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Variation patterns in across-word regressive assimilation in Picard: An Optimality Theoretic account

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ABSTRACT

Before the advent of Optimality Theory (OT), quantitative variation patterns were usually regarded as the outcome of a selection between categorical grammars (see Bailey, 1973; Bickerton, 1973, among others). In a constraint-based approach, like OT, one is able to account for variation without resorting to a separate grammar for each variant, since the framework allows for variation to be encoded in (and therefore predicted by) a single grammar, through variable ranking (or crucial nonranking) of constraints. Along the lines of Reynolds (1994) and Anttila (1997), this study supports the view that, from the predictions determined by a language-specific set of variably ranked constraints, it is possible to establish quantitatively the probability of application of each variant inherent to the variation process. As a consequence, the analysis of across-word regressive assimilation in Picard attempts to incorporate into the grammar of the language both abstract knowledge and quantitative patterns of language use.

This study offers an Optimality Theoretic account for the phonological process of across-word regressive assimilation (AWRA) in Picard, a Gallo-Romance dialect spoken in the Picardie region in northern France and southern Belgium. More specifically, this research focuses on the varieties spoken in the Vimeu region of France, delimited by the Somme river to the north, the Bresle river and Normandy to the south, the English Channel to the west, and departmental road 901 to the east. In my investigation, I focus on one particular topic in the analysis of AWRA: the variation patterns observed in the application of the phenomenon. The data come from Vasseur's (1963) and Debrie's (1981) work on Picard, as well as from Auger's database consisting of written documents (e.g., private letters,

I am extremely grateful to Heather Goad for her guidance, encouragement, and continuing support throughout the development of this research. For their insightful comments, I would like to thank the audience of NWAVE-26 (University of Laval, Québec, October 1997) and the reviewers of its proceedings, *Papers in Sociolinguistics: NWAVE-26 à l'Université Laval*, where an early version of this study was presented and subsequently published. This research has also benefited from conversations with Arto Anttila and Keren Rice and from helpful input from Julie Auger (who first introduced me to Picard). I also wish to thank two anonymous reviewers for their invaluable suggestions and insightful comments and my wife Daria for the revision of several versions of the manuscript. Finally, I would like to acknowledge funding from an FCAR grant to Julie Auger (NC-1648) in the earlier stages of this research. I alone am responsible for any errors that remain.

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Picard magazines, unpublished articles) and an oral fieldwork corpus of tape-recorded interviews with Picard speakers. From these, a sample of 2,783 tokens of variants of AWRA was collected, following a three-level stylistic interview with nine speakers of Picard in five villages of Vimeu: Nibas, Feuquières, Fressenneville, Bienfay, and Bouillancourt.

The investigation presents an account of variation using the tools of Optimality Theory (OT) (McCarthy & Prince, 1993a, 1993b; Prince & Smolensky, 1993). Following the work of Reynolds (1994), Nagy and Reynolds (1997), Anttila (1997), Taler (1997), and Cardoso (1999), the quantitative analysis that I present for AWRA in Picard provides support for the view that variation can be encoded in the grammar through variable ranking of constraints. In this way, my analysis uses tools from theoretical linguistics in the form of OT and includes quantitative findings to provide an account of the noncategorical regularities found in AWRA in language use. This study is thus an attempt "to account for the broadest possible range of facts about language, including usage as well as abstract knowledge" (Guy, 1997:127) within a single (competence) grammar (see Guy, 1997; Labov, 1969, 1972, 1994; Wardhaugh, 1994). In other words, the study incorporates into the grammar much more than what is usually referred to as such, namely, quantitative patterns of language use.

This article is composed of four main sections. First, I provide the data that illustrate AWRA and its variation patterns and demonstrate that the phenomenon is exclusively sensitive to the phonological phrase domain. Next, I set forth my motivations for the selection of the frameworks of OT and Prosodic Phonology to analyze the AWRA data. I then present the data collection procedures, the independent variables employed in the study, and my quantitative analysis. Finally, I introduce the subject of variation in OT and propose an OT analysis for the variation patterns involved in AWRA.

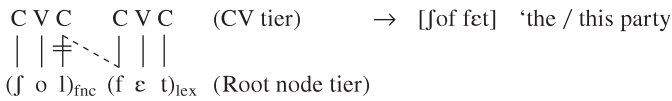
THE DATA: PROSODIC DOMAIN AND VARIATION

This section reviews the data upon which my study is based. First, I provide evidence that AWRA is sensitive to prosodic domains inasmuch as the scope of the process is limited to a specific prosodic configuration. Then, I illustrate the variation patterns encountered in clitic plus lexical word sequences in Picard.

As shown in (1), AWRA is a domain-sensitive phonological phenomenon that operates exclusively at the domain juncture of a (C)V1 shape clitic (/l/-clitic; *fnc* in (1)), followed by a consonant-initial lexical word (*lex*). In the appropriate phonological and morphosyntactic contexts, the Root node of the lexical word's initial consonant associates to the timing slot of the previous clitic-final consonant /l/, resulting in a complete geminate across the two words.[1] Note that the representation in (1), in particular the CV tier, is used for illustrative purposes only. Later, I dispense with the CV tier in favor of prosodic constituents.

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(1) AWRA process



→ [ʃof fɛt] 'the / this party'

In (2), (3), and (4), I demonstrate that the application of AWRA is sensitive to morphosyntactic (or prosodic) domains (i.e., a clitic must be followed by a lexical word) as well as to the melodic properties of the following segment (i.e., consonant vs. vowel). Observe in (2) that the clitic-final consonant /l/ completely assimilates to the following onset when the /l/-clitic (by definition unstressed) is followed by a consonant-initial lexical word, regardless of its grammatical status (Noun, Adjective, etc.).[2]

(2) AWRA contexts (Auger, field notes; Debrie, 1981; Vasseur, 1963)

a.	/ʃol glɛn/	→ [ʃog glɛn]	'the / this chicken'	(Determiner *ʃol*)
	/ʃol vak/	→ [ʃov vak]	'the / this cow'	
	/ʃol pjøt tab/	→ [ʃop pjøt tab]	'the / this small table'	
b.	/dol grɛs/	→ [dog grɛs]	'some fat'	(Partitive *dol*)
	/dol vjan/	→ [dov vjãn]	'some meat'	
	/dol bɔn vjan/	→ [dob bɔ̃n vjãn]	'some good meat'	
c.	/al fɛt/	→ [af fɛt]	'at the party'	(Preposition *al*)
	/al kaʃ/	→ [ak kaʃ]	'at the hunting'	
	/al mem plaʃ/	→ [am mem . . .]	'in the same place'	
d.	/al dãs/	→ [ad dãs]	'she dances'	(3rd person *al*)
	/al va/	→ [av va]	'she goes / is going'	
e.	/el fis/	→ [ef fis]	'the son'	(Determiner *el*)
	/el mɔn/	→ [em mɔ̃n]	'the world'	
f.	/i el pɔrt/	→ [i p pɔrt][3]	'he brings it'	(Object pronoun *el*)
	/va el vir/	→ [va v vir]	'is going to see it'	

AWRA does not apply in phonological and syntactic contexts distinct from the ones illustrated in (2). In particular, /l/-preservation or /l/-faithfulness (i.e., inapplicability of AWRA) is the result if the following lexical word is vowel-initial, as in (3), or when the relevant sequence of consonants occurs in monomorphemic words, in prefixation, in compounding, and in other higher syntactic configurations, as in (4).

(3) Inapplicability of AWRA (phonological environment)

Vowel-initial word:	/ʃol armwɛr/	→	[ʃ l armwɛr][4]	'the closet'
	/dol arb/	→	[d l arb]	'the tree'

(4) Inapplicability of AWRA (morphosyntactic environment)

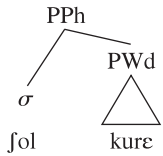
a. Monomorphemic word:	/kalfa/	→	[kalfa], *[ff]	'caulker'
	/belʒik/	→	[belʒik], *[ʒʒ]	'Belgium'
b. Prefixation:[5]	/malpoli/	→	[malpoli], *[pp]	'impolite'
	/malʃãs/	→	[malʃãs], *[ʃʃ]	'bad luck'

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c. Compounding:	/belmer/	→	[belmer], *[mm]	'mother-in-law'
	/belfij/	→	[belfij], *[ff]	'daughter-in-law'
d. Other domains:	/bel tab/	→	[bel tab], *[tt]	'beautiful table'
	/drol de/	→	[drol de], *[dd]	'funny (of)'

Based on these facts, I conclude that an analysis that recognizes the interaction between phonological and morphosyntactic constituents is necessary for a comprehensive account of AWRA in Picard. An analysis that does not refer to prosodic and/or morphosyntactic domains predicts the illicit forms in (4). For the analysis of other domain-sensitive phenomena in Picard, Cardoso (1998a, 1998b) and Steele and Auger (1999) adopted the framework of Prosodic Phonology (see Hayes, 1989; Nespor & Vogel, 1986; Selkirk, 1978, 1981, 1984a), a theory of domains or prosodic structure and their (direct or indirect) relations to morphology and syntax. According to the framework, the mental representation of segmental string is divided into a hierarchically arranged set of chunks—prosodic domains (e.g., syllable, foot, Prosodic Word, Phonological Phrase, etc.)—that constitute the locus of phonological phenomena. For the analysis of the domain of AWRA in Picard, Cardoso (1998a, 1998b) argued that the patterns found in sequences consisting of /l/-clitic and lexical word are governed by the prosodic status that each word assumes in the grammar. More specifically, he argued that AWRA applies exclusively at the domain juncture of an unstressed syllable (σ) (/l/-clitic) and the following Prosodic Word (PWd) (lexical word) within the domain of the Phonological Phrase (PPh), as illustrated in (5) (irrelevant structure omitted). I assume, therefore, that the analysis that I present for AWRA exclusively involves this exact prosodic configuration (see Cardoso, 1998b, for a comprehensive investigation of the domain of AWRA application in Picard).

(5) The prosodic domain of AWRA in Picard (Cardoso, 1998b)



I am aware that, considering the morphosyntactic context in which AWRA operates, other frameworks that handle domain-driven phenomena would also be able to delimit the domain of AWRA application. As an anonymous reviewer pointed out, for instance, the domain of AWRA can be easily determined within the framework of Lexical Phonology, given that the process seems to be plainly morphological and even bears a resemblance to Level 1 nasal regressive assimilation in English (e.g., in + legible → illegible). Unlike AWRA, however, nasal assimilation does not apply in cliticization and exclusively operates within a particular class of prefixes (Class 1 affixes) (see Kiparsky, 1982; Mohanan, 1982; Nespor & Vogel, 1986). It is beyond the scope of this investigation to provide an argumentation in favor of Prosodic Phonology over other theories of domains. For a com-

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prehensive discussion of the different approaches to the analysis of domain-related phenomena, see Nespor and Vogel (1986).

The description of the data in (2) through (4) only partly covers the complexity of AWRA. Contrary to what is implied by the forms shown in (2), AWRA does not apply categorically at the domain juncture of an /l/-clitic and a following consonant-initial lexical word.[6] In this context, three distinct patterns can be found: faithfulness of input /l/ (/l/-preservation) (6a); AWRA (6b); and /l/-deletion (6c):

(6) Variants of AWRA

a. /l/-preservation:	/ʃol kurɛ/	→	[ʃol kurɛ]	'the/this pork paté'
	/dol tart/	→	[dol tart]	'some pie'
b. AWRA:	/ʃol kurɛ/	→	[ʃok kurɛ]	
	/dol tart/	→	[dot tart]	
c. /l/-deletion:	/ʃol kurɛ/	→	[ʃo kurɛ]	
	/dol tart/	→	[do tart]	

In the subsequent sections, I propose a formal account for the variation illustrated here within the framework of OT.

