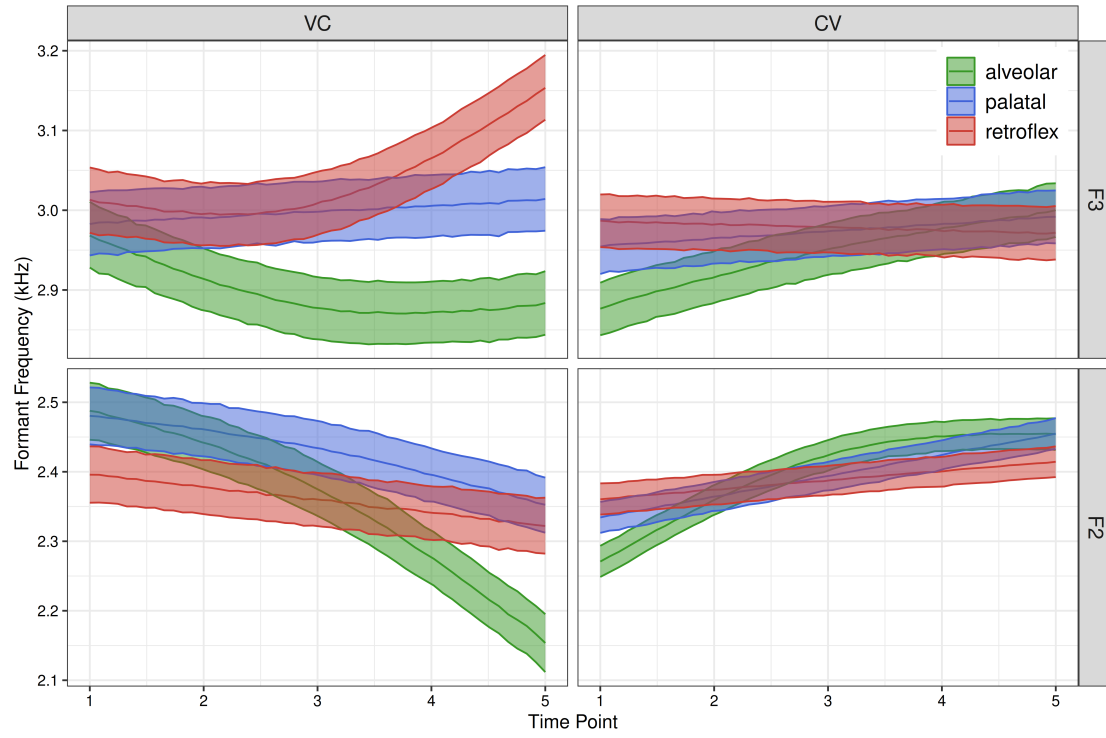
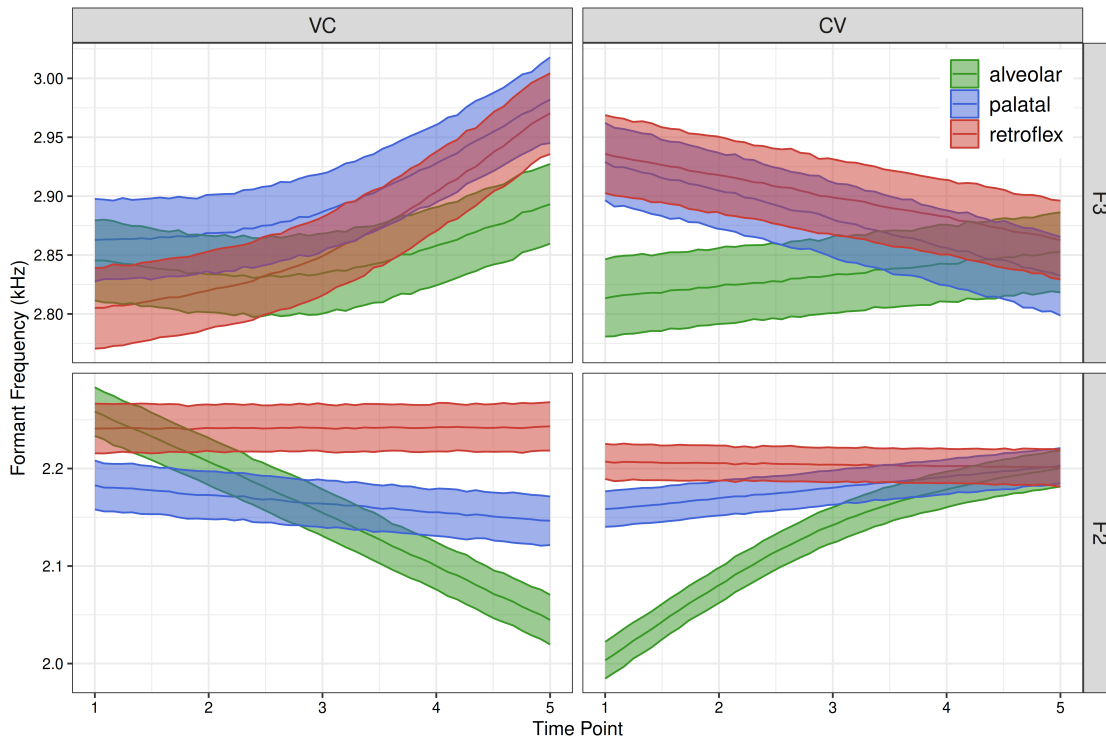


