APPENDIX A

English, Thai, and IPA Phonemes

Standard English Allophonic Distribution (Prevocalic)

The symbols used for consonants are shown in the following table. Where symbols appear in pairs, the one to the left is voiceless, the one to the right voiced.

	Bi-labial	Labio-dental	Labio-velar	Den-tal	Alveo-lar	Post-alveo-lar	Pala-tal	Velar	Glot-tal
Stop	p^h, b				t^h, d			k^h, g	ʔ
Fricative		f, v		θ, ð	s, z	ʃ, ʒ			h
Affricate						$tʃ^h$, dʒ			
Nasal	m				n			ŋ	
Approximant			w		r		j		
Lateral approximant					l				

While initial /ʒ/ generally only appears in loanwords from French, the voiceless stops and affricate have voiceless unaspirated allophones which always occur following /s/. Thus, *spin* [spɪn] as opposed to *pin* [p^hɪn], *stamp* [stæmp] as opposed to *tamp* [t^hæmp], *scamp* [skæmp] as opposed to *camp* [k^hæmp], and *change* [$tʃ^h$eɪndʒ] as opposed to *exchange* [ekstʃeɪndʒ]. The superscript ^{h} denotes aspiration.

Standard English Allophonic Distribution (Postvocalic)

	Bi-labial	Labio-dental	Labio-velar	Den-tal	Alveo-lar	Post-alveo-lar	Pala-tal	Velar	Glot-tal
Stop	p, b				t, d			k, g	ʔ
Fricative		f, v		θ, ð	s, z	ʃ, ʒ			
Affricate						tʃ, dʒ			
Nasal	m				n			ŋ	
Approximant			w		r (rhotic)		j		
Lateral approximant					l				

Standard Thai Consonant Phonemes

Thai distinguishes among three voice/aspiration patterns among stop phonemes:

- unvoiced, unaspirated
- unvoiced, aspirated
- voiced, unaspirated

Where English has only a distinction between the voiced, unaspirated /b/ and the unvoiced, aspirated /p^h/, Thai distinguishes a third phoneme, /p/, which is neither voiced nor aspirated, and which occurs in English only as an allophone of /p/, approximately the sound of the *p* in "spin." There is similarly an alveolar /t/, /t^h/, /d/ triplet. In the velar series there is a /k/, /k^h/ pair and in the post-alveolar series the /tɕ/, /$tɕ^h$/ pair, which are close equivalents to the English /$tʃ^h$/, [tʃ], as represented by '**ch**ange' and ex**ch**ange'.

Standard Thai Allophonic Distribution (Prevocalic)

	Bi-labial	Labio-dental	Labio-velar	Alveo-lar	Post-alveo-lar	Pala-tal	Velar	Glot-tal
Stop	p^h, p, b			t^h, t, d			k^h, k	ʔ
Fricative		f		s				h
Affricate					$tɕ^h$, tɕ			
Nasal	m			n			ŋ	
Approximant			w			j		
Trill				r				
Lateral approximant				l				

Aside from the semivowels, /w/ and /j/ there are only three places of articulation for ending consonant phones, viz., Bilabial, Alveolar, and Velar, and there are only two manners of articulation, viz., stop (plosive) and nasal. / p^h/, /p/, and /b/ all sound as [p]; /t^h/, /t/, and /d/ sound as [t]; and /k^h/ and /k/ sound as [k]. /s/, /$tɕ^h$/ and /tɕ/ additionally sound as [t]. The approximants /l/ and /r/ sound as [n].

Standard Thai Consonant Allophones (Postvocalic)

	Bi-labial	Labio-velar	Alveo-lar	Pala-tal	Velar
Stop	p		t		k
Nasal	m		n		ŋ
Approximant		w		j	

THE INTERNATIONAL PHONETIC ALPHABET (2005)

CONSONANTS (PULMONIC)

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Epi-glottal	Glo
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	N			
Plosive	p b			t d		ʈ ɖ	c ɟ	k g	q ɢ		ʡ	ʔ
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	H ʢ	h
Approximant		ʋ		ɹ		ɻ	j	ɰ				
Trill	ʙ			r					ʀ			
Tap, Flap		ⱱ		ɾ		ɽ						
Lateral fricative				ɬ ɮ								
Lateral approximant				l		ɭ	ʎ	ʟ				
Lateral flap				ɺ								

Where symbols appear in pairs, the one to the right represents a modally voiced consonant, except for murmured ɦ. Shaded areas denote articulations judged to be impossible.

CONSONANTS (NON-PULMONIC)

Anterior click releases (require posterior stops)	Voiced implosives	Ejectives
ʘ Bilabial fricated	ɓ Bilabial	' *Examples:*
ǀ Laminal alveolar fricated ("dental")	ɗ Dental or alveolar	pʼ Bilabial
ǃ Apical (post)alveolar abrupt ("retroflex")	ʄ Palatal	tʼ Dental or alveolar
ǂ Laminal postalveolar abrupt ("palatal")	ɠ Velar	kʼ Velar
ǁ Lateral alveolar fricated ("lateral")	ʛ Uvular	sʼ Alveolar fricative

CONSONANTS (CO-ARTICULATED)

ʍ Voiceless labialized velar approximant

w Voiced labialized velar approximant

ɥ Voiced labialized palatal approximant

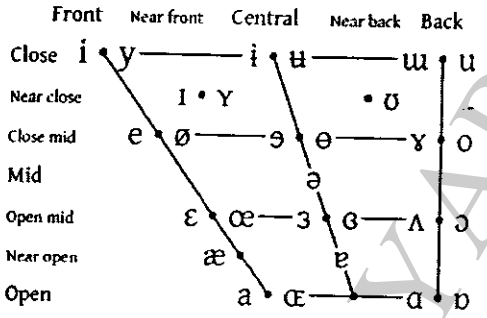
ɕ Voiceless palatalized postalveolar (alveolo-palatal) fri

ʑ Voiced palatalized postalveolar (alveolo-palatal) fricat

ɧ Simultaneous *x* and ʃ (disputed)

k͡p t͡s Affricates and double articulations may be joined by a

VOWELS



Vowels at right & left of bullets are rounded & unrounded.