OT AND VARIATION

OT offers the necessary tools for analyzing patterns of variation. First, the framework allows for multiple outputs within a single grammar through crucial nonranking or variable ranking of constraints (see Anttila, 1997; Reynolds, 1994). Second, an OT analysis is able to account for the distinction between a categorical (crucially ranked) and a variable (crucially nonranked or variably ranked) grammar; the distinction is in the form of the grammar. Finally, the framework allows for quantitative predictions to be directly encoded in the grammar via the unranking of constraints. A rule-based approach, on the other hand, does not provide the aforementioned advantages: it merely describes the phenomenon and the environments that favor the rule, without giving rise to explicit quantitative predictions. Besides, a rule-based approach as originally proposed by Labov (1969) does not allow for the possibility of more than two variants or outputs without the postulation of more than one rule. In the case of AWRA in Picard, two rules would be required to describe the process, namely, /l/ → C (AWRA) and /l/ → ∅ (/l/-deletion), each followed by the respective linguistic and/or extralinguistic environments that favor the application of AWRA.

OT is a theory of constraint interaction according to which a grammar consists of a set of universal constraints (CON) that form part of Universal Grammar. Two important premises of OT are violability (constraints are violable, and violation of low-ranked constraints occurs in order to satisfy higher ranked ones) and ranking (constraints are ranked on a language-particular basis, and the notion of minimal violation is thus defined in terms of a language-specific ranking). Accordingly, while all constraints are present in the grammars of all languages, crosslinguistic variation can be accounted for by variation in language-specific constraint rank-

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ings. Constraints are primarily of two types: faithfulness constraints, those that demand a match between the input underlying representation (UR) and the output surface representation (e.g., Max-IO, according to which every segment in the input has a correspondent in the output), and markedness constraints, those that demand structurally well-formed outputs (e.g., NoCoda, according to which codas are not allowed). In my analysis, I adopt the Correspondence Theory version of OT (McCarthy & Prince, 1995), where faithfulness constraints are expressed in terms of the identity relation between input and output, in contrast to the containment-based OT of Prince and Smolensky (1993) and McCarthy and Prince (1993a, 1993b), where all constraints are stated on outputs. This way, each candidate comes from GEN (the function *generator*) with a correspondence relation that holds between the elements of the input and those of the output, and evaluation is performed in parallel on the whole candidate set. The candidate that best satisfies the constraint hierarchy of the language emerges as the optimal form.

In the context of constraint ranking in OT, there could exist a situation in which a constraint set imposes noncrucial dominance (nonranking) of its components (Prince & Smolensky, 1993:51): "It is entirely conceivable that the grammar should recognize nonranking of pairs of constraints." According to Reynolds (1994) and Anttila (1997), this scenario characterizes the phenomenon called variation, in which two or more constraints remain unranked in the grammar. As I discuss later, when a set of constraints in a given grammar is unable to yield categorically one of two or more rankings allowed by that constraint set, the result is the possibility of two or more forms or outputs in that grammar—that is, variation.

DATA COLLECTION AND QUANTITATIVE RESULTS

In this section, I discuss the data collection procedures and the linguistic and extralinguistic variables that I employed in the study, followed by a brief discussion of the quantitative VARBRUL (Pintzuk, 1988) results for each variable investigated.

The study consisted of 2,783 tokens of variants of AWRA collected in the field by Julie Auger for the Picard project during the summers of 1996 and 1997, transcribed by four research assistants (including me), and later rechecked for consistency.[7] The data were analyzed using VARBRUL, employing six independent variables: three extralinguistic factor groups—level of formality, speaker, and geographic location—and three linguistic factor groups—status of the /l/-clitic, place of articulation of following consonant, and manner of articulation of following consonant.

The subjects were nine male adult native speakers of Picard, with an average age of more than 70 years, who were residents of five villages in the Picardie region in northern France: Feuquières, Fressenneville, Bienfay, Bouillancourt, and Nibas. Women and younger speakers were not included in the investigation because the vast majority of native speakers of Picard who still use the language

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routinely are older men. Languages such as Picard that die out gradually through the progressive failure of intergeneration transmission usually retreat in the final generations to a few spheres of use: they persist in domestic settings among the older (usually male) generation, and they are used for casual interaction among contemporaries who were schoolmates or coworkers in their younger years (see Dorian, 1977; Dressler, 1972, 1988; Dressler & Wodak-Leodolter, 1977).

In order to collect tokens from a wide range of stylistic levels, the data collection methodology used in this study provides a three-level distinction in a formality hierarchy: informal interview, formal interview, and collection of written documents.

The informal interview consisted of tape-recorded conversations between the field worker and the interviewee or between the interviewee and other native speakers of Picard. To avoid more careful (or less informal) speech produced as a result of observation, the first 10 to 15 minutes of each conversation was ignored, and whenever possible preference was given to data from conversations involving only speakers of Picard. Also, tokens contained in discussions about topics liable to elicit more formal speech or code-switching (e.g., politics, history, professional and educational activities) were excluded from the analysis.

The formal interview consisted of a tape-recorded translation task in which the subjects were asked to translate orally French sentences (designed for the purpose of this study) into Picard. The only way to elicit more formal oral data was through the translation task because Picard, as a dying (or recessive) language, is characterized by monostylism. As has been attested in the sociolinguistic literature (see, e.g., Dorian, 1977; Dressler, 1972, 1988; Dressler & Wodak-Leodolter, 1977), languages in the process of decay are mostly used in a single formality style (either in a casual style or in religious contexts such as church services or scripture readings). In the case of Picard, its use is limited to more casual styles, such as for routine topics in oral situations and for intimate interaction with close friends and at home.

The collection of written documents consisted of the selection of written documents from at least one speaker from each region investigated. These documents were extracted from articles from the Picard magazine *Ch'Lanchron*, books (including compilations), and unpublished material (including short stories, articles, and a few private letters).

The transcription of the data was not an uncomplicated task because of intense bilingualism involving French and Picard in the communities investigated and high levels of code-switching, an inevitable consequence of an environment of bilingualism (Hudson, 1996).[8] The distribution of subjects according to age and geographic location and the level of formality from which the data were elicited is illustrated in Table 1.[9]

Finally, the three linguistic factor groups were examined. Status of the /l/-clitic was selected based on Debrie's (1981) description and my initial observation that AWRA does not apply in an identical fashion across the repertoire of /l/-clitics. While the typically Picard forms /ʃol/ and /dol/ are more likely to assimilate, the determiner /el/ and pronoun /el/ are more likely to surface as

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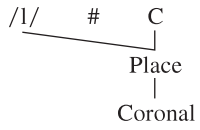
TABLE 1. *Distribution of subjects according to age, location, and level of formality*

Speaker	Age	Geographic Location	Level of Formality		
			Informal	Formal	Written
Speaker 1	60s	Feuquières	n/a	✓	✓
Speaker 2	70s	Feuquières	✓	✓	n/a
Speaker 3	60s	Fressenneville	✓	n/a	n/a
Speaker 4	84	Fressenneville	n/a	✓	✓
Speaker 5	60s	Bienfay	✓	✓	✓
Speaker 6	84	Bouillancourt	✓	✓	✓
Speaker 7	37	Nibas	✓	✓	✓
Speaker 8	80s	Nibas	✓	n/a	n/a
Speaker 9	—	Nibas	n/a	n/a	✓

faithful to the input, with /l/ preserved. The factors included in this group were determiner /ʃol/, preposition /dol/, subject pronoun /al/, preposition /al/, pronoun /el/, and determiner /el/.

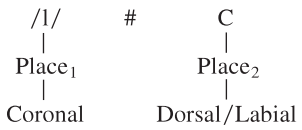
Place of articulation of following consonant was included in this investigation based on the hypothesis that the place of articulation of the following lexical word's initial segment might have an effect on the outcome of AWRA. As has been well documented in the literature on syllable structure, heterosyllabic coda–onset restrictions are sensitive to place (e.g., where the coda /l/ licenses its own place vs. where place is shared with the following onset consonant) (see Clements, 1990; Itô, 1986, 1989; Prince, 1985; Rice, 1992; Yip, 1991). Since the clitic-final consonant /l/ is coronal, /l/-preservation might be more likely if the following consonant is also coronal (/t, s, l, n/, etc.), in which case both the coda and the onset would share the same place of articulation (see (7a)). This is in contrast to cases where the coda is followed by a noncoronal segment (i.e., a labial, e.g., /f, v, m/, or a dorsal, e.g., /k, g/). In the latter case, assimilation or /l/-deletion might be more likely to occur because otherwise the coda would be required to license its own place (see (7b)).

(7) a. /l/-preservation expected



E.g., /ʃol tab/ → [ʃol_tab]

b. AWRA or /l/-deletion expected



E.g., /ʃol fɛt/ → [ʃof_fɛt] or [ʃo_fɛt]

The factors included in this group were labial, coronal, and dorsal.

Manner of articulation of following consonant was selected based on the cross-linguistic observation that heterosyllabic coda–onset restrictions are sonority-driven (i.e., onsets must be less sonorous than codas) (Clements, 1990; Hooper,

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1972; Murray & Vennemann, 1983; Rice, 1992). The prediction for Picard is that the AWRA and /l/-deletion variants would be used to repair a relatively bad sonority profile (e.g., while an /l p/ coda–onset sequence might be preserved, an /l m/ sequence might surface as [mm] or [m]). As illustrated in the sonority hierarchy in (8), the nasal /m/ is closer in sonority to the clitic-final liquid /l/ than the obstruent /p/ is. In other words, in Picard, obstruents such as /p/ might be better onsets for preceding codas than sonorants such as /m/.

(8) Sonority scale (e.g., Clements, 1990)

vowels > glides > liquids > nasals > obstruents
/l/ /m/ /p/

Based on this sonority scale, the factors included in this group were glide, liquid, nasal, fricative, and other obstruent (i.e., stops and affricates).

Quantitative analysis: Results and discussion

I now present the results of a trinomial VARBRUL analysis of the AWRA data. Because there were three variants involved in the process (i.e., /l/-deletion, AWRA, and /l/-preservation), the factor weight of .33 was established as the cut-off point above which a factor was said to favor the occurrence of each variant (cf. Major, 1996; Preston, 1996). VARBRUL's probabilistic results indicate that the external variables, level of formality, speaker, and geographic location, as well as the internal variable, status of the /l/-clitic, were significant factor groups. On the other hand, the internal variables, place of articulation of following consonant and manner of articulation of following consonant, played no major role in the selection of the three variants, even with additional factor recodings. Because of persistent knockouts towards /l/-faithfulness (categorical), the pronoun /el/ and determiner /el/ were excluded from subsequent runs. Speaker 9 was also eliminated from further analysis because of his near-categorical use of AWRA (98%). In what follows, I briefly discuss the results obtained for the linguistic and extralinguistic factors involved in the investigation of AWRA. An analysis of these results within the framework of OT is provided later on.

