisyllabic words "cápital" and "párity" and nonfinal dactylic sequences as in the first three syllables of "Wìnnesáukee". The last syllable of a word-final dactylic sequence behaves as foot-internal under the view that flapping occurs in a foot-internal environment, as opposed to aspiration which is foot-initial (cf. Kiparksy 1979). The fact that the /t/ in "cápital" and "párity" is flapped constitutes evidence of a foot-internal environment. Researchers such as Hayes (1981) who incorporated the superfoot structure in (7) for nonfinal dactylic sequences essentially assumed that they were parallel with word-final dactylic sequences. However, the problem with the foot structure shown in (7) is that there is no clear reason why the stop would be aspirated at the beginning of the third syllable since that syllable is not foot-initial. Hayes (1981) and McCarthy (1982) did not consider aspiration in their proposed footing of words like "Wìnnesáukee" with nonfinal dactylic sequences.

An alternative foot structure that I will argue for and that does account for the aspiration in the third syllable of "Wìnnesáukee" is shown in (8). This involves a superfoot as well, but different from that in (7). Here, the third syllable of the initial dactylic sequence is adjoined as the first syllable of a superfoot and does not group with the preceding syllables. That is, the third syllable of the initial (nonfinal) dactylic sequence forms a constituent with what follows rather than with what precedes as in (7).

(8)  

```
    F
   / \  
  F | F
 / \ | / \  
σs σw σw σs σs
 | | | | |  
wi nə pʰə sa ki
```
The foot structure in (8) for nonfinal dactylic sequences was originally proposed by Withgott (1982) but was also suggested in a footnote by McCarthy (1982). More recently, this foot structure has been adopted by Jensen (2000), Davis & Cho (2003) and is suggested by Pater (2000). One immediate advantage of this footing is that it makes for a unified statement regarding American English aspiration (as noted by Jensen 2000). Namely, that voiceless stops are aspirated in foot-initial position. This is what unifies the aspiration environments in (6) with that shown in (1). We can illustrate this with the convenient word "pèripatétic" in (9) where each foot-initial position consists of a voiceless stop.

(9) pèripatétic  (D = coronal flap)

In (9), we see that all foot-initial stops are aspirated whether they begin a binary foot like the first and fourth syllables of "pèripatétic" or the superfoot like the third syllable of "pèripatétic".

Further evidence for the superfoot structure comes from words like "potáto" and other words like those in the second column of (6) which begin with an initial stressless syllable. When such syllables have an initial voiceless stop they surface as aspirated. This can be accounted for by the foot structure shown in (10) where the initial syllable forms the first syllable of a superfoot.

(10) potáto
The superfoot in (10) has the same structure as the superfoot shown in (8) and (9). Thus, the superfoot is the same whether it is word-initial or not.

An additional piece of evidence for the foot structure proposed in (8) comes from expletive infixation. McCarthy (1982) observed that words like "Winnepesáukee" (and the others in 1) show variation with respect to expletive infixation as seen in (11).

(11) Expletive infixation of "Winnepesáukee"

   a. Winne-fucking-pesaukee  b. Winnepe-fucking-saukee

McCarthy's observation regarding the variant forms of expletive infixation in (11) seems correct and robust. Such variation is applicable to all the words shown in (1). Given the foot structure in (8), one can make a clear generalization accounting for the variant forms of expletive infixation illustrated in (11), namely, that the expletive occurs before a foot boundary. This can either be before a superfoot as in (11a) or the binary foot as in (11b). Moreover, the generalization must be that the expletive occurs before a foot boundary and not after. This follows from McCarthy's (1982) discussion of expletive infixation in words having the prosodic pattern of "potáto" illustrated in (10). In such words the expletive occurs between the first and second syllables (e.g. po-fucking-tato, Ne-fucking-braska). Given the foot structure for these words as exemplified in (10), the generalization regarding expletive infixation for both (10) and (11) is that the expletive occurs before the foot boundary. Thus, the foot structure proposed in (8) accounts for variation in expletive infixation as well as allowing for a unified generalization of English aspiration as foot-initial.
Consequently, in considering the word "militarístic", paradigm uniformity has no necessary role. Like "Winnepesúkee", it has the foot structure of (8), shown below.

