Lexical Diffusion and Neogrammarian Regularity

Mieko Ogura[1,2] & William S-Y. Wang[2]

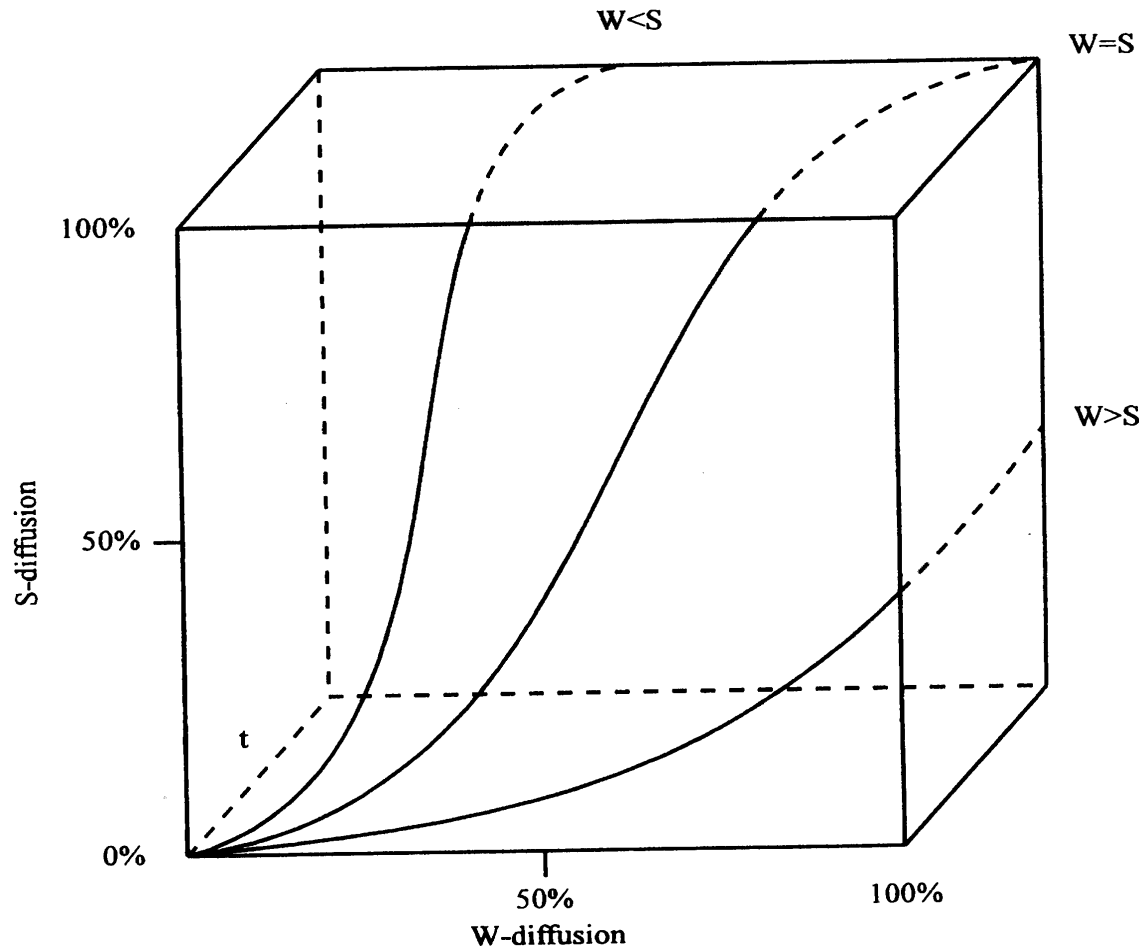
[1]Linguistics Laboratory, Tsurumi University, Yokohama

[2]Joint Research Centre for Language and Human Complexity,

Chinese University of Hong Kong

Theoretical Preliminaries

S-curve Progress of Two-dementional Diffusion through Time (Ogura & Wang 1998)