Parameter	Position	Alveolar – Palatal	Alveolar – Retroflex	Palatal – Retroflex
AMP (dB)	VCV	−1.552 [−2.7, −0.4] Ss: P>A: 9; P=A: 6; A<P: 1	−2.328 [−3.6, −1.0] Ss: R>A: 11; A=R: 4; A>R: 1	−0.747 [−1.8, 0.2] Ss: P=R: 11; R>P: 4
	CV	−2.124 [−3.4, −1.0] Ss: P>A: 12; P=A: 3; A>P: 1	−2.645 [−3.9, −1.3] Ss: R>A: 13; A=R: 2; A>R: 1	−0.486 [−1.5, 0.5] Ss: P=R: 13; R>P: 3
SPF (kHz)	VCV	2.947 [2.5, 3.4] Ss: A>P: 16	3.181 [2.8, 3.6] Ss: A>R: 16	0.229 [−0.0, 0.5] Ss: P=R: 14; P>R: 2
	CV	3.123 [2.7, 3.5] Ss: A>P: 16	3.535 [3.1, 3.9] Ss: A>R: 16	0.407 [0.2, 0.6] Ss: P>R: 8; P=R: 8
LF TILT	VCV	−0.769 [−2.0, 0.5] Ss: P=A: 11; P>A: 4; A>P: 1	−1.723 [−3.0, −0.4] Ss: R=A: 9; R>A: 7	−0.957 [−1.9, −0.1] Ss: P=R: 15; R>P: 1
	CV	−2.252 [−3.5, −1.0] Ss: P>A: 8; P=A: 8	−2.820 [−4.1, −1.5] Ss: R>A: 10; R=A: 6	−0.550 [−1.5, 0.4] Ss: R=A: 16
HF TILT	VCV	−1.853 [−2.9, −0.7] Ss: P>A: 9; P=A: 7	−1.885 [−3.0, −0.7] Ss: R>A: 9; R=A: 7	−0.041 [−0.7, 0.6] Ss: P=R: 16
	CV	−2.301 [−3.3, −1.2] Ss: P>A: 10; P=A: 6	−2.464 [−3.6, −1.3] Ss: R>A: 11; R=A: 5	−0.162 [−0.8, 0.4] Ss: P=R: 16
μ_1 (kHz)	VCV	2.234 [1.9, 2.6] Ss: A>P: 16	2.488 [2.1, 2.8] Ss: A>R: 16	0.251 [0.0, 0.5] Ss: P=R: 10; P>R: 6
	CV	2.351 [2.0, 2.7] Ss: A>P: 16	2.631 [2.3, 3.0] Ss: A>R: 16	0.276 [0.1, 0.5] Ss: P=R: 9; P>R: 7
μ_2 (kHz)	VCV	0.065 [−0.1, 0.3] Ss: A>P: 6; P>A: 5; A=P: 5	0.133 [−0.1, 0.3] Ss: A>R: 6; A=R: 6; R>A: 4	0.069 [0.0, 0.5] Ss: P=R: 12; P>R: 4
	CV	−0.069 [−0.3, 0.1] Ss: P>A: 10; A>P: 5; A=P: 1	−0.048 [−0.2, 0.2] Ss: R>A: 10; A>R: 6	0.021 [−0.1, 0.1] Ss: P=R: 12; P>R: 3; R>P: 1
μ_3	VCV	−1.620 [−2.0, −1.3] Ss: P>A: 16	−1.851 [−2.2, −1.5] Ss: R>A: 16	−0.228 [−0.4, −0.0] Ss: P=R: 11; R>P: 5
	CV	−1.655 [−2.0, −1.3] Ss: P>A: 16	−1.898 [−2.3, −1.6] Ss: R>A: 16	−0.242 [−0.5, −0.0] Ss: P=R: 11; R>P: 5
μ_4	VCV	0.953 [−0.4, 2.2] Ss: A>P: 7; A=P: 5; P>A: 4	0.925 [−0.6, 2.4] Ss: A>R: 8; R>A: 4; A=R: 4	−0.025 [−0.7, 0.7] Ss: P=R: 14; P>R: 1; R>P: 1
	CV	1.073 [−0.3, 2.4] Ss: A>P: 7; A=P: 5; P>A: 4	0.816 [−0.7, 2.3] Ss: A>R: 8; R>A: 4; A=R: 4	−0.258 [−1.0, 0.4] Ss: P=R: 14; P>R: 1; R>P: 1