SUPRASEGMENTALS

ˈ Primary stress ˌ Secondary stress [ˌfoonəˈtɪʃən]

ˈ Extra stress

eː Long eˑ Half-long

e Short ĕ Extra-short

. Syllable break ‿ Linking (no break)

INTONATION

| Minor (foot) break

‖ Major (intonation) break

↗ Global rise ↘ Global fall

TONE

Level tones		*Contour-tone*	
é̋ ˥	Top	ě ˩˥	Ris
é ˦	High	ê ˥˩	Fal
ē ˧	Mid	ě ˧˥	Hig
è ˨	Low	ě ˩˧	Lo
è̏ ˩	Bottom	ê ˦˩	Hig
Tone terracing		ē ˨˩	Lo
ˈ Upstep		ě ˥˧	Pe
ˌ Downstep		ê ˩˦	Dip

DIACRITICS

Diacritics may be placed above a symbol with a descender, as ŋ̊. Other IPA symbols may appear as diacritics to phonetic detail: tʳ (fricative release), *b*ʱ (breathy voice), ˀa (glottal onset), ᵊ (epenthetic schwa), *o*ᵑ (diphthongi

SYLLABICITY & RELEASES		PHONATION		PRIMARY ARTICULATION		SECONDARY ARTICULATION			
n̩ ɹ̩	Syllabic	n̥ d̥	Voiceless or Slack voice	t̪ b̪	Dental	tʷ dʷ	Labialized	ɔ̹ χ̹	More
e̯ o̯	Non-syllabic	s̬ d̬	Modal voice or Stiff voice	t̺ d̺	Apical	tʲ dʲ	Palatalized	ɔ̹ χ̹ʷ	Less r
tʰ ʰt	(Pre)aspirated	n̤ a̤	Breathy voice	t̻ d̻	Laminal	tˠ dˠ	Velarized	ẽ z̃	Nasal
dⁿ	Nasal release	n̰ a̰	Creaky voice	u̟ t̟	Advanced	tˤ dˤ	Pharyngealized	ɚ ɝ	Rhoti
dˡ	Lateral release		Strident	i̠ t̠	Retracted	ɬ ʒ	Velarized or pharyngealized	e̹ o̹	Advar tongu
t̚	No audible release	n̼ d̼	Linguolabial	ä j̈	Centralized	ɯ̽	Mid-centralized	e̹ o̹	Retra tongu
e̞ β̞	Lowered (β̞ is a bilabial approximant)			e̝ ɹ̝	Raised (ɹ̝ is a voiced alveolar non-sibilant fricative)				

APPENDIX B

Frequency of RP (British) Complex Codas

Compiled from Brigham-Young University Concordance of the British National Corpus of 100 Million Words). http://view.byu.edu/

BRITISH (RP) COMPLEX CODAS WITH FREQUENCIES

							Occurs
	Common				Common		Per 1,000
Rank	Word	Coda		Rank	Word	Coda	Words
2-cons				2-cons			
1	*and*	/nd/	31.70	30	*-ism*	/zm/	0.40
2	*won't*	/nt/	23.10	31	*sense*	/ns/	0.40
3	*must*	/st/	8.90	32	*health*	/lθ/	0.30
4	*its*	/ts/	5.10	33	*else*	/ls/	0.30
5	*means*	/nz/	3.20	34	*described*	/bd/	0.30
6	*old*	/ld/	3.10	35	*jobs*	/bz/	0.30
7	*terms*	/mz/	3.10	36	*film*	/lm/	0.20
8	*fact*	/kt/	2.90	37	*month*	/nθ/	0.20
9	*think*	/ŋk/	1.60	38	*legs*	/gz/	0.20
10	*self*	/lf/	1.40	39	*camp*	/mp/	0.20
11	*used*	/zd/	1.40	40	*deaths*	/θs/	0.20
12	*works*	/ks/	1.90	41	*twelve*	/lv/	0.17
13	*things*	/ŋz/	1.20	42	*beliefs*	/fs/	0.10
14	*perhaps*	/ps/	1.20	43	*milk*	/lk/	0.09
15	*moved*	/vd/	1.20	44	*clothes*	/ðz/	0.08
16	*felt*	/lt/	1.10	45	*dragged*	/gd/	0.08
17	*gives*	/vz/	1.10	46	*belonged*	/ŋd/	0.06
18	*seemed*	/md/	0.80	47	*grasp*	/sp/	0.06
19	*left*	/ft/	0.80	48	*fifth*	/fθ/	0.05
20	*change*	/ndʒ/	0.80	49	*welsh*	/lʃ/	0.04
21	*needs*	/dz/	0.70	50	*depth*	/pθ/	0.03
22	*kept*	/pt/	0.70	51	*breathed*	/ðd/	0.03
23	*managed*	/ dʒd/	0.60	52	*width*	/tθ/	0.03
24	*girls*	/lz/	0.50	53	*indulge*	/ldʒ/	0.01
25	*ask*	/sk/	0.50	54	*welch*	/ltʃ/	Rare
26	*finished*	/ʃt/	0.50	55	*bulb*	/lb/	Rare
27	*help*	/lp/	0.40	56	*kiln*	/ln/	Rare
28	*French*	/ntʃ/	0.40	57	*garaged*	/ʒd/	Rare
29	*reached*	/tʃt/	0.40	58	*berthed*	/θt/	Rare

Rank	Word	Coda	Words	Rank	Word	Coda	Words
3-cons				**3-cons**			
59	*students*	/nts/	2.20	89	*gasped*	/spt/	0.01
60	*against*	/nst/	0.50	90	*overwhelmed*	/lmd/	0.01
61	*asked*	/skt/	0.40	91	*depths*	/pθs/	0.01
62	*hands*	/ndz/	1.30	92	*twelfth*	/lfθ/	0.01
63	*costs*	/sts/	0.90	93	*bulbs*	/lbz/	Rare
64	*products*	/kts/	0.80	94	*indulged*	/ldʒd/	Rare
65	*months*	/nθs/	0.40	95	*silks*	/lks/	Rare
66	*themselves*	/lvz/	0.37	96	*milked*	/lkt/	Rare
67	*thanks*	/ŋks/	0.30	97	*welched*	/ltʃt/	Rare
68	*involved*	/lvd/	0.26	98	*kilns*	/lnz/	Rare
69	*results*	/lts/	0.23	99	*gulfs*	/lfs/	Rare
70	*changed*	/ndʒd/	0.20	100	*grasps*	/sps/	Rare
71	*attempt*	/mpt/	0.20	101	*cleansed*	/nzd/	Rare
72	*fields*	/ldz/	0.06	102	*kilned*	/lnd/	Rare
73	*length*	/ŋkθ/	0.20	103	*triumphed*	/mft/	Rare
74	*fixed*	/kst/	0.15	104	*nymphs*	/mfs/	Rare
75	*tasks*	/sks/	0.10				
76	*camps*	/mps/	0.10	**Rank**	**Word**	**Coda**	**Words**
77	*helped*	/lpt/	0.09	**4-cons**			
78	*linked*	/ŋkt/	0.08	105	*attempts*	/mpts/	0.05
79	*launched*	/ntʃt/	0.07	106	*lengths*	/ŋkθs/	0.03
80	*repulsed*	/lst/	0.07	107	*texts*	/ksts/	0.03
81	*gifts*	/fts/	0.06	108	*twelfths*	/lfθs/	Rare
82	*mechanisms*	/zmz/	0.06	109	*sixths*	/ksθs/	Rare
83	*films*	/lmz/	0.05	110	*instincts*	/ŋkts/	Rare
84	*amongst*	/ŋst/	0.04	111	*glimpsed*	/mpst/	Rare
85	*helps*	/lps/	0.03	112	*waltzed*	/ltst/	Rare
86	*collapsed*	/pst/	0.02	113	*jinxed*	/ŋkst/	Rare
87	*sixth*	/ksθ/	0.02				
88	*warmth*	/mpθ/	0.02		Total		115.00

