A VARIABLE RULE FOR A CREOLE CONTINUUM

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In this paper I present a variable rule analysis of tense-lax variation in the unstressed vowels of Guyanese personal pronouns: *mi~mɪ*, *ju~jʊ*, *wi~wɪ*, and *de~dɛ* (or *dɪ*).* I hope that this presentati will be useful as a description and explanation of one aspect of linguistic variation in the Guyanese continuum, and as yet another exemplification of the variable rule approach to the study of linguistic variation. But I also hope that it will be successful in challenging the standard opinion that variable rules and creole continua are not well suited for each other. This opinion has been directly expressed by several creolists, and has been reinforced by the fact that descriptions of creole continua tend to come out in every other framework BUT that of variable rules.

FREQUENCY DATA. Table 1 shows the relative frequencies of the pronoun variants with lax vowels in a total of 2,759 pronoun tokens produced by twenty-four Guyanese speakers living in Cane-Walk, a pseudonym for a village less than ten miles away from the capital city of Georgetown. These tokens occurred in a sample of over seventy-hours of speech which I recorded in this area over a fieldwork period of two years. Overall frequencies for individuals and the two primary social classes which they represent are shown in column one,[1] and frequency distributions by style,[2] pronoun form, the syntactic position or function of the pronoun, and nature of following segment, are shown in columns to the right. I do not include the n's or raw figures on which each of the relative frequencies in Table 1 are based, but Figure 1 gives some idea of the size of individual speaker cells in this table.

We might first ask whether the data in Table 1 give us any a priori reason for not using variable rules in the analysis. Bickerton (1975:17-18) had noted that, unlike the situation in the urban North American communities in which the variable rule framework was originally developed, there was no single item on which all of his informants were variable. Given this situation, he felt that variable rules would be inappropriate for the Guyanese continuum,"since they would simply obscure the considerable amount of invariant patterning that is to be found there."

The situation depicted in Table 1 is, however, quite different. In the overall column, every individual shows variable vowel laxing; there is no one who always has lax pronoun vowels or never does. The entries for individual speakers by pronoun form, position, and following segment do reveal some instances of 1.00 and .00, signifying categorical laxing and non-laxing respectively. But these instances of invariance constitute only *10%* of all the cells for individual speakers in Table 1 (37/360, the 360 being the product of the 15 factor columns multiplied by the 24 individual speakers). And when we examine the distribution of invariant cells according to cell-size--as depicted in Figure 1--it is clear that invariance in this data is mainly a function of limited cell-size. Note how invariance disappears altogether once we have a minimum of thirty-one tokens per cell--a result which agrees uncannily with Guy's (1975) finding that individual speaker data on *t,d* deletion