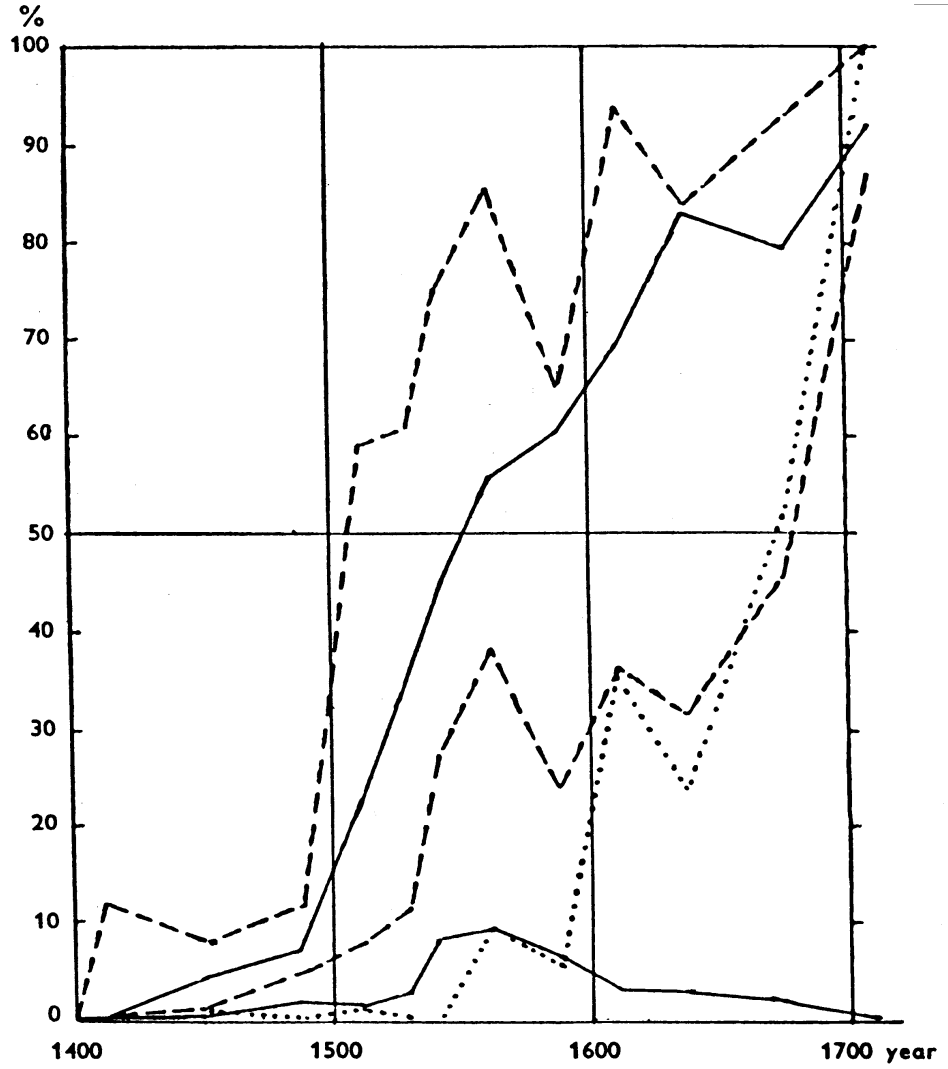
S-curve Progress, Snowball Effect, and Word Frequency in W-diffusion

The Development of Periphrastic Do

The development of periphrastic *do* (Ellegård 1953)

Period	Date	Aff.decl.		Neg.decl.		Neg.q.		Aff.q.		Neg.imp.	
		do	n	do	s	do	s	do	s	do	s
0	1390-1400	6	45000	0	--	0	--	0	--	0	--
1	1400-1425	11	4600	0	177	2	15	0	10	0	52
2	1425-1475	121	45500	11	892	2	23	6	136	3	279
3	1475-1500	1059	59600	33	660	3	24	10	132	0	129
4	1500-1525	396	28600	47	558	46	32	41	140	2	164
5	1525-1535	494	18800	89	562	34	22	33	69	0	101
6	1535-1550	1564	19200	205	530	63	21	93	114	0	72
7	1550-1575	1360	14600	119	194	41	7	72	56	4	39
8	1575-1600	1142	18000	150	479	83	45	228	150	8	117
9	1600-1625	240	7900	102	176	89	6	406	181	65	119
10	1625-1650	212	7200	109	235	32	6	116	24	5	10
11	1650-1700	140	7900	126	148	48	4	164	43	17	16
12	1710	5	2800	61	9	16	0	53	3	28	0

The development of periphrastic *do* (Ellegård 1953)



Affirmative declaratives: lower solid line
Neg. declaratives, main group: lower broken line
Aff. questions, adv. and yes/no questions: upper solid line
Neg. questions, adv. and yes/no questions: upper broken line
Negative imperatives, main group: dotted line

Slope and intercept parameters of logistic regressions on the data in different contexts (Ogura 1993)

	Affirmative declaratives	Negative declaratives	Negative questions	Affirmative questions	Negative imperatives
slope	3.41	5.90	6.90	7.73	13.44
intercept	-23.61	-36.45	-40.14	-46.15	-82.72

affirmative declarative, c1175; negative declarative, c1280; negative question, c.1370; affirmative question, c.1380; negative imperative, c.1422.

The results show that the later a change starts, the sharper its slope becomes. This shows the ‘snowball effect’ of lexical diffusion: diffusion across more and more contexts at faster rates in later starting contexts.

Within each context, there is a significant tendency for the high frequency words to change late and therefore to have a sharper slope.

The development of the *do*-form in the *say*-group and the main group of affirmative *wh*-object questions, and slope and intercept parameters (Ogura 1993)

Period	Date	*say*-group		main group	
		do	s	do	s
1	1400-1425		0	0	1
2	1425-1475		19	0	28
3	1475-1500	1	39	1	24
4	1500-1525	2	27	4	36
5	1525-1535	0	33	6	22
6	1535-1550	0	45	8	32
7	1550-1575	3	51	22	14
8	1575-1600	7	56	39	27
9	1600-1625	25	93	28	30
10	1625-1650	15	39	24	32
11	1650-1700	24	20	11	3
12	1710	7	4	4	0