APPENDIX C

Frequency of North American Complex Codas

(Includes Rhotic Codas)

Compiled from Brigham-Young University Concordance of the British National Corpus of 100 Million Words). http://view.byu.edu/

Frequency of North American Complex Codas

Rank 2-Cons	Common Word	*2-cons.*	Frequency Per 1,000	Rank	Common Word	*2-cons.*	Frequency per 1,000
1	*and*	/nd/	31.70	38	*French*	/ntʃ/	0.40
2	*won't*	/nt/	23.10	39	*reached*	/tʃt/	0.40
3	*just*	/st/	8.90	40	*-ism*	/zm/	0.40
4	*its*	/ts/	5.10	41	*sense*	/ns/	0.40
6	*means*	/nz/	3.20	43	*else*	/ls/	0.30
7	*old*	/ld/	3.10	44	*described*	/bd/	0.30
8	*times*	/mz/	3.10	45	*jobs*	/bz/	0.30
9	*part*	/rt/	2.90	46	*girl*	/rl/	0.20
10	*fact*	/kt/	2.90	47	*film*	/lm/	0.20
11	*hard*	/rd/	2.30	48	*month*	/nθ/	0.20
12	*schools*	/lz/	1.90	49	*legs*	/gz/	0.20
13	*makes*	/ks/	1.90	50	*camp*	/mp/	0.20
14	*form*	/rm/	1.70	51	*deaths*	/θs/	0.20
15	*work*	/rk/	1.60	52	*serve*	/rv/	0.18
16	*think*	/ŋk/	1.60	53	*twelve*	/lv/	0.17
17	*self*	/lf/	1.40	54	*sharp*	/rp/	0.10
18	*used*	/zd/	1.40	55	*beliefs*	/fs/	0.10
19	*turn*	/rn/	1.30	56	*milk*	/lk/	0.09
20	*things*	/ŋz/	1.20	57	*clothes*	/ðz/	0.08
21	*perhaps*	/ps/	1.20	58	*dragged*	/gd/	0.08
22	*moved*	/vd/	1.20	59	*superb*	/rb/	0.07
23	*felt*	/lt/	1.10	60	*iceberg*	/rg/	0.07
24	*gives*	/vz/	1.10	61	*belonged*	/ŋd/	0.06
25	*worse*	/rs/	0.90	62	*grasp*	/sp/	0.06
26	*seemed*	/md/	0.80	63	*fifth*	/fθ/	0.05
27	*left*	/ft/	0.80	64	*welsh*	/lʃ/	0.04
28	*change*	/ndʒ/	0.80	65	*depth*	/pθ/	0.03
29	*research*	/rtʃ/	0.70	66	*scarf*	/rf/	0.03
30	*needs*	/dz/	0.70	67	*breathed*	/ðd/	0.03
31	*kept*	/pt/	0.70	68	*width*	/tθ/	0.03
32	*large*	/rdʒ/	0.60	69	*harsh*	/rʃ/	0.03
33	*managed*	/ dʒd/	0.60	70	*indulge*	/ldʒ/	0.01
34	*north*	/rθ/	0.60	71	*welch*	/ltʃ/	0.005
35	*ask*	/sk/	0.50	72	*bulb*	/lb/	0.004
36	*finished*	/ʃt/	0.50	73	*kiln*	/ln/	0.002
37	*help*	/lp/	0.40	74	*garaged*	/ʒd/	0.001
				75	*triumph*	/mf/	0.001

Rank	Common Word	3-cons.	Coda Frequency per 1,000	Rank	Common Word	3-cons.	Coda Frequency per 1,000
75	*students*	/nts/	2.20	114	*disturbed*	/rbd/	0.04
76	*first*	/rst/	1.20	115	*searched*	/rtʃt/	0.04
77	*world*	/rld/	0.60	116	*herbs*	/rbz/	0.04
78	*against*	/nst/	0.50	117	*collapsed*	/pst/	0.03
79	*asked*	/skt/	0.40	118	*sixth*	/ksθ/	0.02
80	*towards*	/rdz/	1.20	119	*warmth*	/rmθ/	0.02
81	*hands*	/nds/	1.30	120	*gasped*	/spt/	0.02
82	*costs*	/sts/	0.90	121	*filmed*	/lmd/	0.01
83	*products*	/kts/	0.80	122	*depths*	/pθs/	0.01
84	*parts*	/rts/	0.70	123	*twelfth*	/lfθ/	0.01
85	*terms*	/rmz/	0.60	124	*births*	/rθs/	0.01
86	*returned*	/rnd/	0.60	125	*bulbs*	/lbz/	0.006
87	*months*	/nθs/	0.40	126	*surfs*	/rfs/	0.005
88	*themselves*	/lvz/	0.37	127	*indulged*	/ldʒd/	0.004
89	*works*	/rks/	0.30	128	*silks*	/lks/	0.004
90	*formed*	/rmd/	0.30	129	*warped*	/rpt/	0.003
91	*thanks*	/ŋks/	0.30	130	*dwarfed*	/rft/	0.002
92	*involved*	/lvd/	0.26	131	*milked*	/lkt/	0.002
93	*results*	/ltz/	0.23	132	*belched*	/ltʃt/	0.001
94	*changed*	/ndʒd/	0.20	133	*kilns*	/lnz/	0.001
95	*attempt*	/mpt/	0.20	134	*harps*	/rps/	0.001
96	*fields*	/lds/	0.20	135	*gulfs*	/lfs/	0.001
97	*served*	/rvd/	0.20	136	*grasps*	/sps/	0.001
98	*girls*	/rlz/	0.18	137	*cleansed*	/nzd/	0.001
99	*length*	/ŋkθ/	0.15	138	*triumphs*	/mfs/	0.001
100	*charged*	/rdʒd/	0.14	139	*triumphed*	/mft/	0.001
101	*fixed*	/kst/	0.10				
102	*tasks*	/sks/	0.10	140	***4 cons.***		
103	*camps*	/mps/	0.09	141	*attempts*	/mpts/	0.05
104	*helped*	/lpt/	0.08	142	*lengths*	/ŋkθs/	0.03
105	*reserves*	/rvz/	0.08	143	*worlds*	/rldz/	0.01
106	*linked*	/ŋkt/	0.07	144	*bursts*	/rsts/	0.01
107	*launched*	/ntʃt/	0.07	145	*twelfths*	/lfθs/	0.01
108	*whilst*	/lst/	0.06	146	*sixths*	/ksθs/	0.00
109	*gifts*	/fts/	0.06	147	*instincts*	/ŋkts/	0.001
110	*mechanisms*	/zmz/	0.06	148	*glimpsed*	/mpst/	0.001
111	*amongst*	/ŋst/	0.05	149	*waltzed*	/ltst/	0.001
112	*films*	/lmz/	0.05	150	*jinxed*	/ŋkst/	0.001
113	*helps*	/lps/	0.04	Total			133.9

