SOUNDS – MEANING – COMMUNICATION 4

Anna Bloch-Rozmej / Anna Bondaruk (eds.)

Constraints on Structure and Derivation in Syntax, Phonology and Morphology

PETER LANG
EDITION

SOUNDS – MEANING – COMMUNICATION 4

Anna Bloch-Rozmej / Anna Bondaruk (eds.)

Constraints on Structure and Derivation in Syntax, Phonology and Morphology

The papers collected in this volume explore and discuss the major mechanisms, that is derivations and constraints, claimed to be responsible for various aspects of the linguistic systems, their syntax, phonology and morphology. The contributors approach these issues through a detailed analysis of selected phenomena of Modern English, Old English, Polish, Russian, Hungarian and Icelandic, offering novel theoretical and descriptive insights into the working of human language.

The Editors

Anna Bloch-Rozmej is Professor at the John Paul II Catholic University of Lublin, Poland. She is Head of the Department of Applied Linguistics, the author of two monographs and editor of six volumes. She specializes in phonology and applied linguistics.

Anna Bondaruk is Professor at the John Paul II Catholic University of Lublin, Poland. She is Head of the Department of Theoretical Linguistics, the author of three books and editor of five volumes. She specializes in syntax and theoretical linguistics.

ISBN 978-3-631-67379-9

www.peterlang.com

SOUNDS – MEANING – COMMUNICATION

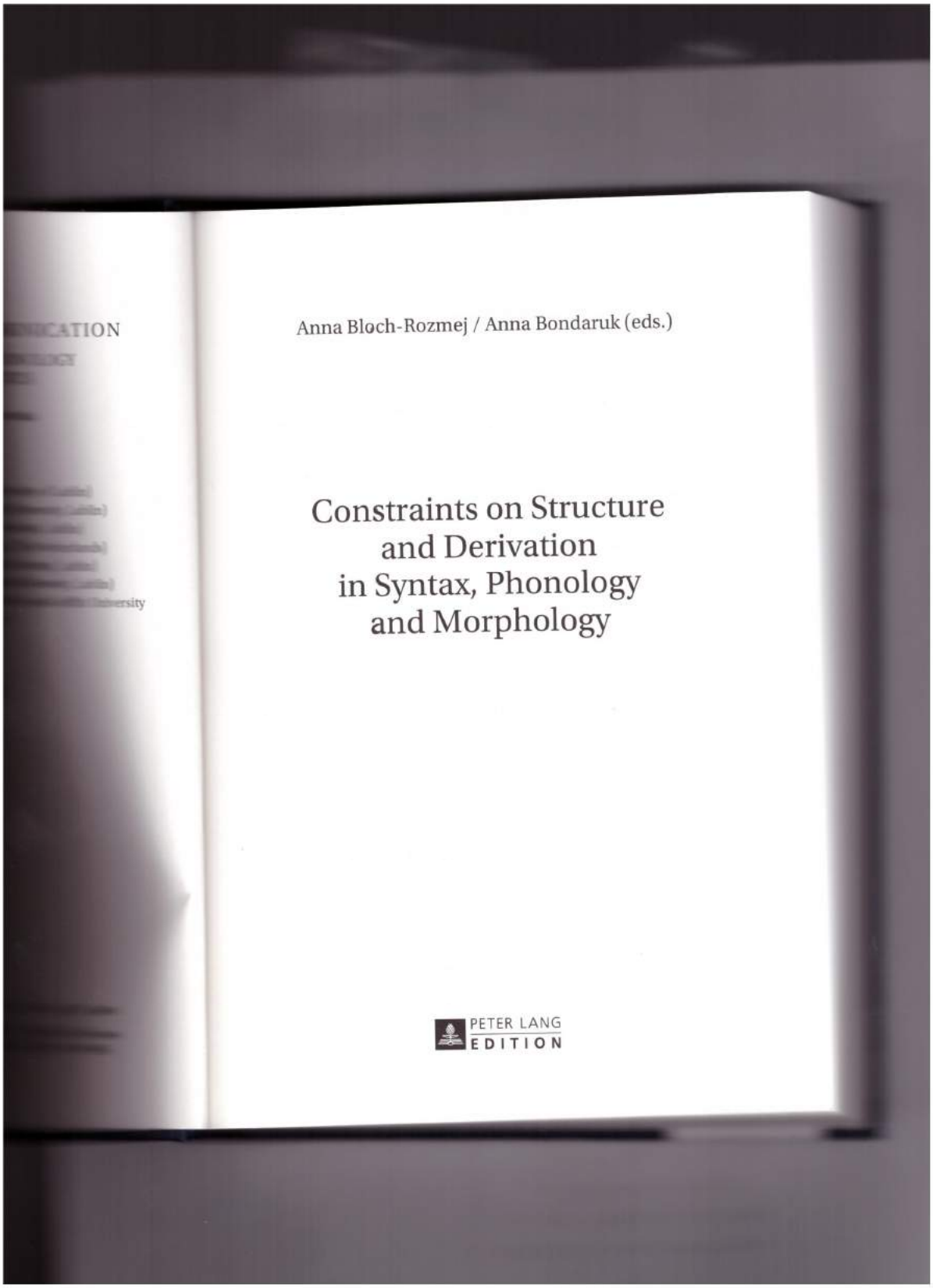
LANDMARKS IN PHONETICS, PHONOLOGY AND COGNITIVE LINGUISTICS

Edited by Jolanta Szpyra-Kozłowska

VOLUME 4

Notes on the quality assurance and peer review of this publication

Prior to publication, the quality of the work published in this series is reviewed by an external referee appointed by the editorship.



Anna Bloch-Rozmej / Anna Bondaruk (eds.)

Constraints on Structure and Derivation in Syntax, Phonology and Morphology

PETER LANG
EDITION

Bibliographic Information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data is available in the internet at http://dnb.d-nb.de.

Library of Congress Cataloging-in-Publication Data
Names: Bloch-Rozmej, Anna, editor. | Bondaruk, Anna, editor.
Title: Constraints on structure and derivation in syntax, phonology and morphology / Anna Bloch-Rozmej, Anna Bondaruk (eds.).
Description: Frankfurt am Main ; New York : Peter Lang, [2017] | Series: Sounds - meaning - communication; Vol. 4
Identifiers: LCCN 2016041271 | ISBN 9783631673799
Subjects: LCSH: Linguistic change–Variation. | Language and languages–Variation. | Grammar, Comparative and general–Syntax. | Grammar, Comparative and general–Morphology. | Grammar, Comparative and general–Phonology.
Classification: LCC P40.5.L54 L45 2017 | DDC 415–dc23 LC record available at https://lccn.loc.gov/2016041271

This publication was financially supported by the John Paul II Catholic University of Lublin, Poland.

Cover illustration printed with kind permission of Jerzy Durczak.

Reviewed by prof. Ángel L. Jiménez-Fernández (University of Seville, Spain).

ISSN 2365-8150
ISBN 978-3-631-67379-9 (Print)
E-ISBN 978-3-653-06638-8 (E-PDF)
E-ISBN 978-3-631-69888-4 (EPUB)
E-ISBN 978-3-631-69889-1 (MOBI)
DOI 10.3726/b10705

This publication has been peer reviewed.

www.peterlang.com

Contents

he Nationalbibliothek
i in the Deutsche
ailable in the internet at

a
ia, editor.
ix, phonology and mor-
).
ng, [2017] | Series: Sounds -

uage and languages–
itax. | Grammar, Compara-
tive and general–Phonology.
223 LC record available at

y the John Paul II
oland.
n of Jerzy Durczak.
niversity of Seville, Spain).