	say-group	main group
slope	10.49	6.82
intercept	-65.19	-41.33

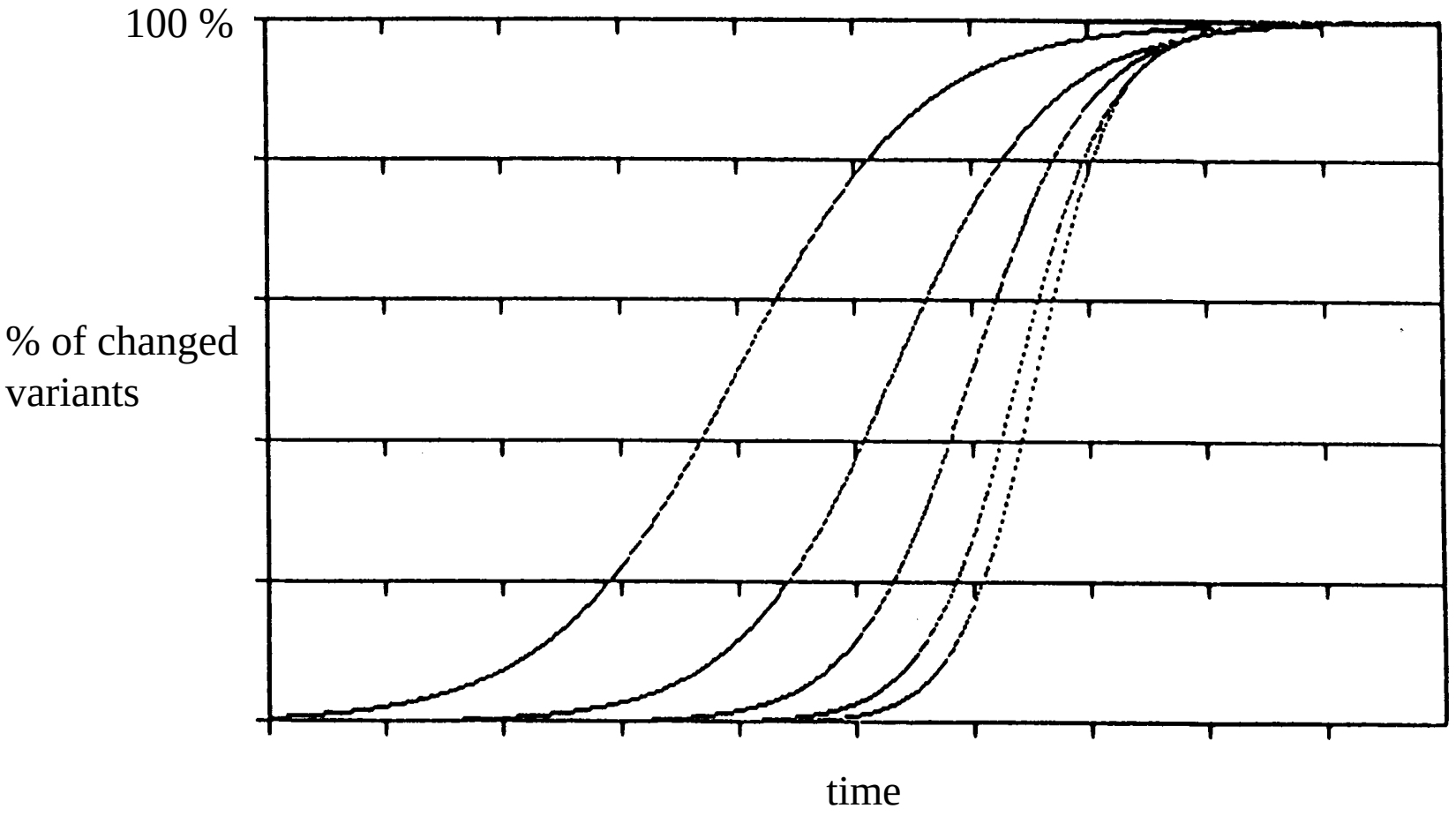
The Development of -s in the third person singular present indicative

The overall distributions of the *–(e)th* and *–(e)s* endings in non-sibilant verbs in EModE (Ogura & Wang 1996)

freq	EModE I-th	EModE I-s	EModE II-th	EModE II-s	EModE III-th	EModE III-s
1084-21 (33 types)	1103 tokens	29 tokens (2.6%)	932 tokens	331 tokens (26.2%)	251 tokens	697 tokens (73.5%)
20-3 (176 types)	384 tokens	6 tokens (1.5%)	282 tokens	166 tokens (37.1%)	28 tokens	339 tokens (92.4%)
2-1 (262 types)	116 tokens	0 tokens (0%)	72 tokens	25 tokens (25.8%)	5 tokens	121 tokens (96.0%)

The change started slowly from a handful of high-frequency words. Once the infrequent verbs got started, they changed more quickly than the frequent verbs

An idealized diagram of snowball effect in lexical diffusion (Ogura & Wang 1996)



Word frequency

Based on Hooper (1976), Bybee (2002), Phillips (1984, 2001, 2006), Ogura (1987, 1993, 2012, forthcoming), Ogura and Wang (1995, 1996) and others, we may synthesize the investigations and assume that:

a) Productively or physiologically motivated change, pragmatically motivated change, and socially motivated change occur in high-frequency words first. If all of these changes are concerned with linguistic production, those words that are used frequently will have more opportunity to be affected by these processes.
b) Perceptually motivated change and cognitively motivated change affect low-frequency words first. Perceptually or cognitively unfavorable forms can be learned and maintained in their unfavorable forms if they are of high frequency in the input. However, if their frequency of use is low, they may not be sufficiently available in experience to be acquired. Thus they may be more susceptible to change on the basis of perceptually or cognitively favorable forms.

There is no significant ordering relation among words through which the change moves quickly in mid-stream, and the order of the change of words varies among individuals.