TABLE 1

RELATIVE FREQUENCY OF VOWEL LAXING IN GUYANESE PERSONAL PRONOUNS

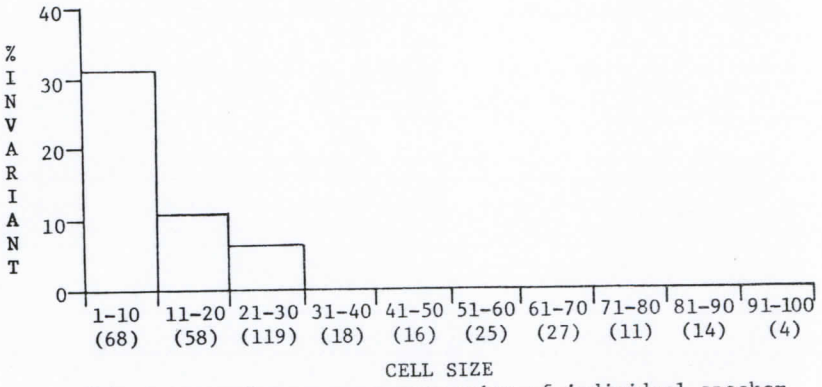
Spk. No.	Speaker's Name	Over-all	Style		(Pro-) Form					Position			Following Segment				
			C	I	M	J	F	D	W	S	O	P	U	E	G	K	Z
1.	Derek	.72	.62	.79	.62	.96	.92	.96	.12	.69	.64	.89	.60	.40	.71	.82	.60
2.	James	.76	.57	.92	.76	.96	.88	.88	.06	.69	.89	1.0	.00	.67	.75	.96	.58
3.	Florine	.67	.61	.75	.60	.92	.84	.96	.04	.67	.56	.83	.50	.67	.69	.86	.31
4.	Reefer	.72	.72	.71	.84	1.0	.67	.92	.08	.67	.67	1.0	.50	.42	.75	.83	.50
5.	Sultan	.71	.74	.67	.72	.96	.92	.80	.24	.64	.87	1.0	1.0	.50	.71	.70	1.0
6.	Raj	.65	.64	.66	.80	.88	.90	.88	.00	.62	.67	.90	1.0	.55	.61	.76	.67
7.	Irene	.82	.78	.88	.72	.96	.88	.80	.00	.80	.86	1.0	.33	.60	.84	.89	.90
8.	Rose	.75	.67	.84	.76	.96	.80	.86	.00	.74	.79	.77	1.0	.87	.72	.81	.60
9.	Sari	.77	.72	.84	.72	.96	.84	1.0	.12	.76	.67	.93	1.0	.67	.73	.94	.50
10.	Ajah	.74	.72	.75	.80	1.0	.90	.88	.00	.73	.85	.71	1.0	.50	.74	.81	.57
11.	Darling	.72	.70	.74	.76	.96	.88	1.0	.16	.68	.89	.85	1.0	.75	.65	.83	.53
12.	Nani	.88	.82	.97	.76	.96	.95	.93	.00	.84	.94	1.0	.67	.55	.94	1.0	.67
EC	TOTALS	.74	.69	.79	.74	.96	.88	.89	.09	.71	.76	.90	.71	.60	.73	.84	.60
13.	Mark	.67	.53	.79	.76	.96	.84	.76	.04	.63	.80	.83	.33	.47	.70	.83	.57
14.	Magda	.62	.41	.75	.60	.84	.64	.80	.24	.61	.53	.87	.38	.47	.67	.79	.40
15.	Katherine	.39	.29	.59	.20	.70	.44	.53	.00	.40	.19	1.0	.33	.00	.41	.52	.12
16.	Kishore	.45	.37	.57	.52	.64	.57	.56	.00	.40	.52	.69	.33	.08	.49	.50	.71
17.	Sheik	.59	.53	.64	.68	.88	.72	.64	.04	.49	.69	.91	.80	.36	.58	.65	.75
18.	Seymour	.46	.28	.72	.40	.72	.60	.52	.04	.40	.44	.85	1.0	.42	.49	.42	.33
19.	Radika	.52	.50	.54	.52	.84	.50	.72	.00	.39	.65	.95	.75	.33	.46	.63	.62
20.	Claire	.54	.51	.57	.52	.88	.72	.56	.00	.48	.46	.94	.40	.29	.54	.64	.29
21.	Bonnette	.43	.25	.58	.20	.76	.76	.44	.00	.46	.10	1.0	.00	.15	.37	.70	.17
22.	Ustad	.35	.30	.43	.36	.56	.28	.48	.08	.35	.23	.83	.00	.00	.33	.44	.33
23.	Oxford	.46	.38	.57	.36	.68	.36	.60	.32	.48	.29	1.0	1.0	.30	.38	.63	.27
24.	Granny	.76	.66	.87	.68	.96	.96	.88	.32	.74	.78	.83	.75	.57	.67	.95	.83
NEC	TOTALS	.52	.41	.64	.48	.78	.63	.62	.09	.49	.44	.89	.51	.30	.51	.63	.43
EC+NEC	TOTALS	.62	.54	.71	.61	.87	.75	.74	.09	.59	.56	.89	.59	.44	.62	.72	.50

Key: C=Careful, I=Casual; M=mi, J=ju, F=fi, D=de, W=wi; S=Subj., O=Obj., P=Possess.; U="ense Vowel, E=Lax Vowel, G=Voiced Cons., K=Voiceless Cons., Z=Pause.

was most regular once cells had thirty-five tokens or more. Far from ruling out variable rules, the data in Table 1 and Figure 1 convince us that pronominal vowel laxing is a highly variable area of the Guyanese continuum, and one admirably suited for analysis in the variable-rule framework.