(12) \( F_s \)

\[
\begin{array}{c|c|c|c}
\sigma_s & \sigma_w & \sigma_s & \sigma_w \\
\hline
m & l & t & H \text{-} \text{ três} t k
\end{array}
\]

The /t/ at the beginning of the third syllable is aspirated, as expected, because it is foot-initial (that is, at the beginning of the superfoot). Moreover, as indicated in (13), expletive infixation shows variation with this word.

(13) Expletive infixation of "militarístic"

a. mili-fucking-taristic  b. milita-fucking-ristic

Notice that the variation of expletive infixation is not a fact about the word "military" where the expletive can occur before the relevant third syllable (mili-fucking-tary) but not after it (*milita-fucking-ry). Consequently, we maintain that, contrary to Steriade, "militarístic" does not display a paradigm uniformity effect with "military" involving the noncontrastive phonetic property of closure duration. Rather, "militarístic" displays the same phonological patterning of the similarly shaped monomorphemic words in (1). The non-flapped nature of the /t/ at the beginning of the third syllable is what is expected, and it does not crucially reflect paradigm uniformity.

3. The role of paradigm uniformity

In the previous section I have argued against the view of Steriade that paradigm uniformity is at issue in explaining the unflapped /t/ in the third syllable of "militaristic". Instead
I have argued that an unflapped (and aspirated) /t/ is expected. However, what is unexpected on the analysis presented so far is the apparent obligatory flapping of the /t/ in the third syllable of "càpitalístic". My contention, following Pater (2000:270), is that there is a paradigm uniformity effect in "càpitalístic" with "cápital". However, unlike Pater (2000), I do not view the paradigm uniformity effect here as involving a flap (or the closure duration of a flap), rather I contend that the paradigm uniformity effect involves uniformity with respect to foot structure. That is, "càpitalístic" preserves the foot structure of "cápital". Under this view, the flapping of the /t/ in "càpitalístic" is a consequence of the uniformity of foot structure with "cápital". Since the /t/ in "cápital" is foot-internal and intervocalic (i.e. a salient environment for flapping) it will surface as a flap. Hence, if "càpitalístic" preserves the foot structure of "cápital", the /t/ at the beginning of the third syllable of "càpitalístic" is flapped because of its foot-internal (and intervocalic) environment.

First, let us consider the foot structure in a word like "cápital". Our contention is that the footing of a third syllable of a dactylic sequence that is word-final is different from such a syllable when nonfinal as in (1). Words like in (1) have the foot structure shown in (8) where the third syllable of the dactylic sequence forms a superfoot with the syllables that follow. This is not an option if the third syllable of the dactylic sequence is word-final since there is no following foot to which it can adjoin. As a result, such a syllable is incorporated into the preceding foot as shown in (14).

(14) cápital

```
        F
       / | \ 
      σ₃ σ₆ σ₇
    /    |    |
```

This foot structure readily accounts for the flapping of the /t/ on the view that flapping occurs foot internally (in an intervocalic environment). Even if one maintains that final syllables in English nouns are extrametrical, the foot structure in (14) would reflect the surface foot structure of the word (and not necessarily the initial foot structure under a derivational view of phonology). As mentioned earlier, an alternative to the foot structure in (14), found in Hayes (1981), is to assume that the final syllable in (14) is adjoined to the end of a superfoot in a way identical to what is shown for the first three syllables in (7). While such a structure would still allow for the expression of the flapping environment to be foot-internal, the foot structure would not be independently motivated since there do not seem to be other patterns that would require an adjoined syllable at the end of a superfoot. This should be contrasted with the superfoot type proposed in this paper in which the adjoined syllable is at the beginning of the superfoot as seen in (8) and (9). As argued, the same superfoot structure occurs in words like that in (10). Consequently, I would maintain that the only superfoot structure allowed in English is one that begins with an adjoined syllable as illustrated in (8)-(10).

