

## Supplementary Materials

C-Duration: Pairwise comparisons	t-value	p-value	effect size
A-Comp vs. S-Comp /b/	-14.420	< 0.0001	5.004
A-Bil vs. S-Bil /b/	35.474	< 0.0001	4.865
A-Comp vs. S-Comp /d/	-6.715	< 0.0001	2.244
A-Comp vs. S-Comp /p/	-6.319	< 0.0001	2.235
A-Comp vs. A-Bil /k/	-6.591	< 0.0001	2.016
A-Comp vs. S-Comp /k/	-5.880	< 0.0001	1.948
A-Bil vs. S-Bil /d/	15.856	< 0.0001	1.876
S-Comp vs. S-Bil /b/	5.136	< 0.0001	1.634
A-Comp vs. A-Bil /b/	4.546	< 0.0001	1.495
S-Comp vs. S-Bil /d/	4.135	0.0002	1.300
A-Bil vs. S-Bil /p/	7.074	< 0.0001	1.050
A-Comp vs. A-Bil /d/	2.991	0.0046	0.932
A-Comp vs. A-Bil /p/	-2.671	0.0098	0.898
A-Comp vs. S-Comp /t/	-2.607	0.0125	0.887
A-Comp vs. A-Bil /t/	-2.653	0.0109	0.843
S-Comp vs. S-Bil /g/	-0.979	0.3296	0.396
S-Comp vs. S-Bil /p/	0.879	0.3841	0.286
S-Comp vs. S-Bil /t/	0.315	0.7541	0.101
S-Comp vs. S-Bil /k/	-0.313	0.7558	0.098
A-Bil vs. S-Bil /t/	-0.464	0.6427	0.057
A-Bil vs. S-Bil /k/	0.305	0.7603	0.029

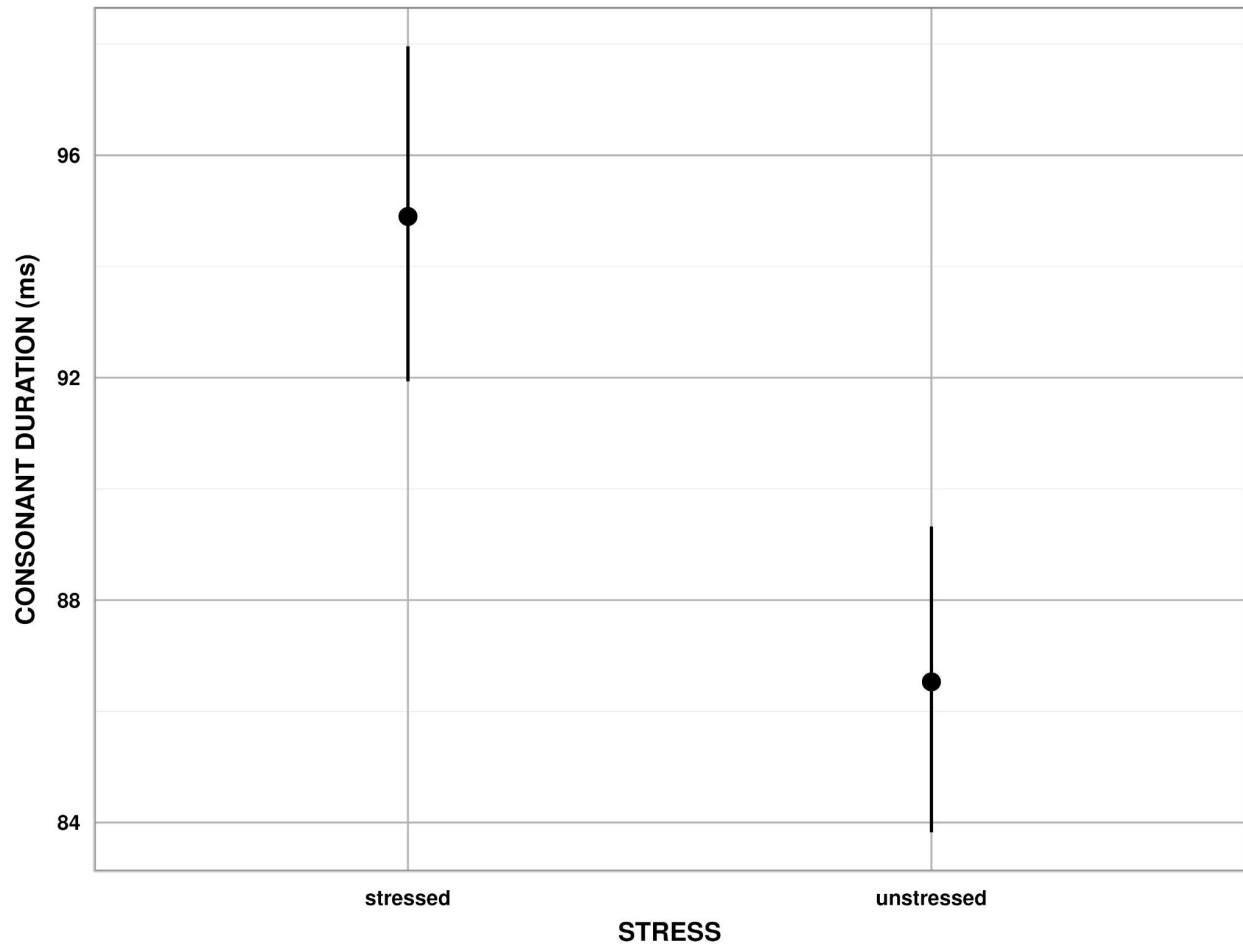
Supplementary Materials, Table 1. Pairwise comparisons ordered by effect size for C-Duration