FIGURE 1

PERCENTAGE OF INVARIANT VOWEL-LAXING CELLS BY CELL SIZE



(N's in parentheses represent number of individual speaker cells in table 1 which fall within each cell size range.)

VARBRUL PROBABILITIES AND INITIAL VERSIONS OF THE VOWEL LAXING RULE. There are a number of independent reasons for treating the tense pronominal vowels as underlying, and the lax ones as derived,[3] so the kind of variable rule which we will require will have to be a vowel laxing rule, of this basic form:

(1) Basic form of the variable vowel laxing rule

$$\begin{bmatrix}+\text{syll}\\-\text{cons}\end{bmatrix} \rightarrow \langle\text{-tns}\rangle \;/\; [\text{-syll}]\_\_\_\_\_ \begin{bmatrix}+\text{pro}\\-\text{str}\end{bmatrix} \#\#$$

As is customary in the variable rule framework, the angled brackets around the output signify that this is a variable rule. The square brackets enclose those features which must be present for the rule to apply. [+pro] is an abbreviation for [+ personal pronoun], but it should be noted that this rule does not apply to *hi*, which is always tense (a fact which will be explained later on). In prose terms, rule (1) states that a final unstressed vowel of a personal pronoun, when preceded by a non-syllabic (consonants, including glides), becomes variably lax.

However, rule (1) is hardly different from a conventional optional rule, since it does not specify the factors or constraints which determine how likely the rule is to apply under different conditions. In order to improve rule (1) along these lines, the data in Table 1 was analyzed with the help of D. Sankoff's VARBRUL

2 computer program.[4] This program, a development of the VARBRUL 1 program introduced by Cedergren and D. Sankoff (1974), uses the statistical method of maximum likelihood to estimate an input probability (p_o), and the probability contribution of each factor ($p_i - p_n$) to the overall probability of rule-application in any environment (p), according to the following logistic model (Rousseau and D. Sankoff 1978:62):

$$(2)\quad \left(\frac{p}{1-p}\right) = \left(\frac{p_o}{1-p_o}\right) \left(\frac{p}{1-p_i}\right) \cdots \times \left(\frac{p_n}{1-p_n}\right)$$

The probability contributions calculated by the program for each of the factors relevant to vowel laxing in the pronouns are displayed in Table 2.

TABLE 2

PROBABILITY CONTRIBUTIONS FOR VOWEL LAXING IN THE PRONOUNS

INPUT PROBABILITY = .50	
PRONOUN FORM:	ju = .84, de = .68, ʃi = .68, mi = .48, wi = .04
SYNTACTIC POSITION:	Possessive = .76, Subject = .36, Object = .34
FOLLOWING SEGMENT:	C_{vl} = .70, C_{vd} = .58, Ø = .44, V_{tns} = .42, V_{lax} = .34
STYLE:	Casual = .64, Careful = .36
SOCIAL CLASS:	Estate Class = .66, Non-Estate Class = .34

As is customary with the logistic model (Fasold 1978:93), probability contributions or values over .50 are interpreted as favouring the rule, and those under .50 as disfavouring the rule. From this, it is clear that non-first person pronoun forms, possessive position, a following consonant, casual style, and Estate Class membership favour the rule in their respective factor groups.

We may represent the effects of the variable constraints, as indicated above, in the following variable rule:

(3) First version of vowel laxing rule with variable constraints

$$\begin{bmatrix}+\text{syll}\\-\text{cons}\end{bmatrix} \rightarrow \langle\text{-tns}\rangle \;/\; [\text{-syll}]\underline{\quad\quad}\begin{bmatrix}+\text{pro}\\-\text{str}\end{bmatrix} \#\# \left\langle\begin{matrix}\text{-syll}\\+\text{tns}\end{matrix}\right\rangle \;//\; \left\langle\begin{matrix}\text{+casual}\\+\text{EC}\\ \text{<+noun>}\\ \left\langle\begin{matrix}\text{-1st person}\\-\text{3rd person}\end{matrix}\right\rangle\end{matrix}\right\rangle$$

In order to save space, I will not provide a prose paraphrase of this rule, nor of rule (6) below, but the following explanatory points should be noted:

(a) The significance of angled brackets around the output, and square brackets everywhere, is as was stated above for rule (2). But note that the angled brackets in the environment signify variable constraints.

