

SUPRASEGMENTAL CONSTITUENCY AS THE DOMAIN FOR SANDHI VARIATION

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The purpose of this paper is to claim that suprasegmental constituency alone is the domain for sandhi variation in French. In support of this, a prosodic analysis of French syllable prominence will be proposed which will, however, necessitate considerable relaxing of the Strict Layer Hypothesis (cf. Nespor & Vogel, 1986). Starting from an identification of typical lexical entries marked with suprasegmentals such as S, W S, W W S with the Suprasegmental Word (sw), processes such as lexical compounding, schwa-retention, and stress clash resolution will give support for identifying yet another pattern, S W (W) S, with the Suprasegmental Group (sg). The Suprasegmental Group will constitute a prosodic domain, free from lexical and syntactic strictures, which will account for sandhi variation as well as the location of pauses in French.

Keywords: Suprasegmental constituency, Sandhi variation, phonological domains, secondary stress in French

1. INTRODUCTION.

This paper attempts to demonstrate that there are suprasegmental constituents in French which serve as environments for phonological operations commonly referred to as sandhi variation, e.g. *liaison* and *mute-e*. These suprasegmental constituents are realized in the form of a favored template of strong and weak syllables which by themselves, I argue, define the domain. In many respects, this suprasegmental template is coincidental with what is called the Prosodic Word or at other times with what is termed the Phonological Phrase in Prosodic Phonology (cf. especially Selkirk (1984) and Nespor and Vogel (1986)). There are several phenomena, however, which the Prosodic Word and the Phonological Phrase of classical Prosodic Phonology do not address and which according to the analysis proposed here can not account for: (1) the suprasegmental processes themselves and (2) the consequences those processes have for (a) the occurrence of sandhi segments, and (b) the non-haphazard, I maintain, location of pauses, and (c) glide formation.

Certain combinatorial processes within the suprasegmental phonology are obscured by current practice in Prosodic Phonology. These processes involve especially the building up of stress patterns and how those stress patterns are modified as items are combined to compose larger groups and phrases. Elsewhere (Mazzola 1992, 1993, 1994a & b, 1996), I have been intent on demonstrating that some interesting insights can be offered by exploring the combinatorial patterns as realized in their suprasegmental characteristics. This can only be done, however, if we can agree first of all to allow for constituencies which are defined suprasegmentally as well as those which are defined by their import for the operations of the segmental phonology. This can be accomplished first by identifying typical lexical entries marked with the patterns S, W S, W W S with the Suprasegmental Word for French:

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- (7) w s s s w s
 bateau + mouche → bateau mouche 'sightseeing boat'
 meilleurs + vœux → meilleurs vœux 'best wishes'

and optionally before polysyllables:

- (8) a. w s ws s w w s
 bateau + maison → bateau-maison 'house boat'

From this it can be seen that lexical and morpho-syntactic information is passed onto the phonology by means of configurations of syllable strength, since this process of retraction can only be applied to NP's made up of compounds and attributive phrases. For predicative NP's, on the other hand, these same patterns of syllable strength do not hold in unmarked cases:

- (8) b. w s w s s w w s
 bateau français → *bateau français 'French boat'

- (8) c. w s s s w s
 bateau moche → *bateau moche 'lousy boat'

Occurrence of retraction in such cases seems rather to give the reading reserved for what is commonly referred to as the *accent d'insistence* or *accent d'intensité*. It should be pointed out in connection with the examples already given that syllables labeled above as strong for French are not equal in strength. This is to say that the left-most strong syllable within a constituent designates secondary stress, while the right-most strong syllable indicates primary stress. For further discussion regarding the phenomenon of secondary stress in French, see Hoskins (1994: 35-47); Mazzola (1992); Passy (1899: 52-53); and Tranel (1987: 199-200).