APPENDIX D

FINAL CODA EVALUATION LIST

FINAL CODA EVALUATION LIST

Coda number	Coda	Occurrence per 1,000 English words	Test Example	-ed endings	-s endings	/d/	/t/	/z/	/s/
Single									
1	aɪd	0.85	lied	0.85		0.85			
2	aʊd	0.15	allowed	0.15		0.15			
3	ɔɪd	0.18	enjoyed	0.18		0.18			
4	aɪz	0.06	lies		0.06			0.06	
5	aʊz	0.06	cows		0.06			0.06	
6	ɔɪz	0.12	boys		0.12			0.12	
Total	Single	1.42		1.18	0.24	1.18		0.24	
				-ed	**-s**				
Double				endings	endings	**/d/**	**/t/**	**/z/**	**/s/**
7	/nd/	31.70	rained	31.70		31.70			
8	/st/	8.90	passed	8.90			8.90		
9	/ts/	5.10	cats		5.10				5.1
10	/nz/	4.50	chickens		4.50			4.50	
11	/ld/	3.10	called	3.10		3.10			
12	/mz/	3.10	seems		3.10			3.10	
13	/ns/	3.00	sense	3.00			3.00		
14	/kt/	2.90	picked	2.9			2.9		
15	/ks/	2.70	makes		2.70				2.7
16	/lz/	1.90	tells		1.90			1.90	
17	/zd/	1.40	used	1.40		1.40			
18	/ŋz/	1.20	sings		1.20			1.20	
19	/ps/	1.20	lips		1.20				1.2
20	/vd/	1.20	saved	1.20		1.20			
21	/vz/	1.10	gives		1.10			1.10	
22	/md/	0.80	seemed	0.80		0.80			
23	/ft/	0.80	laughed	0.80			0.80		
24	/dz/	0.70	needs		0.70			0.70	
25	/pt/	0.70	hoped	0.70			0.70		
26	/dʒd/	0.60	judged	0.60		0.60			
27	/ʃt/	0.50	wished	0.50			0.5		

FINAL CODA EVALUATION LIST- Continued

Coda number	Coda	Occurrence per 1,000 English words	Test Example	-ed endings	-s endings	/d/	/t/	/z/	/s/
28	/tʃt/	0.40	reached	0.40			0.40		
29	/bd/	0.30	rubbed	0.30		0.30			
30	/bz/	0.30	jobs		0.30			0.3	
31	/gz/	0.20	eggs		0.2			0.2	
32	/θs/	0.20	deaths		0.2				0.2
33	/fs/	0.10	beliefs		0.1				0.1
34	/gd/	0.08	dragged	0.08		0.08			
35	/ŋd/	0.06	belonged	0.08		0.08			
Total	**Double**	78.74		56.46	22.30	39.2	17.2	13.0	9.3
				-ed	**-s**				
Triple				endings	endings	**/d/**	**/t/**	**/z/**	**/s/**
37	/nst/	0.50	sensed	0.50			0.50		
36	/skt/	0.40	asked	0.40			0.40		
38	/lvz/	0.37	solves		0.37			0.37	
39	/ŋks/	0.33	thinks		0.33				0.3
40	/lvd/	0.26	solved	0.26		0.26			
41	/lts/	0.23	belts		0.23				0.2
42	/ndʒd/	0.20	changed	0.20		0.20			
43	/mpt/	0.20	camped	0.20			0.20		
44	/kst/	0.15	fixed	0.15			0.15		
45	/sks/	0.10	tasks		0.10				0.1
46	/mps/	0.15	lamps		0.15				0.1
47	/lpt/	0.10	helped	0.10			0.10		
48	/ŋkt/	0.08	linked	0.08			0.08		
49	/ntʃt/	0.07	pinched	0.07			0.07		
50	/lmz/	0.05	films		0.05			0.05	
Total	Triple	3.19		1.96	1.23	0.46	1.50	0.42	0.8
Grand	**Total**	**83.35**		**59.60**	**23.77**	**40.9**	**18.7**	**13.7**	**10.1**

APPENDIX E

NARRATIVE TEXT

Bird Flu Version 1 (evaluated words in boldface)

I am a businessman in Thailand and I worry about Bird Flu. I worry that we are not doing enough about it. We **watched films** that showed **chickens** buried alive in death **camps**. This made me very afraid.

Bird flu has **changed** some **beliefs** amongst many farmers. The Thai government **managed** to **adopt** a change in farm policy, and has **moved** to help some large farmers use bird-flu tests. While the right questions were **asked**, few problems were **solved**. Once **results** of research on bird deaths show that **cats**, **pigs** or **cows** are **linked** to **birds**, we humans are at risk. But the government **lies** about the problem and **thinks** this **makes** the **crowd** content. The **steps** it's taken haven't **fixed** much, and farmers must be **dragged** into the modern world. They haven't even **washed** the **eggs** they have sold.

The costs of the bird flu can't be **described**: **besides** the **risks** to insurance, tourists might **avoid** coming here. **Jobs** that have **helped** to **lift** many would be at risk. Thaksin **tells** us **things** are fine, but the aid he **gives solves** nothing. The **boys** on the farm were **used** and **lied** to, and it **seems** they **picked** the wrong leader. True, they **seemed** to have **enjoyed** the last five years. But many are **camped** out in Bangkok who have **called** for him to step down. Many who **belonged** to the TRT last year have now **launched attacks against** him.