Linguistic factors. The first factor, /l/-clitic status, displays a pattern in which the determiner /el/ and pronoun /el/ present no significant variation and /l/-preservation is categorically observed. Because of their near-categorical behavior, the results of the analyses in which they are included can only be given in percentages. Figure 1 illustrates the overall pattern detected in the first VARBRUL analysis of the six items included in this factor group. Three distinct patterns are observable concerning the behavior of /l/-clitics. First, as mentioned earlier, in the context of the pronoun /el/ and determiner /el/ clitic, /l/-preservation is nearly categorical (98% and 99%, respectively), there are few tokens with AWRA (2% and 1%), and /l/-deletion is categorically absent (0% in both cases). Second, in the context of the pronoun /al/ and preposition /al/, there are higher percentages of /l/-preservation (44% and 42%, respectively) and /l/-deletion

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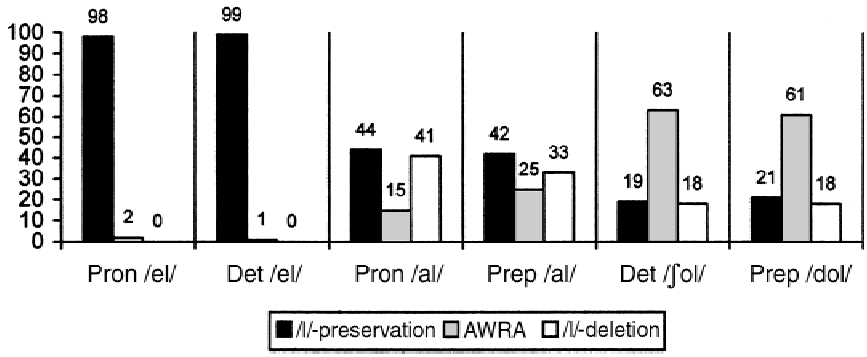


FIGURE 1. Status of the /l/-clitic (in percent).

(41% and 33%) and a lower tendency toward the AWRA variant (15% and 25%). Third, the determiner /ʃol/ as well as preposition /dol/ display a pattern in which AWRA is frequent (63% and 61%, respectively), and /l/-preservation (19% and 21%) and /l/-deletion (18% and 18%) are relatively equally distributed.

Because of the categorical results for /el/, these clitics were excluded from further VARBRUL runs. The probabilities resulting from the final reanalysis (third run)[10] for this factor group are shown in Table 2. While the AWRA variant is favored by both the determiner /ʃol/ and preposition /dol/, the pronoun /al/ and preposition /al/ favor /l/-preservation and /l/-deletion.[11] In order to account for the three distinct patterns observed in /l/-clitics (see Figure 1), I opt for lexically specific constraints (rather than distinct constraint rankings), which interact within a single grammar to yield the results illustrated here. This is discussed in more detail later.

The numerical results achieved for the second factor, place of articulation of following consonant, were not consistent with my initial hypothesis, since neither the factor group nor any of the factors was selected as significant. As Table 3 shows, according to the nature of the following consonant's place of articulation, all three variants of AWRA are likely to occur.

The third factor, manner of articulation of following consonant, was also selected as nonsignificant by VARBRUL, as shown in Table 4. Based on the values assigned to each factor, manner of articulation of the following consonant does not affect the variants involved in AWRA, because the likelihood that each factor will interfere in the process is relatively equal. Again, my initial hypothesis that the assimilation phenomenon could be driven by sonority was not confirmed.

An explanation for the fact that segmental properties (i.e., place and manner of articulation) do not seem to affect the outcome of AWRA may lie in the prosodicization of the elements involved in the process. Most research on sonority/place profile has focused on coda–onset sequences internal to the Prosodic Word (i.e., involving roots and affixes). As was shown in (5), AWRA is sensitive only

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TABLE 2. *Effect of grammatical status of /l/-clitics (after reanalysis)*

Clitic Status	/l/-preservation	AWRA	/l/-deletion
Det. /ʃol/	.19	.58	.23
Prep. /dol/	.22	.55	.22
Pron. /al/	.45	.13	.42
Prep. /al/	.42	.20	.39

TABLE 3. *Effect of place of articulation*

	/l/-preservation	AWRA	/l/-deletion
Labial	.38	.35	.33
Coronal	.32	.33	.35
Dorsal	.34	.34	.32

TABLE 4. *Effect of manner of articulation*

	/l/-preservation	AWRA	/l/-deletion
Glide	.35	.32	.33
Liquid	.34	.35	.31
Nasal	.30	.32	.38
Fricative	.34	.33	.33
Other obstruent	.34	.35	.31

to the Phonological Phrase domain, at the juncture of a clitic and a following Prosodic Word. Because the consonant-initial lexical word prosodicizes as a Prosodic Word, the 1-C sequence is not contained within this domain. Following the rationale developed so far and the evidence from AWRA, it seems reasonable to suppose that constraints that apply within the Prosodic Word may not have the same strength in other higher prosodic domains. I return to this issue later.

Extralinguistic factors. The first factor, level of formality, exhibited a significant effect on AWRA, as shown in Table 5. The three variants of AWRA did not behave similarly in the three stylistic levels as the differences in the trends of variation suggest: while the informal environment favors less faithful forms (AWRA and /l/-deletion), a more formal environment favors a more faithful output (/l/-preservation and AWRA).[12] Contrary to my expectations, the written style favors both the most faithful (/l/-preservation) and the least faithful (/l/-deletion) of the three variants, which seems to constitute a coun-

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TABLE 5. *Effect of level of formality*

	/l/-preservation	AWRA	/l/-deletion
Written	.38	.23	.39
Formal	.41	.36	.23
Informal	.22	.40	.38

terexample to van Oostendorp's (1997:209) proposal that "[t]he more formal the style level, the higher ranked the faithfulness constraints." In addition, the less faithful AWRA variant is unexpectedly favored in both the formal (.36) and informal (.40) styles. That AWRA is favored in an informal stylistic environment is not surprising; what is surprising, however, is the relative high probability of AWRA in more formal stylistic contexts.

A viable explanation for the unexpected likelihood of AWRA in more formal environments is that AWRA functions as a group identity marker for Vimeu Picard. Because of the current revival of Picard in the region of Vimeu and the upwardly mobile social status it is assuming in a community in which French prevails, some characteristically Picard forms are sometimes overused, and thus the selection of the AWRA variant may constitute a form of expression of solidarity and a marker of group identity. This was the case for Speaker 7, for instance, who curiously produced a higher percentage of AWRA in formal situations (67% AWRA, 19% /l/-deletion, 14% /l/-preservation) and a lower percentage of AWRA in informal situations (26% AWRA, 41% /l/-deletion, 33% /l/-preservation). As for the written style, the result may reflect the fact that, unlike the oral data, the written corpus derives from written documents that span a period of approximately 30 years and, moreover, includes formal as well as informal documentation. Because of the unreliable results achieved for the written texts, I exclude this stylistic factor from the OT analysis. Nevertheless, the issue requires further investigation.

Focusing on the formal and informal styles separately (and excluding the written style and the variant AWRA), /l/-preservation and /l/-deletion exhibit opposite trends: while /l/-preservation increases as the context becomes more formal, /l/-deletion decreases in the same context, as shown in Figure 2. As I discuss later, this scenario suggests the existence of different (stylistic) grammars for AWRA. The allegation that stylistic levels constitute separate grammars is not an original claim; as Oostendorp (1997) pointed out, generative phonologists have traditionally taken recourse to the notion "style level" or "register" as separate grammars (Selkirk, 1972).

The second factor, speaker, was selected as significant by VARBRUL. Due to the categorical absence of /l/-preservation in the speech of Speaker 9 (0% /l/-preservation, 98% AWRA, 2% /l/-deletion), he was excluded from further probabilistic analyses. The results involving the remaining eight speakers are shown in Table 6. Two distinct patterns can be observed: one in which all three variants are relatively equally distributed (Speakers 1 through 6), and another pattern in

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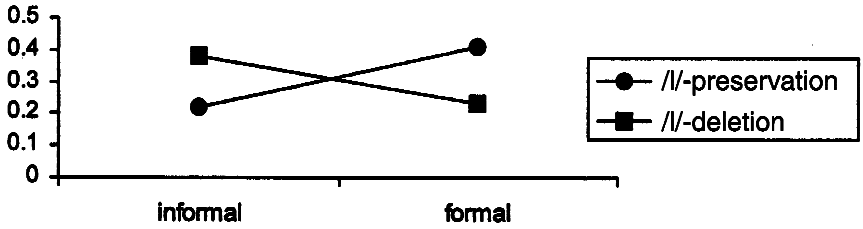


FIGURE 2. Formal and informal styles.

TABLE 6. *Probabilities in the speech of eight speakers*

Speakers	/l/-preservation	AWRA	/l/-deletion
Speaker 1	.35	.31	.34
Speaker 2	.35	.31	.34
Speaker 3	.30	.30	.40
Speaker 4	.32	.28	.40
Speaker 5	.36	.26	.37
Speaker 6	.34	.30	.36
Speaker 7	.30	.45	.25
Speaker 8	.31	.48	.21

which AWRA is favored over both /l/-preservation and /l/-deletion (Speakers 7 and 8).

Because of the relevance of this factor, the third factor, geographic location, should as well constitute a major effect in determining the variants of AWRA, for one factor inherently includes the other. The results for geographic location are shown in Table 7. In the village of Nibas, the AWRA variant is more likely to appear (.48), while the two other variants are equally distributed (and equally disfavored). In the other villages, on the other hand, each variant is relatively equally expected to occur (average around .33). This pattern agrees with the facts found in the speaker factor group: recall from Table 1 that Speakers 7 and 8 are from Nibas, while the other speakers are from different locations. For ease of exposition, I therefore divide the geographic location factor group into two major categories: Nibas and other (including all the remaining villages). The resulting probabilities are shown in Figure 3.

It might be argued that the variation patterns seen in the speaker factor group merely demonstrate intraspeaker variation, especially in the context of a limited number of tokens and subjects. A brief look at previous studies on regressive assimilation in Picard leads me to conclude that, even though intraspeaker variation is the most logical alternative for describing AWRA in the language, more needs to be said about the effect of geographic variation as a determining factor

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TABLE 7. *Probabilities in five geographic locations*

Village	/l/-preservation	AWRA	/l/-deletion
Nibas	.28	.48	.24
Feuquières	.31	.30	.39
Fressenneville	.38	.29	.32
Bienfay	.30	.32	.38
Bouillancourt	.38	.30	.32

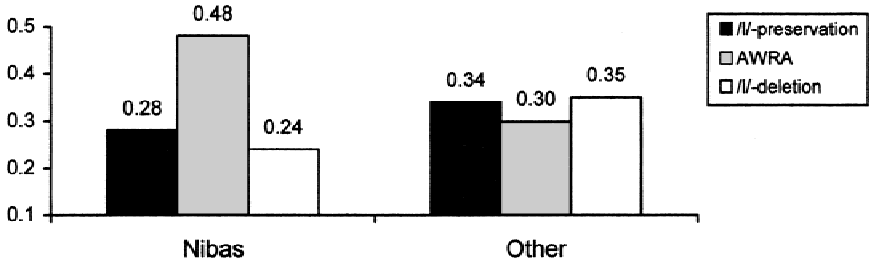


FIGURE 3. AWRA and geographic location.

in the results observed here. According to Vasseur (1963, 1996), regressive assimilation applies always and without exception in the region of Nibas. He acknowledged that assimilation occurs in other regions, but to a lesser extent and sometimes only involving the determiner /ʃol/. Likewise, Debrie (1981:455) observed that regressive assimilation "is concentrated to its maximum intensity in Nibas and in other neighboring villages: 65 [Arrest], 66 [Mons], 86 [Franleu], 87 [Quesnoy] and 122 [Toeufles]" (see Figure 4). Our results display a relatively similar pattern: of the five villages included in this investigation, it is in Nibas that the AWRA variant is most likely to appear. In Figure 4 (adapted from Dubois, 1957), I show the geographic location of the five villages in the region of Vimeu. The numbers that relate to the villages investigated are circled: 84 = Nibas; 105 = Bienfay (which belongs to the commune of Moyenneville); 118 = Fressenneville; 119 = Fequières; and 162 = Bouillancourt. The straight line on the map indicates an isogloss-like geographical boundary between two probable dialects: one in which AWRA is highly favored (represented by the region of Nibas), and one in which the three variants are equally likely to appear (represented by the other villages).

