McLaughlin, B. 1987. *Theories of Second-language Learning*. London: Edward Arnold Publishers.
Miao, X-C. 1981. "Word Order and Semantic Strategies in Chinese Sentence Comprehension." Ms., University of California, Berkeley.
Muñoz-Liceras, J. 1983. *Markedness, Contrastive Analysis, and the Acquisition of Spanish Syntax by English Speakers*. Unpublished Ph.D. dissertation, University of Toronto.
Ochs, E. 1979. "Planned and Unplanned Discourse." *Discourse and Grammar. Syntax and Semantics, vol. 12* ed. by T. Givón. New York: Academic Press.
Pfaff, C. 1987. "Functional Approaches to Interlanguage." *First and Second Language Acquisition Processes* ed. by C. Pfaff. Rowley, MA: Newbury House.
Ritchie, W. 1978. "The Right-Roof Constraint in an Adult Acquired Language." *Second Language Acquisition Research: Issues and Implications* ed. by W. Ritchie. New York: Academic Press.
Rumelhart, D. and McClelland, J.L. 1986. "On Learning the Past Tenses of English Verbs." *Parallel Distributed Processing: Explorations in the Microstructure of Cognition. Vol. 2* ed. by D. Rumelhart and J.L. McClelland, Cambridge, MA: MIT Press.
Rutherford, W.E. 1983. "Language Typology and Language Transfer." *Language Transfer in Language Learning* ed. by S. Gass and L. Selinker. Rowley, MA: Newbury House.
Schmidt, M. 1980. "Coordinate Structures and Language Universals in Interlanguage." *Language Learning* 30.397-416.
Scollon, Robert. 1976. *Conversations With a One Year Old: A Case Study of the Developmental Foundation of Syntax*. Honolulu: University of Hawaii Press.
Shibatani, M. 1988. *Passives and Voicing (=Typological Studies in Language 16)*. Amsterdam: John Benjamins.
Tomlin, R. 1987. "Linguistic Reflections of Cognitive Events." *Coherence and Grounding in Discourse (=Typological Studies in Language 11)* ed. by R. Tomlin. Amsterdam: John Benjamins.
Van Valin, R.D. Jr. and W.A. Foley. 1980. "Role and reference Grammar." *Current Approaches to Syntax (=Syntax and Semantics 13)* ed. by E.A. Moravcsik and J.R. Wirth. New York: Academic Press.
Wulfeck, B., L. Juarez, E. Bates, and K. Kilborn 1986. "Sentence Interpretation Strategies in Healthy and Aphasic Bilingual Adults." *Language Processing in Bilinguals: Psycholinguistic and Neuropsychological Perspectives* ed. by J. Vaid. Hillsdale, NJ: Erlbaum.
Zobl, H. 1984. "Cross-language Generalizations and the Contrastive Dimension of the Interlanguage Hypothesis." *Interlanguage* ed. by A. Davis, C. Criper and A.P.R. Howatt. Edinburgh University Press.
Zubin, D. 1979. "Discourse Function of Morphology: The Focus System in German." *Discourse and Syntax* (=Discourse and Semantics) ed. by T. Givón. New York: Academic Press.

Variation theory: implicational scaling and critical age limits in models of linguistic variation, acquisition and change

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1. Introduction

Although Chomsky (1965) and other generativists are often criticized (or credited, depending on one's point of view) for suggesting that the study of non-categorical variation is peripheral to linguistics, it was Chomsky's structuralist predecessor, Joos (1950) who proclaimed that:

> All phenomena [...] which we find we cannot describe with a finite number of absolute categories we classify as non-linguistic elements of the real world and expel them from linguistic science. Let sociologists and others do what they will with such things [...] they represent that 'continuity' which we refuse to tolerate in our own science. (Joos 1950: 703)

Gleason (1961), in the textbook on which many structuralists were reared, was equally categorical:

> Descriptive linguistics is an either/or proposition, and its methods are applied only when the data can be so quantified. (Gleason 1961: 393)

Regardless of the dominant theoretical paradigm, it's been an issue for some time now as to whether scholars who were looking seriously at non-categorical or free variation in language (that is, cases other than those in which A always becomes B in environment C), or its external conditioning in the "real world" were really doing linguistics or something else, like sociology. Even today, some who take variability as central harbor private anxieties that they might be "expelled" from linguistics in line with Joos' grave directive of some forty years ago, or be relegated to the periphery of the field.

Thankfully, however, between the 1950's and the present, enough linguists have become involved in the direct study of linguistic variation to

provide a critical mass, and to establish the theoretical significance and interest of variability. Their numbers include sociolinguists (and I would include in this number most creolists and variationists) as well as students of second language acquisition (SLA), both of whom have benefitted from each other's findings and approaches and stand to benefit even more.

This paper is about theoretical intersections between these subfields. Instead of saying a little about the many issues in relation to which these sub-fields could contribute or have already contributed to each other (in the study of code-switching, for instance, or transfer, or the viability of variable rules, or the issue of where in the grammar variability might be handled, or the way in which socio-affective variables interact with internal linguistic ones), I will concentrate on two which have a critical bearing on our theoretical models. These are: (i) Implicational scaling and its use to constrain and explain variation; and (2) Limits on the acquisition and mastery of new features beyond puberty.

2. Implicational Scaling

The fact that sociolinguists and students of SLA often concentrate on what other linguists dismiss as "free variation" does not mean that they do not share the latter's concern to constrain variability in language. Clearly, if language use and acquisition can vary limitlessly, the theoretical task of accounting for our ability to acquire and use languages is difficult if not impossible. The innovators of the quantitative paradigm — in particular John Fischer and William Labov — were at pains to show that so called "free variation" could be constrained if we extended the notion of environment to external factors like social class, sex and style, and attended to quantitative as well as qualitative relations. Fischer (1958) showed that the boys in his New England village regularly used more *-In* than the girls, and that in other respects, *-In* was a systematic "socially conditioned" or "sociosymbolic" variant. Similar findings turned up in many other communities. Labov (1966) further demonstrated that synchronic variation may be a reflection of — in fact the very engine of — diachronic change.