Lang GmbH.
New York ·

pyright. Any
law, without
liable to
ssions,
ssing in

Contents

DICHIARAZIONI SOSTITUTIVE DI CERTIFICAZIONI

(art. 46 D.P.R. n. 445/ 2000)

DICHIARAZIONI SOSTITUTIVE DELL'ATTO DI NOTORIETÀ

(art. 47 D.P.R. n. 445/ 2000)

La sottoscritta Benedetta Baldi, nata a Firenze (Fi) il 06/04/1969 e residente a Firenze, via Cavour, 85, a conoscenza di quanto prescritto dall'art. 76 del D.P.R. 28 dicembre 2000, n. 445, sulla responsabilità penale cui può andare incontro in caso di falsità in atti e di dichiarazioni mendaci, ai sensi e per gli effetti del citato D.P.R. n. 445/ 2000 e sotto la propria personale responsabilità:

DICHIARA

che nella pubblicazione in collaborazione:

Leonardo M. Savoia e Benedetta Baldi, 2017, *Enhancing stressed /a/ low frequency components in the context of sonorants. Some proposals on phonological representations*, in B. Baldi e L.M. Savoia (a cura di), La lingua e i parlanti. Studi e ricerche di linguistica, Edizioni dell'Orso, Alessandria:151-173.
Il lavoro è frutto di una riflessione comune degli autori.
I pff. elaborati e scritti da Benedetta Baldi sono i seguenti 1, 3, 3.1, 3.2, 4, 4.1, 5; il pf. 2 può essere attribuito principalmente a Leonardo M. Savoia

Data, 2.3.2017

Il dichiarante

Benedetta Baldi

Si allega copia della carta d'identità della sottoscritta

Il presente documento
scade il 06/04/2023

AT 5335758

I.P.Z.S. S.p.A. - OFFICINA C.V. - ROMA

REPVBBLICA ITALIANA

COMVNE DI
FIRENZE

CARTA D'IDENTITA'

N°. AT 5335758

DI

BALDI

BENEDETTA

Cognome BALDI
Nome BENEDETTA
nato il 06/04/1969
(atto n. 1964 *S.* 1 *A.)*
a Firenze)
Cittadinanza italiana
Residenza Firenze
Via Camillo Cavour N. 85
Stato civile cgt. GALLETTI
Professione

CONNOTATI E CONTRASSEGNI SALIENTI

Statura 174
Capelli CASTANI
Occhi VERDI
Segni particolari

Firma del titolare

FIRENZE 13/02/2013

IL SINDACO

Impronta del dito
indice sinistro

D'ORDINE DEL SINDACO
ISTRUTTORE AMMINISTRATIVO
Marco Francesca

Euro 5,1
0,2

Leonardo M. Savoia and Benedetta Baldi
Università di Firenze

Enhancing stressed /a/ low frequency components in the context of sonorants. Some proposals on phonological representations

Abstract: In this article two main topics are addressed: the treatment of vowel-sonorant interaction processes and, as a crucial theoretical point, the nature of phonological representations. As to the first point, data from some Italo-Romance and Romansh varieties are examined, which involve the relation between segmental phonological content and its prosodic manifestation. We examine the cavity and duration properties of stressed nuclei in contexts preceding a sonorant and in contexts involving the acoustic space associated with long nuclei. Nasal contexts favour the insertion of a cavity component triggering F1 lowering effects in the vowel. Liquid contexts favour the centralisation of the stressed nucleus by sharing of the [A] element. We conclude that the colour and length properties associated to the stressed nucleus license a second cavity component, manifesting its licenser role in the prosodic domain. We propose that in the assimilatory processes triggering the downward shift of F1 in vowels in nasal contexts, the element [Lf1], low-frequency F1, is involved. As to the phonological representations, a point recently discussed in the literature, we have concentrate on the relation between the prosodic structure and the melodic content of segments.

Key words: vowel-sonorant interaction, licensing, assimilation processes, phonological representations, element theory

1. Introduction

In this article two main topics are addressed: the treatment of vowel-sonorant interaction processes and, as a crucial point, the nature of phonological representations. As to the first point, data from some Italo-Romance and Romansh varieties will be examined. In particular the relation between segmental phonological content and its prosodic manifestation will be investigated by combining experimental observations with the documented phenomena. The second point has recently been discussed and the most debated points concern the explanatory role of structure and its relation to the melodic content of segments (Kaye 2014; Pöchtrager and Kaye 2013; Pöchtrager 2006; 2015; van Oostendorp 2013).

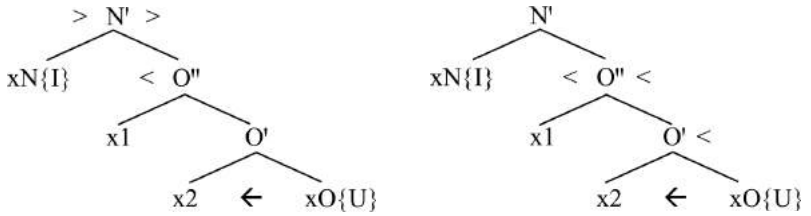
In what follows the fundamental tenets of Government Phonology (GP) will provide the starting point for analysis. In this light, prosodic organisation and licensing relations between positions will be analysed as a reflex of the phonological content of segments inthe relevant domains. A fundamental requirement that will be adopted is the one concerning the phonetic interpretability of representations, assuming the *Projection principle* and *Non-arbitrariness* of processes (Kaye 1986/87; Kaye 1990; Kaye, Lowenstamm and Vergnaud 1990). The consequence of these constraints, preserved in successive versions of the theory, is that "all phonological representations are fully interpretable at any stage in a phonological derivation" (Kaye and Pöchtrager 2013).

2. Some theoretical and empirical questions

In the classical GP framework (Kaye 1990; Charette 1991; Harris 1994; Kaye, Lowenstamm and Vergnaud 1990), the acoustic potential of a segment depends on whether it is in a licensed position or is a licenser or a governor. A critical point is the relation between the phonological potential of the segments and the structural and prosodic organisation, insofar as some degree of redundancy is present in the autosegmental model. With the *Non-segmentalist Hypothesis* Jensen (1994) aims to reduce these redundancies, assuming that the acoustic differences of segments "are direct phonetic interpretations of particular positions within the constituent structure." The structure is to be "understood weakly as the governing and licensing relations that obtain between points in a given domain" (Jensen 1994, 73). In particular, this type of approach has inspired the CV model proposed in Lowenstamm 1996. Recent discussion in GP has applied the idea that at least some of the traditional melodic properties can be treated as structural properties. Pöchtrager (2006; 2010), Pöchtrager and Kaye (2013), and Kaye (2014) support a revision of GP whereby processes concerning the melodic content of segments can be reduced to structural relations, a solution that has the undesirable effect of multiplying abstract positions.

For the sake of clarity, let us consider the proposal by Pöchtrager (2006) and Pöchtrager and Kaye (2013), whereby prosodic structure is a sort of recursive projection of the nucleus (cf. van Oostendorp 2013). In this approach, for example, strong consonants contrast with weak consonants in terms of the structural properties inherent in single segments, as in (1a,b), where xN and xO are possible heads.

(1) a. *rib* b. *rip*



So, the contrast between [rɪb] and [rɪp] is represented by the two structures in (1a,b) (Pöchtrager 2006, 71), projected on the basis of two types of relations, m-command (>, <), whereby "the interpretation of a terminal node A controls the interpretation of terminal node B" and control (←), a licensing "that does not contribute to length" (Pöchtrager and Kaye 2013, 57). In (1a), the nucleus licenses (m-commands) the first position inside the following consonants, as suggested by the > and <, which is realised as the weak variant [b]. In (1b), it is the consonant head that also licenses its highest position, giving rise to the strong outcome [p]. So, the number and interpretive power of the phonological distinctions can be re-interpreted in terms of structural positions and their relations.

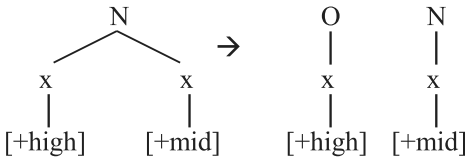
A different solution is, however, at hand, namely to deal with metrical structure as a reflex of deeper and elementary properties that group together the segments in the string. In other words, the melodic content can be understood as the basic property that creates the prosodic interpretation. Specifically, there are grounds for reconsidering the idea that an ordered constituent structure is the exhaustive way of representing relations between elements. Thus, pursuing a minimalist line of analysis, Chomsky (2013) proposes a revision of phrase structure grammar PSG assuming that the order of constituents depends on a third factor principle operating in the process of externalisation at the sensorimotor (SM) interface (Chomsky 2013; see discussion in Manzini and Savoia submitted). Specifically, the computational operation that forms the syntactic objects, namely *Merge*, yields non-ordered couples (sets) of the type {x, y}. According to Chomsky (1995), the operation Merge projects either x or y; the projected element is the head and the label of the syntactic object, as in {x{x, y}}. Therefore, two orders are equally possible, {the{the, book}} and {{the, book}the}.