Because the results for both factors, speaker and geographic location, along with the preceding discussion seem to indicate that the influencing factor in the variation pattern involving these two groups is the latter, the variation analysis that I present is based on the results shown in Figure 3. As is the case in traditional

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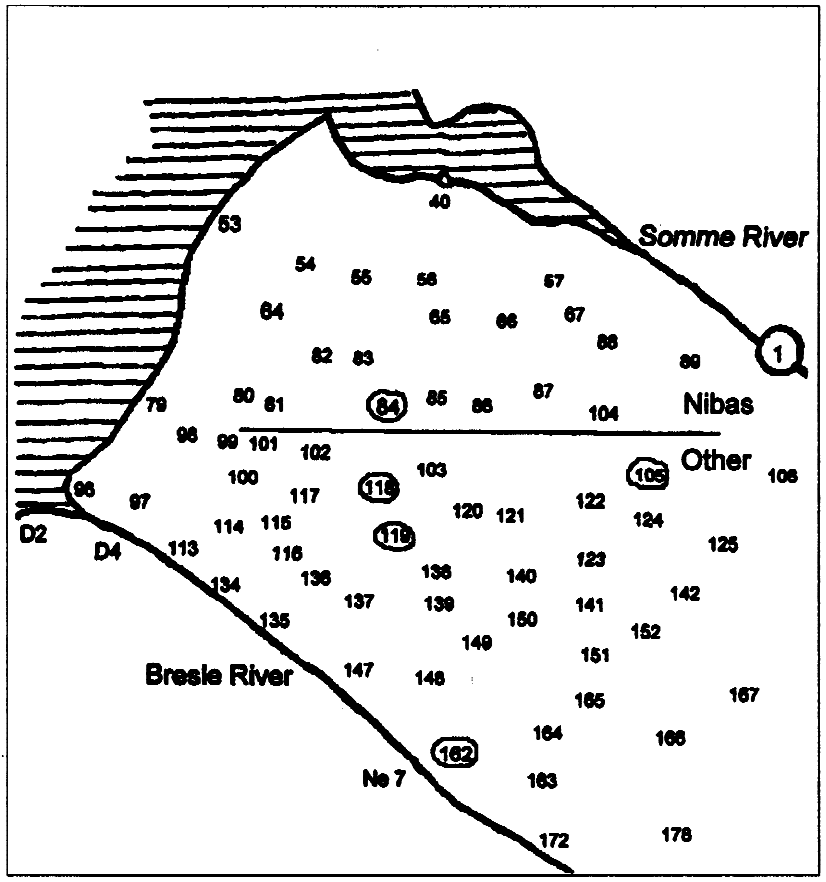


FIGURE 4. Five villages in Vimeu (Picardie).

phonology (e.g., three Serbo-Croatian dialects analyzed in Selkirk [1997] equal three different grammars in the language), I argue that there are two dialectal grammars involved in the two sets of villages (Nibas vs. the others).

In order to account for the variation patterns, the analysis to be proposed employs the following theoretical tools: floating (or nonranked) constraints, for cases in which variation involves a single specific speech community or register (e.g., the variation patterns in Nibas, where AWRA is more likely to occur vs. the other two variants), and different grammars, for cases in which variation is determined by what is usually referred to as dialectal difference (e.g., the variation involving Nibas vs. the other villages and the patterns found in the formal and informal registers). Finally, for an account of the idiosyncrasies involving the three sets of clitics included in the investigation, I adopt morpheme-specific constraints (see, e.g., McCarthy & Prince, 1993b; Pater, 1996; Urbanczyk, 1999).

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OT ANALYSIS

Constraints and the domain-specific constraint approach

In this section, I propose an OT analysis to account for the variation patterns found in AWRA. Recall from (6) that the AWRA phenomenon displays the following three variants: /l/-preservation (e.g., /ʃol kurɛ/ → [ʃol kurɛ] 'the pork paté'); AWRA (e.g., /ʃol kurɛ/ → [ʃok kurɛ]); and /l/-deletion (e.g., /ʃol kurɛ/ → [ʃo kurɛ]).

In order to account for this variation pattern, I propose an analysis within the theoretical framework of OT, as previously discussed. In (9), I give the constraints that I use in the analysis.[13]

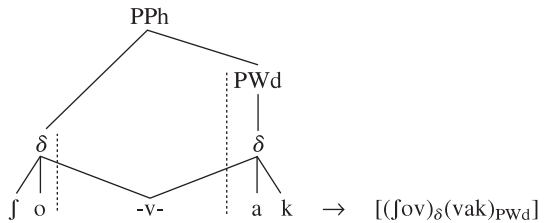
(9) Constraint definitions

Max-IO:	(No Deletion) Every segment of S_1 has a correspondent in S_2 (McCarthy & Prince, 1995)
CrispEdge:	(No Multiple Linking) Multiple linking between prosodic categories is prohibited (Itô & Mester, 1999)
NoCoda-Rt:	A coda cannot license a Root node (adapted from Prince & Smolensky, 1993)

Max-IO is a family of constraints that militates against deletion. It ensures that every segment of the input (S_1) has a corresponding segment in the output (S_2). In cases of /l/-deletion, illustrated in (6c), the optimal candidate violates Max-IO because the input segment /l/ is not present in the output form: /ʃol vak/ → [ʃo vak] 'the cow'.

As proposed by Itô and Mester (1999), CrispEdge is the family of constraints that rules out multiple linking of segmental content across the edges of prosodic categories. In the specific case of AWRA in Picard, the multiple linking between the unstressed syllable (the clitic) and the following Prosodic Word (the lexical word) violates CrispEdge, as shown in (10) (only relevant structure is provided).[14]

(10) Violation of CrispEdge (the AWRA variant)



Finally, the NoCoda-Rt constraint expresses the crosslinguistic observation about syllabic well-formedness that coda segments are marked. As originally proposed by Prince and Smolensky (1993) (syllables do not have codas), the general version of the constraint is inadequate to account for the behavior of coda consonants crosslinguistically, since languages impose different types of restric-

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tions on codas (see Benua, 1995; Kawasaki, 1998; Lombardi, 1995; McCarthy & Prince, 1993b). Observe that NoCoda-Rt is formulated in terms of licensing; therefore, a syllable-final consonant can only surface without incurring a violation of this constraint if it is licensed by a following Root node. In languages in which NoCoda-Rt (and Max-IO, to avoid consonant deletion) are highly ranked, one of the strategies for recovering an otherwise illicit coda in the surface representation is its assimilation to the following consonant: that is, gemination. In the cases of /l/-preservation illustrated in (6a), the output forms violate NoCoda-Rt because the coda /l/ bears and therefore licenses its own Root node (/ʃol vak/ → [ʃol̲ vak]). In cases of assimilation (AWRA), however, NoCoda-Rt is not violated because the assimilated coda's segmental content (Root node) is licensed by the initial onset consonant of the following word (/ʃol vak/ → [ʃov$_i$ v$_i$ak]). This is shown in (11), using standard onset–rhyme theory (segments stand for Root nodes).

(11) a. Violation of NoCoda-Rt b. Satisfaction of NoCoda-Rt



As may have been noticed from the data provided throughout this investigation, the constraints Max-IO, CrispEdge, and NoCoda-Rt do not have the same effect in prosodic (or morphosyntactic) domains distinct from the one argued to be relevant for AWRA. The NoCoda-Rt constraint, for instance, does not seem to be highly ranked internal to the Prosodic Word, as illustrated in (12).

(12) The NoCoda-Rt constraint within the PWd domain in Picard

a. Root-internal

[bel . ʒik]$_{PWd}$	*[beʒ . ʒik]	'Belgium'
[kal . fa]$_{PWd}$	*[kaf . fa]	'caulker'

b. Prefixation (prefix + root)

[mal . po . li]$_{PWd}$	*[map . po . li]	'impolite'
[mal . ʃãs]$_{PWd}$	*[maʃ . ʃãs]	'bad luck'

Only between an /l/-clitic and the following lexical word (or at the juncture of an unstressed syllable and the following Prosodic Word, within the Phonological Phrase) does the NoCoda-Rt constraint become relevant. This behavior found with clitics in Picard agrees with a variety of studies that demonstrate that clitics behave in a peculiar way with respect to phonological processes. As Zwicky (1977:1) pointed out, clitics are "morphemes that present analytic difficulty because they are neither clearly independent words nor clearly affixes." Due to their hybrid nature, the hypothesis that there exist constraints (e.g., on syllabification) that are exclusively pertinent to this category of words is not surprising.

The claim that some constraints have a stronger effect in a larger domain than in a smaller one or vice versa is not an original claim (Booij, 1988; Buckley, 1996a,

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1996b; Cardoso, 1998a, 1998b, 1998c; Chomsky & Halle, 1968; Condoravdi, 1990; Hayes, 1989, 1990; Hyman, Katamba, & Walusimbi, 1987; McCarthy & Prince, 1995; Mohanan, 1993; Nespor & Vogel, 1986; Pater, 1996; Peperkamp, 1997; Pulleyblank, 1997; Selkirk, 1972, 1978, 1981, 1984a, 1984b, 1997). Within the OT approach to prosodic phonology that I adopt in this study, there are at least three possibilities for dealing with such domain-specific phenomena.

First, there is the cophonology (or reranking of constraints) approach, proposed by Itô and Mester (1995), for whom lexicon-internal variation is an effect of reranking of Faithfulness constraints. In order to account for the irregularities found in domain-specific phenomena, the cophonology approach conjectures that each morphological or prosodic constituent or even a class of specific morphemes may constitute a cophonology or subgrammar that coexists with other cophonologies in a single language.

The constraint domains approach, proposed by Buckley (1995a, 1995b, 1996a, 1996b) in light of the works of Inkelas (1989), Cole and Coleman (1992), Kisseberth (1994), and Cole and Kisseberth (1994), presupposes the existence of different constraint rankings (different grammars) for specific substrings of surface representation.[15] According to Buckley, domains are a viable reinterpretation of levels posited in Lexical Phonology without the disadvantage of stepwise derivations and the complications created by intermediate levels. In his view, levels are created not with intermediate stages, but with the delimitation of substrings of morphosyntactic (or prosodic) surface representation, which are then subjected to different constraint rankings. Applying these two views to the investigation of AWRA would require that the constraints Max-IO, CrispEdge, and NoCoda-Rt and their proposed ranking hold only within the domain argued for the particular process (here, at the juncture of an unstressed syllable and a Prosodic Word, within the Phonological Phrase), and that other rankings (or grammars) would therefore be necessary for different prosodic domains.