Bird Flu Version 2 (evaluated words in boldface)

I am a businessman in Thailand and I worry about Bird-flu. I worry that we are not doing enough about it. I saw some **films** that made me afraid.

Bird flu has **changed** some **beliefs** amongst many farmers. They have **watched** their **chickens** being buried alive in death **camps**. Once **results** of research on bird **deaths** show that **cats, pigs** or **cows** are **linked** to **birds**, we humans are at risk. The Thai government has **managed** to **adopt** a change in farm policy, and has **moved** to help some large farmers use bird-flu tests. While the right questions were **asked**, few problems were **solved**. Farmers must be **dragged** into the modern world. The **steps** they have taken haven't **fixed** much, and they haven't even **washed** the **eggs** they sell. The government **lies** about the problem and **thinks** this **makes** the **crowd** content.

The costs of the bird flu can't be **described**. **Jobs** that have **helped** to **lift** many would be at risk. **Besides** the **risks** to insurance, tourists might **avoid** coming here. Thaksin **tells** us **things** are fine, but the aid he **gives solves** nothing. The **boys** on the farm were **used** and **lied** to, and it **seems** they **picked** the wrong leader. True, they **seemed** to like him during the last five years. But many who **belonged** to the TRT last year have now **launched attacks against** him, and are **camped** out in Bangkok. They have **called** for him to step down.

APPENDIX F

INTELLIGIBILITY RUBRIC

(Reproduced in Teaching Pronunciation, Celce-Murcia, et.al. 2000)

Appendix 15

Speech Intelligibility/Communicability Index for Describing Speech and Evaluating Its Impact on Communication

Level	Description	Impact on communication
1	Speech is basically unintelligible; only an occasional word or phrase can be recognized.	Accent precludes functional oral communication.
2	Speech is largely unintelligible; great listener effort is required; constant repetition and verifications are required.	Accent causes severe interference with oral communication.
Communicative Threshold A		
3	Speech is reasonably intelligible, but significant listener effort is required because of the speaker's pronunciation or grammatical errors, which impede communication and distract the listener; there is an ongoing need for repetition and verification.	Accent causes frequent interference with communication through the combined effect of the individual features of mispronunciation and the global impact of the variant speech pattern.
4	Speech is largely intelligible; although sound and prosodic variances from the NS norm are obvious, listeners can understand if they concentrate on the message.	Accent causes interference primarily via distraction; the listener's attention is often diverted away from the content to focus instead on the novelty of the speech pattern.
Communicative Threshold B		
5	Speech is fully intelligible; occasional sound and prosodic variances from the NS norm are present but not seriously distracting to the listener.	Accent causes little interference; speech is fully functional for effective communication.
6	Speech is near native; only minimal features of divergence from NS speech can be detected; near-native sound and prosodic patterning.	Accent is virtually nonexistent.

From "A Multidemensional Curriculum Design," by Joan Morley, 1994, in Joan Morley (Ed.), *Pronunciation Pedagogy and Theory: New Views, New Directions* (pp. 76–77). Copyright 1994 by Teachers of English to Speakers of Other Languages, Inc. Used with permission.

APPENDIX G

CONSONANT DELETIONS SUMMARY

CONSONANT DELETIONS SUMMARY

Wordlist	Consonant	Deletions								
Informant #1										
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	Total	Percent
First		1				1			2	14%
Medial	2							1	3	21%
Last		3	4	1	1				9	64%
Total	2	4	4	1	1	1	0	1	14	100%
Percent	14	29	29	7	7	7	0	7		
Informant #2										
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	Total	Percent
First						1			1	3%
Medial								1	1	3%
Last		12	11	3	6				32	94%
Total		12	11	3	6	1		1	34	100%
Percent		35%	32%	9%	18%	3%	0%	3%	100%	
Informant #3										
deleted	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	total	Percent
First						2			2	25%
Medial								1	1	13%
Last		2	1		2				5	63%
total		2	1		2	2		1	8	100%
Percent		25%	13%	0%	25%	25%	0%	13%	100%	
Informant #4										
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	Total	Percent
First					1	3			4	12%
Medial	1		1		2		1	1	6	18%
Last		9	8	3	3				23	70%
Total	1	9	9	3	6	3	1	1	33	100%
Percent	3%	27%	27%	9%	18%	9%	3%	3%	100%	

Narrative	**Consonant**	**Deletions**								
Informant #1										
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	Total	Percent
First						2			2	13%
Medial							1	1	2	13%
Last		4	7		1				12	75%
Total		4	7		1	2	1	1	16	100%
Percent		25%	45%		6%	12%	6%	6%	100%	
Informant #2										
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	Total	Percent
First						4			4	9%
Medial	1		1					2	4	9%
Last		11	11	9	4				35	81%
Total	1	11	12	9	4	4		2	43	100%
Percent	2%	26%	28%	21%	9%	9%		5%		
Informant #3										
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	Total	Percent
First		1				3			4	11%
Medial								2	2	6%
Last		12	9	7	1				29	83%
Total		13	9	7	1	3		2	35	100%
Percent		37%	26%	20%	3%	9%		6%	100%	3%
Informant #4										
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	/b/	Total	Percent
First	1	1				2			2	6	12%
Medial	1		1		1		1	3		7	14%
Last		9	11	10	6					37	74%
Total	2	10	12	10	7	2	1	4	2	50	100%
Percent	4%	19%	24%	20%	14%	4%	2%	8%	4%		
Total	**Wordlist**	**Phoneme**	**Deletions**							
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	Total	Percent
First	0	1	0	0	1	7	0	0	9	10%
Medial	3	0	1	0	2	0	1	4	11	12%
Last	0	26	24	7	12	0	0	0	69	78%
Total	3	27	25	7	15	7	1	4	89	100%
Percent	3%	30%	28%	8%	17%	8%	1%	4%	100%	
Total	**Narrative**	**Phoneme**	**Deletions**							
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	/b/	Total	Percent
First	1	2	0	0	0	11	0	0	2	16	11%
Medial	2	0	2	0	1	0	2	8		15	11%
Last	0	36	38	26	12	0	0	0		112	78%
Total	3	38	40	26	13	11	2	8	2	143	100%
Percent	2%	26%	28%	18%	9%	8%	1%	6%	1%		
Total	**Phoneme**	**Deletions**								
	/p/	/d/	/t/	/z/	/s/	/l/	/dʒ/	/k/	/b/	Total	Percent
First	1	3	0	0	1	18	0	0	2	25	11%
Medial	5	0	3	0	3	0	3	12		26	11%
Last	0	62	62	33	24	0	0	0		181	78%
Total	6	65	65	33	28	18	3	12	2	232	100%
Percent	3%	28%	28%	14%	12%	8%	1%	5%	1%		