Now given the structure in (14), the form "càpitalístic" would have the structure in (15) in which the dactylic foot from "cápital" is preserved.

(15) càpitalístic

\[
\begin{array}{cccc}
F & F \\
/ & \backslash & / & \backslash \\
\sigma_s & \sigma_w & \sigma_s & \sigma_w \\
\mid & \mid & \mid & \mid \\
\text{kæ} & \text{pə} & \text{Də} & \text{ls tik}
\end{array}
\]
The flapping of the /t/ in the third syllable of "càpitalístic" is a consequence of the uniformity of foot structure with "cápital". As we have seen from data like in (1), the beginning of the third syllable of "càpitalístic" is not an environment where one would otherwise expect flapping.

Evidence that it the paradigm uniformity effect involves foot structure and not, for example, the phonetic closure duration of the coronal stop in terms of milliseconds, comes from expletive infixation. As shown by the comparison of the two possibilities in (16), the expletive can only occur after the third syllable (at the foot boundary) as in (16a) and not before it (foot-internally) as in (16b). (Infixation before the third syllable might be possible if the coronal stop is pronounced as a nonflap.)

(16)  a. capiDa-fucking-listic
    b. *capi-fucking-Dalistic

This should be compared with the optionality found with expletive infixation with "militarístic" that was shown in (13). That the difference between (16) and (13) seems to be robust can be taken as independent evidence that the paradigm uniformity effect involves foot structure between "cápiťal and "càpiťalístic" and not the noncontrastive phonetic property of closure duration. It is worth mentioning that Steriade (2000) reports experimentally that a paradigm uniformity effect was induced in such nonce pairs as "primitive" — "primitivistic" in that speakers who flapped the /t/ in "primitive" would also flap the same /t/ in "primitivistic". I would interpret this paradigm uniformity effect as likewise involving foot structure in a way similar to "cápiťal and "càpiťalístic. 

4. Optimality-theoretic analysis
In the previous two sections of this paper I have argued that the unflapped (and aspirated) /t/ in the third syllable of "militarístic" reflects a regular pattern as exemplified by the monomorphemic words in (1) while the flapped /t/ in the third syllable of "càpitalístic" reflects a paradigm uniformity effect involving foot structure. The initial ternary foot of "càpitalístic" reflects the footing of "cápital". The /t/ of the third syllable is flapped because it is foot internal and intervocalic which is the salient environment for flapping. The aspirated nature of the stop of the third syllable of the initial dactylic sequence in "militarístic" and the other forms in (1) constitute a minor issue for a comprehensive analysis of aspiration in American English. In this section I will briefly sketch an optimality theoretic analysis based on Davis & Cho (2003) that accounts for the environments in which aspirated stops appear and then will formalize the paradigm uniformity effect involved in "càpitalístic" by reference to output-output constraints along the lines of Benua (1997) and Pater (2000).

The analysis of American English aspiration developed in Davis & Cho (2003) and sketched briefly in modified form here is an alignment approach to English aspiration within optimality theory. The analysis assumes (noncrucially) that English voiceless stops are not underlyingly specified for the aspiration feature [spread glottis]. It follows Kiparsky (1979), Nespor & Vogel (1986), Iverson & Salmons (1995) and Jensen (2000) in viewing aspiration as occurring on voiceless stops in foot-initial position. As discussed earlier, foot-initial position is what connects the various environments of aspiration shown in (6) and in (1). (See Davis & Cho for discussion on forms that are potentially counterexamples to the foot-initial view of aspiration.) The gist of the analysis centers on the constraints given in (17) with the critical ranking show in (18).

(17) Constraints \( (sg = \text{spread glottis}) \)
a. AlignL(Ft, [sg]) -- Align the left edge of the foot with the feature [spread glottis].

b. *[sg, +voice] -- The feature [sg] cannot be realized on sounds that are [+voice].