The third approach to domain-sensitive phenomena involves domain-sensitive constraints (McCarthy & Prince, 1993b; Pater, 1996). This constitutes a more constrained approach because it restricts the number of grammars (cophonologies or constraint domains) allowed in a given language. Instead of the assignment of different grammars for specific prosodic domains or classes of specific morphemes, constraints are decomposed into distinct domain-specific or morpheme-specific constraints, each having a different hierarchical status within a single grammar. In the first two approaches, both grammars and constraints are allowed to proliferate, the former as a consequence of the cophonology or constraint domains approaches, and the latter because the decomposition of apparently monolithic constraints has been argued to be indispensable in several studies regardless of the approach adopted for dealing with domain-driven variation and morpheme-specific phenomena: for instance, the decomposition of Faithfulness constraints (Benua, 1995; Buckley, 1996a, 1996b; Casali, 1996, 1997; Inkelas, Orgun, & Zoll, 2000; Lubowicz, 1997; McCarthy & Prince, 1995, 1999; Pater, 1999; Peperkamp, 1997; Plag, 1999; Urbanczyk, 1997); the decomposition of the Strict Layer Hypothesis (van der Leeuw; Peperkamp, 1997; Selkirk, 1997); the

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TABLEAU 1. *A hypothetical Picard grammar*

		NoCoda-Rt$_{\Phi}$	Max-IO	NoCoda-Rt
Cliticization: /l/-deletion				
/ʃol fɛt/	☞ (a) (ʃo fɛ)$_{\Phi}$		*	*
	(b) (ʃol fɛt)$_{\Phi}$	*!		**
Prefixation: /l/-preservation				
/mal ʃãs/	(c) (ma ʃãs)$_{PWd}$		*!	*
	☞ (d) (mal ʃãs)$_{PWd}$			**

decomposition of NoCoda (Kawasaki, 1998); the decomposition of OCP (Anttila, 1997; Buckley, 1997; Plénat, 1996); and morpheme-specific alignment constraint (Align-*um* in Tagalog in McCarthy & Prince, 1993b; Align-Plural{s} in Russell, 1997). I adopt this approach not only because it is more constrained and convenient for analyzing domain-related and morpheme-specific phenomena, but also because it harmonizes with my analysis of variation, which postulates the existence of a single grammar to account for variable outputs within a speech community. As a result, domain-driven variation and morpheme-specific phenomena within a single speech community or style should now be considered as a direct outcome of the approach and not as the result of different grammars or reranking of constraints.

As a consequence of this approach, the three constraints in (9) bear a specification for the domain in which they are relevant. For AWRA, this is the Phonological Phrase, at the domain juncture of an unstressed syllable and the following Prosodic Word. I represent this domain juncture as Φ, and each constraint will be labeled as Max-IO$_{\Phi}$, CrispEdge$_{\Phi}$, and NoCoda-Rt$_{\Phi}$, indicating that these constraints are sensitive to the Phonological Phrase domain. In the tableaux to follow, I illustrate how these constraints interact with other non domain-specific constraints. Suppose that, in a given Picard grammar, the hypothetical ranking NoCoda-Rt$_{\Phi}$ ≫ Max-IO ≫ NoCoda-Rt is responsible for the categorical selection of the outputs /l/-deletion in cliticization and /l/-preservation in prefixation, as in Tableau 1. Notice that, in cliticization, the winning candidate (a) does not violate NoCoda-Rt$_{\Phi}$ because the only coda present in this form ([t]) is outside the scope of the constraint (the domain juncture Φ). The candidate does, however, violate the lower-ranked general NoCoda-Rt constraint due to the licensing of /t/ as a coda. A violation of the domain-sensitive NoCoda-Rt$_{\Phi}$ is shown in the nonoptimal candidate (b). In prefixation, the winning candidate (d) does not incur in violation of NoCoda-Rt$_{\Phi}$ because the prosodization of prefix plus root sequences—((pref)$_{\sigma}$ (root)$_{PWd}$)$_{PWd}$ (see Cardoso, 1998a, 1998b)—does not constitute the domain in which this domain-sensitive constraint operates. Notice, however, that candidate (d) incurs two violations of the general NoCoda-Rt constraint because

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of the licensing of the two codas [l] and [s]. Nevertheless, it is selected as optimal over candidate (c) because deletion of coda [l] in (c) violates the more highly ranked constraint Max-IO.

For simplicity, I refer to the distinction between the general constraints (e.g., NoCoda-Rt) and the domain-specific constraints (e.g., NoCoda-Rt_{Φ}) only when they become relevant to the analysis.

The categorical results

In this section, I provide analyses for the categorical results obtained for the clitic /el/ and for Speaker 9. As discussed earlier, the clitic (determiner and pronoun) /el/ presented nearly categorical /l/-preservation (99%), while Speaker 9 produced AWRA nearly categorically (98%).

Determiner /el/ and pronoun /el/. The categorical results obtained for the clitic /el/ (group [el] henceforth) (99% /l/-preservation, 0% /l/-deletion, 2% AWRA) suggest one or both of the following. Due to the striking similarity between the Picard form /el/ and the French equivalent /lə/ (especially in cases of vocalic hiatus), speakers might code-switch to the French grammar in which AWRA and /l/-deletion (in the determiner and pronoun /lə/) do not occur and the French form surfaces. Alternatively, speakers might represent the clitic /el/ as not containing the underlying vowel /e/. Julie Auger (personal communication) pointed out the possibility that the underlying form for such clitics could be /l/, and [e] would be epenthesized in order to correct an unsyllabifiable consonant cluster (e.g., /pur l fwɛr/ → [pur e̲l fwɛr] vs. *[purl.fwɛr] 'to do it').

The possibility that the clitic /el/ is underlyingly a single segment /l/ is able to account for why /l/-deletion never appears in the results. If /l/ is the only segment, its deletion leaves no remaining segmental trace of the clitic. Its presence, therefore, must be forced by a functional constraint that requires that monosegmental morphemes be preserved in the output.[16] The constraint Max-Ms, given in (13), requires the preservation of features in monosegmental morphemes. Assuming that this constraint is highly ranked in the grammar of Picard, we can account for the absence of /l/-deletion in connection with the hypothetically monosegmental clitic /l/.

(13) Max-Ms
Every input segment that is the only segment in its morpheme must have a corresponding segment in the output (Casali, 1997; Schuh, 1995).

Because /el/-clitics do not undergo assimilation or deletion, it is reasonable to assume that they are lexically marked for /l/-preservation. In order to restrict the application of regressive assimilation within this group of clitics, yet preserve the hypothesis of a single grammar, a lexically specific version of the constraint CrispEdge is required: $\text{CrispEdge}_{[el]}$, where subscript [el] represents the constraint specification for the group of /el/ clitics. The crucially ranked hierarchy in (14) yields the expected results in Tableau 2.[17]

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TABLEAU 2. *Monosegmental /l/ and /l/-preservation*

/l fis/	Max-Ms	CrispEdge$_{[el]}$	NoCoda-Rt	Max-IO	CrispEdge
(a) fis	*!		*	*	
☞ (b) el. fis			**		
(c) ef.fis		*!	*		*

TABLEAU 3. *AWRA and clitic /el/: Categorical /l/-preservation*

/el fis/	Max-IO$_{[el]}$	CrispEdge$_{[el]}$	NoCoda-Rt	Max-IO	CrispEdge
(a) e . fis	*!		*	*	
☞ (b) el . fis			**		
(c) ef . fis		*!	*		*

(14) Lexically marked Group [el]:
Max-Ms, CrispEdge$_{[el]}$ ≫ NoCoda-Rt, Max-IO, CrispEdge

Observe that the selected candidate is the one with complete faithfulness between input and output. Candidate (b) wins because it only minimally violates the NoCoda-Rt constraint (due to the licensing of the /l/ and /s/ as codas), ranked low in the constraint hierarchy proposed. The remaining candidates each violate a highly ranked constraint and are therefore ruled out as optimal forms: candidate (a) violates Max-Ms because the only segment in the input is deleted in the surface form, while candidate (c) violates CrispEdge$_{[el]}$ due to the multiple linking of the segment /f/ in the output.

If the underlying form for such clitics is the one in which the vowel /e/ is part of the input, the rationale is identical to that just presented. Max-Ms, however, is replaced by Max-IO$_{[el]}$, lexically marking the clitic not to undergo deletion. The result is shown in Tableau 3. Since the two possibilities for the shape of the /l/-clitic under discussion yield similar results in my analysis, I opt for the presence of the vowel in the input, since it is more harmonious with the underlying representations of the other clitics investigated. For further discussion of vowel epenthesis in Picard, see Steele and Auger (1999).

Speaker 9. As previously mentioned, the second item that did not present variation in the AWRA investigation was Speaker 9. The categorical results observed (98% AWRA, 2% /l/-deletion, 0% /l/-preservation) point in the direction of a single categorical grammar in which only one form results: AWRA. Speaker 9's data come exclusively from written texts, arguably his most formal style. Since different styles are believed to constitute separate grammars (van Oostendorp, 1997; Selkirk, 1972), it is reasonable to assume that the results obtained for

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TABLEAU 4. *Speaker 9's grammar*

/ʃol kurɛ/	NoCoda-Rt$_\Phi$	Max-IO$_\Phi$	CrispEdge$_\Phi$
(a) ʃol . kurɛ	*!		
(b) ʃo . kurɛ		*!	
☞ (c) ʃok . kurɛ			*

Speaker 9 reflect a distinct grammar. One could argue that these results have been affected by the fact that only written data were collected from Speaker 9. A closer look at the overall results, however, suggests that there is something particular about this speaker, since no other speaker presents such a great discrepancy between the three output forms found in written material. This is evident from the results of the stylistic level written in which the distribution of each variant's occurrence is relatively similar: 36% /l/-preservation, 32% AWRA, and 32% /l/-deletion (see Appendix). To account for the nearly categorical results observed for Speaker 9, I propose the constraint ranking in (15), which results in the selection of the AWRA candidate as optimal, shown in Tableau 4.

(15) Speaker 9's categorical grammar: NoCoda-Rt$_\Phi$, Max-IO$_\Phi$ ≫ CrispEdge$_\Phi$

Candidates (a) and (b) each violate a highly ranked constraint in Speaker 9's grammar, and therefore both are ruled out as optimal forms. Candidate (a) violates NoCoda-Rt$_\Phi$ due to the licensing of the consonant /l/ as a coda; candidate (b), on the other hand, violates Max-IO$_\Phi$ since input /l/ is absent from the surface form. Candidate (c) represents the optimal form for Speaker 9's grammar, even though it violates the low-ranked constraint CrispEdge$_\Phi$.

In the next section, I propose an OT analysis for the variation pattern observed in connection with AWRA using the set of constraints introduced in (9). As we shall see, the only distinction between categorical and variable phenomena lies in the demand that a variation grammar imposes on ranking, namely, the crucial unranking of constraints.

Variation in OT

As I have demonstrated, the framework of OT provides the tools necessary for analyzing variation. Specifically, it allows for multiple outputs within a single grammar through crucial unranking of constraints, without the need to resort to separate rules for each distinct output; it expresses how a certain environment favors or does not favor the application of a phonological process; and it allows for quantitative values to be directly encoded in (and therefore predicted by) the grammar. In order to achieve these results, two different proposals have been made in the OT literature. According to Anttila (1997), a more constrained approach in which variation grammars constitute partial orders, some subsets of constraints S′ within the set S are all crucially unranked with respect to each other (e.g., {A ≫ {B; C; D}$_{S'}$ ≫E}$_S$). For Reynolds (1994), on the other hand, varia-

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tion grammars are formed of (variably ranked) floating constraints, where within the set S some subset of constraints S′ may be variably ranked with respect to some other subset S″. Within each subset, constraints may be crucially unranked (i.e., float with respect to each other) (e.g. $\{A \gg \{\{B\}_{S'}; \{C; D\}_{S''}\} \gg E\}_S$, where $\{B\}_{S'}$ floats with respect to the subset $\{C; D\}_{S''}$, whose members C and D are crucially unranked with respect to each other). In terms of the options that are possible in each of these two approaches, Anttila's constitutes a subset of Reynolds' floating constraint approach because it is less permissive concerning the possibilities of rankings (or unranking) allowed by the grammar. While these two options (Anttila's crucial unranking of constraints and Reynolds's variable ranking of floating constraints) are possible in a Reynolds-like grammar ({C; D} and {{B}; {C; D}), only crucial unranking of constraints is a possibility in Anttila's grammar ({C; D}).