APPENDIX H

CONSONANT SUBSTITUTIONS SUMMARY

CONSONANT SUBSTITUTIONS

Informant 1	wordlist							Total
Voicing Substitutions	/z/ → /s/	/d/→ /t/	/v/→ /f/	/b/→ /p/	/dʒ→/tʃ/	/p/→ /b/	/g/ →/k	
Count	13	11	4	2	1	1	1	33
Percent of Total Subs	33	29	11	5	3	3	3	88%
Feature Substitutions	/θ→/t/	/dʒ→/ʔ/	/ʃ/→ /tʃ/	/tʃ/ →/ʃ/	/d/→ /n/			
Count	1	1	1	1	1			5
Percent of Total Subs	3%	3%	2%	2%	2%			12%
Total								38

Informant 1	Narrative						Total
Voicing Substitutions	/z/ → /s/	/d/→ /t/	/v/→/f/	/b/ → /p/	/dʒ/→/tʃ/	/g/→ /k/	
Count	12	9	3	1	1	3	29
Percent of Total Subs	36%	27%	10%	3%	3%	9%	88%
Feature Substitutions	/z → /ʔ	/tʃ → /s	/p →/ʔ	/ʌl →/aʊ			
Count	1	1	1	1			4
Percent of Total Subs	3%	3%	3%	3%			12% 100%
Total							33

Informant 2	Wordlist						Total
Voicing Substitutions	/z/ → /s/	/d/ → /t/	/v/ → /f/	/b/→ /p/	/dʒ/→/tʃ/	/g/→ /k/	
Count	10	3	4	2	1	1	21
Percent of Total Subs	37%	11%	15%	7%	4%	4%	78%
Feature Substitutions	/θ/→/t/	/tʃ/ → /ʃ/	/p/ → /f/	/s/ → /f/	/dʒ/→/ts/		
Count	1	1	2	1	1		6
Percent of Total Subs	4%	4%	7%	4%	3%		22%
Total							27

Informant 2	Narrative								Total
Voicing Substitution	/z/ → /s/	/d/ → /t/	/v/ → /f /	/b/ → /p/	/g/ → /k/				
Count	4	3	3	2	3				15
Percent of Total Subs	17%	13%	13%	8%	12%				63%
Feature Substitutions	/θ/→/t/	/k/→ /ʔ/	/l/→ /r/	/p/→ /ʔ/	/dʒ/→/ʃ/	/dʒ/ →/s	/d/→ /ʔ/	/z/→ /ʔ/	
Count	1	1	1	1	1	1	2	1	9
Percent of Total Subs	4%	4%	4%	4%	4%	4%	9% 49	4%	37% 100 %
Total									24

Informant 3	Wordlist							Total
Voicing Substitutions	/z → /s/	/d/→ /t/	/v/ → /f/	/b/ → /p/	/dʒ/→ /tʃ/	/g→ /k/	/t/→ /d/	
Count	13	10	4	2	2	1	2	34
Percent of Total Subs	34%	26%	10%	5%	5%	3%	5%	88%
Feature Substitutions	/θ/→/t/	/t/→/ʔ/	/d/→ /ʔ/	/t/→/s/				
Count	1	1	1	1				4
Percent of Total Subs	3%	3%	3%	3%				12%
Total								38

Informant 3	Narrative						Total
Voicing Substitutions	/z/ → /s/	/d/ →	/v/ →	/b/ →	/dʒ/→/tʃ/	/g/→ /k/	
Count	4	3	1	2	1	2	13
Percent of Total Subs	23%	18%	6%	12%	6%	12%	77%

Other Substitutions	/t/→ /s/	/d/ → /ʔ/	/dʒ/→/ʃ/	/tʃ/→/ʃ/	Total
Count	1	1	1	1	4
Percent of Total Subs	6%	6%	6%	5%	23%
Total					17

Informant 4	Wordlist							Total
Voicing Substitutions	/z/→ /s/	/d/ → /t/	/v/ → /f/	/b/ → /p/	/dʒ/→/tʃ/	/p/ → /b/	/g/→ /k/	
Count	10	5	4	2	1	1	2	25
Percent of Total Subs	30%	15%	12%	6%	3%	3%	6%	75%
Feature Substitutions	/θ/→/t/	/z/→ /t/	/ʃ/→ /tʃ/	/l/→ /o/	/ʊ/→/f/	/d/→ /ʔ/		
Count	1	2	1	1	2	1		8
Percent of Total Subs	3%	6%	3%	3%	6%	3%		25%
Total								33

View	Narrative					Total
Voicing Substitutions	/z/ → /s/	/d/ → /t/	/v/ → /f/	/p/ → /b/	/g/ →/k/	
Count	1	2	4	1	1	9
Percent of Total Subs	5%	10%	19%	5%	5%	43%
Feature Substitutions	/θ/→/t/	/d/ →/ʔ/	/z/ →/ʔ/	/dʒ/ →/ʃ/	/k/ → /ʔ/	
Count	1	2	2	1	2	
Total						
Percent	5%	10%	9%	5%	9%	100%
Other Substitutions	/b →/ʔ/	/t/ →/ʔ/	/g/ →/ʔ/			
Count	1	1	2			12
Percent of Total	5%	5%	9%			57%
Total						21

Total Wordlist Voicing Substitutions	110
Total Narrative Voicing Substitutions	66
Total Voicing Substitutions	176
Total Wordlist Feature Substitutions	23
Total Narrative Feature Substitutions	29
Total Feature Substitutions	52
Total Wordlist Substitutions	133
Total Narrative Substitutions	95
Total Substitutions	228

APPENDIX I

EXAMPLE OF A STUDENT PRONUNCIATION TEST

Given to M2 Students (8th Grade)

At a Local School

ชื่อ ..... เลขที่ .....

1. ให้นักเรียนอ่านออกเสียงคำศัพท์ที่กำหนดให้ต่อไปนี้

1. organized 2. surprise 3. decided 4. cousin 5. invitation
6. arrived 7. started 8. finished 9. person 10. street

2. ให้นักเรียนอ่านออกเสียงข้อความที่กำหนดให้ต่อไปนี้

Last week, I organized a surprise birthday party for my brother. I decided to have it at my cousin's house, because her house is bigger than ours, and she's got a garden. She lives in the next street. My brother's birthday was on Thursday, but we have the party at the weekend, on Saturday.