In keeping with this perspective, we can assume that an operation of phonological Merge takes phonological objects (segments), x and y, and forms a new object, i.e. the set {x, y} – a melodic domain. The structural arrangements that emerge in phonological representations, as head-complement relations in syllable, foot, etc. can be interpreted "as reflexes of SM interface properties," in the sense of Chomsky

(2013, 39). This means that the structural representation of relations traditionally assumed as basic, such as nuclear head-complement, C_{coda}-C_{onset} and V-V, relations, can be understood as derivative properties introduced in the process of SM interpretation. Hence, the metrical constructs are projections from vowels or consonants which license the phonological objects they combine with. Concretely, phonological sequences are organised around segments endowed with resonance/intensity properties enabling them to regulate the concatenation of consonants and form domain. If we are on the right track, we can argue that the surface structural arrangement is not fixed once and for all by a rigid structural model and that syllable and foot can be understood as domains of prominence/licensing.

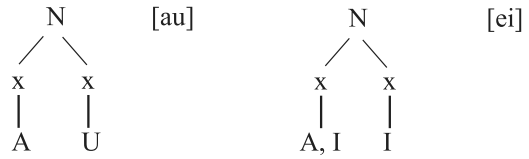
Consider, by way of an example, rising (light) diphthongs, like [jɛ wɔ], vs. falling (heavy) diphthongs, like [ai au]. Usually the literature based on metrical models and GP assigns different structures to rising diphthongs, treated as contour segments or syllabic sequences, compared to falling diphthongs, considered true complex nuclei. So, the head role is assigned to the first position inside the nucleus. This excludes the possibility of interpreting rising diphthongs as a realisation of a binary nucleus. Along these lines, Booij (1989), resuming a proposal of Anderson (1974), analyses the rising sequences of Frisian, like [fwotən] *fuotten* 'feet', as combinations where the first part is associated with the syllabic onset. According to Booij (1989, 326), the process of breaking removes the first part of the diphthongised mid vowels from the nucleus, associating it to the onset through the universal CV-rule that assigns a prevocalic segment to the onset (cf. Levin 1985), as in (1).

(2)



In GP, this asymmetry is expressed in terms of a universal constraint requiring left-right governing inside the constituents (Kaye 1986/1987; Kaye, Lowenstamm and Vergnaud 1995); this solution is substantiated in Harris (1990) on the basis of the requirement, whereby the head cannot be less complex than the governed position (Complexity Condition). Harris (1990, 276) considers only heavy diphthongs genuine ones, assuming that "in branching nuclei the governee can only ever be simplex;" so only nuclei like (3a,b) are true diphthongs.

(3) a. b.

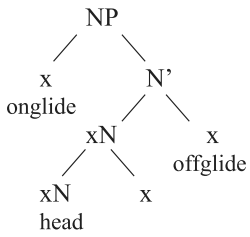


The fallacies in this characterisation of diphthongs are highlighted in Pöchtrager (2015); in particular, he points out that the Complexity Condition does not exclude diphthongs like *ia*, i.e. typical light diphthongs. Nevertheless, in other approaches, complex nuclei including onglide sequences are admitted on the basis of general considerations concerning sonority prominence. For example, Harris (1985) analyses Spanish rising diphthongs, occurring both in open and closed syllables, cf. [ˈjerro] *hierro* 'iron', [ˈpwerta] *puerta* 'door', assuming that the full vowel has the role of the head by virtue of its sonority degree. Actually in many languages the distribution of rising diphthongs is sensitive to the syllabic structure, connecting them to the open syllables exactly like falling diphthongs in other languages. This distribution characterises standard Italian (Marotta 1988), as in (4):

(4) [ˈpjɛde] 'foot' vs. [ˈpɛtto] 'chest'
[ˈrwɔta] 'wheel' vs. [ˈpɔrta] 'door'

A natural conclusion is that a clear-cut distinction between rising and falling diphthongs on the basis of their relation with syllabic contexts is not proved by the data. Pöchtrager (2015) and Kaye (2014) submit a treatment that gets over the impasse characterising the traditional analysis of diphthongs, by assigning a richer structure to the vocalic sequences shaped like the X-bar organisation of syntactic phrases. The difference between light and heavy diphthongs is accounted for by the different points of insertion of the onglide, in a spec position (further removed from the head), and the offglide (closer to the head) in an adjunct to the head position, as in (5).

(5)



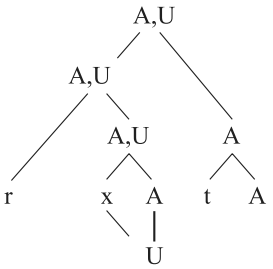
These structural solutions encounter the same difficulties as the cartographic treatment of syntax, in the sense that the sequencing of elements gives rise to rigid universal templates, with the effect of requiring more recourse to stipulation. Anyway, important insights are implied in the proposals of Pöchtrager and Kaye: particularly, the idea that some sort of embedding characterises phonological structures/categories, as shown in (1) and (5), and that the coda consonant is simply the consonant licensed by the nucleus, as in (1a).

A reduced notion of structure in phonological representations can be pursued, in which relational properties project from the qualitative properties (types of assimilation and harmonisation, strength prominence) of the segments. So, for instance, diphthongs can be represented as a set including two slots hosting cavity properties sufficient to license the stress domain. In the spirit of the minimalist approach, structural relations can be reduced to licensing of the melodic content in the domains that compose the sequence. We go a step further and assume that licensing/legitimisation is nothing but the phonetic interpretation of the string organisation, specifically the (partial) melodic assimilation between a prominent phonological content (head) and the other segments in its domain. Also the partial melodic depletion of weak positions can be thought of as a type of phonological agreement, in the sense that the head subsumes part of the resonance properties of the string.

In the terms of this approach, an elementary representation that registers domains and licensing is obtained. The ability of a nucleus (or possibly a consonant) to license a phonological string i.e. its domain,[1] is implemented by the sharing of properties (harmony, propagation, assimilation) or simply by phonological fullness/prosodic strength. The prosodic strength refers to the nature of the melodic content associated to a position; this means that it will be the nuclei that generally define the domains, as suggested in (6). We will say that only consonant and vowel slots exist and that they realise the order established by licensing.

1 The idea that the rhyme is the projection of the nucleus is part of the set of basic concepts and principles inspiring GP (Kaye, Lowenstamm and Vergnaud 1985; 1990).

(6)



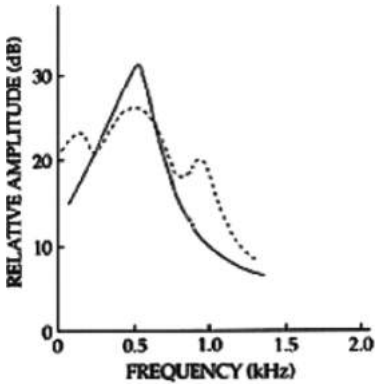
[ˈrwɔta]

Then, there is no longer a need for a head as a category fixed by virtue of a particular structural constituent. All that is necessary is a sequence where a perceptually prominent melodic content interprets or affects the melodic properties in the other slots in its domain. In the representation in (6), the vocalic heads introduce the domains that organise the sequence. Thus, the projection reflects the vocalic domains, configuring the prosodic domain of the stressed nucleus. It is of note that in the following sections we could use lightly simplified representations.