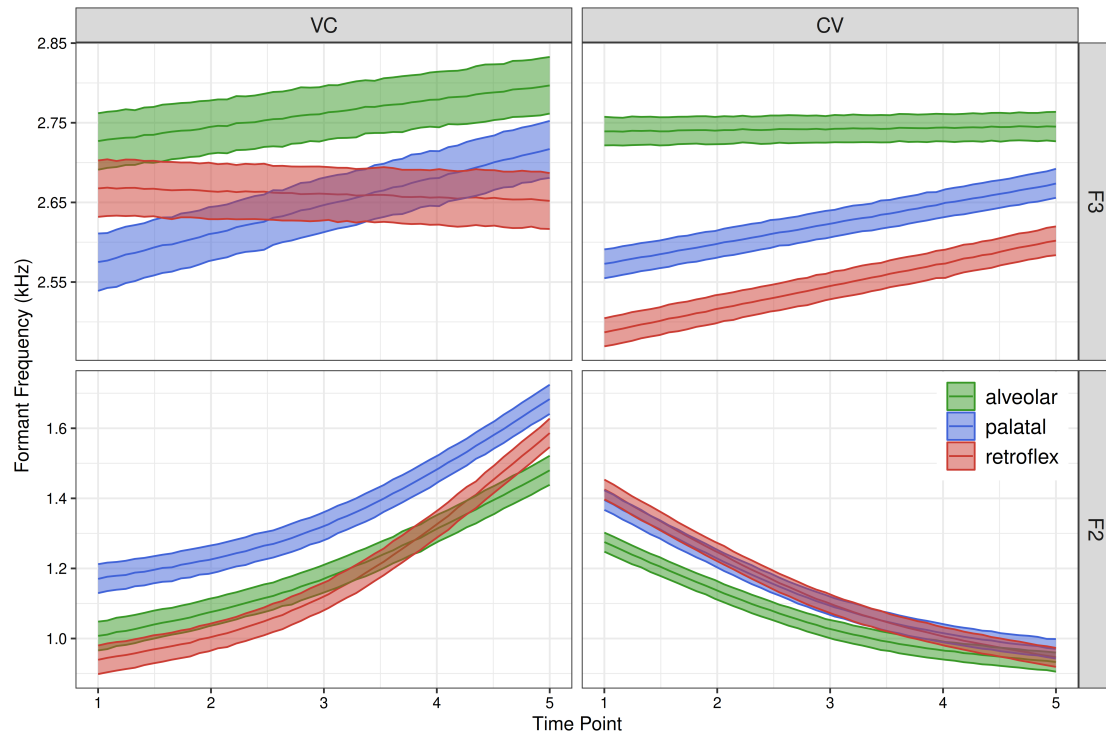
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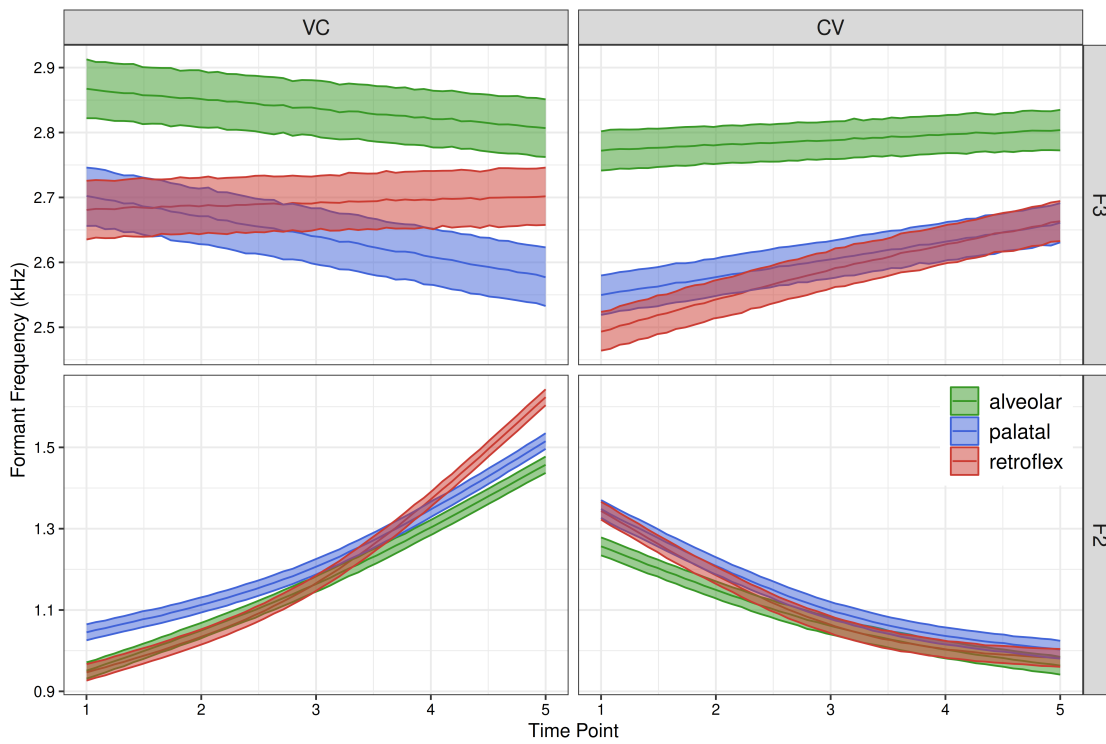
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Time Periods of Significant Formant Contrasts