(18) *[sg, +voice] >> AlignL (Ft, [sg]) >> Dep-[sg]

The constraint in (17a) requires every foot to begin with a segment having the feature [sg]. However, the force of this constraint is mitigated by the higher ranked feature cooccurrence constraint in (17b) that disallows the feature [sg] from being realized on a voiced sound. (I leave open the question whether [sg] is realized on voiceless fricatives in American English; if it is not, then a constraint *[sg, +continuant] would be high ranked. See Vaux 1998 for relevant discussion.) The constraint in (17c) militates against insertion of the feature [sg] and is the lowest ranked of the three constraints in (17). The constraints are ranked as in (18). This ranking can be justified by the tableaux shown in (19) and (20).

(19) "pie" /pay/ -- [pʰay]

<table>
<thead>
<tr>
<th>/pay/</th>
<th>*[sg, +voice]</th>
<th>AlignL (Ft, [sg])</th>
<th>Dep-[sg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pay</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>☞ b. pʰay</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(20) "buy" /bay/ -- [bʰay]

<table>
<thead>
<tr>
<th>/bay/</th>
<th>*[sg, +voice]</th>
<th>AlignL (Ft, [sg])</th>
<th>Dep-[sg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. bʰay</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>☞ b. bay</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

The tableau in (19) provides an argument for the ranking of AlignL(Ft, [sg]) over Dep-[sg] since the reverse ranking would wrongly select (19a) with an unaspirated [p] as the output. And the tableau in (20) provides an argument for the ranking of *[sg, +voice] over AlignL(Foot, [sg]) since the reverse ranking would incorrectly choose (20a) with aspirated [bʰ] as the output. Under
this analysis, the feature [sg] is added only in foot initial position. This can be seen by the tableau below in (21) where the voiceless stop is not in foot-initial position.

(21) "lapse" /læps/ -- [læps]

<table>
<thead>
<tr>
<th></th>
<th>*[sg, +voice]</th>
<th>AlignL (Ft, [sg])</th>
<th>Dep-[sg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. læp's</td>
<td>*</td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>b. læps</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. lʰæps</td>
<td>!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The key comparison is between candidates (21a) and (21b). Candidate (21a) loses out because of its superfluous violation of Dep-[sg]. That is, the insertion of [sg] on the /p/ in (21a) is unmotivated because it is not in foot-initial position. The analysis sketched here readily accounts for the aspiration in the third syllable of data like that in (1) or (2). This is shown in (22) where we compare two candidates, one with the third syllable aspirated and one without the aspiration. The candidate without aspiration, (22b), is eliminated because of its fatal violation of the higher ranked alignment constraint.

(22) "peripatetic" /pɛrɪpəˈtɛtɪk/ -- [pʰɛɾɪpʰətʰɛDIk] (brackets = superfoot; parentheses = foot)

<table>
<thead>
<tr>
<th></th>
<th>*[sg, +voice]</th>
<th>AlignL (Ft, [sg])</th>
<th>Dep-[sg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (pʰɛ.ri){pʰə (tʰɛ.DIk )}</td>
<td></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>b. (pʰɛ.ri){pə (tʰɛ.DIk )}</td>
<td>*!</td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

The tableaux in (19)-(22) illustrate the alignment approach to aspiration, the full details of which can be found in Davis & Cho (2003). It is of some interest that Jensen (2000:215) specifically argues against an alignment analysis of English aspiration. He says, "We cannot
simply state an alignment constraint that requires all aspirated stops to appear initially in a foot, since this would be equally unviolated by aspirated and unaspirated stops in that position. Conversely, we cannot require that all feet begin with an aspirated stop, since other segment types must be permitted in that position." However, this criticism does not hold. First, Jensen's statement that "we cannot require that all feet begin with an aspirated stop, since other segment types must be permitted in that position" ignores the fact that the constraint requiring all feet to begin with the feature [sg] can be dominated. This is shown by the ranking of *[sg, +voice] over AlignL(Foot, [sg]), as exemplified in the tableau in (20). With this ranking a voiced sound cannot be aspirated even if it is in foot-initial position.