The discovery of implicational relationships in language, made several years after the development of the quantitative paradigm, provided another mechanism for constraining linguistic variability, for revealing order in chaos, and drawing us closer to our larger theoretical goals. As Politzer

(1976: 123) reminds us, it was Greenberg (1963: 73) who first drew our attention to the existence of such relationships at the level of language universals and typology ("Given x in a particular language, we always find y"). However, it was DeCamp (1971) who first noted the existence of similar patterns in inter-speaker variation within the speech community ("the speaker who says x will also say y, but not necessarily the reverse), and proposed a method of scaling raw data which has become extremely popular in studies of language variation, acquisition, and change, particularly in creole continua. DeCamp's method was actually, as he noted (1971: 369) an independent reinvention of the "scalogram analysis" which Guttman (1944) had developed for sociological data; and DeCamp's methods and assumptions were subsequently modified by C.J. Bailey and Derek Bickerton, among others. But since it is DeCamp whom variationists and SLA students regard as the "godfather" of the scaling methods they use, we'll use the scale that DeCamp (1971) taught us how to construct (but didn't include in his paper) to show how implicational scaling constrains variation.

Table 1 is DeCamp's scale, in fact a modified version of Fasold's (1970) version of it. Items A to F across the top represent six variables or features in the Jamaican Creole speech continuum, each of which has two variants or values — a Creole variant, represented by − in the scale, and an English or non-Creole variant, represented by +. In the A column, for instance, − is Creole *nyam* and + is English *eat*. In the E and F columns, the situation is slightly more complicated, inasmuch as − means exclusive use of the

Table 1. Implicational scale for the Jamaican Creole continuum

	VARIABLES					
SPEAKERS	A	B	C	D	E	F
1	+	+	+	+	+	+
2	+	+	+	+	+	−
3	+	+	+	+	−	−
4	+	+	+	−	−	−
5	+	+	−	−	−	−
6	+	−	−	−	−	−
7	−	−	−	−	−	−
Key: Minus (−):	nyam	nanny	no ben	pikni	/t/	/d/
Plus (+):	eat	granny	didn't	child	/t¯θ/	/d¯ð/

*Based on (DeCamp 1971:356)

Creole stop pronunciation while + means that there's variation between the Creole stop and non-Creole interdental fricative pronunciations, but the basic principle should be clear.

The scale as a whole depicts the usage of seven speakers, listed as 1-7 down the left, for whom the following implicational pattern holds: a plus anywhere in the table implies plusses to the left (and above); a minus anywhere in the table implies minuses to the right (and below). More concretely, taking feature D as our focal point, a speaker (like 4, 5, 6, or 7) who says *pikni* (who has a minus value on feature D) will also use alveolar stops instead of interdental fricatives, both voiceless and voiced (will also have minus values on features E and F); a speaker (like 1, 2, or 3) who instead says *child* (who has a plus value on feature D), will also use *didn't*, *granny*, and *eat* instead of their Creole equivalents (will also have plus values on features C, B and A). When variables form a perfect implicational scale, in the sense that these implicational predictions are borne out perfectly by usage, as they are in Table 1, the range of possible variation is constrained significantly. For instance, if minuses and plusses could occur randomly across the six columns of Table 1 (true "free variation") we'd have 64 possible patterns (2^6 — the formula is k to the n, where k=number of variants possible for each variable, and n=number of variables). Table 1' shows some of the excluded patterns. By contrast, in a perfect scale, for 6 binary variables, there are only 7 possible scale types (in general, n + 1): precisely the ones shown in Table 1. Now of course, we can see how scaling constrains variation; with nine variables (several scales in the literature have this many), there are 512 possible arrangements of + and −, but only 10 perfect scale types. With variation so tamed, we can feel more confident about engaging in the scientific enterprise of prediction and explanation.

Table 1'. Some of the 57 patterns excluded by the scale model

VARIABLES					
A	B	C	D	E	F
+	−	+	−	+	−
−	+	+	+	−	+
+	+	−	+	−	−
−	+	+	−	−	−
+	−	−	−	−	+
−	−	−	+	+	+

DeCamp himself didn't give us a quantitative indication of how significantly scaling constrained variation, nor did he attempt to interpret scales like the one in Table 1 in diachronic terms. It was C.J. Bailey who provided the diachronic principles for interpreting such scales according to his dynamic or wave model, succintly summarized by Bickerton (1971):

> implicational phenomena [...] arise as a result of waves of change spreading through a speech community (therefore moving in time as well as space) so that at any given time a particular change will have 'passed' certain speakers but will not yet have 'reached' others, while those who it has 'passed' will also (anomalies apart) have experienced the change waves that preceded it. [...] implicational relationships come about only because an original change, while it is being diffused through [...] space, is also being generalised through time in the place where it originated (i.e. it spreads to more and more environments until it is completely unconditioned). (Bickerton 1971: 476-81)

Returning to Table 1, we can use Bailey's (1973a: 82) principle 20 ("What is quantitatively less is slower and later; what is more is earlier and faster") to interpret it as depicting a general process of decreolization, which began for everyone with variable A (the one with the most plusses or rule applications) and spread gradually to variables B, C, D, E, and F. Speaker 1's idiolect, with the most plusses, is also the most advanced with respect to decreolization, which has affected variables A, B, C, D, E and F. As it turns out, he is an educated appliance store proprietor, with good oppor-

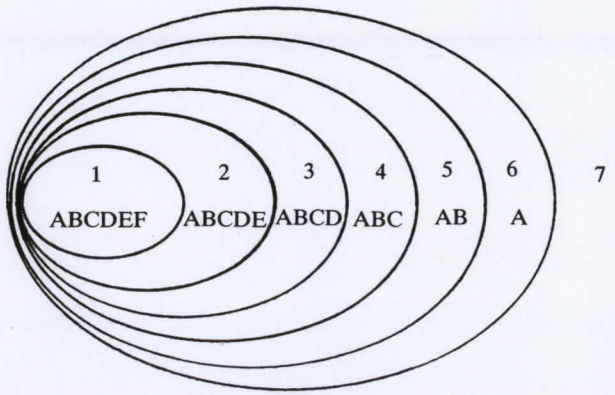

Figure 1. Diachronic interpretation of Table 1 at the time of data collection

tunity and motivation to acquire and use standard English. On the other hand, speaker 7's idiolect remains unaffected by the decreolizing waves which have spread out through linguistic environments and social segments of the Jamaican community as depicted in Figure 1, and he uses only the Creole variants. Speaker 7 is an unschooled peasant farmer who has presumably had little opportunity or motivation to acquire the standard or shift his native Creole usage.