3. Nasals and liquids

In the phonetic and descriptive literature the effects that nasals and liquids exert on the surrounding vowels are well known. Generally speaking, a nasal or liquid context involves a low first formant frequency in the spectrum, which can be connected with enhancing low frequency components in the adjacent vowels. Stevens (1997, 486) highlights the fact that the velopharingeal port in the nasal consonants introduces two resonances, one around 250–300 Hz and the other around 800–1,000Hz. Nasalised vowels imply increasing the bandwidth of the first formant, enhancing low-frequency energy in the glottal spectrum and introducing an additional prominence in the spectrum over the first formant. On the whole, nasality causes flattening of the spectral structure in the vicinity of F1 due to the widening of F1, thus reducing the prominence of F1 as an "isolated peak" (Stevens 1997, 484–485), as in the graph in (7). In (7) the continuous line shows the spectral envelope for a non-nasal mid vowel in the F1 region. The dashed line illustrates the modified spectrum when the same vowel is nasalised. The overall result of nasalisation is a levelling of the spectrum in the region of F1.

(7) Stevens (1997, 486)



This characterisation of nasality allows us to connect both low-mid properties and nasality in the spectrum. For example, in many languages nasality effects show up in particular on the stressed /a/ favouring a low frequency component in the vocalic spectrum. Concerning liquids, Stevens (1997, 488) notes that "there are three general properties of liquids and glides…: a reduced low-frequency spectrum amplitude, an additional decrease in amplitude at high frequencies, and a reduced prominence of the second or third formant peak." In fact, the empirical data register a specialised range of vocalic phenomena in liquid contexts, where the low frequency spectral region is exploited. A link between low frequency components and duration in vowels is highlighted in experimental research, e.g. see Maddieson (1997). We know that conditions being equal, lower vowels are longer. Moreover, vowels that precede voiced consonants are longer than those preceding unvoiced consonants; in high vowels F0 is on average higher than in low vowels. Finally, F0 is lower in voiced consonants.

Krakow et al. (1987) observe that the low-frequency component of nasals (FN) leads to two different effects according to the height of the adjacent vowel. If we consider the oral vowel F1 frequencies as "hypothetical target values," the following picture emerges:

– In a high/mid vowel, nasalisation determines lowering by shifting the F1 frequency upwards. FN is higher than F1 determining the "lowering" effect.
– In low vowels the opposite result appears, i.e. raising. The low-frequency component of the nasal is lower than the vocalic F1 and a raising effect is determined when FN is prominent.

More to the point, enhancing the low frequency component of an original low vowel and its upward shift (a > ɛ/ɔ) can be a manifestation of the syllabic duration as well.

The acoustic properties of nasals and liquids can account for the quality adjustment observable in the adjacent vowels, by manipulating their F1. We will concentrate on the acoustic effects of nasal or liquid contexts on the low vowel [a]; specifically, a low-frequency F1 is favoured which creates the configuration of a low-mid vowel [-high, -ATR]. According to the vocalic prototypes in the UPSID (UCLA Phonological Segment Inventory Database) corpus, in [+back] low-mid vowel [ɔ] F1 is around 561 Hz and in [-back] low-mid [ɛ] F1 is about 536 Hz, i.e. values which are much lower than the F1 of [a], typically about 742 Hz. In the systems we will examine, acoustic effects of nasality induce a peripheral cavity configuration realised as [ɔ]/[ɛ] or as a diphthong, which increases the low resonance properties.

3.1. Vowels in nasal contexts: velarisation[2]

Consider the vocalism of the Romansh Surselva (*Vattiz*) and Engadine (*Müstair*) varieties, where stressed [ɔ] corresponds to an etymological /a/ in contexts where it is followed by a nasal in coda, __*NC*, including original geminate nasal, as in [ɔn] "anno," as in (8a)–(9a). In a subset of dialects, a following liquid, in turn, selects a velarised outcome, as we will see below. Before a velar nasal in the word final position or in an intervocalic position [au]/[ɛu] occur, according to different varieties, as in (8b)–(9b). As suggested by transcription, in these contexts word final or onset nasal in (8b) is realised as velar or pre-velarised [ᵑn]. Labials and palatals imply a geminate structure, which closes the rhyme, as suggested by [ɔ] in (8c)–(9c). The data in (8d)–(9d) illustrate the occurrence of stressed [a] in all other contexts, independently of the nature of the following consonant and syllabic structure. In the *Müstair* variety, the outcome [au] also occurs in some contexts of closed rhyme. More precisely, the diphthong precedes __ *N [C,-voiced]* contexts, in (9a), whereas [ɔ] occurs in __ *N[C,+voiced]* contexts, in (9a').

(8)

a. ___ NC
[jau ˈkɔntəl]/[nus kanˈtain] 'I sing/we sing',
[ˈkɔmba] 'leg', [ɔn(s)] 'year/s'

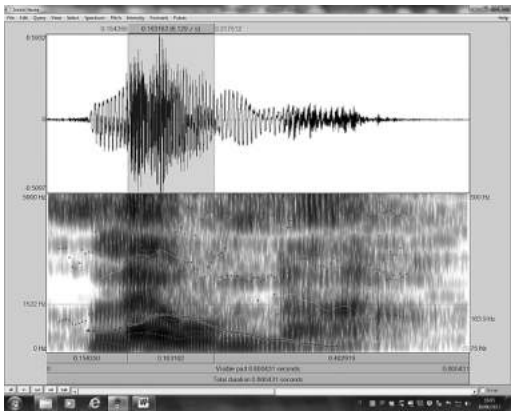
2 It is of note that velarisation of the original/underlying *a* systematically includes rounding.

b. ___N(V)
[mɛuŋ] 'hand', [tʃɛuŋ] 'dog', [pɛuŋ] 'bread',
[sɛuŋ]/[ˊsɛuᵍna] 'healthy.m/f', [ˊlɛuᵍna] 'wool'
c. [ju ˊklɔməl] 'I call', [fɔm] 'hunger', [bɔŋ] 'bath'
d. [na:s] 'nose', [sa:l] 'salt', [ˊka:za] 'house', [ˊvaka] 'cow'
[fra:(rs)] 'brother/s', [bratʃ]/[ˊbratʃa] 'arm/s' *Vattiz*

(9)
a. ___ NC
[jau ˊtʃaunt]/[nu tʃaunˊtaiŋ] 'I sing / we sing'
a'. [grɔnd]/[ˊgrɔnda] 'big.m/f'
b. ___N(V)
[mauŋ] 'hand', [tʃauŋ] 'dog', [grauŋ] 'corn',
[duˊmauŋ] 'tomorrow', [ˊlauŋa] 'wool', [sauŋ]/[ˊsauŋa]
'healthy.m/f', [ɛ:s ˊfauŋ] 'they make'
c. [i ˊklɔmən] 'SCl call', [fɔm] 'hunger', [ˊjɔma] 'leg',
[tʃɔmp] 'field', [ɔŋ(s)] 'year/s'
d. [na:s] 'nose', [ba:p] 'father', [sa:l] 'salt', [ˊa:la] 'wing',
[tʃarn] 'meat', [bratʃ]/[ˊbratʃa] 'arm/s', [ˊvatʃa] 'cow' *Müstair*

Descriptively, these outcomes can be dealt with by assuming that nasals spread a velar resonance component that can be realised as [U]. Stressed nuclei in the contexts where the nasal is not in the domain of a following consonant, subsume the resonance properties of the nasal it licenses. The association of element [U] with the velar configurations is motivated in the literature (Backley 2011) on the basis of the empirical evidence highlighting both the link between round back vowels and velar consonants, and between labial and velar consonants (see Savoia and Baldi in press). This is particularly clear in the contexts where the diphthong is realised in the presence of a velar or (pre)velarised quality of the final or intervocalic nasal, as in (8b)–(9b). The spectrogram of [ˊlɛuŋna] in (10) illustrates this realisation.

(10)



[ˈl ɛ u ᵑn a] ‘moon’ *Vattiz*

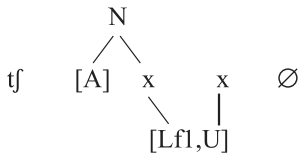
In the intervocalic context a clearly perceptible velar appendix is realised, which combines with the coronal segment of the nasal.

