

Supplemental File: Exploring Onset Cluster Preferability

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OBSTRUENT			SONORANT				VOWEL		
Stop	Affricate	Fricative	Nasal	Liquid		Glide			
				lateral	rhotic				
5.0	4.5	4.0	3.0	2.5	2.0	1.0	0.0		
p b			m			w	1.0	bilabial	LABIAL
f v							1.5	labio-dental	
θ ð							2.0	inter-dental	CORONAL
t d							2.3	alveolar	
tʃ dʒ			n	l			2.6	post-alveolar	
				ɹ		j	3.0	palatal	DORSAL
k g			ŋ			w	3.5	velar	
							4.0		RADICAL
?	h						5.0	glottal	GLOTTAL

Table 1. NAD Values of English Consonants (Dziubalska-Kolaczyk 2014, 5)

Cluster	NAD
st	1.00
sn	1.00
sl	1.50
stɹ	1.65
stʃɹ	1.65
ʃɹ	2.00
sk	2.20
fl	2.30
sp	2.30
sm	2.30
*sɹ	2.30
tʃɹ	2.50
dʒɹ	2.50
θɹ	2.60

Cluster	NAD
spl	3.05
skɹ	3.05
fɹ	3.10
vɹ ¹	3.10
skw (2)	3.10
dɹ	3.30
tɹ	3.30
spɹ	3.45
kl	3.70
gl	3.70
pl	3.80
bl	3.80
kɹ	3.90
gɹ	3.90

Cluster	NAD
kw (2)	4.00
sw (2)	4.20
sw (1)	4.30
skw (1)	4.35
pɹ	4.60
bɹ	4.60
tw (2)	5.20
dw (2)	5.20
tw (1)	5.30
dw (1)	5.30
kw (1)	6.50
tw (2)	5.20

Table 2: NAD Values of Consonant Clusters in American English

¹ This cluster occurs only marginally, such as in the onomatopoeia *vroom*.

Segment	Nasal Airflow (mL/s)	Oral Airflow (mL/s)	EKG Intensity (dB)	Relative Larynx Height
p	0	0.03	71	-0.06
t	0	0.06	71	-0.09
k	0	0.04	72	-0.9
b	0	0.02	76	-0.09
d	0	0.03	77	-0.09
g	0	0.09	78	-0.14
tʃ	0	0.15	73	-0.09
dʒ	0	0.09	78	-0.16
f	0.01	0.33	69	-0.075
s	0	0.3	70	-0.08
ʃ	0.01	0.45	70	-0.085
h	0.03	0.57	68	-0.06
v	0.02	0.2	80	-0.1
z	0	0.18	81	-0.14
ʒ	0	0.28	81	-0.135
m	0.34	0.02	84	-0.07
n	0.36	0.02	83	-0.055
ŋ	0.35	0.025	84	-0.09
l	0.04	0.02	83	-0.04
r	0.02	0.15	84	-0.03
r ²	0.04	0.02	-	-
j	0.01	0.13	82	-0.05
w	0.01	0.11	82	-0.06

Table 3: Phonetic Similarity Measurements for American English Consonants

Cluster	Nasal Airflow	Oral Airflow	EKG Intensity	Larynx Height	Difference AVG
sp	0	0	1	0.02	0.255
st	0	0.24	1	0.01	0.3125
sk	0	0.26	3	0.82	1.02
dw	0.01	0.08	5	0.03	1.28
gl	0.04	0.07	5	0.1	1.3025
spl	-	-	-	-	1.63625
skw	-	-	-	-	1.64875
bl	0.04	0	7	0.05	1.7725
kw	0.01	0.07	9	0.03	2.2775
kl	0.04	0.02	10	0.86	2.73
tw	0.01	0.05	11	0.03	2.7725
pl	0.04	0.01	12	0.02	3.0175
sw	0.01	0.19	12	0.02	3.055
sl	0.04	0.28	13	0.04	3.34
sn	0.36	0.28	13	0.025	3.41625
fl	0.03	0.31	14	0.035	3.59375
sm	0.34	0.28	14	0.01	3.6575

Table 4: Phonetic Similarity Differences of American English Consonant Clusters²

² While Mielke uses the symbol [ɹ], [ɹ] is used for consistency here. Not much data for [ɹ] was presented in the original study. This unfortunately means clusters containing [ɹ] cannot be considered with respect to Mielke's approach here.