It is further claimed here that these patterns can be parsed and labeled as suprasegmental constituents as in (9) where we have two Suprasegmental Words combining in conformity with the template to give a Suprasegmental Group:

- (9) [w s]SW + [s]SW → [s w = s]SG
 petit homme petit = homme 'little man'
- (10) [w s]SW + [w s]SW → [w[s = w s]SG]
 petit ami petit = ami
- [s w = w s]SG
 OR petit = ami 'boy friend'

Out of these Suprasegmental Word constituents, then, we see formed Suprasegmental Groups which can undergo the restructuring shown in (10). Thus, (9) illustrates the creation of a SG as a result of stress retraction, while (10) illustrates the creation of two possible SG's. The first output in (10) is the result of restructuring, that is to say, the creation of a new constituent starting with the first strong syllable, giving [S W S] preceded by a single orphaned, weak syllable. This constitutes a violation of the Strict Layer Hypothesis (cf. Selkirk, 1984) which, if applied, would deprive us of the insight that in such an environment

the weak syllable in question may not be realized segmentally. The second output in (10), moreover, is achieved through the optional stress retraction before polysyllables within attributive phrases. Schwa in this instance is in a strong syllable, and, therefore, fully targeted for insertion. As discussed in Mazzola (1994), the SG, as defined here, is then revealed to be the environment for the liaison consonant in French (indicated by the symbol "=" in (10) above). This method of determining suprasegmental domains with the resultant restructuring in (10) allows for the formation of the Suprasegmental Group, now freed from lexical and syntactic strictures, out of the material provided by Suprasegmental Words.

Similarly, with regard to the occurrence of mute-e, we can observe for (6) given above, repeated here as (11):

- (11) [s w s]SG
 porte-voix 'megaphone'
 carte grise 'car registration'
 ours[ë] blanc 'polar bear'
 film[ë] noir

that the compound consists of an SG, for which the insertion of the schwa is required. For (4), however, reproduced here as (12):

- (12) [s w s]SG
 porte- bonheur 'good luck charm'
 cartes truquées 'marked cards'
 Porte-Maillot

and (5), given again as (13):

- (13) [s ww s]SG
 porte-parapluies 'umbrella stand'
 carte perforée 'punch card'

no schwa is inserted since the phrase already conforms to one of the two favored templates of syllable stress patterns. We see the same phenomenon in seemingly unrelated items exemplifying the behavior of schwa as in (14):

- (14) [s w s]SG
 a. l'oncle de Paul 'Paul's uncle'
 [s w ws]SG
 b. l'oncle de Pauline 'Pauline's uncle'
 [s ww s]SG [ws]SW
 c. l'oncle de la petite Pauline 'little P's ...'

Here, we see always the absence of the first schwa in the sequence, but not because of the increasing number of syllables following it as it would appear from (7), (8), and (9), but rather by virtue of it's being unnecessary, since we have a phrase within which one of the two favored configurations of syllables must be preserved. For exactly the same reason, the

schwa in the word petite in (14c) is deleted in order to reduce the length of the phrase to conform to the pattern of syllable strength.

Above it was observed that stress retraction can occur with compounds and attributive noun phrases, exemplified once again in (15a) and (16a). Such a phenomenon seems not to take place, however, with predicative noun phrases; cf. (15b) and (16b):

(15) a. $\begin{matrix} \text{ws} & & \text{s} & & \text{s w s} \\ [\text{petit}] \text{PW} & + & [\text{homme}] \text{PW} & \rightarrow & [\text{petit homme}] \text{SG} \end{matrix}$ 'little man'

b. $\begin{matrix} \text{ws} & & \text{s} & & \text{s w s} \\ [\text{bateau}] \text{PW} & + & [\text{moche}] \text{PW} & \rightarrow & *[\text{bateau moche}] \text{SG} \end{matrix}$ 'lousy boat'

(16) a. $\begin{matrix} \text{ws} & & \text{w s} & & \text{s w w s} \\ [\text{petit}] \text{PW} & + & [\text{ami}] \text{PW} & \rightarrow & [\text{petit ami}] \text{SG} \end{matrix}$ 'boyfriend'

b. $\begin{matrix} \text{w s} & & \text{w s} & & \text{s w w s} \\ [\text{bateau}] \text{PW} & + & [\text{français}] \text{PW} & \rightarrow & *[\text{bateau français}] \text{SG} \end{matrix}$ 'French boat'

In this way we can see that attributive phrases can be made into Suprasegmental Groups as in (15a) & (16a) via stress retraction, but predicative phrases can not (cf. (15b) & (16b)). The latter must retain their status as sequences of Suprasegmental Words and this must be reflected in their representation of syllable strength. There must be some instruction, therefore, originating in the syntax --- since all the phrases in (15) & (16) are noun phrases --- which signals this fact. However, because they are all noun phrases, there must be some other tag, no doubt related to the morphology, which completes this instruction. Thus, there must be some instruction to the effect that the final lexical stress on adjectives can be retracted to avoid stress clash, but the final stress of nouns can not. For this reason, we see that there is an interface of the phonological phrase not only with the syntax, but with the morphology as well (cf. also Morin & Kaye, 1982; and Mazzola, 1993, and 1994b).