Bailey (1973b; 1982) provides several other examples illustrating his predictions that linguistic change begins in the most marked or tightly constrained environment and spreads to less marked/more general environments, and that implicational patterns derive from the spread of rules through social or geographical and linguistic space over time. Table 2 (from Bailey 1973b, based on research by Labov and others) depicts the raising of /æ/ by following environment and geographical locale; a plus anywhere

Table 2. Schematized illustration of the spread of the change that raises the vowel nucleus of words like **ham** *in the different envirnonments shown#*

	Sound environments differentiated according to the following consonants:								
	m n	f θ s	d	b	š	g	v z	p t k	l
Locales	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
0. *	–	–	–	–	–	–	–	–	–
1. *	x	–	–	–	–	–	–	–	–
2. Birdsboro	+	x	–	–	–	–	–	–	–
3. Philadelphia	+	+	x	–	–	–	–	–	–
4. Mammouth Junction	+	+	+	x	–	–	–	–	–
5. Ringoes	+	+	+	+	x	–	–	–	–
6. Jackson	+	+	+	+	+	x	–	–	–
7. New York City	+	+	+	+	+	+	x	–	–
8. *	+	+	+	+	+	+	+	x	–
9. *	+	+	+	+	+	+	+	+	x
10. Buffalo	+	+	+	+	+	+	+	+	+

#A minus sign denotes the categorical nonoperation of the rule for the change; x denotes the variable operation of the rule; a plus sign denotes its categorical operation. An asterisk denotes a thus far untested, but presumably discoverable, pattern. The change is presumed to originate in locale 10, where it is complete in the vernacular style of speaking — the style illustrated in this table. (Source: Bailey 1973a: 158.)

implies plusses to the left, a minus anywhere implies minuses to the right, and variable usage (X) separates categorical non-applications from applications. Following Bailey's principle 20, we'd again infer from the preponderance of plusses that the change originated in Buffalo and before /m/ and /n/ and spread outwards in linguistic and social space as shown in Figure 2.

Implicational scales have been extensively employed in studies of pidgin and creole continua (in addition to Bickerton's work, see Day 1972, Washabaugh 1977, Akers 1981, Escure 1982 and Rickford 1987), but they have also been employed in other studies which fall more directly within the

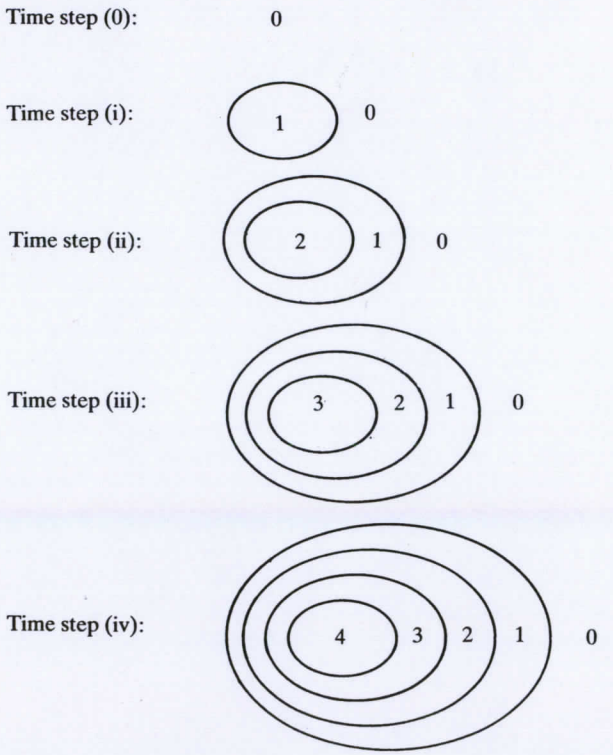

Figure 2. Wavelike propagation of the change shown in Table 1
The Arabic numerals represent the same varieties of the language here as in Table 1. The time steps are defined by the changes themselves. (Source: Bailey 1973b: 159.)

SLA paradigm. Politzer (1976) used it to model mastery of the appropriate rules for five grammatical contrasts in French and English by San Francisco Bay Area students enrolled in bilingual schools; Andersen (1978) to model mastery of 13 grammatical morphemes in English by Spanish-speaking students at the University of Puerto-Rico; Zobl (1984) to model acquisition of the rules for using the possessive-case-marked forms *his* and *her* in English by 162 French-speaking students; Trudgill (1986: 25), drawing on data in

*Table 3. Norwegian and Swedish pronouns**

N/S forms:	*jeg/jag* 'I'	*de/dom* 'they'	*ham/honom* 'him'	*dere/ni* 'you'
Fanny	N	N	N	N
Jenny	N	N	N	N
Katarina	N	N	N	N
Bodil	N	N	N	S
Eva	N	N	N	S
Blenda	N	N	S	*N*
Charlotte	N	N	S	*N*
Henny	N	N	S	S
Carin	N	S	*N*	S
Stine	N	S	*N*	S
Barbro	N	S	S	S
Lisbeth	N	S	S	S
Alma	N	S	S	S
Nancy	N	S	S	S
Erna	S	S	S	S
Ellen	S	S	S	S
Inez	S	S	S	S
Helen	S	S	S	S
Helen	S	S	S	S
Mona	S	S	S	S
Nina	S	S	S	S
Linda	S	S	S	S
Lena	S	S	S	S

*Source: Nordenstam (1979) as reported in Trudgill (1985).
Index of Reproducibility (IR) =
1 − # scaling errors/#opportunities for error
or 1 − # scaling errors/(# variables) (# subjects)
or 1 − # scaling errors/(# columns) (# rows)
IR = 1 − 4 / 4 x 22 = 1 − .0454 = .95
Note: *N*s in table = scaling errors.

Nordenstam (1979), to model the order in which Swedes living in Norway acquire Norwegian personal pronouns, as shown in Table 3.

Useful though implicational scaling is as an heuristic device, a few cautions about the theoretical interpretation and use of scales need to be sounded in the light of recent findings.