Now, the question is how this assimilation can be analysed in a coherent theoretical framework. As has been seen, licensing operations concerning a stressed nucleus and its immediate domain are represented assuming a simpler notion of structure, as discussed in connection with (6). The present proposal is that positions and licensing (prominence) relations derive from the phonological potential of segments, which triggers licensing, i.e. properties sharing, as in (6), or other types of properties concord. Licensing corresponds to the ability of a nucleus or another phonological element to authorise a phonological string, i.e. to subsume (some of) its prosodic/melodic properties. As to the content of nasals, according to Harris and Lindsey (1995), and Backley (2011), it includes an inherent acoustic low frequency configuration expressed by [L]. In our varieties this low frequency property is interpreted by [U] in the vowels. The difficulty is evident: Element Theory does not provide any way for connecting this acoustic component with the cavity content of vowels. We can tentatively assume that a low-frequency formant [Lf1] is involved in the harmonising process; more precisely, suppose that [L] can be identified with [Lf1]. [Lf1] will have slightly different sensorimotor interface level interpretations according to its role in the string. Vowels will be associated to acoustic values different from those required by nasals. The [Lf1] element implements licensing of the formantic composition of a nasal in the domain of a stressed vowel. Its sharing gives rise to a high back vowel. Tentatively, we propose that the stressed vowel including [A] licenses a low frequency component, as in (11), so interpreting the crucial acoustic property of the nasal in its domain:

(11) a. the stressed nucleus [A] licenses the phonological content in its domain
b. the low-frequency [Lf1] element is shared by the stressed nucleus and the nasal
c. [Lf1] combines with [U]/[I], i.e. a vowel characterised by a low Lf1

The different possibilities implied in (11) depend on the different prosodic domains where the stressed nucleus acts as a licenser. Firstly, consider the case of diphthongs in (8b)-(9b), where the licensing mechanism is implemented by the sharing of the [U] element. In (12) the stressed nucleus takes on the [U] element, licensing it. Since the final nucleus is devoid of phonetic instantiation, the head vowel [ɛ] is the sole licenser of the velar nasal in its domain, as indicated by the arrow between the two braces. The nucleus subsumes the low-frequency properties of the nasal in the form of the colour element [U]. Seen in this light, metrical structure is nothing more than the arrangement determined by the content properties of the vowel.

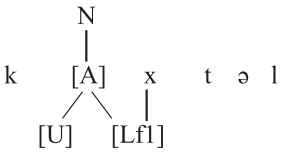
(12)



[tʃauŋ] 'dog' *Müstair*

In the contexts where the nasal is an intermediate onset, as in (12), a long nucleus is admitted which in turn realises the [U] element as its complement position, licensing it through sharing of the [U] in the following nasal. Alternatively, if the selection of a second position is excluded, licensing is implemented by realising the [U] element inside the vowel, as in (13). Besides, we are induced to conclude that [Lf1] combines with the other vocalic elements, [I], [U], [A], as in (13), specifying the low-frequency content. The difference between low-mid and high-mid vowels can be interpreted in terms of a privative element [Lf1], and we could put aside the notion of head element.

(13)



[ˈkɔntəl] 'I sing' *Vattiz*

The head vowel [ɔ] includes the low-frequency component in its domain, subsuming this property. If the nasal is followed by a consonant (in traditional terms, it

is a coda), the short nucleus [ɔ] occurs, as in (13). In this case the low frequency element [Lf1] is directly associated with the vowel content, which implies a back outcome. This solution seems to be insensitive to the cavity configuration of the nasal, whereby the velarisation of /a/ emerges in labial, coronal and palatal contexts as well. So, the stressed nucleus includes the head [A] combined with the element [Lf1], low-frequency configuration, and [U]. In these varieties, nasals enhance their intrinsic acoustic configuration [L]/[Lf1] selecting the component [U]; in other words, the stressed vowel interprets the low frequency configuration by requiring [U], as in (8a,c)–(9a',c).

(13) characterises a sequence in which the two consonants share a part of their content, namely [U]. Phonological content sharing corresponds to the traditional coda-onset context, in which the following consonant is normally assumed to govern the preceding one. In our terms we will say that the first consonant is in the immediate domain of the vowel, as indicated by the braces in (13).

3.2. Micro-variation in nasal contexts

A phenomenon connected with formant lowering discussed in the preceding paragraph is the colouring of /a/ in contexts where a long outcome is realised. An example is provided by the system of *Garbagna* (Piedmont), where [ɔ:] realises a long stressed /a/, (14d), including nasal and liquid contexts, (14a,a',b). The diphthong [ɑu] is triggered by an intervocalic nasal, (14c). Nasals are (pre)velarised in the intervocalic/final position, in (14b,c). A short [a] occurs, (14d,e).

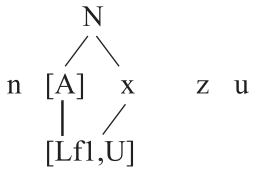
(14)

a. __ NC
   [a ˈkɔ:ŋtu] 'I sing', [a ˈmɔ:ŋdʒu] 'I eat', [ˈkɔ:mpu] 'field'
a'. [ˈlɔ:rgu] 'large', [ˈsɔ:rʑu] 'willow'
b. __N#
   [mɔ:ŋ] 'hand', [kɔ:ŋ] 'dog', [sɔ:ŋ] 'healthy'
c. __NV
   [ˈsɑuŋa] 'healty.f', [ˈrɑuŋa] 'frog', [ˈlɑuŋa] 'wool'
d. [ˈnɔ:zu] 'nose', [a ˈlɔ:vu]/[a laˈvuma] 'I wash / we wash',
   [sɔ:] 'salt'
e. [ˈvaka] 'cow', [ˈgatu] 'cat' *Garbagna*

The data in (14) show that nasals and liquids in the coda combine with the long [A] stressed vowel. As in the case of velarisation, lenghtening combines with more complex content including [Lf1, U], as in (15)–(16). In (16) also the velar

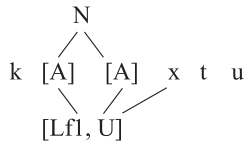
nasal shares this content with the preceding stressed nucleus, which interprets all spectral properties in its immediate domain.

(15)



[ˈnɔːzu] ‘nose’ *Garbagna*

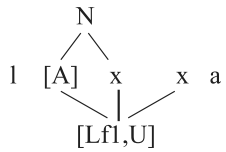
(16)



[ˈkɔːŋtu] ‘I sing’ *Garbagna*

Lengthening in the head position of the foot enhances the downward shift of Lf1, selecting colour resonances that can be shared with the nasal. In [ˈlAuŋa] in (14c) lengthening and velarisation combine. The nasal is independently licensed by its following nucleus; the diphthong [Au] licenses the domain entirely subsuming the back low-frequency configuration, as in (17).

(17)



[ˈlɑuŋa] ‘moon’ *Garbagna*

In the variety of S. Nazzaro Sesia (Novara) in (18), the outcome [ø] occurs before a nasal in the coda or a word final nasal, as in (18a,b). In the other contexts in (18a’,d,e), including the intervocalic position in (18c), the realisation [ɑ] appears. [ø] is present in the system, corresponding to stressed original /e/ in the closed syllable, as in (18a’).

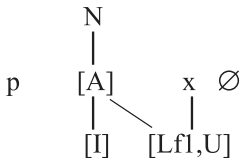
(18)

a. ___ NC
[ˈgømba] ‘leg’, [grønt]/[ˈgrønda] ‘big.m/f’, [kømp] ‘field’,
[i ˈkønt]/[i kanˈtuma] ‘I sing / we sing’

a'. [frøtʃ]/[ˈfrøtʃa] 'cold.m/f', [søk]/[ˈsøka] 'dry.m/f', [ˈʃøndra] 'ash'
b. ___N#
[møŋ] 'hand', [pøŋ] 'bread', [køŋ] 'dog'
b'. [fa:m] 'hunger'
c. ___NV
[ˈlaŋa] 'wool',
d. [na:s] 'nose', [sa:l] 'salt'
d'. [kaˈdɛŋa] 'chain', [ˈsɛda] 'silk', [ˈstɛla] 'star'
e. [ga:t] 'cat', [ˈvaka] 'cow' *S. Nazzaro Sesia*

The occurrence of [ø] is connected to contexts in which the nasal is in the coda or is followed by an empty vocalic position, like in (18b). In both contexts the nucleus is the only available licenser for the nasal. In these contexts the realisation [ø] interprets its prominence by introducing the low frequency components [Lf1,U]; an especially rich content is externalised as in (19).