This early relationship between the phonology and the syntax can be exemplified further by the examples given as (17) and (18):

(17) a. $\begin{matrix} [[\text{s}] \text{SW} & [\text{s}] \text{SW}] & [\text{w s}] \text{SW} \\ \text{livre} & \text{d'art} & \text{chinois} \end{matrix} \rightarrow$

$\begin{matrix} [\text{s w s}] \text{SG} & [\text{w s}] \text{SW} \\ \text{livre d'art} & \text{chinois} \end{matrix}$ "Chinese art book"

(18) a. $\begin{matrix} [\text{s}] \text{SW} & [\text{s w s}] \text{SG} \\ \text{livre} & \text{d'art chinois} \end{matrix} \rightarrow$

$\begin{matrix} [\text{s w w s}] \text{SG} \\ \text{livre d'art chinois} \end{matrix}$ "book on Chinese art"

In these examples taken from Dell (1973), the schwa in (17), so noticeable in contributing to the distinction between items (17) and (18), is inserted to remove the stress clash by forming the Suprasegmental Group as given. However, the contrastive parsing for both

examples must have already been present for the insertion to have taken place for (17a), but not for (18a). The stress clash for (18) is resolved by limiting strong syllables only to the beginning and the end of the constituent, thereby bringing the phrase into line with the template of the Suprasegmental Group. The potential environment for schwa insertion in (18a), identical to that in (14), remains, therefore, unfilled. For this reason, stress clash resolution whether through schwa insertion or through stress retraction must be considered to occur during restructuring. In the process, there may occur further modifications on the suprasegmental configuration of the phrase, i.e. restructuring, due to the resolution of stress clash resulting in the creation of a new constituent as in (18b). This results in the formation of a larger Suprasegmental Group, one within which, given the preservation of the favored template, there is no need for the realization of the schwa. For (17a), on the other hand, the clash is resolved through insertion.

We, therefore, have both the realization of the liaison consonant and suprasegmental operations dependent on the parsing handed down from the syntax. From these suprasegmental processes is derived a determination of stress clash with a resulting modification in the configuration of strong and weak syllables. This operation, as shown in (18b), feeds in a crucial way possible changes in constituent structure and ultimate parsing. In this way, the distinctive intonations of the phrases --- as well as the behavior of the sandhi variant --- can be viewed as the vestiges of the earlier parsing function of the syntax. *Syntactic constituents, I argue, pass on their relationships in the form of metrical phrasing.* It is in turn this phrasing which is modified to form the phonological environment for the insertion of segments.

3. LOCATION OF PAUSES.

Also significant in this regard is the relationship of this approach with the phenomenon of **pause** within the phrase. Elsewhere (Mazzola, 1996), I have been especially intent on examining whether these intonational constituencies are not the true domain for **pauses** in French. It is not surprising, for example, that in the phrase:

[s w w w s] || [w w s]
(19) professeur de droit || canadien "Canadian law professor"

the pause occurs at a syntactic boundary. For the phrase in (23), however, the pause is entirely unrelated to the syntax:

[w w s] w || [s w w s]
(20) professeur de || droit canadien "prof of Canadian law"

My contention is that this is purely the result of the intonational (= rhythmic, = prosodic) constituency which acts as the domain for this operation and that this is the by-product of the orientation which views sandhi-variation as a function of suprasegmental constituency.