2.1 *Goodness of fit*

Pavone's (1981) dissertation — the most statistically sophisticated study of linguistic scaling to date — points out that there are more demanding tests of the goodness of fit between scale models and actual data than Guttman's "Index of Reproducibility" (IR, the percentage of non-deviant cells out of all possible cells), the one which virtually all linguists use. Furthermore, several scales in the sociolinguistic literature fail to pass even this goodness of fit measure. For one thing, many linguists accept reproducibility or scalability-figures of 85%, following Guttman's original paper (1944 — see Fasold 1975: 46), but as Dunn-Rankin (1983: 107) notes, Guttman had stated elsewhere that a scale with an index less than 90% cannot be considered an adequate approximation to a perfect scale, and that an index of 93% "approximates the .05 level of significance" which we demand in other studies. Among the scales which fail by this criterion are those in Bickerton's (1973) study of morphological variation in Guyanese pronouns, and his earlier (1971) study of *tu/fu* variation, their problems exacerbated by their high proportion of empty cells. To cite Bickerton is not to excuse myself, for, as Pavone notes (p. 155), Rickford (1975) had faulted the reproducibility measure for "passing" a scale (at a level of .889) which allowed inferences about the distribution of Black English BIN which my other independent evidence did not support, when in fact if I had used the correct 90% criterion, I would have gotten my theoretical wish. Scales used by Bailey, Day, Anshen, Elliot, Legum and Thomson, Stolz and Bills, Fasold, and Day — some of them classics in the literature — also come in for critiques of similar sorts.

2.2 *Multi-valued scaling*

Table 4 (from Rickford 1979: 255) shows a 2-valued display for vowel-laxing in five Guyanese Creole personal pronouns — as used by 24 individuals. The data form a perfect scale (IR=100%), conforming to the following

implicational prediction: any laxing of *wi* implies laxing of the other forms. However, the considerably stronger frequency-valued scale in Table 5 also passes the IR at an acceptably high level (99% or 94/96 errorless cells) — note that a deviation by 1 percentage point could throw it off — and subdivides the forms into four groups which support this stronger implicational prediction: laxing of *wi* implies laxing of *mi* at an equal or higher frequency, implies laxing of *de* or *shi* at an equal or higher frequency, implies laxing of *ju* at an equal or higher frequency. Table 6 from Andersen (1978) — shows a binary and quantitative (multi-valued) implicational scale side by side. Both achieve a sufficiently high reproducibility index (98% for the binary

*Table 4. Two-valued implicational scale for vowel laxing by pro-form**

Lects	Interv. Number	Interviewee's Name	*ju, de, shi* and *mi*	*wi*
	1.	Derek	+	+
	2.	James	+	+
	3.	Florine	+	+
	4.	Reefer	+	+
	5.	Sultan	+	+
	9.	Sari	+	+
Lect A	11.	Darling	+	+
	13.	Mark	+	+
	14.	Magda	+	+
	17.	Sheik	+	+
	18.	Seymour	+	+
	22.	Ustad	+	+
	23.	Oxford	+	+
	24.	Granny	+	+
	6.	Raj	+	–
	7.	Irene	+	–
	8.	Rose	+	–
	10.	Ajah	+	–
Lect B	12.	Nani	+	–
	15.	Katherine	+	–
	16.	Kishore	+	–
	19.	Radika	+	–
	20.	Claire	+	–
	21.	Bonnette	+	–

*IR = 100% (48/48); Key: – = .00, + = .01 – 1.00. (Source: Rickford 1979:255.)

scale, 94% for the multi-valued) for the pattern: mastery of auxiliary *have* precedes mastery of irregular past verbs, precedes mastery of auxiliary *be* in progressive constructions, precedes mastery of copula *be*. Tables 4, 5 and 6 together reveal that whether we are dealing with variable sociolinguistic usage or acquisition data, strong multi-valued implicational scales which make highly constrained predictions about how the data will pattern are possible. Yet the tendency has been to accept weaker binary scales without attempting to see if stronger predictions are possible.

*Table 5. Frequency valued scale for vowel laxing by pro-form**

Lects	Int. No.	Interv's Name	*ju*	*de* *shi*	*mi*	*wi*
Lect A	4.	Reefer	1.00	.89	.84	.08
	10.	Ajah	1.00	.89	.80	.00
	12.	Nani	.96	.94	.76	.00
	11.	Darling	.96	.94	.76	.00
	2.	James	.96	.88	.76	.00
	24.	Granny	.96	.92	.68	.32
	6.	Raj	.88	.89	.80	.00
Lect B	1.	Derek	.96	.94	.62	.12
	5.	Sultan	.96	.84	.72	.24
	7.	Irene	.96	.84	.72	.00
	8.	Rose	.96	.81	.76	.00
	9.	Sari	.96	.85	.72	.12
	13.	Mark	.96	.80	.76	.04
	3.	Florine	.92	.90	.60	.04
	17.	Sheik	.88	.68	.68	.04
Lect C	20.	Claire	.88	.68	.68	.04
	14.	Magda	.84	.72	.60	.24
	19.	Radika	.84	.63	.52	.00
	18.	Seymour	.72	.56	.40	.04
	16.	Kishore	.64	.57	.52	.00
Lect D	23.	Oxford	.68	.48	.36	.32
	15.	Katherine	.70	.51	.20	.00
	22.	Ustad	.56	.38	.36	.08
	21.	Bonnette	.76	.60	.20	.00

*IR = 99% (95/96); solid diagonal line running from upper right to lower left = .80 line; deviations circled. (Source: Rickford 1979: 261.)