(19)



[pøŋ] 'bread' *S. Nazzaro Sesia*

The velarisation and rounding of a stressed /a/ adjacent to a nasal characterise many Central-Southern Italian varieties. The system of *Gallo* (Caserta) shows [ɔ], variably nasalised, in all contexts with a nasal, both preceding and following, independently of the syllabic position of the nasal, as illustrated in (20a-e). So, the velarisation emerges when the nasal is in the coda, in (20a), in the following onset, in (20b), and in the preceding onset, in (20c). [ɔ] also occurs in a stressed final position, as in (20d), where it includes a nasal resonance. The examples in (20e) document the occurrence of [a] in the other contexts. Surface the alternations [ɔ] vs. [a] are present, as the data in (20b,c') show.

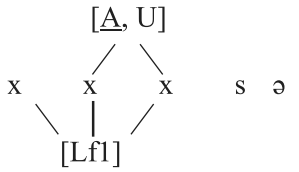
(20)
a. [ˈkɔntə] 'I sing', [ˈpɔnnə] 'cloth'
b. [ˈkɔ:nə] 'dog', [ˈfɔ:mə] 'hunger', [ˈcɔ:mə]/[caˈmɔ:tə] 'I call / you call'
c. [ˈnɔ:sə] 'nose', [ˈnɔ:tə] 'born', [ˈmɔ:lə] 'ill'
c'. [ˈn ɔ:ku]/[ˈl a:ku] 'a needle / the needle'

d. [kan′tɔ] ‘to sing’, [llɔ̃] ‘there’
e. [a′la:və] ‘I wash’, [′sa:lə] ‘salt’, [′vakkə] ‘cow’

Gallo

We can derive the velarisation of /a/ in *Gallo* variety from the analysis we have adopted for the preceding varieties. An interesting difference is that in (20) the preceding nasal is operating as well, selecting [ɔ] in the stressed vowel, as in (21); the phonosyntactic contexts are included, as illustrated in (20c’)

(21)



[′nɔ:sə] ‘nose’ *Gallo*

The fact that there are grammars, like that of *Gallo* in (20), in which velarisation also applies in contexts where the nasal precedes the stressed nucleus, confirms the idea that traditional intra-syllabic relations are not sufficient to account for the assimilatory processes. Indeed, we could expect that the relation between the onset and the nucleus is not so strong as to induce a left-right assimilation. Generally, the nucleus subsumes properties in its rhyme domain or in the vowels in its foot domain. In the case in (20), it is sensitive to the acoustic properties of the onset, normally left out by the metrical models in prosodic computation. This point has already emerged in cases like (12) and (19), where a following nasal in a position identifiable with the onset of an empty nucleus is suitable for phonetic interpretation (licensing) by the preceding stressed nucleus, as in (21). Again, this context is not a canonical licensing context for the vowel. These facts lead us to conclude that many aspects of the traditional syllabic and foot structural implementation are too restrictive, cutting off possible relations between the segments in the string. Naturally, GP structural principles capture important assimilatory phenomena in terms of government or licensing, but many phenomena escape the relations defined by the theory suggesting a treatment based on a different notion of structure.

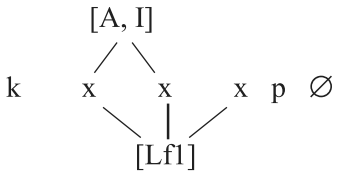
A second point concerns the fact that nasality does not necessarily involve velarisation and rounding. In the Lombard-Alpine variety of *Villa di Chiavenna* in (22), [ɛ] realises the original /a/ before a nasal in the coda (22a), in the onset (22b), in the final position (22c). In the other contexts, [a] occurs independently of duration.

(22)

a. [kɛ:nti] 'I sing', [kɛ:mp] 'field'
a'. [ˈgambɛ] 'leg', [gra:nd]/[ˈgrandɛ] 'big.m/f'
b. [ˈsɛ:nɛ] 'healthy.f', [ˈlɛ:nɛ] 'wool', [ˈrɛ:nɛ] 'frog'
c. [mɛ:n] 'hand', [sɛ:n] 'healthy.m', [kɛ:n] 'dog',
d. [ˈkaɲɲɛ] 'bitch', [ˈkannɛ] 'reed'
d'. [al me ˈtʃammɛ] 'he calls me'
e. [a me ˈla:vi] 'I wash up', [tʃa:f] 'key', [na:s] 'nose'
f. [al ˈparlɛ] 'he talks', [ˈvakɛ] 'cow', [gat] 'cat' *Villa di Chiavenna*

The lowering of F1 in the stressed nucleus exploits the nasal low frequency subsuming it, in the rhyme domain or in its foot, as in (23). The colour element [I] is not shared by the nasal; it concurs to realise the low frequency properties of the following nasal. [ɛ] is excluded in contexts where a nasal precedes a voiced obstruent in (22a'), which preserve [a].

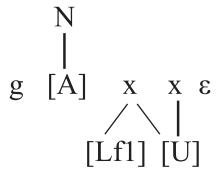
(23)



[kɛ:mp] 'field' *Villa di Chiavenna*

If we relate the realisation of [ɛ] to a wider phonological space in the nucleus, we must conclude that a voiced obstruent is computed in the domain of the nucleus, without making its lengthening possible, as in (24). More precisely, the resonance properties of a voiced obstruent are able to contribute to the acoustic interpretation of the domain.

(24)



[ˈgambɛ] 'leg' *Villa di Chiavenna*

(24) recalls the proposal of Jensen (1994), followed in Pöchtrager (2006; 2012), whereby only unvoiced obstruents govern the coda, while a voiced obstruent is unable to license the preceding nasal. Actually, (20) only suggests that a voiced obstruent can be interpreted in the domain of a nucleus without requiring a specialised implementation of it. More precisely, in (24) the nasal shares the articulation place with the following obstruent; this seems to be sufficient to license the sequence.

Palatalisation to [ɛ] characterises the realisation of /a/, both stressed and unstressed, in the variety of *Molfetta* (Apulia) in (25). In this system all of the nasal contexts, including phonosyntactic ones, trigger fronting, as illustrated in (25a) for word-internal contexts and (25b) for syntactic contexts, giving rise to alternations like those in (25b').

(25) a. [ˈnɛːsə] 'nose', [ˈmɛːnə] 'hand', [mɛˈraitə] 'husband', [ˈkɛmbə] 'field'
b. [lɛ ˈmɛːnə] 'the hand', [ker altɛː ˈmɛːnə] 'the other hand'
b'. [ɔn ɛˈpɛrtə] 'they.have open' vs. [aˈpɛrtə] 'open' *Molfetta*

In conclusion, we can expect that nasality can be realised through palatalised outcomes including, in turn, a lower value of F1. Naturally, the process that brings about the particular realisations is instantiated at the SM interface level.

4. Stressed vowels preceding liquids

In many varieties, velarisation and rounding emerge in context __*lateral C*. In the case of *Vattiz*, [au] corresponds to an original stressed /a/, in (26). This diphthong occurs in contexts where the lateral precedes a coronal [t d] or a palato-alveolar [t ʃ] in the onset, in (26a). Elsewhere, [a] is realised, as in (26b). Analogously, in the dialect of *Villa di Chiavenna*, the outcome [o] occurs in contexts where a lateral precedes a coronal, like in (27a); elsewhere we find [a], as in (27b).