I sent about twenty invitations but I forgot to put the time on them. The first person arrived at eleven o'clock in the morning and the last one at ten o'clock at night.

The party started at midday and finished at midnigl t.

3. ให้นักเรียนจับคู่แสดงบทบาทสมมุติตามบทสนทนาที่นักเรียนเตรียมมา

เกณฑ์การให้คะแนน

1. การอ่านออกเสียงคำศัพท์ 1 คำ 1 คะแนน เลือกอ่านเพียง 5 คำ
   1. ..... 2. ..... 3. ..... 4. ..... 5. .....
2. การอ่านออกเสียงข้อความ อ่านถูกต้อง 5 คะแนน ได้ .....
   น้ำเสียง 3 คะแนน ได้ .....
   วรรคตอน 2 คะแนน ได้ .....
3. การสนทนา 1. ความคิดสร้างสรรค์ 3 คะแนน ได้ .....
   2. สำนวนภาษาที่ใช้เหมาะสม 4 คะแนน ได้ .....
   3. น้ำเสียง ท่าทาง 3 คะแนน ได้ .....

APPENDIX J

INSTRUCTIONS TO AUDITORS

Dear Michael,

Thank you for helping me on this project. My intention is to determine to what degree my Thai informants are intelligible to us native speakers,

Accordingly, I have assembled the raw recordings I made of my four subjects for you to listen to and evaluate. First you will hear them speaking two narrations. I will play back their speech in phrases with repetitions if necessary. I want you to try and transcribe what they say.

Next, you will listen to the individual words from the narrations and wordlist which I have segmented out and copied to other files. You will attempt to classify each word as correctly pronounced, intelligible with certain errors, or unintelligible.

Finally, you'll hear all four narrations again, plus interviews with each informant. The purpose is to rate the four speakers using a six-point intelligibility scale which I will provide.

ENDNOTES

[1] G. B. Shaw long ago pointed out that the word "fish" might just as well be spelled GHOTI; GH as in enough, O as in women, TI as in nation. GH-O-TI = fish.

[2] The vast majority of bilingual dictionaries do not give the English phonetics, but the Thai approximation. Few Thai-English dictionaries give any phonetic representation of English words. There are several problems with this approach.

1) six English fricatives (v, z, θ, ð, ʃ, ʒ) have no close equivalent in Thai

2) Ad hoc Thai substitutes, e.g., (v = ว, ʃ and ʒ = ช, z = ซ, θ and ð = ธ) conflict with the Thai language as learned and universally recognized by literate Thai society.

3) Even if such substitutes were allowed, there is little uniformity in their use. Various problem English phonemes are given varying substitutes from book to book. The lack of uniformity means that the learner must learn each author's phonetic system before being able to correctly pronounce a word. This may discourage students from consulting dictionaries for pronunciation.

4) Even if a uniform system which assigned some little-used Thai letters to these English phonemes could be established, it would have to be universally adopted, taught in school, and used publicly on signs and in literature to be remembered.

It is interesting that some of the English-Thai dictionaries reviewed make the distinction between the voiced and unvoiced inter-dental fricatives (ð, θ) by designating two separate Thai letters to represent them, and some only one. One such dictionary, *English-Thai Dictionary for English Teachers*, Chumphongthong, L. (2001) Bangkok, Thailand: C-Education makes three distinctions: 'this', 'thank', and 'theatre' have three separate Thai letter substitutes. Ending 'th', as in 'with', gets yet a fourth representation, this time using two Thai letters, (ฅห), which on their own have [d] and [l] sounds. Some dictionaries represent /z/ and /ʒ/ by a single Thai letter (ช), and some by two letters (ซ and ช respectively). Voiced final fricatives like /v/ may be represented as /bf/ (บฟ) or /fw/ (ฟว). The word "glove" is transliterated as /glʌfw/ กลัฟว in the *New Thai English Dictionary*,Thiangburanatham, W. (1986). Bangkok, Thailand: Ruamsarn, and as /globf/ โกลบฟ in the *English Thai Dictionary for English Teachers*. There are other possible representations for postvocalic /v/, such as ฝ. Sometimes cluster consonants show a marking below, as in กลิ้มซ์ The effect of this mark is variable: sometimes it indicates voicing, e.g. ซ์ /ṣ/= /z/, and at other times it appears to be an acknowledgement that the affected consonant is outside the boundaries of Thai phonology.

The increasingly popular, though more costly, talking dictionaries may be an improvement over most paper dictionaries in that English words falling outside the limits of Thai phonology are at least aurally represented by a recording. Such electronic dictionaries do not instruct learners how to reproduce these sounds, however.

[3] Psycho-linguist Eric Lenneberg (1964) stated that the crucial period of language acquisition ends around the age of 12 years. He claimed that if no language is learned before then, it could never be learned in a normal and fully functional sense. This was called the "Critical period hypothesis."

[4] The author witnessed an oral exam given to beginning-intermediate M2 (eighth grade) students at a local school, in which the students were required to read aloud words like "organized" and "arrived", which both contain voiced complex codas following a diphthong—one of the hardest phonemic combinations for Thai speakers. The same test included the much easier words "started" and "person". Appendix I reproduces the pertinent portion of the test.

[5] The word 'strengths' may be phonetically represented as [streŋkθs], with epenthetic /k/, and hence of the form CCCVCCCC. A few dozen English words end in four consonants, e.g., 'texts' /teksts/ and 'glimpsed' /glɪmpst/, which would be notated as CVCCCC and CCVCCCC respectively. The maximal Thai syllable structure of CCVVC is found in words such as เครื่อง /khrîaŋ/ (machine).