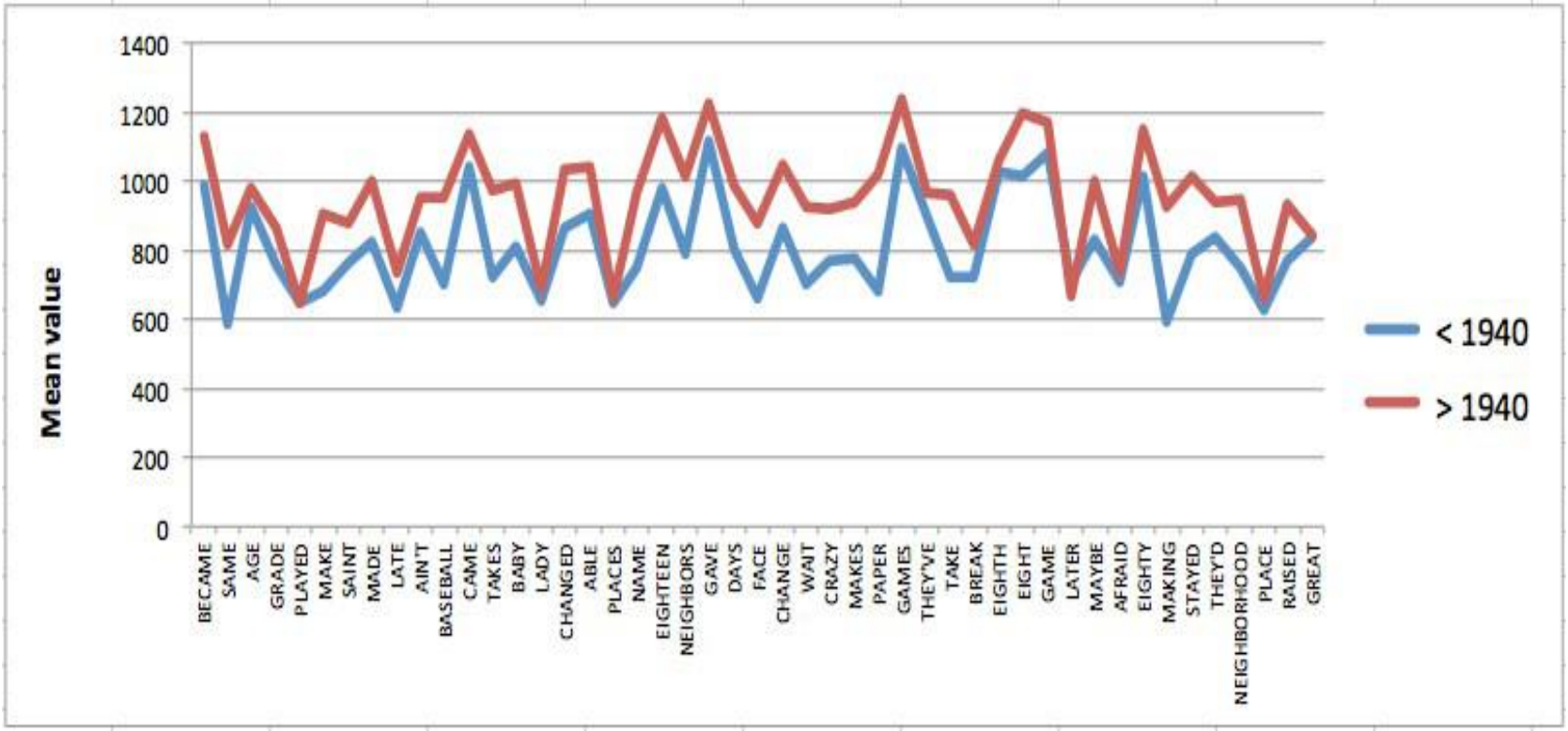
Gell-Mann (1992) was perhaps the first to suggest the relevance of Kolmogorov Complexity to the study of language evolution.

When regularity exists in the observed data, the hypothesis will capture this regularity, when justified, and allow for generalization beyond what was observed. Thus we assume that the speakers, after they observe a small number of changed words, generalize the change into more and more words without necessarily having observed all the relevant words, with the result that the order of the generalization varies among individuals. The spread of change into a large number of words implicates the rapid rate of change of each word, which produces snowball effect.