CV-Intensity-Ratio: Pairwise comparison	t-value	p-value	effect size
A-Comp vs. S-Comp /b/	7.707	< 0.0001	20.756
A-Comp vs. S-Comp /d/	8.258	< 0.0001	18.571
A-Bil vs. S-Bil /b/	-24.438	< 0.0001	14.665
A-Bil vs. S-Bil /d/	-20.549	< 0.0001	10.640
A-Comp vs. A-Bil /k/	4.355	0.0001	10.234
A-Comp vs. S-Comp /p/	3.365	0.0019	9.952
A-Comp vs. S-Comp /k/	3.532	0.0012	9.297
A-Comp vs. A-Bil /p/	2.939	0.0061	7.615
A-Comp vs. A-Bil /t/	2.853	0.0076	6.964
S-Comp vs. S-Bil /g/	1.885	0.0674	6.145
A-Comp vs. S-Comp /t/	1.976	0.0558	5.595
S-Comp vs. S-Bil /d/	-2.120	0.0407	4.302
S-Comp vs. S-Bil /b/	-1.623	0.1161	3.897
A-Comp vs. A-Bil /d/	1.856	0.0708	3.628
A-Bil vs. S-Bil /t/	6.402	< 0.0001	3.407
A-Bil vs. S-Bil /p/	-3.767	0.0002	2.400
A-Bil vs. S-Bil /k/	5.236	< 0.0001	2.215
A-Comp vs. A-Bil /b/	0.966	0.3406	2.194
S-Comp vs. S-Bil /t/	-0.786	0.4380	2.038
S-Comp vs. S-Bil /k/	-0.531	0.5993	1.278
S-Comp vs. S-Bil /p/	0.023	0.9818	0.063