Based on empirical evidence from Picard, I adopt Reynolds's approach. Anttila (personal communication) suggested that the results found in Picard are either a counterexample to his claim that (variation) grammars are partial orders or a case of dialect mixture. Further investigation is required.

In Reynolds's (1994) conception of variably ranked Floating Constraints and consequent encoding of probability predictions in the grammar, a constraint or set of constraints may fall anywhere within a range (set by the grammar) in the ranking hierarchy of a single language, as expressed in slightly modified form in (16).

(16) Reynolds's (1994) Floating Constraints
A particular constraint X may be classified as being ranked somewhere within a certain range lying between two other constraints W and Z, without the specification of its exact ranking relative to a certain other constraint Y (or constraints Y_1, Y_2, etc.).
$ConW \gg \{\{ConX\}\ \{ConY_1, ConY_2, ConY_n\}\} \gg ConZ$

From the number of rankings allowed by a set of variably ranked constraints, distinct outputs can be predicted. Anttila (1997) demonstrated that the probability of each variant's occurrence is the result of the number of rankings for which each variant wins, divided by the total number or rankings (or tableaux) generated by the variably ranked constraints, as summarized in (17).

(17) Variant Probabilistic Prediction (Anttila, 1997)
a. A candidate is predicted by the grammar iff it wins in some tableaux.
b. If a candidate wins in *n* tableaux, and if *t* is the total number of tableaux, then the candidate's probability of occurrence is n/t.

To illustrate, suppose that in a given grammar, GRAM, two constraints B and C float with respect to each other. This is indicated by the semicolon (to distinguish crucial unranking from cases of indeterminate ranking) between the two constraints involved, with the curly brackets delimiting the set of floating constraints. As a result, the two different constraint rankings in (18b) are possible.

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TABLEAU 5. *Variation in GRAM*

a. A ≫ B ≫ C ≫D					b. A ≫ C ≫ B ≫ D				
	A	B	C	D		A	C	B	D
☞ $Cand_1$			*		$Cand_1$		*!		
$Cand_2$		*!			☞ $Cand_2$			*	

(18) A variably ranked grammar

a. Constraint ranking: A ≫ {B; C} ≫ D

b. Possibilities of rankings: A ≫ **B** ≫ **C** ≫ D
A ≫ **C** ≫ **B** ≫ D

Imagine that two optimal forms are possible in GRAM, $Cand_1$ and $Cand_2$. $Cand_1$ is selected when B is ranked higher than C, whereas $Cand_2$ is selected in the reverse situation. This is illustrated in Tableau 5.

Following Anttila's (1997) variant probability prediction, the variable ranking of constraints B and C results in a pattern in which two outputs are possible, and the probability of each output occurrence can be predicted by (17). For example, candidates 1 and 2 in Tableau 5 win in exactly one tableau each ($n = 1$), and the total number of tableaux is two. Each candidate's probability of occurrence is thus 0.5 ($n/t = 1/2 = 0.5$), and each variant is likely to occur 50% of the time in the same grammar.

The constraint ranking in (18a) and Tableau 5 emphasize a crucial distinction in the context of variation in OT: the distinction between grammars and tableaux. While in (18a) one ranking or grammar yields two tableaux and consequently two outputs, a categorical grammar such as the one argued for Speaker 9 in (15) yields only one tableau and consequently only one output. In the next section, variable grammars such as the one illustrated in (18) is used to analyze the variation involving AWRA in Picard.

The variable results

In this section, I present the OT analysis for the variable aspect of AWRA. As previously discussed, two extralinguistic factors were selected as significant by the VARBRUL program, geographic location and level of formality, whereas the grammatical category of the /l/-clitic was the only one selected from the linguistic factor groups.

Geographic location. The first significant factor group in the AWRA investigation is geographic location. As discussed earlier, two distinct patterns could be delineated: the AWRA variant is more likely to appear in the region of Nibas ($p = .48$), with the other two variants being equally distributed (and equally disfavored) ($p = .28$ for /l/ preservation, $p = .24$ for /l/-deletion), whereas in the other villages the three variants are equally expected to occur (average around

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TABLE 8. *Predicted and observed probability of variant occurrence by geographic location*

Geographic Location	Total Number of Tableaux	/l/-preservation		AWRA		/l/-deletion	
		Predicted	Observed	Predicted	Observed	Predicted	Observed
Nibas	4	.25 (1)	.28	.50 (2)	.48	.25 (1)	.24
Other	6	.33 (2)	.34	.33 (2)	.30	.33 (2)	.35

.33). To account for the disparity of results observed involving geographic location, I propose the two distinct grammars in (19), composed of three domain-specific constraints (Max-IO$_\Phi$, NoCoda-Rt$_\Phi$, and CrispEdge$_\Phi$, where Φ represents the prosodic domain Phonological Phrase to which the constraints are sensitive). In the grammar for Nibas, the variable ranking of the three constraints yields four tableaux, whereas in the grammar for the other villages, the unranking (or floating) of the three constraints yields six tableaux. As previously discussed, the claim that regional varieties or dialects must constitute different grammars is not an innovative proposal. Several authors have claimed that the difference between two or more dialects amounts to a difference in constraint ranking (i.e., different grammars) (van Oostendorp, 1997; Rose, 1997; Selkirk, 1997).

(19) Geographic Location and AWRA

a. Nibas (Speakers 7 and 8): {{Max-IO$_\Phi$; NoCoda-Rt$_\Phi$}; CrispEdge$_\Phi$}

b. Other (Speakers 1–6): {Max-IO$_\Phi$; NoCoda-Rt$_\Phi$; CrispEdge$_\Phi$}

Following Reynolds's (1994) conception of variably ranked constraints, the distinct behavior observed in the two dialects can be accounted for if we assume that the pattern in Nibas results from the constraint ranking in (19a), in which the constraints Max-IO$_\Phi$ and NoCoda-Rt$_\Phi$ float in relation to one another and form a subset of constraints that floats in relation to CrispEdge$_\Phi$. In the constraint ranking responsible for the output in the other villages, (19b), the three constraints (Max-IO$_\Phi$; NoCoda-Rt$_\Phi$; CrispEdge$_\Phi$) all float with respect to each other.

The application of Anttila's (1997) variant probability prediction in (17) yields the results illustrated in Table 8. Under each variant, the left column indicates the predicted probability of each variant's occurrence, calculated by n/t (the numbers in parentheses illustrate the number of rankings [or tableaux][18] in which that candidate is the winner). The right column indicates the actual probability observed for each variant (from Figure 3).

To illustrate, I demonstrate how the ranking responsible for the results in Nibas determines the selection of each of the three variants and how it predicts the probability of each variant. According to Table 8, the two subsets of floating constraints in {{Max-IO$_\Phi$, NoCoda-Rt$_\Phi$}, CrispEdge$_\Phi$} yield four rankings. Of these, one yields the /l/-faithful candidate (/l/-preservation) ($n/t = 1/4 = .25$), two result in the AWRA candidate ($n/t = 2/4 = .50$), and one results in /l/-

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TABLEAU 6. */l/-preservation, ranking (20a)*

/ʃol kurɛ/	$CrispEdge_{\Phi}$	$Max\text{-}IO_{\Phi}$	$NoCoda\text{-}Rt_{\Phi}$
☞ (a) ʃol . kurɛ			*
(b) ʃo . kurɛ		*!	
(c) ʃok . kurɛ	*!		

TABLEAU 7. *AWRA, rankings (20bi) and (20bii)*

/ʃol . kurɛ/	$NoCoda\text{-}Rt_{\Phi}$	$Max\text{-}IO_{\Phi}$	$CrispEdge_{\Phi}$
(a) ʃol . kurɛ	*!		
(b) ʃo . kurɛ		*!	
☞ (c) ʃok . kurɛ			*
	$Max\text{-}IO_{\Phi}$	$NoCoda\text{-}Rt_{\Phi}$	$CrispEdge_{\Phi}$
(a) ʃol . kurɛ		*!	
(b) ʃo . kurɛ	*!		
☞ (c) ʃok . kurɛ			*

TABLEAU 8. */l/-deletion, ranking (20c)*

/ʃol kurɛ/	$CrispEdge_{\Phi}$	$NoCoda\text{-}Rt_{\Phi}$	$Max\text{-}IO_{\Phi}$
(a) ʃol . kurɛ		*!	
☞ (b) ʃo . kurɛ			*
(c) ʃok . kurɛ	*!		

deletion ($n/t = 1/4 = .25$), as shown in (20). Tableaux 6 to 8 are the corresponding tableaux for each variant selected by the variable ranking established for Nibas.

(20) Output selection for Nibas

{{$Max\text{-}IO_{\Phi}$; $NoCoda\text{-}Rt_{\Phi}$}; $CrispEdge_{\Phi}$} yields four rankings

a. /l/-preservation
($NoCoda\text{-}Rt_{\Phi}$ dominated): $CrispEdge_{\Phi} \gg Max\text{-}IO_{\Phi} \gg NoCoda\text{-}Rt_{\Phi}$

b. AWRA
($CrispEdge_{\Phi}$ dominated): i. $NoCoda\text{-}Rt_{\Phi} \gg Max\text{-}IO_{\Phi} \gg CrispEdge_{\Phi}$
ii. $Max\text{-}IO_{\Phi} \gg NoCoda\text{-}Rt_{\Phi} \gg CrispEdge$

c. /l/-deletion
($Max\text{-}IO_{\Phi}$ dominated): $CrispEdge_{\Phi} \gg NoCoda\text{-}Rt_{\Phi} \gg Max\text{-}IO_{\Phi}$

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In sum, the variable ranking of the three constraints {{Max-IO$_\Phi$; NoCoda-Rt$_\Phi$}; CrispEdge$_\Phi$} in Nibas results in a pattern in which AWRA is favored over the other variants. In the grammar of the other villages, the variable ranking of the constraints {Max-IO$_\Phi$; NoCoda-Rt$_\Phi$; CrispEdge$_\Phi$} predicts a variation pattern in which each of the three variants is equally expected to surface (probability .33). As shown in Table 8, the predictions correspond closely to the observed results.

Level of formality. The second significant factor group selected by VARBRUL was level of formality. The probabilistic results indicate a pattern in which the AWRA and /l/-deletion variants are favored in more informal environments (p = .40 and .38, respectively), whereas the variants /l/-preservation and AWRA (p = .41 and .36, respectively) are favored as the context becomes more formal. In order to account for these variation patterns, I propose the constraint rankings in (21) for each of the stylistic levels investigated.