(b) Extralinguistic factors come after the double diagonal (//), while internal linguistic ones come after the single diagonal (/).

(c) The feature <-1st person> sets off *ju*, *de*, and *ʃi*, the forms which favour the rule, from *mi* and *wi*, which do not. The feature <-3rd person> further identifies *ju* as the most favourable of the former group.

(d) The feature <-syll> sets off the consonants, which favour the rule, from the vowels, which do not. The feature <+tns> further identifies the tense or voiceless consonants as most favourable of all.

(e) The favouring effect of possessive position is formally represented by <+noun> after the pronoun slot. In the Guyanese continuum, possession is most frequently signalled in pronouns and nouns by the fact that they are juxtaposed to a following noun (e.g. *mi hat* 'my hat').

DIGGING DEEPER, AND REVISING THE VOWEL LAXING RULE. We now have, in rule (3), a variable rule for vowel laxing complete with variable constraints. But before we consider our task ended, we need to ask whether any of the constraints listed in (3) might not merely be surface manifestations of deeper, less visible constraints which the rule must be rewritten to include. In the light of Bickerton's forceful (1971) demonstration that it is possible to have apparently neat variable rules with spurious constraints, it is necessary to ensure that constraints are plausible or explainable in linguistic terms (Washabaugh 1974: 109).

The effect of the different pronoun forms on the probability of vowel laxing was at first difficult to understand, even though it agreed with the evidence of Allsopp (1958) in this respect almost perfectly. However, I eventually hypothesized that the explanation lay in the relative strength of the consonant preceding the vowel in these CV pronominal forms: the stronger the preceding consonant (in terms of force of articulation and resistance to phonological weakening processes, to mention two of the relevant criteria), the more likely the vowel is to undergo laxing.[5] This hypothesis first came to me when I was trying to figure out why the vowel in the pronoun *hi* never underwent laxing (this was also true of *hu* 'who'). The answer seemed to be related to the fact that, of all the personal pronouns, *hi* was the only one subject to consonant loss (the ultimate weakening process): i.e., we get *hi* and *i*, but no *hI*. The extension of the hypothesis to the other personal pronouns is easy once we refer to a consonantal strength hierarchy of the following type (Hooper 1973):[6]

				voiced stops		
			voiced	voiceless	voiceless	
(4) WEAK	glides	liquids	nasals	continuants	continuants	stops STRONG
	1	2	3	4	5	6

Leaving aside the case of *ju* for the moment, note how perfectly the ranking of the pronouns on the consonantal strength hierarchy agrees with their ranking on the vowel laxing hierarchy. For example, *de* and *ʃi* rank equally high on both hierarchies (5-strength, .68 prob.), *mi* is intermediate on both (3-strength, .48 prob.), and *wi* is at the bottom of both (1-strength, .04 prob.).

The pronoun *ju* is an exception, since its initial glide should rank it at the bottom of the vowel laxing hierarchy instead of at the top. But this exception seems to be due primarily to the fact that the semantics of this form are more highly recoverable from the syntactic and discourse context that any other personal pronoun. (Note, for instance, that subject *ju* is often absent from the surface structure of questions and imperatives, but leaves traces of its existence at a deeper level in reflexives and the like: '(You) come cut it yuhself!'). Since the brake on vowel laxing provided by consonantal strength is presumably to prevent

complete erosion of the pronoun (vowel laxing may be followed by reduction to schwa and vowel loss), it is apparently not needed when the semantic recoverability of the form is high, as is the case with *ju*.

The effect of the syntactic positions in which the pronouns occur is most plausibly related to the degree of stress they carry, since the possessive position tends to receive tertiary or weak stress more often than the others. This is particularly so when the following noun is itself stressed:

(5) *mI* húsban does proper cut *mI* áss! (Seymour, SI 70, quoting a friend.)