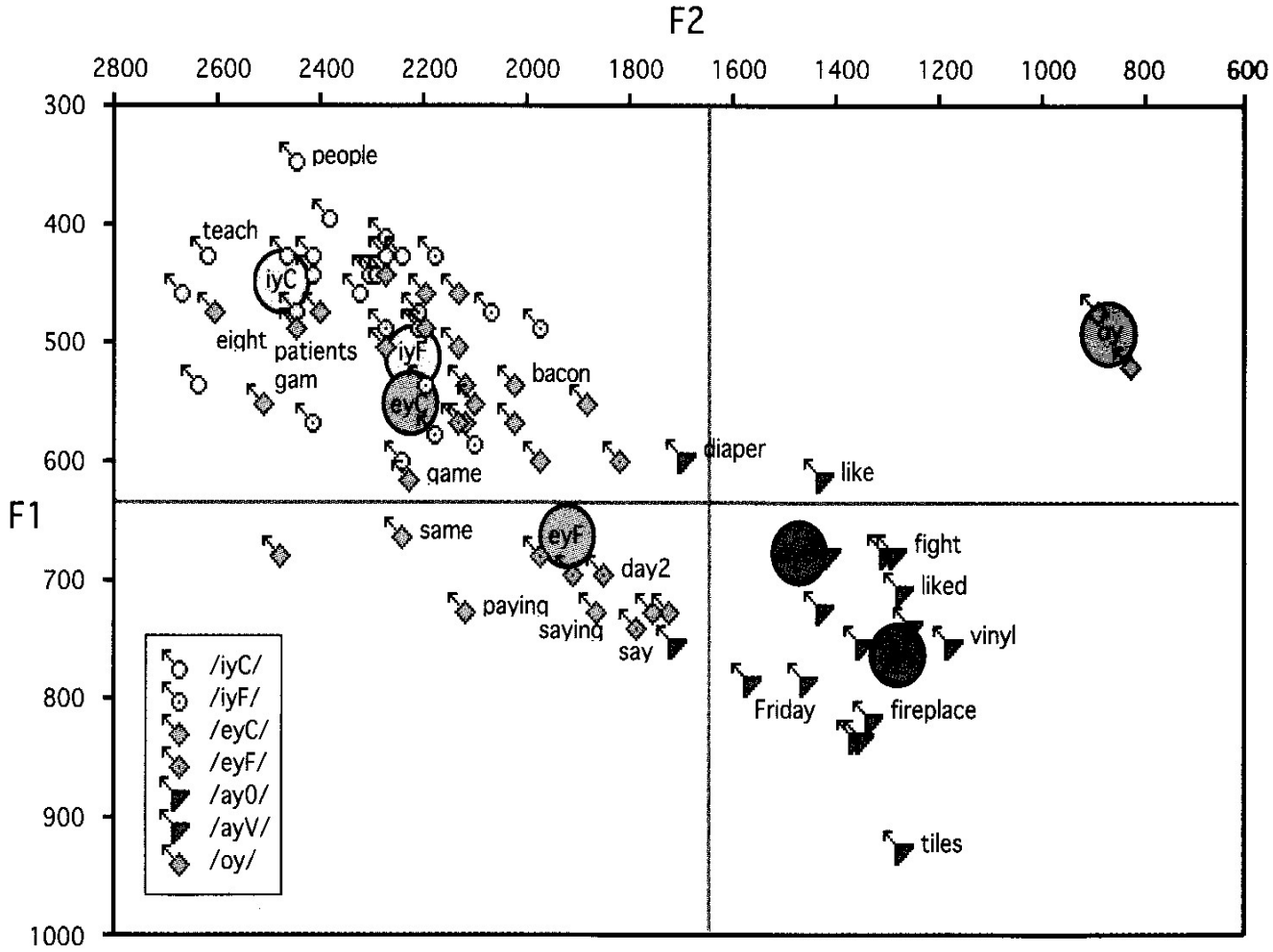
Word Frequency and Constant Rate Effect in Neogrammarian Regularity

Word frequency and Neogrammarian regularity

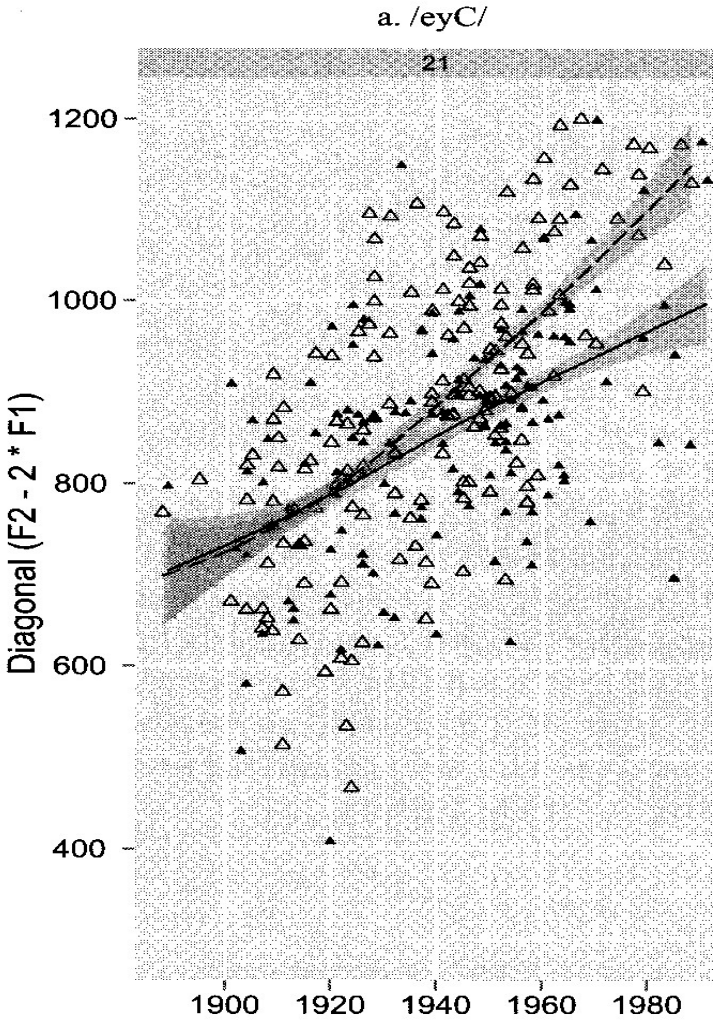
Mean front diagonal values for 47 most common words with checked /eyC/ for speakers in the Philadelphia Neighborhood Corpus born before and after 1940 (taken from Labov 2012)



Front upgliding subsystem of Rosanne V., 30, Philadelphia, PA (taken from Labov et al. 2007)