(21) Level of formality and AWRA

a. Informal style:
{Max-IO$_\Phi$; NoCoda-Rt$_\Phi$; CrispEdge$_\Phi$; NoCoda-Rt} ≫ MAX-IO

b. Formal style:
{Max-IO$_\Phi$; NoCoda-Rt$_\Phi$; CrispEdge$_\Phi$; Max-IO} ≫ NoCoda-Rt

Considering that speakers are more concerned with the listener's perception in more formal situations, it is reasonable to assume that faithfulness constraints (e.g., Max-IO in formal style) predominate in such contexts for the convenience of the addressee (see van Oostendorp, 1997; Taler, 1997); in less formal situations, however, the fact that they become less prominent is not surprising.

In (21), I show that two distinct grammars are necessary to account for the variation patterns found involving level of formality. As shown in Figure 2, the two patterns observed for informal and formal levels are the inverse of one another with respect to /l/-preservation and /l/-deletion. As mentioned previously, this suggests the existence of two distinct grammars: one in which /l/-preservation is favored (formal), and one in which /l/-deletion is favored (informal). Each stylistic level should therefore constitute a discrete grammar to which Picard speakers code-switch according to the context of the intercourse. As previously discussed, this claim is in accordance with the commonly accepted view that every style level is a separate grammar, and that consequently a language system consists of several style-level grammars (e.g., van Oostendorp, 1997; Selkirk, 1972).

The application of Anttila's variant probability prediction in (17) results in the numerical values illustrated in Table 9. The values provided by the statistical program correspond to the ones predicted by the ranking in each respective stylistic level.

Grammatical category of the /l/-clitic. The only linguistic factor selected as significant by VARBRUL was the grammatical category of the /l/-clitic. The six /l/-clitics included in this investigation can be grouped into three classes: those where /l/-preservation is categorically expected (the determiner /el/ and pro-

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TABLE 9. *Predicted and observed probability of variant occurrence by level of formality*

Level of Formality	Total Number of Tableaux	/l/-preservation		AWRA		/l/-deletion	
		Predicted	Observed	Predicted	Observed	Predicted	Observed
Informal	24	.17 (4)	.22	.42 (10)	.40	.42 (10)	.38
Formal	24	.42 (10)	.41	.42 (10)	.36	.17 (4)	.23

noun /el/), those where AWRA is highly favored (average of .56) and the other two variants are equally less favored (average of .21 for /l/-preservation and .23 for /l/-deletion) (i.e., the determiner /ʃol/ and preposition /dol/), and those where /l/-preservation and /l/-deletion are equally highly favored (average of .43 for /l/-preservation and .41 for /l/-deletion), while AWRA is less likely to occur (average of .17) (i.e., the pronoun /al/ and preposition /al/).

In order to account for the two contrasting sets of results involving the clitics /ʃol/ and /dol/ (henceforth, group [ol]) and the two /al/ clitics (henceforth, group [al]), I propose the constraint ranking in (22). To maintain the hypothesis that there is a single grammar involved in the outcome of the AWRA phenomenon relating to these two groups of clitics, it is necessary to decompose the constraints responsible for AWRA in Picard into morpheme-specific constraints. This way, the analysis is able to capture the idiosyncrasies of each group of clitics as being lexically marked for a specific pattern. While group [ol] is lexically marked to display a higher likelihood of AWRA as opposed to the other two variants, group [al] is lexically marked to exhibit a pattern in which /l/-preservation and /l/-deletion are highly and equally favored over AWRA (this is illustrated by a subscripted [ol] or [al] respectively).

(22) Lexically marked groups [ol] and [al]

{{Max-IO$_{[ol]}$; NoCoda-Rt$_{[ol]}$}; CrispEdge$_{[ol]}$} (Group [ol])

≫

{Max-IO$_{[al]}$; NoCoda-Rt$_{[al]}$; CrispEdge$_{[al]}$; CrispEdge} (Group [al])

Following Reynolds's (1994) conception of variably ranked constraints, the distinct behavior observed in groups [ol] and [al] can be accounted for if we assume that the pattern observed for [ol] clitics results from the constraint ranking in (22), in which the constraints Max-IO$_{[ol]}$ and NoCoda-Rt$_{[ol]}$ float in relation to one another and form a subset of constraints which floats in relation to CrispEdge$_{[ol]}$. In the constraint ranking responsible for the output observed in group [al] (i.e., the dominated set in (22)), the four constraints float with respect to each other.

Applying Anttila's (1997) variant probability prediction yields the results illustrated in Table 10. In sum, this factor group indicates the existence of a twofold variation pattern: one in which AWRA is highly favored while the remaining variants are equally less likely to occur (i.e., /ʃol/ and /dol/), and one in which the variants /l/-preservation and /l/-deletion are more likely to occur as opposed

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TABLE 10. *Predicted and observed probability of variant occurrence by clitic status*

Clitic Status	Total Number of Tableaux	/l/-preservation		AWRA		/l/-deletion	
		Predicted	Observed	Predicted	Observed	Predicted	Observed
Group [ol]	4	.25 (1)	.21	.56 (2)	.50	.25 (1)	.23
Group [al]	24	.42 (10)	.43	.17 (4)	.17	.42 (10)	.41

to the AWRA variant. As we have seen, through the variable ranking of the relevant constraints responsible for the output in each group of clitics, we are able to account for the different patterns involving the groups of clitics [ol] and [al] via the use of a single constraint hierarchy (i.e., a single grammar)[19] and to establish the probability of each variant's occurrence in its respective clitic group.

To conclude, for the analysis of the categorical and variation results of AWRA, I have utilized the following theoretical tools: different grammars to account for the variation in connection with regional dialects and different styles (Nibas vs. other and formal vs. informal), as in traditional generative linguistics, and variable grammars for cases in which variation is associated with a single dialectical grammar (e.g., the variation patterns found within the community of Nibas), a single stylistic grammar (e.g., formal style), or a class of lexically marked items ([ol] vs. [al] clitics). I have also shown that what distinguishes a categorical grammar from other variable grammars is that, while a crucially ranked categorical grammar yields only one tableau (and consequently only one output), a crucially unranked variable grammar generates two or more tableaux (and consequently two or more outputs). In order to preserve the hypothesis that variation can be accounted for via the use of a single constraint ranking or grammar, I have adopted an approach that allows constraints previously alleged to be monolithic to be decomposed into their domain-specific and morpheme-specific counterparts.

CONCLUDING REMARKS

In this study, I have attempted to demonstrate how OT can serve as a framework for analyzing variation: it not only allows the possibility of multiple outputs, but also allows the possibility of predictability of occurrence for each variant involved in the variation process. The claim that the probability of each variant's occurrence may be encoded in (and therefore predicted by) the grammar yields important consequences for the study of variation and linguistic theory in general, because it constitutes an attempt to narrow the distinction between competence and performance.

In traditional (non-variationist) linguistics, the focus of linguistic theory lies almost entirely on the "ideal speaker-listener, in a completely homogeneous speech community" (Chomsky, 1965), and data collection procedures rely almost exclusively on grammaticality judgments given by individual speakers. In variationist linguistics, the focus has been on the analysis of large corpora of spontaneous or

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controlled discourse, in which "errors" can be (and sometimes are) classified as systematized ways of saying the same thing. In order to achieve the correct description and/or explanation of linguistic data, systematic quantitative generalizations about language should be included in what is usually referred to as competence. In agreement with Stefan Frisch (personal communication, 1997), we should be seeking the correct explanations for language facts regardless of their quantitative or categorical character; the facts determine what the grammar looks like.

By proposing an analysis in which variables as well as the predictability of each variant's occurrence are encoded in the grammar and therefore in competence, we obtain a more accurate and comprehensive approach to the study of language. My analysis (among many others in the sociolinguistic literature) presupposes that variation is an inherent part of what is usually referred to as competence. As a consequence, the competence that I strive to account for in this study includes much more than what Chomsky (1965) proposed to be competence. As Labov (1972:226) pointed out,

> [t]he ability of human beings to accept, preserve, and interpret rules with variable constraints is clearly an important aspect of their linguistic competence of *langue*. But no one is aware of this competence, and there are no intuitive judgments accessible to reveal it to us. Instead, naive perception of our own and others' behavior is usually categorical, and only careful study of language in use will demonstrate the existence of this capacity to operate with variable rules.

In this study, I have provided an account for the variation patterns found for AWRA involving three significant factors: /l/-clitic status, level of formality, and geographic location. In order to account for the variable results involving these factors, I have proposed the decomposition of general constraints into morpheme-specific and domain-sensitive constraints, each taking effect at the relevant prosodic domain of AWRA application. In what concerns geographic location, I have argued that variation in AWRA involves the existence of two variable grammars: one that equally favors the three variants found in the process, and one that favors AWRA over the remaining variants. I have also shown that the distinction between Speaker 9's categorical grammar and that of the other speakers lies in the limitations imposed by his fixed-ranked grammar whose output is a single candidate: AWRA. Based on predictions determined by the variable ranking of the relevant constraints in the grammar of Picard, I was able to establish quantitatively the probability of application of each variant in both grammars.

NOTES

1. The gemination that results from the concatenation of a clitic-final /l/ and the following word-initial consonant is easily perceivable even by untrained ears. A phonetic analysis of gemination in Picard is beyond the scope of this investigation.

In addition, observe in (1) that I adopt the one-root theory for gemination, for which length (i.e., gemination) involves a single melody node (e.g., the root [f]) linked to two skeletal positions (see Hayes, 1988; Hyman, 1985; McCarthy & Prince, 1986). This approach agrees with Hayes's (1986) view on the representation of true geminates, those that result from spreading rules (as opposed to fake geminates, which originate from feature-changing rules). For a comprehensive discussion on the representation of geminates, see Hayes (1986) and Selkirk (1991).

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2. I will refer to these CV1-items as clitics or prosodic clitics because of the manner in which they are licensed in the phonology of Picard. Unlike prefixes, which are licensed by a Recursive Prosodic Word (Cohn & McCarthy, 1994; van der Leeuw, 1997; Peperkamp, 1997), CV1-clitics are licensed directly by the Phonological Phrase (Berendsen, 1986; Peperkamp, 1997), a typical example of a free clitic in Selkirk's (1997) view. For a comprehensive analysis of the prosodization of function words and, more specifically, the prosodization of prefixes and clitics in Picard, see Selkirk (1997) and Cardoso (1998a, 1998b), respectively.

From a morphosyntactic perspective, Zwicky and Pullum (1983) provided a set of criteria to determine whether certain bound morphemes are clitics or inflections. From these criteria, four tests assign all CV1-words in Picard the status of clitics, while one test assigns the status of affixes to the proposition /al/ and pronoun /ɛl/.

3. Observe in (2f) that the underlying vowel /e/ undergoes elision when preceded by a vowel. Languages vary in the strategies that they employ to correct these marked V_1V_2 (vowel + vowel) sequences: elision of V_1, elision of V_2, glide formation or consonant epenthesis. Picard exhibits all four strategies to syllabify an illicit vocalic hiatus. In the cases illustrated in (2f), the preference is for elision of V_2. For an OT approach to the subject, see Cardoso (1998a).

4. Observe that the vowel in /ʃol/ and /dol/ is deleted when these forms are followed by a vowel-initial lexical word. Leininger (1998) proposed that this vowel/zero alternation is motivated by the highly ranked constraints Integ-Det (the prosodic structure of the determiner should correspond with its morphological structure), which requires that the entire clitic be in one syllable (i.e., a type of alignment), and Onset (Prince & Smolensky, 1993). Thus, the determiner's vowel is deleted in the optimal form (c), in spite of incurring a violation of Max-IO.