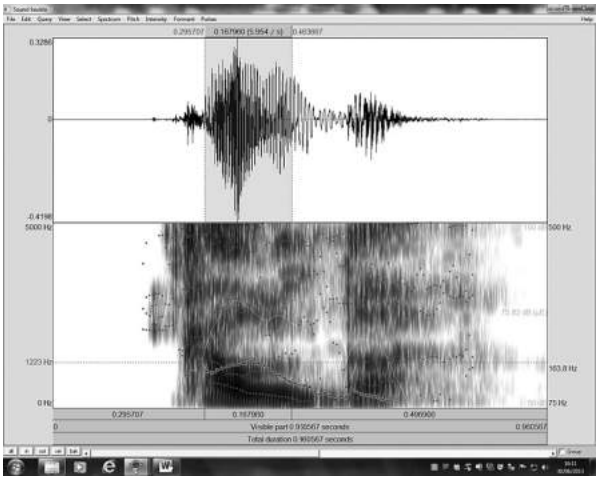
(26) a. [kaulᵗ]/[ˈkaulda] 'warm.m/f', [ault]/[ˈaulta] 'tall.m/f', [faultʃ] 'scythe'
b. [ˈpalma] 'palm' *Vattiz*

(27) a. [oːlt]/[ˈoltɛ] 'high/a', [koːlt]/[ˈkoldɛ] 'caldo/a',
[foːltʃ] 'falce', [ˈoltrɛ] 'altra', [koːlts] 'calzini'
b. [ˈmalgɛ] 'malga', *Villa di Chavenna*

The spectrogram in (28) shows the acoustic configuration of the lateral in [ˈkaulda]. In particular the lateral has a 216Hz F1 and a 1320Hz F2. These values coincide with those given in Ladefoged and Maddieson (1996, 193) for the velarised lateral. So, the adjacent lateral determines the downward shift of F1 towards the

values of [u], around 300Hz, favouring a second phase [u] in the diphthong, or, in the Lombard varieties, a low-mid back vowel [ɔ]/[o].

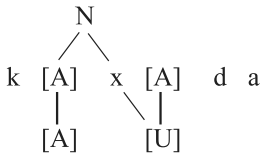
(28)



[ˈk a u l d a] ‘hot.f’ *Vattiz*

The effect induced by the liquid is to favour an acoustic configuration similar to that of back vowels, which can be characterised by assigning [U] as a secondary articulation to the lateral. [au] realises properties connected with the downward shift of F1, manifesting lengthening, as in (29), where [A] specifies the alveolar place content of the liquid (Backley 2011). The lateral can be licensed by virtue of the duration of the head nucleus in the domain. Sharing [U] with the following lateral enhances the licensing capacity of the nucleus.

(29)



[ˈkaulda] ‘hot.f’ *Vattiz*

An interesting problem is manifested by the distribution in (26)-(27): the labial and velar consonants following a lateral block velarisation and rounding in spite of the fact that they include the element [U] (Backley 2011), corresponding to velarisation and rounding. A possible explanation is that velarisation/rounding is a mechanism that contributes an accessory vocalic content to the adjacent vowel implementing its prominence. Our idea is that [U] appears in contexts where it is autonomously realised, i.e. licensed by the preceding nucleus. This prevents the consonants intrinsically endowed with [U] from sharing this property with the prominent vowel in the domain.

4.1. Introducing [A] in contexts of liquid

Stevens (1997, 488) characterises the acoustic properties of liquids as 'a reduced low-frequency spectrum amplitude, an additional decrease in amplitude at high frequencies, and a reduced prominence of the second or third formant peak'. This configuration, expressed by means of the [A] element, may give rise to a tendential centralisation in the spectrum of an adjacent vowel. A lowering of the low-mid front vowels to [a] before coronal trills characterises Corsican (*Munacia*) and Gallurese (*S. Teresa di Gallura*) varieties. In Corsican, the original front low-mid vowel opens to [a] in contexts where [r] closes the stressed rhyme, as in (30a) where [r] is followed by an obstruent, and in (30b) in the contexts of geminate consonants. The back low-mid vowel is preserved, as in (30c).

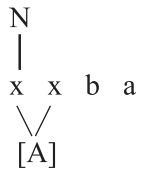
(30) a. [kuˈparta] 'blanket', [aˈpartu] 'open', [ˈarba] 'grass'
b. [ˈtarra] 'earth', [ˈsarru]/[sarˈrɛmu] 'I lock / we lock'
c. [ˈpɔrta] 'door', [ˈdɔrmu] 'I sleep' *Munacia*

In the Gallurese varieties in (31), [r] is preserved in the contexts of geminates, in (31b), while in preconsonantal contexts a lateral [lʲ] occurs.

(31) a. [kuˈpalʲta] 'blanket', [ˈpalʲdu]/[palʲˈdimu] 'I.lose / we.lose'
[ˈsalʲpi] 'snake', [tʃalʲˈbeḍḍu] 'brain'
b. [ˈtarra] 'earth', [ˈfarru] 'iron' *S.Teresa di Gallura*

The [A] resonance component is licensed in the nucleus which realises it, as in (32). [a] in the contexts in (30)–(31) can be viewed as the result of the stressed nucleus interpreting the frequency components of the following sonorant that it licenses. In other words, licensing is satisfied by including [A] in the prominent part.

(32)



[ˈarba] ‘grass’ *Munacia*

Finally, let us consider the lowering phenomenon that characterises the Romagna varieties. In these dialects, stressed nuclei followed by a liquid in their immediate domain (in the coda) have the same outcome, as in (33a), that occurs in an open syllable as well, as in (33b). The diphthongs [ɛɐ]/[ɔɐ] occur respectively from original /a/ and /ɔ/.

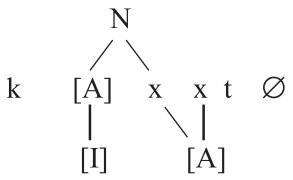
(33) a. [kɛɐlt]/[ˈkɛɐldʒ] ‘warm.m/f’
[lɛɐrg]/[ˈlɛɐrgʒ] ‘large.m/f’
[pɔɐrk] ‘pig’
b. [ˈɛɐvʒ] ‘bee’
[ˈroɐdʒ] ‘wheel’ *Alfonsine*

Pöchtrager (2006; 2010) and Pöchtrager and Kaye (2013) highlight the relation between [A] and structural properties, such as duration and the height of the nucleus. In particular, Pöchtrager (2006; 2010; 2012) examines the distribution of long or diphthongised nuclei in English in the contexts of the *coronal nasal-C* and *r-C*, as in [tɔ:nt] *taunt*, [bɔ:rd] *board* which show a systematic relation between the intrinsic properties of the nucleus and the sonority degree of the consonant sequence. The presence of [A] in the vowel relates to the sonority properties of the consonant. So, *nd* can follow both vowels when devoid of [A] and including only [A], *rd* can follow vowels with the head [A], *nt* can follow any expression with [A]. There is a number of phenomena where [A] interacts with non-melodic properties, i.e. length and laryngeal mechanisms, in different languages. For example, in French, the nasalised nuclei are long and long nuclei must contain [A]. A relation exists that involves length, nasality and the melodic properties of [A].

The conclusion of Pöchtrager (2010) and Pöchtrager and Kaye (2013) is that [A] can be treated as a structural property, corresponding to an adjunction, whereby [A] introduces a sort of reduplication. Naturally a question arises: why does this solution concern only [A]? In fact we have seen that [U] and [I] are also involved in contexts where sonorants favour the lengthening of the stressed nucleus. If so, all elements could or should be translatable into distinctive structural configurations, with the paradoxical result of assigning the structure a complete descriptive power.

In keeping with the present proposal, diphthongs [ɛɐ ɔɐ] can be treated as the effect of lengthening in contexts where the expansion of the nucleus is able to license a liquid by including its resonance component [A]. In other words, [ɛɐ ɔɐ] allow liquids to anchor in the acoustic space of their licenser, as in (34).

(34)



[kɛɐlt] 'hot' *Alfonsine*

We know that in the standard GP framework liquids [l r] have a phonological content which allows them to be governed by the sole following onset. The coronal tap has a phonological content coinciding with the single component [A] (Pöchtrager 2006; Backley 2011). Lateral sounds are more complex including the manner element [ʔ] besides the cavity property (Harris and Lindsey 1995). In general, in the terms of Halle and Stevens (1971), the features [spread glottis] and [slack vocal cords] bring together sonorants and vowels, suggesting that simple sonorants like [l r] are sufficiently vocalic to allow for a greater autonomy compared with obstruents. By virtue of these properties liquids can be governed by the only stressed nucleus, independently of the structural properties of the following context, as in (34) where the final nucleus is not realised. More precisely, the liquid shares [A] with the melodic content of the stressed nucleus. So, diphthongs[ɛɐ ɔɐ] include a second position [A], allowing liquids to anchor to the acoustic space of the nucleus licensing them.