Moreover, Jensen's second criticism about an alignment constraint not being able to distinguish an aspirated from an unaspirated stop only applies if the alignment constraint were stated as in (23) where the feature [sg] is aligned to the beginning of the foot.

(23)  AlignL([sg], Ft)--Align the feature [spread glottis] with the left edge of the foot.

If we consider the tableau with this constraint in (24) we see that Jensen is right.

(24) "pie" /pay/ -- [pʰay]

<table>
<thead>
<tr>
<th></th>
<th>AlignL ([sg], Ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>pay</td>
</tr>
<tr>
<td>b.</td>
<td>pʰay</td>
</tr>
</tbody>
</table>

The constraint as stated in (23) is unviolated by unaspirated stops. The candidate with the unaspirated stop in (24a) vacuously satisfies the constraint since there is no feature [sg] present. Crucial for the analysis, then, is that the constraint must be stated as in (17a), AlignL(Ft, [sg]) whereby the foot is aligned with the feature [sg]. Stated this way, the alignment constraint distinguishes between aspirated and unaspirated stops as seen by tableaux like those in (19) and (22). Consequently, Jensen's criticisms of an alignment analysis does not hold. The alignment analysis...
analysis posited in (17)-(18) and illustrated by the tableaux in (19)-(22) accounts for aspiration in American English. (See Davis & Cho 2003 for a more thorough and detailed analysis.)

The remaining matter to be discussed is the optimality theoretic analysis of "càpitalístic". I argued in Section 3 of this paper that the flapping of the /t/ in the third syllable of "càpitalístic" is a result of a paradigm uniformity effect with respect to the foot structure of "cápital". That is, "càpitalístic" preserves the ternary foot of "cápital". Flapping occurs because the foot-internal environment for flapping is met if the foot structure is preserved. The question that arises is why the foot structure of "cápital" can be maintained in "càpitalístic" whereas the foot structure of "militàry" is not maintained in "militarístic". The answer is quite straightforward. As noted by Chomsky & Halle (1968) and Myers (1987), the suffix -ic requires that the syllable immediately preceding it be stressed. From Prince (1990) we can understand this as a requirement that -ic be a weak member of a trochaic foot, as is evidenced by its triggering vowel shortening in such pairs as cone-conic and Semite-Semitic. Thus, in both "militarístic" and "càpitalístic" the final two syllables comprise a trochaic foot. Given this, if the foot structure of "militàry" were preserved in "militarístic" there would be a stress clash in that there would be a stress on both the third and fourth syllables: *militàrirístic. Following Pater (2000), we view the constraint against stress clash as outranking a constraint on stress identity, which in our context would be viewed as a general output-output constraint on foot structure. (We label this OO-foot structure in the tableaux below.) Because of the stress clash constraint, the third syllable of "militarístic" cannot surface with stress and consequently would be footed like the monomorphemic words in (1) which reflect the regular footing constraints for English (indicated in the tableaux below by 'Footing constraints' which is shorthand for the series of constraints responsible for English foot structure).
The tableau in (25) shows the evaluation for "militarístico". (Orthographic forms are used for convenience.)

(25) militarístico (parentheses indicate a foot, braces indicate a superfoot)

<table>
<thead>
<tr>
<th>/military + istic/</th>
<th>StressClash</th>
<th>OO-foot structure</th>
<th>Footing constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>(míli)(tàry)</td>
<td></td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>a. (míli)(tìà)(rístic)</td>
<td>!</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b. (míli){tìà(rístic)}</td>
<td>*</td>
<td>*</td>
<td>!</td>
</tr>
<tr>
<td>c. (mílita)(rístic)</td>
<td>*</td>
<td></td>
<td>!</td>
</tr>
</tbody>
</table>

We see from candidate (25a) that maintaining a foot structure in "militarístico" that reflects "militàry" where the third syllable is stressed (i.e. the head of a foot) would result in a stress clash with the following stressed syllable. (25a), though, respects OO-foot structure since the foot heads in the word "militàry" are also foot heads in "militarístico". Nonetheless, it is the higher ranked stress clash constraint that prevents (25a) from being the winning candidate. Consequently, the output of "militarístico" cannot respect the OO-foot structure constraint. The choice then is between (25b) and (25c); neither violates stress clash, but both violate OO-foot structure in that the head of the second foot in the base word "militàry" is not a foot head in either (25b) or (25c). The winning candidate, (25b), is preferred to (25c) since (25b) results from the normal footing of a dactylic sequence that is not word-final, obeying 'Footing constraints'. Thus, the footing of "militarístico" is like that of the monomorphemic words in (1) as shown in (8).