[6] An orthographic illustration may clarify: two plosive-one fricative combinations where /s/ is the medial consonant are less likely to be deleted. Consider the following:

Pete's bear	Pete's jar	Pete's sad (deleted /s/)	Pete's chair (assimilated /s/)
Pete's car	Pete's lair	Pete's ten	Pete's shoes (assimilated /s/)
Pete's dog	Pete's mad	Pete's very happy	Pete's judge
Pete's fear	Pete's near	Pete's won	
Pete's gear	Pete's poor	Pete's yellow	
Pete's here	Pete's red	Pete's zoo (deleted /s/)	

Compare with the following:

Best boy (deleted /t/)	Best jar	Best said
Best car (deleted /t/)	Best lair	Best to (deleted /t/)
Best dog (deleted /t/)	Best maid	Best voice
Best friend	Best now	Best win
Best gear (deleted /t/	Best paid (deleted /t/)	Best yet
Best help	Best red wine	Best zoo

A search through the BNC database (available at http://view.byu.edu/) showed words begin with plosives much more often than with the sibilants /s/, /z/, and /ʃ/. The following had approximate occurrences per 1,000 words: /p/, p*: 16; /b/, b*: 33; /t/, t*, -th: 32; /d/, d*: 16; /g/, g*: 12; /k/, k*: 4; /k/, c* -/tʃ/, -/s/: 16; /s/ + /ʃ/, s: 32; /z/, z*: 0.2. The asterisk acts as a wild-card; c* will return the 100 most common words beginning with the letter c, in this case they cumulatively occur about 20 times per 1,000 words. Of those words beginning with c, some had either ch sounds /tʃ/ or s-sounds /s/ (about 4 times per 1,000 words). The remainder, which had /k/ sounds total about 12 per 1,000. Total plosives thus occur 16+33+32+16+12+4 or 113 times per 1,000 words. Total sibilants /s/, /z/, and /ʃ/ occur about 4+16+0.2 or 20.2 times per 1,000 words.

[7] The voiceless un-aspirated affricate, จ, which is often mistaken by Thai learners as an equivalent for the voiced English /dʒ/, is shown in Appendix A as /tɕ/, and is a close equivalent of the English unaspirated [tʃ] in 'exchange'. The voiceless aspirated affricate, /tɕʰ/ (ช) is a close equivalent of the English [tʃʰ] in 'change'.

[8] Even established Thai beginning 'clusters', like /tr/ and kr/ are often simplified to [t] and [k] by some Thai speakers, e.g., ปลา /plaa/ (fish) → ปา [paa], and ตรง /troŋ/ (straight) →ตง [toŋ]. The new complex onsets which originate from English loanwords may be variably spoken: sometimes as true complex onsets, sometimes with a vowel inserted, e.g., [sʌtaɪ)] (style) /staɪl/, and sometimes simplified, e.g., [beɪk] (brake) /breɪk/.

[9] The following words were unintelligible to all auditors when spoken by some informants, even in the narrative, where there was context: *changed, solved, results* (twice), *crowd, films* (twice), *lift*, and *solves*. Thus, 9 out of approximately 200 narrative tokens (4.5%), or 7 out of 50 test words (14%) caused unintelligibility.

[10] The BNC shows the following pairs resulting from the deletion of medial /k/ in /ŋks/: *banks, bangs*; *thinks, things*; *sinks, sings*; and *stinks, stings*. The only comparable pair for /ŋkt/ is *winked, winged.* All words occur at least once per million words.

[11] The triple substitution of /d/ in "allowed" /ʌlaʊd/ to [f] in [ʌlaʊf] is interesting. Though it might appear to be haphazard, it reveals an underlying phonemic process on the part of the speaker. The Thai language and pedagogy assume an equivalence between /w/ and /v/; that is, /w/ is the approved Thai substitute for the English

/v/. Since "allowed" contains the grapheme 'w', and the semi-vowel /w/ equates to /u/ or /ʊ/ when it follows a vowel, what this speaker has apparently done is a reverse transformation, not from /v/ to /w/, but from /w/ to /v/, and then devoiced to /f/. She has also deleted the /d/. So the transformations might be written, [ʌlaʊd] → [ʌlaʊ] (deletion of /d/) → [ʌlaʊw] (addition of the semivowel equivalent after the vowel) → [ʌlaʊv] (reverse transformation to the English equivalent of Thai /w/) → [ʌlaʊf] (devoicing of the /v/ to [f]). Had we deducted for each of these transformations except the second, the score would be (1-0.4) X (1-0.3) X (1-0.2) = 0.34. Using instead a deduction of 0.5 to reach a score of 0.5 seems more realistic, as what matters to intelligibility is the ear of the listener, not the phonemic processes of the speaker. [ʌlaʊf] was guessed correctly in the narrative context by one auditor as "allowed".

[12] Notably, onset to coda metathesis can also occur, and in fact, did occur during one of the interviews with the word, 'abroad'. Here the /r/ was taken out of the onset of the second syllable /br/ and transferred to the coda. /əbrɔ:d/ was spoken as [əbɔ:rd]. Naturally, onset to coda metathesis would take place less often than coda to onset metathesis, since complex codas are more challenging than complex onsets, but in this case the informant was apparently more comfortable with a rhotic coda, /rd/, than she was with the /br/ onset, which is a recent acquisition in Thai phonology. This occurrence also shows that metathesis can take place in authentic oral production not associated with reading an awkward text.

[13] A fairly complete description of English syllabic consonants—of which /n/ and /l/ are the most predominant--is given in Roach (2000). As /n/ often occurs in syllabic form following consonants, e.g., 'nation' [neɪʃn̩] within single words, this practice can also operate across word boundaries, e.g., 'fish and chips', which is sometimes pronounced [fɪʃ n̩ tʃɪps].

[14] While the Thai equivalents of the English diphthongs, /aɪ/, /aʊ/, and /ɔɪ/ phonetically resemble the English vowels, and may have their own orthographical symbols (graphemes) which operate as vowels, e.g., (ไอ), they are usually considered to end with phonemic, as opposed to phonetic consonants (Haas 1964). Similarly for Thai combinations, such as อุย and อิว, which are usually transcribed as [uj] and [iw], rather than [ui] and [iu], and which also cannot have coda consonants following. An alternative view might consider the Thai equivalents of the three English diphthongs to end with vowels, i.e., /aɪ/, /aʊ/, and /ɔɪ/ and that coda consonants may only be permitted to follow vowel diphthong combinations in which /a/ is the final vowel. Thus, coda consonants are permitted in words such as ด่วน /dùan/ (express), เที่ยง /thîaŋ/ (noon), and เดือน /dɨan/(month).The Thai equivalents of the English diphthongs, /aɪ/, /aʊ/, and /ɔɪ/ are clearly of a different category than Thai diphthongs ending with /a/.

[15] The plot of the effect of frequency in use on accuracy of words may be U-shaped. Extremely common words, such as "and" seem to be simplified—as they are with NS. Fairly common words like "helped" seem to benefit by their familiarity—at least with less proficient speakers. Fairly infrequent ones like "beliefs" and "adopt" are better pronounced by proficient learners (the informants) than by less proficient learners (the students). Rarer words suffer unless their phonemic combinations have been mastered ("launched"). There would seem to be an ideal 'match' for the frequency or words and the proficiency of the learners who pronounce them.