Vowel	Position	Formant	Alv. – Pal.	Alv – Ret.	Pal – Ret.
/i/	VC	F2	– (86-90)	~	~
		F3	~	– (75-90)	~
	CV	F2	~	~	~
		F3	~	~	~
/e/	VC	F2	~	– (73-90)	~
		F3	~	~	~
	CV	F2	– (10-23)	– (10-28)	~
		F3	~	~	~
/a/	VC	F2	– (70-90)	– (74-90)	~
		F3	~	~	~
	CV	F2	– (10-35)	– (10-17)	+ (10-50)
		F3	~	+ (26-50)	~
/o/	VC	F2	– (50-56)	– (81-90)	+ (50-61) – (87-90)
		F3	+ (57-90)	+ (54-90)	~
	CV	F2	– (10-11)	~	~
		F3	+ (10-50)	+ (10-50)	~
/u/	VC	F2	– (74-90)	~	+ (50-79)
		F3	+ (50-55)	~	~
	CV	F2	– (10-14)	– (10-21)	~
		F3	+ (10-50)	+ (10-50)	+ (10-47)

Supervised Model Results (CV)

Speaker	POA	p_alv	p_pal	p_ret
F01	alveolar	87.6	6.6	5.8
F01	palatal	12.2	48.3	39.6
F01	retroflex	1.4	35.1	63.5
F02	alveolar	94.8	4.1	1.1
F02	palatal	2.8	54.6	42.6
F02	retroflex	3.2	42.7	54.2
F03	alveolar	95.3	3.9	0.8
F03	palatal	2.3	52.5	45.1
F03	retroflex	1.6	36.2	62.3
F04	alveolar	89.8	7.0	3.2
F04	palatal	3.6	56.4	40.1
F04	retroflex	2.7	42.1	55.2
F05	alveolar	82.6	12.1	5.3
F05	palatal	7.6	50.9	41.5
F05	retroflex	5.4	50.4	44.2
F06	alveolar	95.4	3.6	1.1
F06	palatal	2.1	52.7	45.2
F06	retroflex	2.7	39.0	58.3
F07	alveolar	71.6	15.0	13.4
F07	palatal	13.0	51.7	35.3
F07	retroflex	8.9	39.8	51.4
F08	alveolar	93.6	5.2	1.2
F08	palatal	3.6	50.7	45.7
F08	retroflex	2.5	43.5	53.9
M01	alveolar	95.3	3.4	1.3
M01	palatal	2.0	47.6	50.4

M01 retroflex	1.5	49.0	49.5
M02 alveolar	96.4	2.7	0.9
M02 palatal	1.6	47.1	51.3
M02 retroflex	1.9	44.7	53.4
M03 alveolar	77.7	16.0	6.2
M03 palatal	13.5	49.8	36.7
M03 retroflex	2.4	48.5	49.1
M04 alveolar	84.8	12.5	2.7
M04 palatal	10.7	48.1	41.2
M04 retroflex	5.8	43.9	50.3
M05 alveolar	91.7	6.4	1.9
M05 palatal	4.4	52.4	43.2
M05 retroflex	3.8	49.9	46.2
M06 alveolar	88.6	7.6	3.8
M06 palatal	3.3	51.4	45.3
M06 retroflex	4.4	45.7	49.9
M07 alveolar	96.2	2.8	0.9
M07 palatal	14.1	43.3	42.6
M07 retroflex	0.6	41.2	58.2
M08 alveolar	86.9	9.0	4.1
M08 palatal	17.9	56.4	25.6
M08 retroflex	1.1	34.1	64.9

Supervised Model Results (VCV)

Speaker	POA	p_alv	p_pal	p_ret
F01	alveolar	76.2	16.9	6.8
F01	palatal	32.1	34.4	33.5
F01	retroflex	1.5	31.1	67.4
F02	alveolar	77.0	18.8	4.3
F02	palatal	16.5	45.6	37.8
F02	retroflex	7.1	40.9	52.0
F03	alveolar	81.0	15.6	3.5
F03	palatal	11.1	42.5	46.4
F03	retroflex	7.5	33.9	58.6
F04	alveolar	75.3	15.3	9.4