/ʃol armwɛr/	Integ-Det	Onset	Max-IO
a. ʃol . ar . mwɛr		*!	
b. ʃol . lar . mwɛr	*!		
☞ c. ʃlar . mwɛr			*

5. In Vasseur (1996), 'mal-' is the only l-final prefix in Picard.

6. Interestingly, there seems to be no variation involving the domain in which AWRA applies. An explanation for this is beyond the scope of this study, and I leave it aside for further research.

7. The rechecking process was necessary because at the initial stage of the transcription task, the research assistants were not aware of the AWRA phenomenon. Besides, they were following a less conservative approach in the transcription (mostly syntax-oriented), and therefore little or no attention was given to the assimilation process.

8. I am aware of the consequences of Picard–French code-switching for my analysis. As mentioned in the discussion of how tokens from the informal interview were collected, AWRA variants present in discussion about topics liable to elicit code-switching from Picard to French (e.g., the status of Picard in France, politics, history, professional and educational activities, etc.) were excluded from the analysis. In addition to the effect of the discussion topic, Wardhaugh (1994) suggested that the environment also plays a decisive role in determining which code will be selected in a bilingual situation. For instance, Picard speakers would be more likely to speak French if they were engaged in a conversation with Picard speakers at a bank than they would if they were shopping in a food market. Wardhaugh distinguished two types of code-switching, both of which are attested in the speech community under investigation: situational, in which the languages used change according to the situations in which the conversants find themselves, and metaphorical, when a change of topic requires a change in the language used. For insightful discussion of code-switching and its effects in a bilingual environment, see Blom and Gumperz (1972), Auer (1984), Poplack (1988a, 1988b), Romaine (1989), among other authors.

9. Speaker 9 was deceased at the time of data collection. Observe that his sample consists exclusively of written data. His inclusion among the other subjects (from whom informal and/or formal tokens were elicited) serves the purpose of contrasting the results: while the other subjects present a variable grammar, Speaker 9's grammar is a categorical one in which only one of the variants is allowed. In the context of this study, this distinction is important because it allows us to delimit and illustrate two possibilities for grammars: one in which the outcome is restricted by a fixed-ranked grammar with a single (categorical) output, and one in which multiple outputs are allowed as a result of nonranked or variably ranked constraints, resulting in variation.

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10. All the probabilistic results provided in the study derive from the final VARBRUL run without the redundant factor group speaker and the factors that yielded categorical results (determiner /el/, pronoun /el/, and Speaker 9). The rationale for the recodings and reanalyses will be explained as they become relevant.

11. In her syntax-oriented investigation of subject pronouns in Picard, Auger (1993) pointed out that "Picard provides a clear evidence of [a] case where subject pronouns have become agreement markers prefixed to finite verbs." Observe the results in percentage obtained for the grammatical status of the /l/-clitic in Figure 1, where there is a relatively higher percentage of /l/-preservation for the subject pronoun clitic /al/: 44%. Based on Auger's arguments, it is possible that Picard speakers no longer recognize the subject pronoun /al/ as a clitic, but instead analyze it as an affix. Recall that the data in (4b) indicates that AWRA does not affect affixation. Accordingly, it is possible that Picard is moving toward a grammar in which certain proclitics are interpreted as affixes, left-aligned to Prosodic Words. Whether this constitutes an instance of language change in progress because of a conflict between the phonology and syntax of Picard requires further investigation.

The possibility that /al/ may be an affix rather than a clitic in syntax poses no major problem for the analysis proposed here, since Prosodic Phonology does not presuppose coincidence between the phonological and the syntactic components (Anderson, 1992; Berendsen, 1986; Nespor, 1999). In other words, /al/ might bear the status of an affix in the syntax, while in the phonology it patterns with the other /l/-clitics.

12. For expository reasons, I consider three degrees of faithfulness: /ʃol fɛt/ → (1) [ʃol fɛt] (/l/-preservation) > (2) [ʃof fɛt] (AWRA) > (3) [ʃo fɛt] (/l/-deletion), in which the first form is more faithful to the input than the second, which is in turn more faithful than the third. Technically, AWRA violates featural faithfulness, while /l/-deletion violates segmental faithfulness.

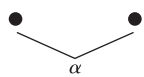
13. Due to limitations of space, only three constraints that directly play a role in the segmental aspects of AWRA are discussed. A relevant undominated constraint that predicts the directionality of the assimilation process is Lex-Faith, proposed by Casali (1997) and Pulleyblank (1997) (under 'Faith-Stem'), though implied in McCarthy and Prince (1995) under the Root-Affix Faithfulness Metaconstraint: Root-Faith ≫ Affix-Faith. The notion that certain prominent positions maintain contrasts goes back to Trubetzkoy (1939) and has recently been discussed in the works of Steriade (1995) and Beckman (1998). Lex-Faith expresses the crosslinguistic tendency to preserve information encoded in lexical words rather than in function words. For Picard, the hierarchical position of Lex-Faith above the constraints Max-IO, CrispEdge, and NoCoda-Rt prevents cases of progressive assimilation (e.g., /ʃol kurɛ/ → *[ʃol lurɛ] vs. √[ʃokkurɛ] 'the pork paté'), as illustrated here.

/ʃol kurɛ/	Lex-Faith	Max-IO, CrispEdge, NoCoda-Rt
a. ʃol . lurɛ	*!	*
☞ b. ʃol . kurɛ		*
☞ c. ʃo . kurɛ		*
☞ d. ʃok . kurɛ		*

14. At least three other possibilities exist to capture the violation of CrispEdge in cases of across-word assimilation. (1) Align-Left-Word or "No Resyllabification" (Kiparsky, 1993; Reynolds, 1994): No resyllabification is allowed across word boundaries. (2) Linearity (McCarthy & Prince, 1995; Pater, 1996): S_1 (input) reflects the precedence structure of S_2 (output), and vice versa. In cases of regressive assimilation, the precedence relation of S_1 /lk/ is not reflected in S_2 [kk]: /l/ precedes /k/ in S_1 but the correspondent of /l/ does not precede the correspondent of /k/ in the output. This is illustrated in (i), (where the linking lines express input–output relations, not association lines).

(i) S_1: ʃol kurɛ
S_2: ʃo kurɛ

Finally, (3) NoLink (Selkirk, 1984a; Urbanczyk, 1999): Linked structures are not allowed, as shown in (ii).

(ii) * 

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I am aware that these alternatives might yield different empirical effects. For the Picard data under investigation, however, these options could be interpreted as mere notational variants of each other, since the adoption of any of these four constraints would present the same results, namely, a constraint violation for the AWRA candidate. The issue is beyond the scope of this research, and I leave it aside for further investigation.

15. It is not clear what constitutes a grammar in Buckley's view. As stated in the literature on the subject of constraint domains (Buckley, 1995a, 1995b, 1996a, 1996b), different domains involve different rankings of constraints: " constraint domains . . . delimit substrings of the surface representation which are subject to different constraint rankings" (Buckley, 1996b:38). Note that this view is by no means distinct from the cophonology approach, even though the constraint domains approach displays constraint ranking in a single hierarchy. The fundamental difference between Buckley's view and cophonology, however, is its inherent assumption that constraint domains operate in a strictly parallel fashion with substrings from the surface representation. Under his view, this constitutes a one-to-one relation between input and output, without intervening steps or derivations. This suggests that the author believes in a (conceptually imprecise) one-grammar approach, even though no discussion of the matter is incorporated into his analyses.

16. The intuition behind this constraint is consistent with the Functional Hypothesis (Kiparsky, 1972), according to which there is tendency for semantically relevant information to be retained in surface structure. I am aware, however, that the hypothesis is easily falsifiable (see Cardoso, 1999; Guy, 1980, 1991; Labov, 1994): many languages have phonological rules that obscure semantic information. In a framework with violable constraints, the preservation of monosegmental morphemes satisfies the constraint Max-Ms and consequently implies a general tendency for languages to preserve these morphemes in the unmarked situation. In fact, this is what Casali (1996, 1997) demonstrated in his crosslinguistic analysis of vowel elision in 68 Niger-Congo and 19 non-Niger-Congo languages: of the 26 languages in which a vowel-final root is concatenated with a monosegmental suffix vowel, 17 languages display preservation of the monosegmental suffix vowel, while only 4 display deletion of the vowel-only suffix. Interestingly, 4 languages display deletion of the root vowel in certain contexts, while the monosegmental suffix vowel is deleted in others.

17. The formalization of epenthesis in Picard is beyond the scope of the investigation and will not be addressed. For a discussion of vowel epenthesis in Picard, see Steele and Auger (1999).

18. The tableaux are merely illustrative devices. What is crucial in the analysis is the number of possible rankings established by the variably ranked constraint set.

19. The one-grammar hypothesis must also be extended to the full inventory of /l/-clitics, that is, the categorical group [el] and the groups consisting of [ol] and [al] clitics, as discussed earlier. The complete constraint ranking responsible for the categorical and variable results involving /l/-clitics in Picard is the following:

Lexically-marked /l/-clitics

$$\text{Max-IO}_{[el]}, \text{CrispEdge}_{[el]}, \{\{\text{Max-IO}_{[ol],\ \text{NoCoda-Rt}_{[ol]}}\}; \text{CrispEdge}_{[ol]}\}$$
$$\gg$$
$$\text{NoCoda-Rt}_{[el]}, \{\text{Max-IO}_{[al]}, \text{NoCoda-Rt}_{[al]}, \text{CrispEdge}_{[al]}, \text{CrispEdge}\}$$
$$\gg$$
$$\text{NoCoda-Rt, Max-IO}$$

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APPENDIX

Final VARBRUL results for the significant factor groups

		/l/-preservation			AWRA			/l/-deletion		
Factor Groups	Factors	*N*	%	*p*	*N*	%	*p*	*N*	%	*p*
(1) Clitic status	Det. /ʃol/	158	19	.19	526	63	.58	153	18	.23
	Prep. /dol/	39	21	.22	112	61	.55	34	18	.22
	Pron. /al/	335	44	.45	117	15	.13	314	41	.42
	Prep. /al/	151	42	.42	90	25	.20	120	33	.39
(2) Following consonant (Place)	Labial	273	31	.38	366	42	.35	240	27	.33
	Coronal	274	33	.32	273	33	.33	272	33	.35
	Dorsal	136	30	.34	206	46	.34	109	24	.32
(3) Following consonant (Manner)	Glide	39	30	.35	57	45	.32	32	25	.33
	Liquid	74	35	.34	80	37	.35	60	28	.31
	Nasal	151	30	.30	172	34	.32	177	35	.38
	Fricative	182	34	.34	180	34	.33	166	31	.33
	Other	237	30	.34	356	46	.35	186	24	.31
(4) Level of formality	Written	411	36	.38	362	32	.23	368	32	.39
	Formal	143	36	.41	183	46	.36	70	18	.23
	Informal	129	21	.22	300	49	.40	183	30	.38
(5) Geographic location	Nibas	110	26	.28	227	53	.48	88	21	.24
	Feuquières	110	32	.31	128	37	.30	109	31	.39
	Fressenneville	155	35	.38	160	36	.29	124	28	.32
	Bienfay	180	33	.30	164	30	.32	196	36	.38
	Bouillancourt	128	32	.38	166	42	.30	104	26	.32
Input probability			.32			.41			.27	

Note: The probability weights (rounded to the two digits) result from the final VARBRUL analysis, conducted without Speaker 9 and the determiner /el/ and pronoun /el/ and with the removal (recoding) of the redundant speaker factor group ($N = 2{,}149$ tokens).

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