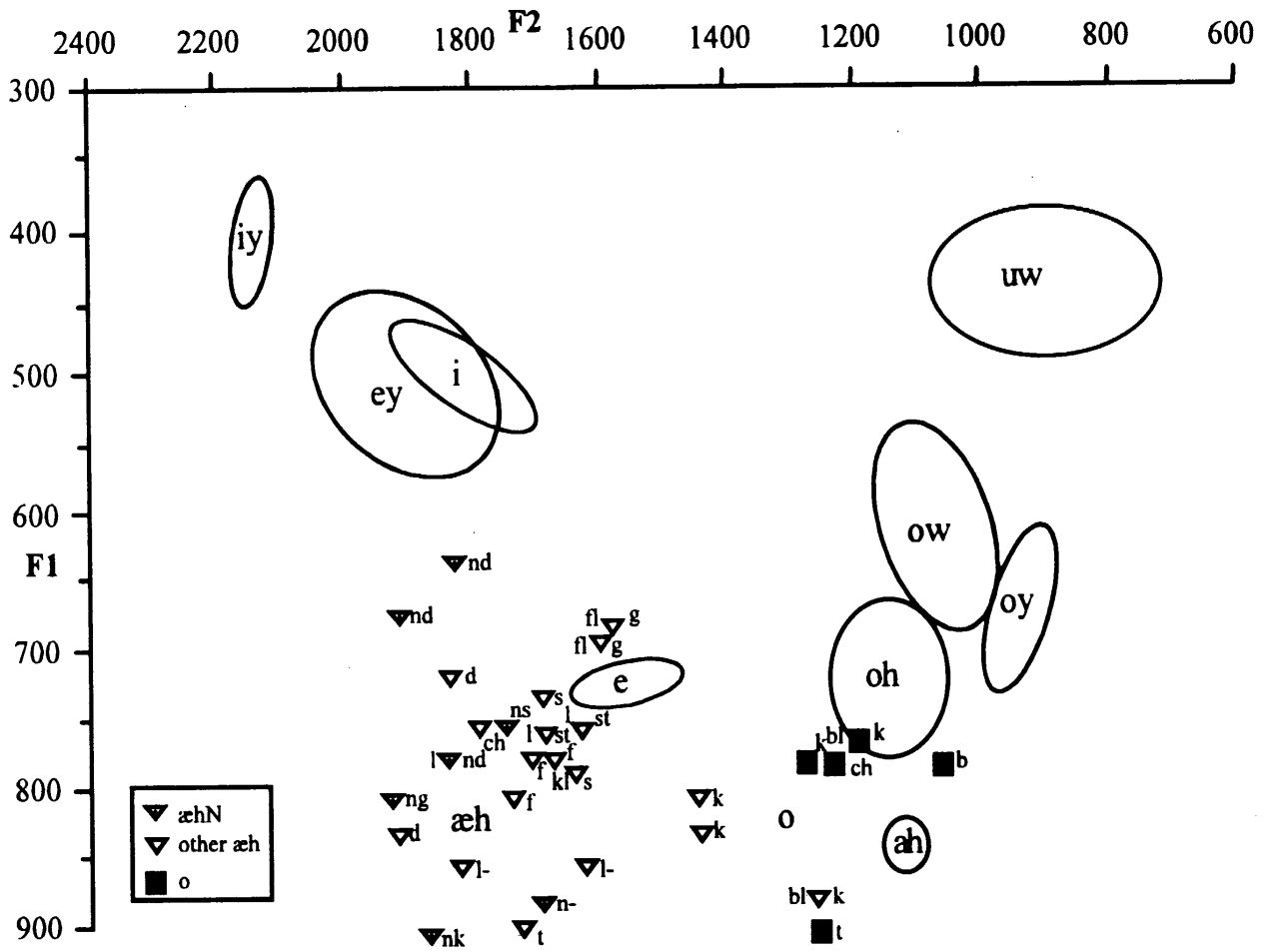


Front diagonal values of /eyC/ allophones by date of birth and sex in Philadelphia Neighborhood Corpus