5. Conclusions

We have concentrated on the cavity and duration properties of stressed nuclei in contexts preceding a sonorant and in contexts involving the acoustic space associated with long nuclei. Nasal contexts favour the insertion of a cavity component triggering F1 lowering effects in the vowel. Liquid contexts favour the centralisation of the stressed nucleus by sharing of the [A] element. Colour and length properties in the stressed nucleus license a second cavity component, manifesting its licenser role in the prosodic domain. In accordance with Walker 2011 (cf. Kaun 1995) the stressed/strong nucleus subsumes the resonance properties in the string, thus preserving or increasing their informational/interpretive force.

The preceding discussion has highlighted the fact that if we aim at expressing the downward shift of F1 in vowels adjacent to nasals, we lack any adequate descriptive tool for capturing the connection between the properties of nasals and the ones of the vowels. The only contact is manifested by the intrinsic properties of [I] and [U], that is the vocalic elements involved in the assimilation process. In order to surmount this obstacle, we have proposed that in the assimilatory processes triggering the downward shift of F1 in vowels in nasal contexts, the element [Lf1], low-frequency F1, is involved. As shown in (12), this element has been assigned also to the nasals, where it specifies the low frequency formant characterising nasality.

Another important issue examined in this article concerns the nature of phonological representations. We have pursued a model based on a "merge" mechanism which creates domains in which the prominent melodic content licenses the other segments. In particular, we assume that the structure is derived by projecting from the licensing element, step by step. This perspective aims to reduce the strong explanatory capacity that many authors assign to structural relations, and to capture the role of the melodic content as the true device which gives rise to the prosodic organisation of the string.

As regards the status of phonological procedures in the grammar, we note that phonology is strictly intertwined with the interpretive content of lexical items and the sentence, that it expresses. In the light of the proposals of Berwick and Chomsky (2011, 15) phonology and morphology are "the linguistic processes that convert internal syntactic objects to the entities accessible to the sensorimotor system." This is compatible with the hypothesis that processes such as metaphony, propagation, assimilation and dissimilation are not insensitive to morpho-syntactic information. Phonological mechanisms are involved in enhancing the perceptibility of phonological features associated to lexical and morpho-syntactic information, as shown in phenomena we have explored in this research.

References

Backley, Phillip. 2011. *An Introduction to Element Theory*. Edinburgh: Edinburgh University Press.

Berwick, Robert and *Noam Chomsky*. 2011. "The Biolinguistic Program: The Current State of its Evolution and Development." In *The Biolinguistic Enterprise*, edited by Anna Maria Di Sciullo and Cedric Boeckx, 19–41. Oxford: Oxford University Press.

Booij, Geert. 1989. "On the Representation of Diphthongs in Frisian." *Journal of Linguistics* 25(1):319–332.

Charette, Monik. 1991. *Conditions on Phonological Government*. Cambridge: Cambridge University Press.

Chomsky, Noam. 2005. "Three Factors in Language Design." *Linguistic Inquiry* 36(1):1–22.

Chomsky, Noam. 2013. "Problems of Projection." *Lingua* 130:33–49.

Halle, Morris and *Kenneth N. Stevens*. 1971. "A Note on Laryngeal Features." *MIT Quarterly Progress Report* 101:198–212.

Harris, James W. 1974. "Evidence from Portuguese for the 'Elsewhere Condition' in Phonology." *Linguistic Inquiry* 5(1):61–80.

Harris, John. 1990. "Segmental Complexity and Phonological Government." *Phonology* 7:255–300.

Harris, John. 1994. *English Sound Structure*. Oxford: Blackwell.

Harris, John. 1996. "Phonological Output Is Redundancy-Free and Fully Interpretable." *UCL Working Papers in Linguistics* 8:1–26.

Harris, John and *Geoff Lindsey*. 1990. "Phonetic Interpretation in Generative Grammar." *UCL Working Papers in Linguistics* 2:355–369.

Harris, John and *Geoff Lindsey*. 1995. "The Elements of Phonological Representation." In *Frontiers of Phonology*, edited by Jacques Durand and Francis Katamba, 34–79. London: Longman.

Jensen, Sean. 1994. "Is P an Element? Towards a Non-Segmental Phonology." *SOAS Working Papers in Linguistics & Phonetics* 4:71–78.

Kaun, Abigail. 1995. *The Typology of Rounding Harmony. An Optimality Theoretic Approach*, Ph.D diss., UCLA.

Kaye, Jonathan. 1986/87. "Government in Phonology. The Case of Moroccan Arabic." *The Linguistic Review* 6:131–159.

Kaye, Jonathan. 2014. "The Ins and Outs of Phonology." In *The Form of Structure, the Structure of Form*, edited by Sabrina Benjaballah, Noam Faust and Mohmed Lampitelli, 255–269. Amsterdam & Philadelphia: John Benjamins.

Kaye, Jonathan, Jean Lowenstamm and *Jean-Roger Vergnaud*. 1985. "The Internal Structure of Phonological Elements: A Theory of Charm and Government." *Phonology Yearbook* 2:305–328.

Kaye, Jonathan, Jean Lowenstamm and *Jean-Roger Vergnaud*. 1990. "Constituent Structure and Government in Phonology." *Phonology* 7:293–231.

Krakow Rena A., Patrice S. Beddor, Louis M. Goldstein and *Carol A. Fowler*. 1987. "Coarticulatory Influences on the Perceived Height of Nasal Vowels." *Haskins Laboratories – Status Report on Speech Research* 92:31–53.

Ladefoged, Peter and *Ian Maddieson*. 1996. *The Sounds of the World's Languages*. Oxford: Blackwell.

Lowenstamm, Jean. 1996. "CV as the Only Syllable Type." In *Current Trends in Phonology Models and Methods*, edited by Jacques Durand, 419–442. European Studies Research Institute, University of Salford.

Maddieson, Ian. 1997. "Phonetic Universals." In *The Handbook of Phonetic Sciences*, edited by William J. Hardcastle and John Laver, 619–639. Oxford: Blackwell.

Manzini, Maria R. and *Leonardo M. Savoia*. submitted. *Enclisis/Proclis Alternations in Romance: Allomorphies and (Re)ordering*.

Marotta, Giovcanna. 1988. "The Italian Diphthongs and the Autosegmental Framework." In *Certamen Phonologicum. Papers from the 1987 Cortona Phonology Meeting*, edited by Pier Marco Bertinetto and Michele Loporcaro, 389–420. Torino: Rosenberg & Sellier.

van Oostendorp, Marc. 2013. "σ Strikes Back: A Defense of Headedness and Constituency in Phonology." *The Linguistic Review* 30(2):347–371.

Pöchtrager, Markus. 2006, *The Structure of Length*, Ph.D. diss., University of Vienna.

Pöchtrager, Markus. 2010, *The Structure of A*. Paper presented at the "33rd GLOW Colloquium," Breslavia.

Pöchtrager, Markus. 2012, *Beyond the Segment*. Paper presented at CUNY Conference on Segment, New York City.

Pöchtrager, Markus. 2015. "Binding in Phonology." In *Representing Structure in Phonology and Syntax*, edited by Marc van Oostendorp and Henk van Riemsdijk, 255–275. Amsterdam & Philadelphia: John Benjamins.

Pöchtrager, Markus and *Jonathan Kaye*. 2013. "GP2.0." *SOAS Working Papers in Linguistics*, 16:51–64.

Savoia, Leonardo M. 2015. *I dialetti italiani. Sistemi e processi fonologici nelle varietà di area italiana e romancia*. Pisa, Pacini.

Savoia, Leonardo M. and *Benedetta Baldi*. in press. "Propagation and Preservation of Rounded Back Vowels in Lucanian and Apulian Varieties." *Quaderni di Linguistica e Studi Orientali / Working Papers in Linguistics and Oriental Studies, 2*.

Stevens, Kenneth N. 1997. "Articulatory-Acoustic-Auditory Relationships." In *The Handbook of Phonetic Sciences*, edited by William J. Hatdcastle and John Laver, 462–506. London: Blackwell.

Walker, Rachel. 2011. *Vowel Patterns in Language*. Cambridge: Cambridge University Press.