Cluster	Articulatory Sequence	Overlap?	Score
fj	Lips Come Together & Tongue Moves & Airflow Begins & Voicing Begins	Yes	4
fɪ	Lips Come Together & Tongue Moves & Airflow Begins & Voicing Begins	Yes	4
sl	Tongue Moves & Airflow Begins & Tongue Moves & Voicing Begins	Yes	4
ʃɪ	Tongue Moves & Airflow Begins & Voicing Begins & Tongue Moves	Yes	4
*sɪ	Tongue Moves & Airflow Begins & Voicing Begins & Tongue Moves	No	4
θɪ	Tongue Moves & Airflow Begins & Tongue Moves & Voicing Begins	Yes	4
sn	Tongue Moves & Airflow Begins & Velum Raises & Voicing Begins	Partial	4.5
fl	Lips Come Together & Airflow Begins & Tongue Moves & Voicing Begins	Yes	5
gl	Tongue Moves & Air Pressure Builds & Air is Released Continuously & Voicing Begins & Tongue Moves	Yes	5
gɪ	Tongue Moves & Air Pressure Builds & Air is Released Continuously & Voicing Begins & Tongue Moves	Yes	5
gw	Tongue Moves & Air Pressure Builds & Air is Released Continually & Voicing Begins & Lips Round	Yes	5
kj	Tongue Moves & Air Pressure Builds & Air is Released Continuously & Tongue Moves & Voicing Begins	Yes	5
kl	Tongue Moves & Air Pressure Builds & Air is Released Continuously & Tongue Moves & Voicing Begins	Yes	5
kɪ	Tongue Moves & Air Pressure Builds & Air is Released Continuously & Tongue Moves & Voicing Begins	Yes	5
kw	Tongue Moves & Air Pressure Builds & Air is Released Continually & Lips Round & Voicing Begins	Yes	5
*ls	Tongue Moves & Airflow Begins & Voicing Begins & Tongue Moves	No	5
pj	Lips Close & Air Pressure Builds & Air is Released Continuously & Tongue Moves & Voicing Begins	Yes	5
pl	Lips Close & Air Pressure Builds & Air is Released Continuously & Tongue Moves & Voicing Begins	Yes	5
pɪ	Lips Close & Air Pressure Builds & Air is Released Continuously & Tongue Moves & Voicing Begins	Yes	5
sw	Tongue Moves & Airflow Begins & Lips Round & Voicing Begins & Tongue Moves	Yes	5
*tɪ	Tongue Moves & Air Pressure Builds & Air Pressure is Released Continuously & Voicing Begins & Tongue Moves	Yes	5
ʃɪ	Tongue Moves & Air Pressure Builds & Air Pressure is Released Continuously & Voicing Begins & Tongue Moves	Yes	5
vɪ	Lips Come Together & Airflow Begins & Voicing Begins & Tongue Moves & Lips Open	Yes	5
sm	Tongue Moves & Airflow Begins & Lips Come Together & Velum Raises & Voicing Begins	Partial	5.5
bj	Lips Close & Air Pressure Builds & Air is Released & Airflow Begins & Voicing Begins & Tongue Moves	Yes	6
bl	Lips Close & Air Pressure Builds & Air is Released & Airflow Begins & Voicing Begins & Tongue Moves	Yes	6
bɪ	Lips Close & Air Pressure Builds & Air is Released & Airflow Begins & Voicing Begins & Tongue Moves	Yes	6
*dɪ	Tongue Moves & Air Pressure Builds & Air is Released & Voicing Begins & Airflow Begins & Tongue Moves	Yes	6

Cluster	Articulatory Sequence	Overlap?	Score
dw	Tongue Moves & Air Pressure Builds & Air is Released Continually & Voicing Begins & Lips Round & Tongue Moves	Yes	6
dʒɪ	Tongue Moves & Air Pressure Builds & Air is Released & Voicing Begins & Airflow Begins & Tongue Moves	Yes	6
*ɪf	Tongue Moves & Airflow Begins & Voicing Begins & Tongue Moves & Voicing Stops & Lips Come Together	Yes	6
sp	Tongue Moves & Airflow Begins & Lips Come Together & Air Pressure Builds & Air Pressure is Released	No	6
st	Tongue Moves & Airflow Begins & Tongue Moves & Air Pressure Builds & Air Pressure is Released	No	6
stʃ	Tongue Moves & Airflow Begins & Tongue Moves & Air Pressure Builds & Air Pressure is Released Continuously	No	6
tw	Tongue Moves & Air Pressure Builds & Air Pressure is Released Continuously & Lips Round & Tongue Moves & Voicing Begins	Yes	6
mj	Lips Close & Velum Raises & Airflow Begins & Voicing Begins & Tongue Moves & Velum Lowers & Lips Open	Yes	7
sk	Tongue Moves & Airflow Begins & Tongue Moves & Airflow Stops & Air Pressure Builds & Air is Released	No	7
*wd	Lips Round & Tongue Moves & Tongue Moves & Airflow Stops & Voicing Stops & Air is Released & Voicing Begins	No	8
*ms	Lips Come Together & Airflow Begins & Velum Raises & Voicing Begins & Lips Open & Velum Lowers & Voicing Ends & Tongue Moves	Partial	8.5
*lp	Tongue Moves & Airflow Begins & Voicing Begins & Lips Close & Airflow Stops & Voicing Stops & Air Pressure Builds & Air is Released	No	9
*jp	Tongue Moves & Airflow Begins & Voicing Begins & Lips Close & Airflow Stops & Voicing Stops & Air Pressure Builds & Air is Released	No	10
*lb	Tongue Moves & Airflow Begins & Voicing Begins & Lips Close & Airflow Stops & Voicing Stops & Air Pressure Builds & Air is Released & Voicing Begins	No	10
spl	-	-	11
spɪ	-	-	11
stʃɪ	-	-	11
*stɪ	-	-	11
skɪ	-	-	12
skw	-	-	12

Table 5: Tentative AGS Scores for American English Consonant Clusters³

³ The stop+/j/ clusters (/bj/, /fj/, /kj/, /pj/, /mj/) occur only before certain vowels (i.e. ‘fury’) and arguably could be omitted but are nonetheless included for comparison.