F04	palatal	14.0	42.4	43.6
F04	retroflex	5.9	40.0	54.1
F05	alveolar	68.0	23.0	9.0
F05	palatal	25.1	44.8	30.1
F05	retroflex	5.7	38.5	55.8
F06	alveolar	70.9	23.1	6.0
F06	palatal	15.4	50.2	34.4
F06	retroflex	9.0	39.2	51.8
F07	alveolar	58.0	29.9	12.1
F07	palatal	24.8	42.5	32.7
F07	retroflex	12.1	37.6	50.3
F08	alveolar	84.6	12.6	2.7
F08	palatal	15.4	45.4	39.2
F08	retroflex	4.0	40.3	55.7
M01	alveolar	83.0	12.1	4.9
M01	palatal	10.1	51.7	38.2

M01 retroflex	5.2	40.4	54.4
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M02 alveolar	80.8	14.2	5.0
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M02 palatal	13.0	48.7	38.2
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M02 retroflex	8.4	40.5	51.2
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M03 alveolar	60.8	26.7	12.5
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M03 palatal	20.9	48.6	30.6
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M03 retroflex	10.0	38.8	51.2
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M04 alveolar	70.6	21.2	8.2
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M04 palatal	11.8	48.7	39.5
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M04 retroflex	9.6	41.1	49.3
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M05 alveolar	69.5	23.9	6.6
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M05 palatal	12.8	51.3	36.0
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M05 retroflex	7.9	39.7	52.4
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M06 alveolar	73.6	17.9	8.5
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M06 palatal	9.5	47.7	42.8
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M06 retroflex	10.2	37.0	52.9
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M07 alveolar	80.8	15.5	3.7
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M07 palatal	17.6	42.2	40.2
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M07 retroflex	4.2	39.3	56.5
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M08 alveolar	67.8	22.8	9.5
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M08 palatal	34.1	44.9	21.0
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M08 retroflex	2.7	36.1	61.2
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