The other constraints do not require rewriting. Briefly, the following segments have a dissimilating effect, constraining vowel laxing in ways similar to the different preceding consonants.[7] Thus a following consonant favours the vowel laxing process more than a following vowel, and within each group, tense members effect more laxing than lax ones. (Remember that voiceless consonants are tense, voiced ones lax.) The style and social class effects, to be fully understood, do require reference to the fact that lax open syllable vowels are often regarded as Creole, and tense ones as English, but there seems to be no way of representing these effects without referring to <casual> and <EC> in the rule itself. Casual speech, in this community, often is faster than careful speech, and this in itself would encourage more vowel laxing; but it is also relevant to know that casual speech often involves as well a shift in the direction of Creole norms (including lax vowels), and careful speech a shift in the direction of English norms (including tense vowels).[8] The effect of social class cannot be fully explicated here, but it is generally true that the everyday speech of Estate Class members tends towards the Creole end of the continuum more than that of the Non-Estate members does. A number of socio-economic and political reasons are involved here, both historical and present-day.

Taking the preceding discussion into consideration, we may rewrite the variable rule for vowel laxing as follows to make it more explanatorily adequate:[9]

(6) Revised rule for vowel laxing, with variable constraints

$$\begin{bmatrix}+\text{syll}\\-\text{cons}\end{bmatrix} \rightarrow \text{<-tns>} \;/\; [\text{-syll}] \_\_\_\_ \#\#$$
$$\text{<n strength><n stress>} \left\langle \begin{matrix}\text{-syll}\\+\text{tns}\end{matrix} \right\rangle \;//\; \left\langle \begin{matrix}\text{+casual}\\+\text{EC}\end{matrix} \right\rangle$$
$$[+\text{ pro}]$$
$$\text{<+ hearer>}$$

In this version the possessive constraint <+noun> has been removed, since the role of syntactic position has been related to degrees of stress. <n stress> refers to stress values less than primary, higher numbers (weaker stresses) promoting more laxing. Reference to the person-number status of the pronoun forms themselves is no longer necessary, since <+hearer> separates the case of *ju* from the other pronouns, and the consonant feature <n strength> orders *de*, *ʃi*, *mi* and *wi* accordingly.

CONCLUDING REMARKS. We now have, in (6), a variable rule which both describes and explains the observed facts about pronominal vowel laxing. One reason why the variable rule framework works better for us than it did for Bickerton (1975) is because we have been dealing with a phonological variable, while Bickerton dealt

with grammatical ones (tense-aspect markers). Wolfram (1969) had noted over a decade ago that phonological variables tended to show gradient stratification, and grammatical variables sharp stratification. Fasold (1970) followed this up with the suggestion that the gradiently stratified variables were well-suited to description in the quantitative, variable rule framework. This paper does not allow us to speak with certainty of grammatical or sharply stratified variables, but it does establish that the preceding suggestion applies to creole continuum communities no less than to communities of any other type.

NOTES

*This paper is based on section 7.1 of my Ph.D. dissertation (Rickford 1979). I wish to thank my supervisors--William Labov, Dell Hymes, and John Fought--for their helpful comments, and my wife Angela for her encouragement and assistance.

1. Most Cane Walkers are Estate Class, working as field labourers on the sugar estate nearby. Non-Estate Class refers to the smaller number who work as shop-owners, clerks, contractors and the like--jobs with better pay and more prestige. EC and NEC may be considered roughly equivalent to Working and Lower Middle Class.
2. Casual style refers to speech in peer-group recordings and spontaneous interviews (the latter including questions on childhood experiences and other topics designed to minimize the constricting effects of the interviewing situation on the interviewee's speech). Careful style refers to speech in controlled interviews, which were conducted in a formal questionnaire format, and included questions which focused directly on language. (Cf. Labov 1972)
3. In chapter six of Rickford (1979), several arguments are presented in favour of tense underlying forms. An important one is that under stress (which often reveals full forms), the pronoun vowels are always tense.
4. I discovered after the computer analysis was completed that it was based on 2,768 tokens, nine more than the total used for Table 1, because of minor errors which occurred when the data was being re-organized for computor processing. Given the large n's for each factor, however, (ranging from 96 tokens in the U column to 1966 in the S), it is unlikely that this significantly affected the probabilities.
5. The case of *hi* and the pronouns subject to tense-lax variation may represent a more general phenomenon in which consonantal and vocalic weakening processes apply in complementary fashion to CV or VC forms. G. Sankoff (1974) notes, for instance, that *l*-deletion in Montreal French applies to *la*, *les*, *il* and *elle*, which have full vowels, but not to *le*, which contains a schwa vowel, and is subject to vowel deletion instead. Here it is the consonantal weakening process which depends on the vowel, rather than the other way around, but the principle is basically the same.
6. I am grateful to Walter Edwards of the University of Guyana for drawing my attention to this hierarchy in (my copy of!) Hooper's (1973) dissertation.
7. When I was presenting this rule in a talk at UCLA in November 1979, Peter Ladefoged noted that the effects of following segments also seemed to show the influence of segment strength (e.g., voiceless stops favouring more laxing than voiced).