4. GLIDE FORMATION.

Recently, Hannahs (1995) has focused on the question of glide formation in French whereby high vowels become corresponding glides when followed by another vowel:

(21)	colonie	→	colonial	'colonial'
	attribut	→	attribuable	'attributable'
	joue	→	jouable	'playable'

The data given in (21) illustrate that in French glide formation takes place word internally as in (21) between a stem and suffix, but it does not typically apply across words:

(22)	j'envie Alain	'I envy Alain'
	je joue au football	'I play soccer'
	il a dû attendre	'he had to wait'

However, Glide Formation does not occur word-internally (a) between prefixes and stems, e.g. anti-, semi-; and (b) between members of a compound as in (23):

(23)	antialcoolique	'antialcoholic'
	tissue-éponge	'terry cloth'

Hannahs concludes from these data that glide formation occurs within Prosodic Words, as in (21), but not between Prosodic Words, as in (22) and (23). Thus, prefixes and members of compounds in (23) are Prosodic Words.

In this connection, Hannahs cites Wetzels observation that "stress rather than the P[rosodic] W[ord] boundary *per se*, is responsible for blocking G[lide] F[ormation]. That is that a stressed high vowel does not become a glide even when followed by another high vowel" (1995: 1132). Hannahs counters by allowing that "this may be a correct characterization of why GF is blocked at the end of a PW - that the PW defines a domain of stress assignment in French and that the final vowel in such a domain is stressed" (*ibid.*).

The confrontation of these two stances raises in a very succinct way the issue of the suprasegmental characteristics of the Prosodic Word. Viewed from the perspective outlined in this paper, even if we equate the Prosodic Word with the Suprasegmental Word, we can posit the following input:

(24)	[w s]	[w ws]	→	[w[sw ws]
	anti	+ alcoolique		antialcoolique
	[w s]	[w s]	→	[w[s ws]
	tissue	+ éponge		tissue-éponge

The output, however, allows us to see once again a restructuring to conform to the characteristic template of the Suprasegmental Group, no longer determined by lexical, morphological, or syntactic structure. Here rather, we have the suprasegmental constituent, in violation of the Strict Layer Hypothesis because it is preceded by a single orphaned weak syllable. Its function, instead, is an essentially rhythmic one which is achieved by beginning

with a strong syllable to initiate the definition of the Group. For that reason, it can not be reduced to a weak syllable, thereby blocking glide formation in both instances.

The same restructuring prevails in the items given in (22), reproduced here as (25):

$$\begin{array}{lcl}
 \begin{array}{c} [w s] \quad [w s] \\ (25) \text{ j'envie} + \text{Alain} \end{array} & \rightarrow & \begin{array}{c} [w [s w s]] \\ \text{j'envie Alain} \end{array} \\
 \\
 \begin{array}{c} [w s] \quad [w w s] \\ \text{je joue au football} \end{array} & \rightarrow & \begin{array}{c} [w [s w w s]] \\ \text{je joue au football} \end{array} \\
 \\
 \begin{array}{c} [ww s] \quad [w s] \\ \text{il a dû attendre} \end{array} & \rightarrow & \begin{array}{c} [ww [s w s]] \\ \text{il a dû attendre} \end{array}
 \end{array}$$

The presence of the template is not favorable to the reduction of the full vowel to a glide as it is in the examples given in (21), reproduced here as (26):

$$\begin{array}{lcl}
 \begin{array}{c} ww s \quad s \\ (26) \text{ colonie} + \text{al} \end{array} & \rightarrow & \begin{array}{c} www s \\ \text{coloni} + \text{al} \end{array} & \rightarrow & \begin{array}{c} ww s \\ \text{colonial} \end{array} \\
 \\
 \begin{array}{c} w ws \quad s \\ \text{attribut} + \text{able} \end{array} & \rightarrow & \begin{array}{c} w ww s \\ \text{attribut} + \text{able} \end{array} & \rightarrow & \begin{array}{c} w ws \\ \text{attribuable} \end{array} \\
 \\
 \begin{array}{c} s \quad s \\ \text{joue} + \text{able} \end{array} & \rightarrow & \begin{array}{c} w s \\ \text{jou} + \text{able} \end{array} & \rightarrow & \begin{array}{c} s \\ \text{jouable} \end{array}
 \end{array}$$

Here, we see again the stress clash that must be resolved during the derivational composition itself to form the Suprasegmental Word. Glide Formation then takes place as the result of the weakening of the first strong syllable in the compound.