Table 6. Quantitative and binary implicational tables

A. Quantitative Table					B. Binary Table				
SUBJECT	COP	AUX	PaI	Hv	SUBJECT	COP	AUX	PaI	Hv
1	100	100	-	100	1	1	1	-	1
2	100	100	100	100	2	1	1	1	1
3	100	100	100	100	3	1	1	1	1
4	100	100	(85)	100	4	1	1	1	1
9	100	100	(88)	100	9	1	1	1	1
10	100	100	(93)	100	10	1	1	1	1
14	100	100	(22)	100	14	1	1	(0)	1
15	100	100	100	88	15	1	1	1	1
16	100	100	(13)	100	16	1	1	(0)	1
41	100	88	(71)	82	41	1	1	(0)	1
5	100	100	100	0	5	1	1	1	0
6	100	100	100	20	6	1	1	1	0
7	100	100	100	78	7	1	1	1	0
8	100	-	91	67	8	1	-	1	0
11	100	100	100	57	11	1	1	1	0
12	100	100	100	0	12	1	1	1	0
13	100	100	100	40	13	1	1	1	0
17	100	100	93	14	17	1	1	1	0
18	92	-	80	13	18	1	-	1	0
19	100	100	80	56	19	1	1	1	0
20	100	100	100	-	20	1	1	1	-
21	100	100	100	73	21	1	1	1	0
22	100	-	100	-	22	1	-	1	-
23	100	100	92	14	23	1	1	1	0
25	100	(57)	80	0	25	1	(0)	1	0
26	100	100	89	0	26	1	1	1	0
27	100	100	86	0	27	1	1	1	0
37	100	-	100	-	37	1	-	1	-
43	100	100	100	13	43	1	1	1	0
44	96	89	86	0	44	1	1	1	0
45	100	91	86	22	45	1	1	1	0
48	100	(75)	91	0	48	1	(0)	1	0
62	100	(88)	100	0	62	1	1	1	0
63	100	(70)	83	25	63	1	(0)	1	0
64	-	-	100	17	64	-	-	1	0
24	100	100	33	0	24	1	1	0	0
28	100	100	50	0	28	1	1	0	0
29	100	87	78	67	29	1	1	0	0
30	100	100	-	0	30	1	1	-	0
31	100	100	25	0	31	1	1	0	0
32	100	100	71	0	32	1	1	0	0
33	100	100	-	0	33	1	1	-	0
34	100	100	25	-	34	1	1	0	-
35	100	100	67	33	35	1	1	0	0
36	100	100	67	1	36	1	1	0	0

A. Quantitative Table (*cont'd*)					B. Binary Table (*cont'd*)				
SUBJECT	COP	AUX	PaI	Hv	SUBJECT	COP	AUX	PaI	Hv
39	100	100	-	0	39	1	1	-	0
40	100	100	8	0	40	1	1	0	0
42	100	85	63	0	42	1	1	0	0
46	100	80	40	38	46	1	1	0	0
47	89	88	69	-	47	1	1	0	-
50	100	100	-	14	50	1	1	-	0
51	100	91	-	0	51	1	1	-	0
52	(89)	100	20	-	52	1	1	0	-
54	100	100	-	-	54	1	1	-	-
55	100	82	(0)	14	55	1	1	0	0
58	-	80	-	0	58	-	1	-	0
59	-	100	-	0	59	-	1	-	0
60	100	100	64	0	60	1	1	0	0
66	(89)	100	-	-	66	1	1	-	-
68	100	86	22	-	68	1	1	0	-
74	100	100	0	0	74	1	1	0	0
82	100	89	-	57	82	1	1	-	0
87	100	100	0	0	87	1	1	0	0
53	100	50	-	-	53	1	0	-	-
56	96	50	25	0	56	1	0	0	0
57	100	0	0	0	57	1	0	0	0
61	100	57	40	0	61	1	0	0	0
65	100	(27)	67	20	65	1	0	0	0
67	100	20	-	11	67	1	0	-	0
69	100	0	-	0	69	1	0	-	0
70	100	0	-	-	70	1	0	-	-
71	100	33	0	0	71	1	0	0	0
72	100	(17)	29	-	72	1	0	0	-
73	100	(40)	67	0	73	1	0	0	0
75	100	73	47	29	75	1	0	0	0
76	100	(12)	17	0	76	1	0	0	0
77	100	(0)	75	-	77	1	0	0	-
78	100	64	0	0	78	1	0	0	0
79	100	40	-	-	79	1	0	-	-
80	100	-	44	0	80	1	-	0	0
83	100	(13)	75	-	83	1	0	0	-
84	100	57	38	0	84	1	0	0	0
88	100	63	0	-	88	1	0	0	-
89	100	14	-	-	89	1	0	-	-
38	-	64	-	-	38	-	0	-	-
49	-	67	(100)	0	49	-	0	(1)	0
85	-	(0)	33	0	85	-	0	0	0
81	75	57	29	-	81	0	0	0	-
86	67	(0)	78	0	86	0	0	0	0

*Quantitative table: IR = .94 (334/356); binary table: IR = .98 (349/356). (Source: Andersen 1978: 226.)

2.3 *Verification and explanation*

A number of the classic studies in sociolinguistics have revealed implicational ordering but made no attempt to provide independent verification or explanation for the ordering. For instance, no one has ever bothered to try to explain **why** *nyam* and *nanny* were the most marked and earliest to decreolize variables in De Camp's scale (Table 1 above), and why the nonstandard phonological features were the least. It turns out that direct African loans like *nyam* and *nanny* (which unlike loan translations tend to be *more obviously non-English in form or function) are for historical and sociological reasons (see Alleyne 1971: 181, Smith 1962: 41) particularly stigmatized in Caribbean societies, while nonstandard phonological variants like t* and *d* are not only more widely distributed among English dialects, but also among Jamaicans and Guyanese of different social classes. For maximum generality and utility, we would obviously need to plug these factors into a more general theory of saliency and its interaction with language shift and change, perhaps as Trudgill (1986) has begun to do for dialect shift in metropolitan societies; but we cannot be satisfied to locate descriptive regularities and not explain them, any more than any other linguists (on this general point see Rickford 1979: 40).

Returning to the vowel-laxing cases we discussed above, justification for the more stringent multi-valued scale ordering derives from the fact that an independent variable rule analysis of the data produces exactly the same ordering of the forms (*ju* .84, *de* and *shi* .68, *mi* .48, *wi* .04), while Allsopp's (1958) study orders the forms almost identically (*ju* .80, *de* .67, *shi* .59, *mi* .56, *wi* .32). Moreover, the independently established consonantal strength hierarchy (Hooper 1973, Jakobson and Halle 1956) provides a virtually exceptionless explanation for this ordering. The generalization is that the stronger the preceding consonant, the greater the likelihood of vowel laxing: the /w/ in *wi* ranks lowest on this scale; nasals, as in *mi* are ranked 3; and voiced stops/voiceless continuants, as in *de/shi* are ranked 5, above the others; *ju*, with an intial glide, should be ranked least with respect to vowel-laxing, like *wi*; but it is the most recoverable by syntactic rules and therefore the most reducible/loseable of all. The reader is referred to Rickford (1979: 221-24) for details. Note too that this discussion relates to unstressed syllables, and not to the categorically tense heavy stress syllables implicated in the discussion of Gibson and Johnson (1984).