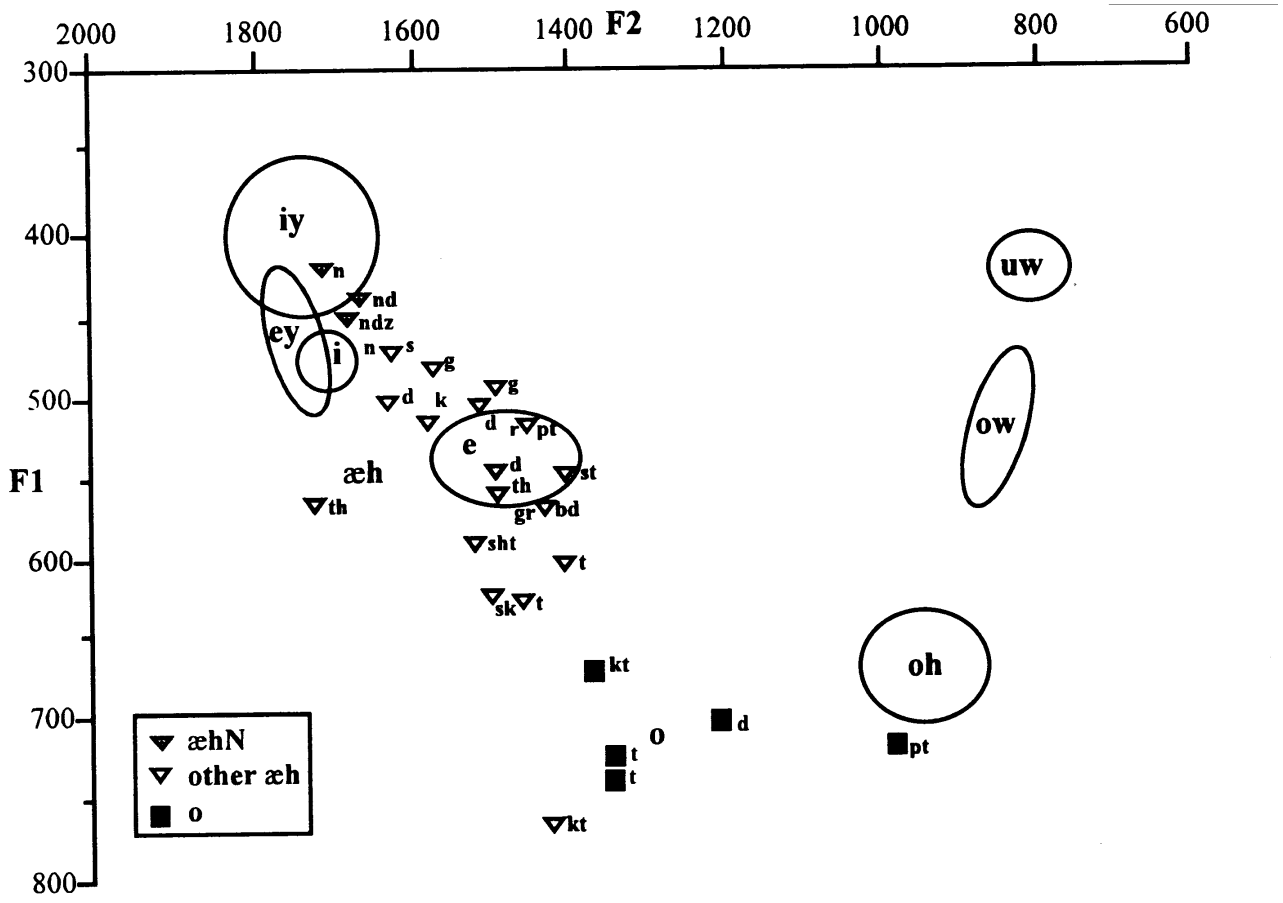


Sex
Broken line female
Solid line male

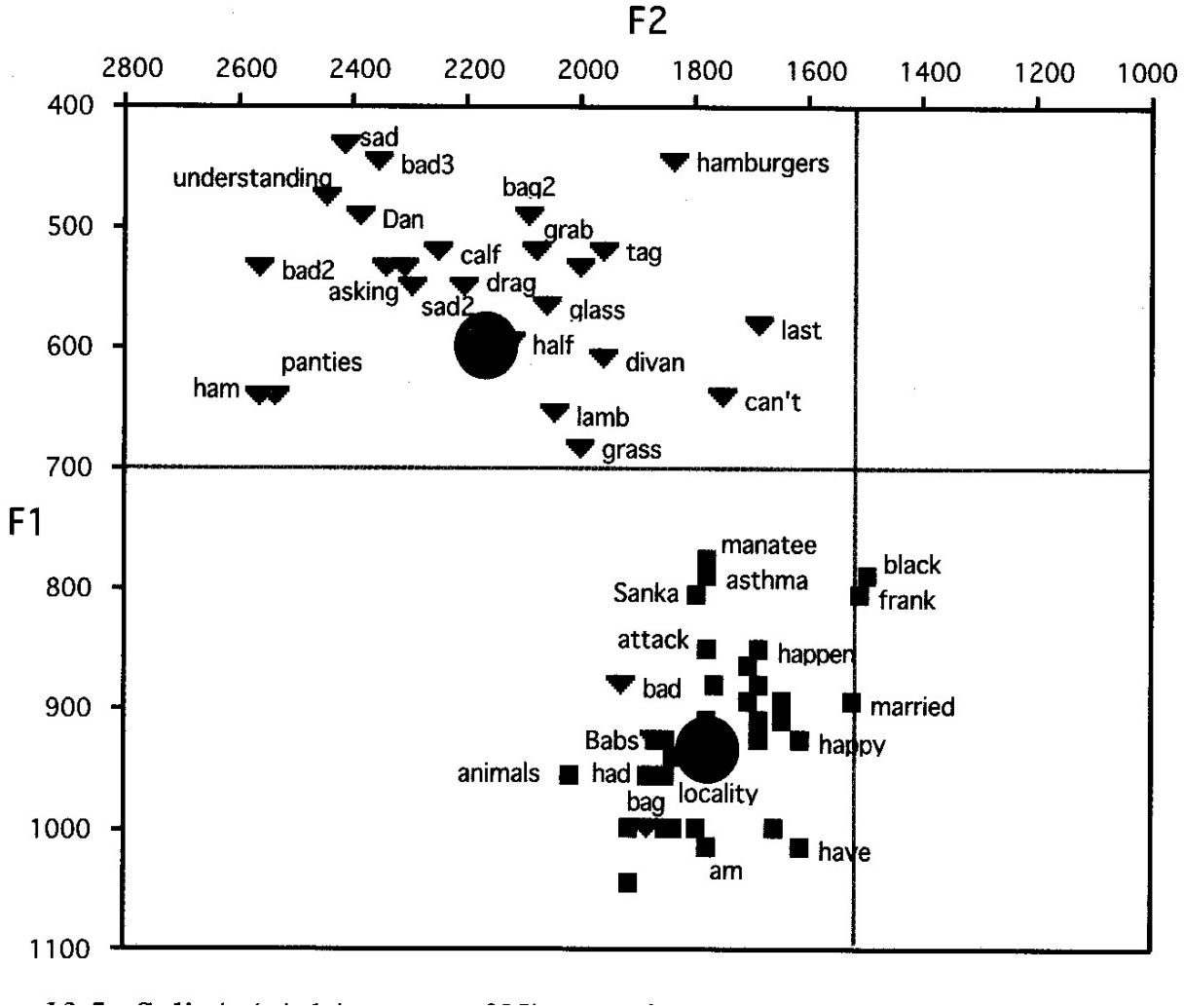
Vowel system of James Adamo, 55, Detroit [A Quantitative Study of Sound Change in Progress, 1968-1972] (taken from Labov 1994)