5. CONCLUSION.

Accentual patternings exist to define favored configurations of syllables which can be identified as constituents of rhythmic structure. This rhythmic structure, while initially informed by syntactic constituency, is modified through purely phonological operations, e.g. stress clash resolution, in order to give shape to the suprasegmental phrasal phonology. It is this phrasal phonology, defined by its characteristic constituency, which serves as the immediate domain for determining the behavior of sandhi segments, as well as glide formation and the location of pauses. The workings of the suprasegmental constituency determining this behavior and the insights gained thereby would be largely obscured by a rigorous application of the Strict Layer Hypothesis. For this reason, the Strict Layer Hypothesis should not be considered to apply to these phenomena which should rather be seen as functions of a nimble and fluid, but uniform, suprasegmental constituency.

REFERENCES

- Bailly, Gérard. 1989. Integration of rhythmic and syntactic constraints in a model of generation of French prosody. *Speech Communication* 8. 137-146.
- Chomsky, Noam, and Morris Halle. 1968. *The sound pattern of English*. New York: Harper & Row.
- De Jong, Daan. 1990. The syntax-phonology interface and French liaison. *Linguistics* 28. 57-88.
- Dell, François. 1973. *Les règles et les sons*. Paris: Hermann.
- _____. 1984. L'accentuation dans les phrases en français. *Forme sonore du langage: Structure des représentations en phonologie*, ed. by François Dell, Daniel Hirst, and Jean-Roger Vergnaud, 65-122. Paris: Hermann.
- Gussenhoven, Carlos. 1985. Two views of accent: A reply. *Journal of Linguistics* 21. 125-138.
- _____, and A. C. M. Rietveld. 1992. Intonation contours, prosodic structure and preboundary lengthening. *Journal of Phonetics* 20. 283-303.
- Hannahs, Stephen J. 1991. *Prosodic structure and French morphophonology*. Newark, DE: University of Delaware PhD Dissertation.
- _____. 1995. The phonological word in French. *Linguistics* 33. 1125-1144.
- Hoskins, Steven. 1994. Secondary stress and stress clash resolution in French: An empirical investigation. *Issues and theory in Romance linguistics*, ed. by M. L. Mazzola, 35-47. Washington, DC: Georgetown University Press.
- Kaisse, Ellen M. 1985. *Connected speech: The interaction of syntax and phonology*. New York: Academic Press.
- Léon, Pierre. 1966. *Prononciation du français standard*. Paris: Didier.
- Martin, Philippe. 1975. Analyse phonologique de la phrase française. *Linguistics* 146. 35-67.
- _____. 1978. Question de phosyntaxe et de phono-sémantique en français. *Linguisticae Investigationes* 2. 1-20.
- _____. 1979. Sur les principes d'une théorie syntaxique de l'intonation. *Problèmes de prosodie*, ed. by Pierre Léon and Mario Rossi, 91-101. Ottawa: Marcel Didier.
- _____. 1981. L'intonation est-elle une structure congruente à la syntaxe? *L'Intonation: De l'acoustique à la sémantique*, ed. by Mario Rossi et al., 234-271. Paris: Klincksieck.
- Mazzola, Michael L. 1992. Stress clash and segment deletion. *Theoretical analyses in Romance linguistics*, ed. by Christiane Laeufer and Terrell Morgan, 81-97. Amsterdam: Benjamins.
- _____. 1993. French rhythm and French segments. *Linguistic perspectives on the Romance languages*, ed. by William Ashby, et al., 113-126. Amsterdam: Benjamins.
- _____. 1994a. Indirect phonology and French segments. *Generative French phonology: Retrospective and Perspectives*, ed. by Chantal Lyche, 191-209. Salford, UK: Association for French Language Studies and European Studies Research Institute.
- _____. 1994b. Prosodic constituency and intonation. *Linguistic Association of Great Britain*. Salford, UK: University of Salford.
- _____. 1996. Syntactic constituency and prosodic phenomena. *Aspects of Romance linguistics: Selected papers from the Linguistic Symposium on Romance Languages XXIV*, ed. by Claudia Parodi et al., 313-327. Washington, DC: Georgetown University Press.
- Morin, Yves-Charles, and Jonathan D. Kaye. 1982. The syntactic bases for French liaison. *Journal of Linguistics* 18. 291-330.