It is worth noting that the implicational scale studies in the SLA literature that I cite above not only use the correct index of reproducibility measure, but also make commendable use of independent verification and explanation. The implicational orderings in Andersen (1978), for instance, are supported by independent implicational orderings in Singapore English discovered by Platt (1977) as well as by non-implicational studies using other methods, for instance, Krashen's (1977) "Natural Order."

In each of these respects, then, the earlier sociolinguistic literature used scales in ways which we now recognize as wanting, and in each of these respects the use of such scales by SLA researchers has been superior. There are two other potential weaknesses of creole continuum scales which I discuss in Rickford (1987) which SLA researchers haven't had to deal with because their data has been more limited than that of the sociolinguists: (i) the fact that the discontinuities on which scaling depend diminish considerably with repeated samplings of natural speech across a wide variety of styles, and (ii) that such discontinuities virtually disappear when introspective data is added to that of observations, undermining the interpretation that speakers like those in Table 1 are fossilized at stages of decreolization or SLA. Because SLA students usually work with elicited (task performance) data and consider acquisition on the individual level, such issues don't arise, but as they consider language acquisition by pre-existing groups and communities in natural settings, and consider stylistically differentiated data — as they should — these and similar issues (such as the appropriateness of unidimensional versus multidimensional scaling) will come to occupy them too, and they may be able to benefit from the experience of the sociolinguists.

3. Acquisition after Puberty

The issues I have been dealing with so far are relatively "old" ones within sociolinguistics and variation theory, although we should not assume that they are therefore settled. However, the next issue I will take up is very new, so new in fact that it has only begun to be raised as a problematic issue in sociolinguistics in recent years, and systematic attacks on it have scarcely begun. I bring it up in this context because SLA scholars have been involved with it in one form or another for a longer period than we have,

and may have something to contribute to (and also take from) our discussion.

The issue has to do with the limits on the ability of speakers to acquire and master the rules of varieties other than the one which they acquire in their pre-puberty years from parents and peers, and it surfaces as a critical issue in relation to the new "acts of identity" theory of LePage and Tabouret-Keller (1985), according to which "We create our linguistic rules so as to resemble as closely as possible those of the group or groups with which, from time to time, we wish to identify" (Edwards 1983: 302, summarizing Le Page's model). This thesis is constrained by the following four riders (LePage and Tabouret-Keller 1985):

> We can only behave according to the behavioural patterns of groups we find it desirable to identify with to the extent that:
> (i) we can identify the groups;
> (ii) we have both adequate access to the groups and ability to analyse their behavioural patterns;
> (iii) the motivation to join the groups is sufficiently powerful, and is either reinforced or reversed by feedback from the groups;
> (iv) we have the ability to modify our behaviour. (Le Page and Tabouret-Keller 1985: 182)

The constraint of greatest interest to us is the last, especially as it relates to and is affected by age (ibid):

> As to ability, it is generally assumed that all children, unless disabled in some way, have the same innate capacity to learn the linguistic systems of their community. It does not seem that this has been demonstrated beyond the earliest years; whether or not there are in later years complexities of grammar or lexicon beyond the capacity of some to cope with is unknown. But apparent differences in capacity to cope with more than one language system in multilingual situations are more likely to stem from differences of access and [...] from differences of motivation, rather than from differences of capacity. (Le Page and Tabouret-Keller 183-84)

Well, attractive as this theory is — it is the most deliberately socio-psychological sociolinguistic theory we have had to date — it is obviously crucial to know what limits to accommodation **are** imposed by age.

Although Le Page correctly observes that the limits to accomodation/acquisition beyond the earliest years are unknown, the standard sociolinguistic assumption, at least since Labov (1966), is that control of vernacular varieties other than the one that one gains from parents and friends is difficult if not impossible after the age of 13. As Labov (1972) suggests:

> The child's first experience in the use of English , at 2 to 3 years old, is usually dominated by the example of his parents. But from about 4 to 13 years old, his speech pattern is dominated and regulated by that of the preadolescent group with which he plays. These are the peers who are able, by their sanctions, to eliminate any deviations from the dialect pattern of the group. It appears that this preadolescent period is the age when automatic patterns of motor production are set; as a rule, any habits acquired after this period are maintained by audio-monitoring in addition to motor-controlled patterns. (Labov 1972: 138)

Support for the existence of limits to vernacular shift among adults (and therefore against the acts of identity model) comes from anecdotal reports within the sociolinguistic literature of adults who claim to have or want to have conscious control of sociolinguistic variables, but whose actual performance doesn't match their ideals. For instance, Labov (1972: 104) discusses the case of Steve K in NYC, who claimed to be able to constrict all his postvocalic r's at will, as he had been able to do in college; even with repeated attempts on a reading passage, however, he couldn't go higher than an r-index of 69, and L concludes that his original reading style of 38 is representative. Similarly, Blom and Gumperz (1973: 430) report that when participants in their Hemnesberget (Norway) study heard themselves switching between Ranamål and Bokmål on tape, they were surprised, and "promised to refrain from switching during future discussion sessions." However, in later sessions:

> when an argument required that the speaker validate his status as an intellectual, he would again tend to use standard forms [...] Code selection rules thus seem to be akin to grammatical rules. Both operate below the level of consciousness and may be independent of the speaker's overt intentions. (emphasis added)

Finally, there is the evidence of a study by Fishman (1983) in which the researcher recorded the conversations of a few couples in their apartments and found that it was the women who provided the bulk of the topic uptake and support via questions and channel cues, with the result that topics were successfully initiated by men much more often than by women. This was so despite the fact that (p. 91) "Two of the women were avowed feminists and all three men as well as the other woman described themselves as sympathetic to the women's movement". I've had similar results in a sociolinguistics class, with male students continuing to interrupt and dominate in mixed-sex discussions despite having read the literature on this subject and attempting to do otherwise.