On the other hand, the foot structure of "càpital" can be completely maintained when the final two syllables of "càpitalístico" comprise a trochaic foot; there is no stress clash in "càpitalístico". Since there is no stress clash, the OO-foot structure constraint can be respected; there is no overriding constraint that would compel the third syllable of "càpitalístico" to be refooted with the syllables that follow in violation of OO-foot structure. The tableau in (26) for "càpitalístico" contrasts with "militarístico" in (25).
(26)  câpitalístic

<table>
<thead>
<tr>
<th>/capital + istic/ (cápital)</th>
<th>StressClash</th>
<th>OO-foot structure</th>
<th>Footing constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.  (càpita)(listic)</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b.  (càpi){h(a)(listic)}</td>
<td></td>
<td>!</td>
<td></td>
</tr>
<tr>
<td>c.  (càpi)(t'à)(listic)</td>
<td>!</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

As seen by the winning candidate in (26a), the foot structure of "capitalistic" can parallel that of "cápital" without violating stress clash. While this candidate violates the expected foot structure constraints by having the third syllable as part of the initial foot, it is nonetheless preferred to (26b) given the ranking of the OO-foot structure constraint over the footing constraints. The flapping of the /t/ in the third syllable of "càpitalístic" is just a consequence of its foot-internal environment reflecting the preserved foot structure from "cápital".

5. Summary and Conclusion

In this paper I have argued against the view of Steriade (2000) that the unflapped /t/ of the third syllable of "militarístic" reflects a paradigm uniformity effect involving the noncontrastive phonetic property of closure duration in milliseconds. In Section 2 I showed that the unflapped (and aspirated) /t/ is expected in "militarístic" and so paradigm uniformity is not at issue. Instead, I argued in Section 3 that the flapped /t/ in the third syllable of "càpitalístic" is phonologically unexpected and can be explained by paradigm uniformity. But, here, paradigm uniformity involves uniformity with respect to the foot structure of "cápital" and not to a noncontrastive phonetic property of duration in milliseconds with respect to the flap. A major claim of my analysis is that there is a difference between a word-final dactylic sequence as in the word "cápital" and one that is not word-final as in "Mèditerránean". The third syllable of a
word-final dactylic sequence forms a foot with the preceding syllables. That is, a word final dactylic sequence surfaces as a single ternary foot. The /t/ in "cápital" is flapped because it is foot-internal and intervocalic, the salient environment for flapping. This is contrasted with the third syllable of a dactylic sequence that is not word-final as in "Mèditerránean" or the other words in (1). The third syllable here forms the beginning of a superfoot with what follows. The voiceless stop in such an environment would be aspirated because it is foot-initial. The flapped /t/ of the third syllable of "càpitalístic" mirrors the foot structure of "cápital" where the /t/ is flapped because it is foot-internal. The optimality-theoretic analysis of Section 4 frames the aspiration issue more generally in terms of a foot-alignment approach. What the analysis captures with respect to the difference between "càpitalístic" and "militarístic" is that the foot structure of "cápital" can be maintained in "càpitalístic" without violating a high ranked stress clash constraint whereas the foot structure of "militàry" with a stressed third syllable cannot be maintained in "militaristic" since that would result in a violation of the stress clash constraint (*militàristic) where both the third and fourth syllables would have stress. In conclusion, while there may be cases of paradigm uniformity involving noncontrastive phonetic properties as Steriade contends, the càpitalístic-militarístic distinction is not a convincing case.

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