8. It is sometimes thought that only syntactic, morphological, or lexical variables are consciously classified by native speakers as English and Creole, but a number of salient phonological variables are also classified in this way.
9. The final version of the vowel laxing rule in Rickford (1979) is like (6), but even more general, since it also covers vowel laxing in open syllables in non-pronominal forms like *say, dey* and *too* as well.

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MATRICES PHONOLOGIQUES INDIVIDUELLES ET VARIABLES

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Les nombreux traits distinctifs qui ont été proposés pour distinguer les cognates PTK/BDG en anglais montrent d'abord qu'il est difficile de s'en tenir à un seul trait dans la matrice phonologique pour remplir cette fonction. Bien plus, les traits qu'on a proposés ne paraissent acceptables que pour l'ensemble ou la moyenne des réalisations; ils reposent en effet sur une généralisation à partir de moyennes. Mais si l'on y regarde de près, on constate que les différents locuteurs recourent tantôt à un trait, tantôt à un autre, et le plus souvent à plusieurs traits en même temps, et que ce choix varie considérablement d'un locuteur à l'autre. En plus de cette variation inter-individuelle, on remarque une variation semblable chez un même locuteur. En effet, aucun des locuteurs n'est constant dans son choix de traits pour distinguer les cognates. Bien plus, un même locuteur varie ses traits sur le même mot répété dans une phrase. Je vais illustrer ce fait au moyen des cognates anglaises et des réalisations du /R/ en français québécois.

S'il faut, bien sûr, s'en tenir aux unités phonologiques abstraites, il serait beaucoup plus réaliste de les définir au moyen de matrices qui peuvent varier d'un individu à l'autre, et selon les contextes et les situations. Les variations phonétiques sont possibles parce que les matrices phonologiques les contiennent. C'est pourquoi je propose que les matrices de traits qui distinguent les phonèmes ne soient pas fixes et minimales pour tous, mais qu'elles comportent tous les traits disponibles que chaque locuteur peut utiliser, i.e. des matrices à configurations multiples et variables, comme dans la réalité. C'est ainsi qu'est vraiment assurée l'opposition au niveau des unités phonologiques.

En phonologie, on cherche depuis au moins 15 ans, le seul et unique trait qui distinguerait les cognates PTK et BDG; on en a proposé plusieurs, comme le voisement, la tension (ATR), le V.O.T., la durée de la voyelle qui précède, la durée de l'occlusion, la fréquence des formants, la pente des transitions formantiques, la forme F_0, etc. Certains de ces traits, le V.O.T. surtout, ont été proposés comme le trait par excellence, du moins pour certaines langues. Ces traits distinctifs qu'on a proposés paraissent acceptables, parce qu'ils peuvent s'appliquer à la moyenne des mesures faites sur les corpus examinés; ils sont le fruit d'une généralisation à partir de moyennes.

1. LES COGNATES ANGLAISES. Le corpus est composé de trois séries de 20 paires en P/B, T/D et K/G, prononcées par six étudiants anglophones, trois garçons et trois filles, de 18 à 26 ans. Pour les précautions prises et les détails matériels, voir Suen (1974). L'ensemble comprend 720 mots qui ont été étudiés au sonagraphe.

1.1 MOYENNES ET GENERALISATIONS. Le Tableau 1 montre les moyennes des durées (en ms) de la voyelle (V), de l'occlusion et du V.O.T., et les moyennes (en Hz) des transitions formantiques avec leurs pourcentages; on y voit aussi les rapports de grandeurs à