At the same time, despite this anecdotal support for the traditional sociolinguistic assumption, it's being challenged by some recent evidence. One kind of challenge comes from studies (Payne 1980; Trudgill 1986: 36) indicating that one has to be actively exposed to a new dialect before the magic age of 13 — even 11 or 8 may be too late — to master the complex constraints on some rules, such as the /æ/ raising rule we discussed earlier, and that in some cases, even if one is born into a community, one may not acquire the rules for that community's vernacular if one's parents are from out of town.

The other kind of challenge is quite the opposite. Labov (1982) reports that while there is a largish body of evidence that an individual's sound system changes little throughout his or her lifetime, there is at least one study (Peng 1979) which shows that "Japanese sound change continues within individuals at a gradually decreasing rate until the age of 35". And with respect to grammatical variables, work by Arnaud (1979) on the history of the English progressive and by Sankoff (1980) on syntactic change in Tok Pisin suggests that grammatical change can continue throughout one's lifetime, although consistent use of the new rules may never be attained.

As Labov notes (p. 67), it is important to get the picture straight to know whether we can make valid inferences about the existence of change in real time on the basis of distributions in apparent time. Those of us (for instance Thomas and Rickford 1987) who have been attempting to model the latter process are aware of the significant differences in our change models which can be made by the assumption that speakers don't change significantly after puberty (Figure 3) versus the assumption that they do (Figure 4).

Hopefully, SLA students will be able to inform us on this issue, because of their much longer concern with the issue of critical periods for language acquisition (Dulay, Burt and Krashen 1982; Scovel 1983; Seliger 1983) and its cognitive, social and linguistic dimensions (Klein 1986: 10). However, we will need longitudinal studies for definitive evidence on this point, and such studies are apparently as rare in SLA as they are in sociolinguistics. Additionally, the kind of data which sociolinguists are likely to find more useful is natural speech data, preferably gathered from recorded spontaneous usage in the speech community rather than elicited in foreign language classrooms, and SLA scholars tend to use the latter rather than the former.

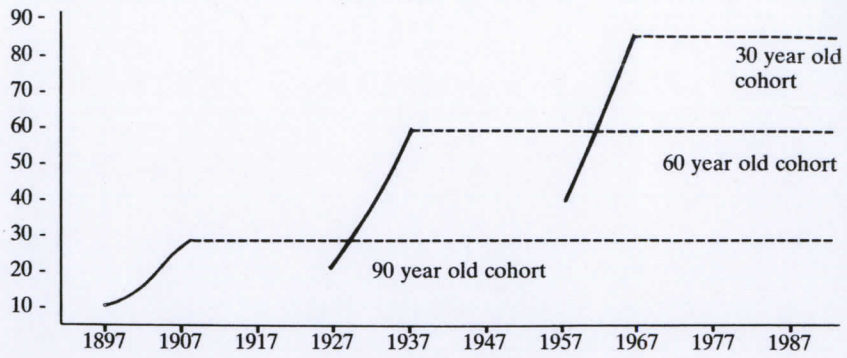

Figure 3. Change model with no post-puberty vernacular change

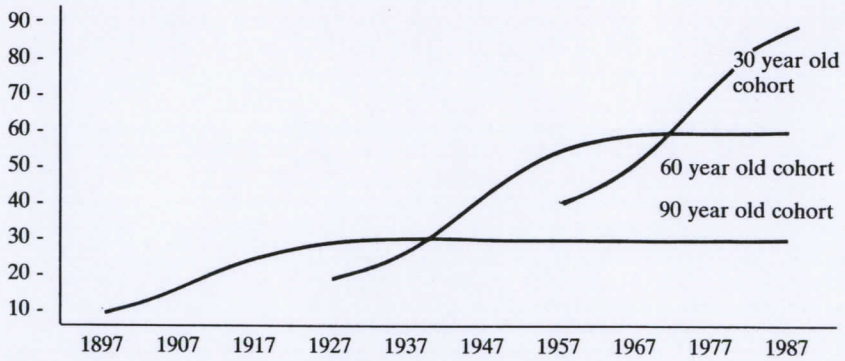

Figure 4. Change model with post-puberty vernacular change

If in these and other respects sociolinguists and students of SLA could be aware of each other's theoretical needs, advances, and approaches, both subfields and Linguistics as a whole could benefit. This is the primary point of this paper.

References

Akers, G. 1981. *Phonological Variation in the Jamaican Continuum*. Ann Arbor: Karoma.

Alleyne, M. C. 1971. "Acculturation and the Cultural Matrix of Creolization." *Pidginization and Creolization of Languages* ed. by Dell Hymes, 169-186. Cambridge: Cambridge University Press.

Allsopp, R. 1958. *Pronominal Forms in the Dialect of English Used in Georgetown (British Guiana) and Its Environs by Persons Engaged in Non-clerical Occupations*. M.A. thesis, London University, Vol. II.

Andersen, R.W. 1978. "An Implicational Model for Second Language Research" *Language Learning* 28.221-282.

Arnaud, R. 1979. "Regard sur la variation syntaxique: La forme progressive dans la correspondence de George Eliot (1838-1880)." *Cahiers Charles* 5.105-118.

Bailey, C.-J. N. 1973a. *Variation and Linguistic Theory*. Arlington, Virginia: Center for Applied Linguistics.

Bailey, C.-J.N. 1973b. "The Patterning of Language Variation." *Varieties of Present-day English* ed. by R. Bailey and J. Robinson. New York: Macmillan

Bailey, C.-J.N. 1982. *On the Yin and Yang Nature of Language*. Ann Arbor: Karoma.

Bickerton, D. 1971. "Inherent Variability and Variable Rules." *Foundations of Language* 7.457-492.

Bickerton, D. 1973. "On the Nature of a Creole Continuum." *Language* 49.640-669.

Blom, J.P. and J.J. Gumperz. 1972. "Social Meaning in Linguistic Structures: Code-switching in Norway." *Directions in Sociolinguistics* ed. by John J. Gumperz and Dell Hymes, 407-34. New York: Holt, Rinehart and Winston, Inc.

Chomsky, N. 1965. *Aspects of the Theory of Syntax*. Cambridge: Massachusetts Institute of Technology Press.

Day, R.R. 1972. *Patterns of Variation in Copula and Tense in the Hawaiian Post-creole Continuum*. Ph.D. dissertation, University of Hawaii. Reprinted in *Working Papers in Linguistics* 5(2), 1973, Department of Linguistics, University of Hawaii.