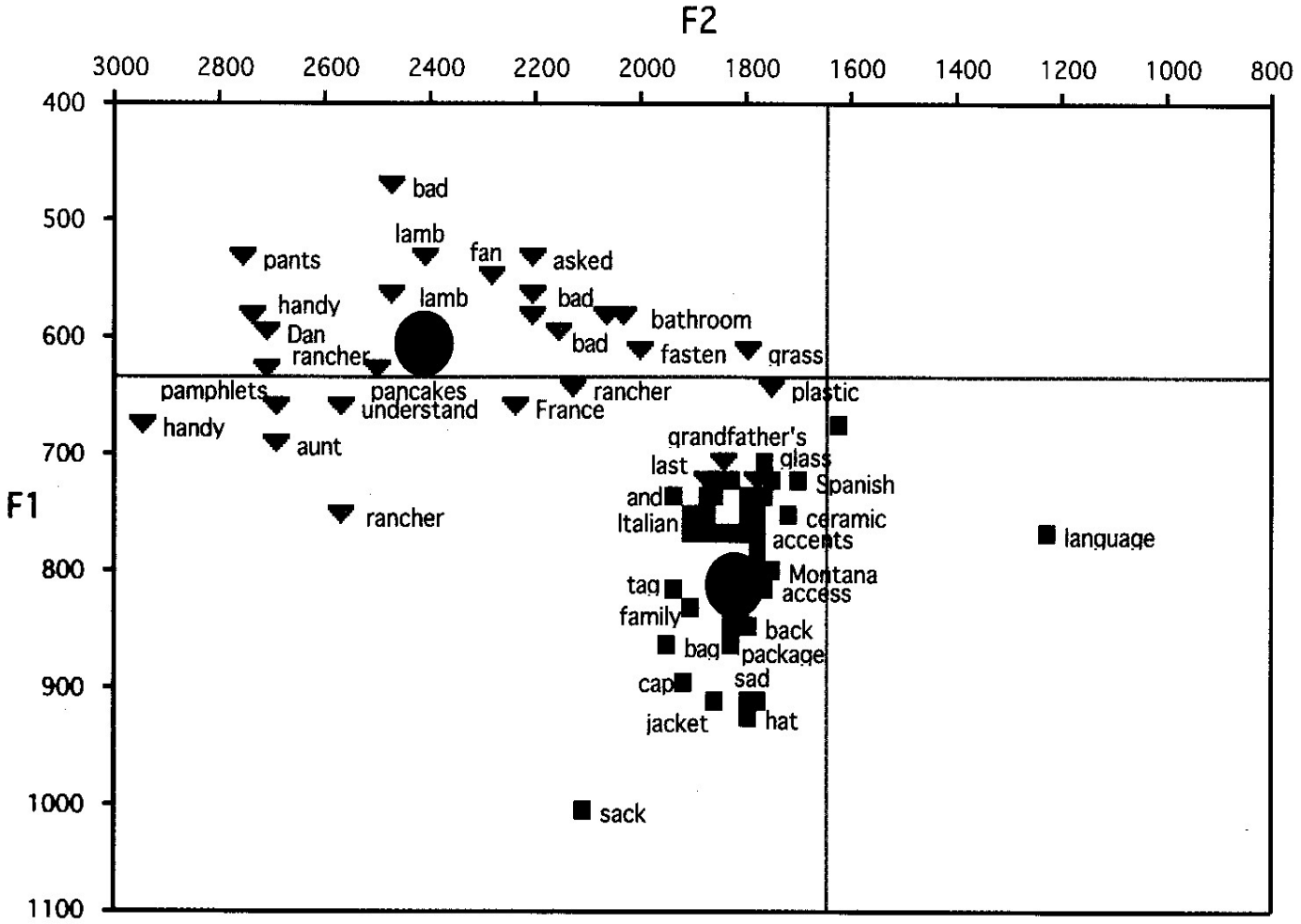
Vowel system of Chris Adamo, 13, Detroit [A Quantitative Study of Sound Change in Progress, 1968-1972] (taken from Labov 1994)



Split /æ/ - /æh/ system of Nina B., 62 [1996], New York City (taken Labov et al. 2006)



Split /æ/-/æh/ system of Rosanne V., 30 [1996], Philadelphia (taken from Labov et al. 2006)



Constant rate effect

Santorini (1992), Pintzuk & Taylor (2006), among others, following Kroch (1989), show that when a new syntactic variant begins to enter the grammar, its use may be more or less favored in different contexts, and it increases in frequency in every context at the same rate over time (the "Constant Rate Effect"). Fruehwald et al. (2009) show that the Constant Rate Effect holds in phonology as well.

Neogrammarian regularity of sound change both phonetically gradual and abrupt and syntactic change proceeds at a constant rate. In lexical diffusion, however, the later a change starts, the greater the rate of change. This shows the "snowball effect", i.e., diffusion across more and more contexts at faster rate in later starting contexts. There is little probability that lexical diffusion proceeds at a constant rate.

The faster the change proceeds within and across the contexts, the less the difference of the rate of change in each word becomes. The stronger the functional or social bias becomes, the faster the word diffusion proceeds. If functional or social bias is so strong, word diffusion proceeds fast. This shows Neogrammarian regularity, in which changes start simultaneously and proceed at a constant rate in all contexts.

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