De Camp, D. 1971. "Toward a Generative Analysis of a Post-creole Continuum." *Pidginization and Creolization of Languages* ed. by Dell Hymes, 349-70. Cambridge: Cambridge University Press.

Dulay, H., M. Burt and S. Krashen. 1982. *Language Two*. New York and Oxford: Oxford University Press.

Dunn-Rankin, P. 1983. *Scaling Methods*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Edwards, W.F. 1983. "Code Selection and Shifting in Guyana." *Language in Society* 12.295-311.

Escure, G. 1982. "Contrastive Patterns of Intragroup and Intergroup Interaction in the Creole Continuum of Belize." *Language in Society* 11.239-64.

Fasold, R.W. 1970. "Two Models of Socially Significant Linguistic Variation." *Language* 46.551-563.

Fasold, R.W. 1975. "The Bailey Wave Model: A Dynamic Quantitative Paradigm." *Analyzing Variation in Language* ed. by Ralph W. Fasold and Roger W. Shuy, 27-58. Washington, DC: Georgetown University Press.

Ferguson, C.A. 1959. "Diglossia." *Word* 15.325-40.

Fischer, J.L. 1958. "Social Influence on the Choice of a Linguistic Variant." *Word* 14.47-56.

Fishman, P. 1983. "Interaction: The Work Women Do." *Language, Ggender and Society* ed. by Barrie Thorne, Cheris Kramarae and Nancy Henley, 89-102. Rowley, MA: Newbury House.

Gibson, K. and S. Johnson. 1984. "A 'Traditional' Analysis of Pronoun Variants in Guyanese Creole." Paper presented at the Fifth Biennial Conference of the Society for Caribbean Linguistics, UWI Mona, Jamaica.

Gleason, H.A. 1961. *Introduction to Descriptive Linguistics, Second Edition*. New York: Holt, Rinehart and Winston.

Greenberg, J.H. 1963. "Some Universals of Grammar with Particular Reference to the Order of Meaningful Elements." *Universals of Language* ed. by Joseph H. Greenberg, 73-113. Cambridge, MA: MIT Press.

Guttman, L. 1944. "A Basis for Scaling Qualitative Data." *American Sociological Review* 9.139-50.

Hooper, J. B. 1973. *Aspects of Natural Generative Phonology*. Ph.D. Dissertation, University of California, Los Angeles. Reproduced by the Indiana University Linguistics Club, 1974.

Jakobson, R. and M. Halle 1956. *Fundamentals of Language*. The Hague: Mouton.

Joos, M. 1950. "Description of Language Design." *Journal of the Acoustical Society of America* 22.701-708.

Klein, W. 1986. *Second Language Acquisition*. Cambridge: Cambridge University Press.

Krashen, S. 1977. "Some Issues Relating to the Monitor Model." *ON TESOL '77*, 144-158.

Labov, W. 1966. *The Social Stratification of English in New York City*. Washington, DC: Center for Applied Linguistics.

Labov, W. 1972. *Sociolinguistic Patterns*. Philadelphia: University of Pennsylvania Press.

Labov, W. 1982. "Building on Empirical Foundations." *Perspectives on Historical Linguistics* ed. by Winfred P. Lehmann and Yakov Malkiel, 17-92. (= *Current Issues in Linguistic Theory*, vol. 24). Amsterdam and Philadelphia: John Benjamins.

Le Page, R.B. and A. Tabouret-Keller. 1985. *Acts of Identity*. Cambridge: Cambridge University Press.

Nordenstam, K. 1979. *Svenskan i Norge*. Gothenberg: University Press.

Pavone, J. 1980. *Implicational Scales and English Dialectology*. Ph.D. Dissertation, Indiana University.

Payne, A. 1980. "Factors Controlling the Acquisition of the Philadelphia Dialect by Out-of-state Children." *Locating Language in Time and Space* ed. by William Labov, 143-178. New York: Academic Press.

Peng, F.C.C. 1979. "The Reality of Sound Change: A Sociolinguistic Interpretation." *Proceedings of the Ninth International Congress of Phonetic Sciences* ed. by Eli Fischer-Jørgensen et al., 212-221. University of Copenhagen.

Platt, J.T. 1977. "The 'Creoloid' as a Special Type of Interlanguage." *The Interlanguage Studies Bulletin*-Utrecht 2.22-38.

Politzer, R.L. 1976. "The Implicational Relation Paradigm in Language Acquisition." *Linguistic Studies Offered to Joseph Greenberg, Vol. 1: General Linguistics* ed. by Alphonse Juilland, 123-135. Saratoga, California: Anma Libri.

Rickford, J.R. 1975. "Carrying the New Wave into Syntax: The Case of Black English BIN." *Analyzing Variation in Language* ed. by Ralph W. Fasold and Roger W. Shuy, 162-183. Washington DC: Center for Applied Linguistics.

Rickford, J.R. 1979. *Variation in a Creole Continuum: Quantitative and Implicational Approaches*. Ph.D. dissertation, University of Pennsylvania.

Rickford, J.R. 1987. "The Haves and Have Nots: Sociolinguistic Surveys and the Assessment of Speaker Competence." *Language in Society* 16.149-

Sankoff, G. 1980. *The Social Life of Language*. Philadelphia: University of Pennsylvania Press.

Scovel, Th. 1981. "The Effects of Neurological Age on Nonprimary Language Acquisition." *New Dimensions in Second Language Acquisition* ed. by Roger Andersen, 33-42. Rowley, MA: Newbury House.

Seliger, H.W. 1978. "Implications of a Multiple Critical Period Hypothesis for Second Language Learning." *Second Language Acquisition Research* ed. by W.C. Ritchie, 11-20. New York: Academic Press.

Smith, R.T. 1962. *British Guiana*. London: Oxford University Press.

Thomas, E. and J.R. Rickford. 1987. "Dynamic Models of Language Variation and Change." Paper presented at the conference on the Social Context of Language Change, LSA Institute, Stanford University.

Trudgill, P. 1986. *Dialects in Contact*. New York: Basil Blackwell.

Washabaugh, W. 1977. "Constraining Variation in Decreolization." *Language* 53.329-352.

III. From Data to Model Building