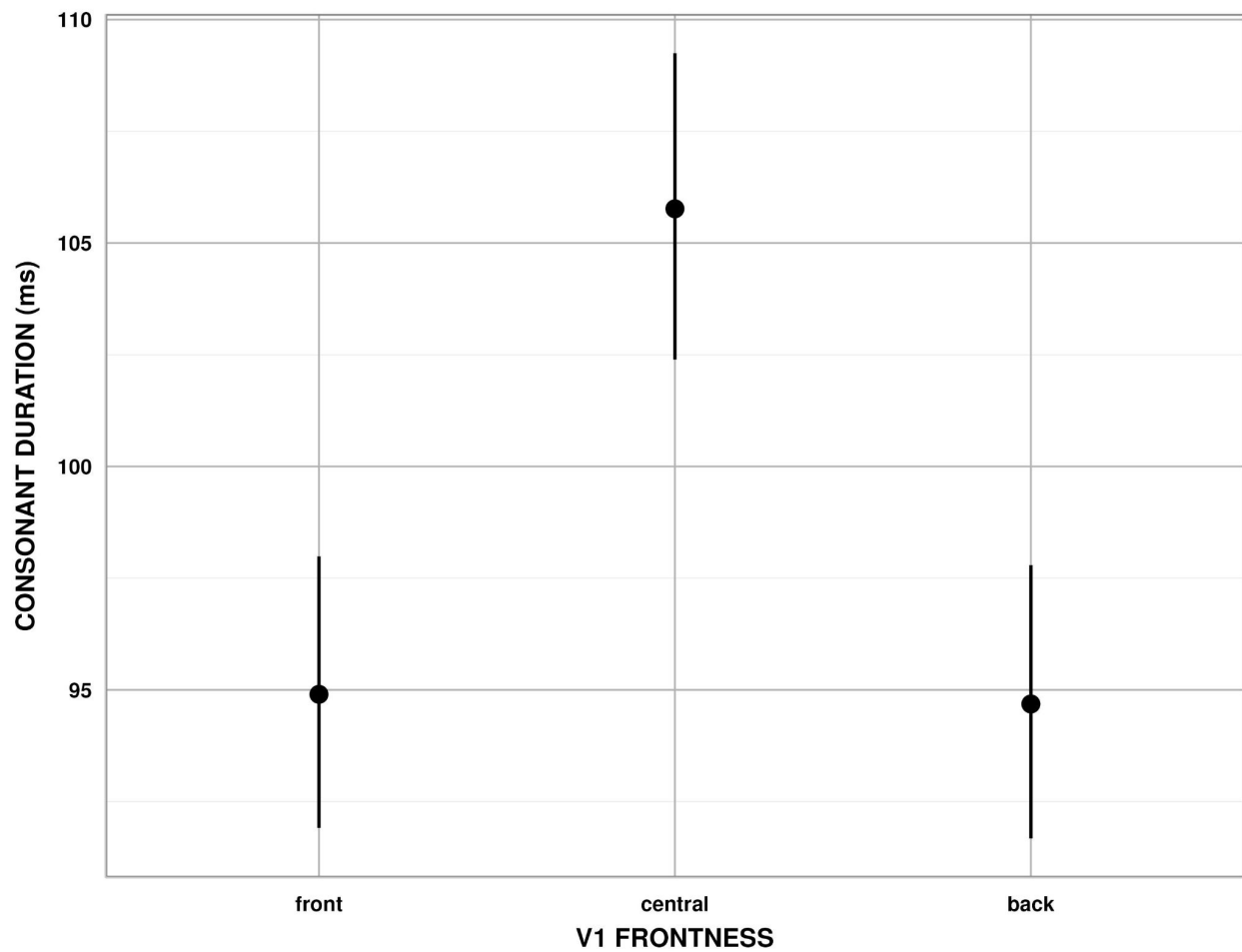
**Supplementary Materials, Table 2. Pairwise comparisons ordered by effect size for CV-Intensity-Ratio**

Percent Voicing: Pairwise comparisons	z-value	p-value	effect size
A-Comp vs. S-Comp /k/	4.648	< 0.0001	0.763
A-Comp vs. A-Bil /t/	3.613	0.0003	0.719
A-Comp vs. S-Comp /t/	3.465	0.0005	0.636
A-Comp vs. S-Comp /p/	4.734	< 0.0001	0.634
A-Comp vs. A-Bil /p/	3.547	0.0004	0.606
A-Comp vs. A-Bil /k/	2.705	0.0068	0.507
A-Bil vs. S-Bil /k/	-12.528	< 0.0001	0.388
A-Bil vs. S-Bil /p/	-8.323	< 0.0001	0.377
S-Comp vs. S-Bil /p/	1.920	0.0548	0.349
S-Comp vs. S-Bil /t/	1.042	0.2976	0.228
A-Bil vs. S-Bil /t/	-3.815	0.0001	0.145
S-Comp vs. S-Bil /k/	0.645	0.5190	0.131

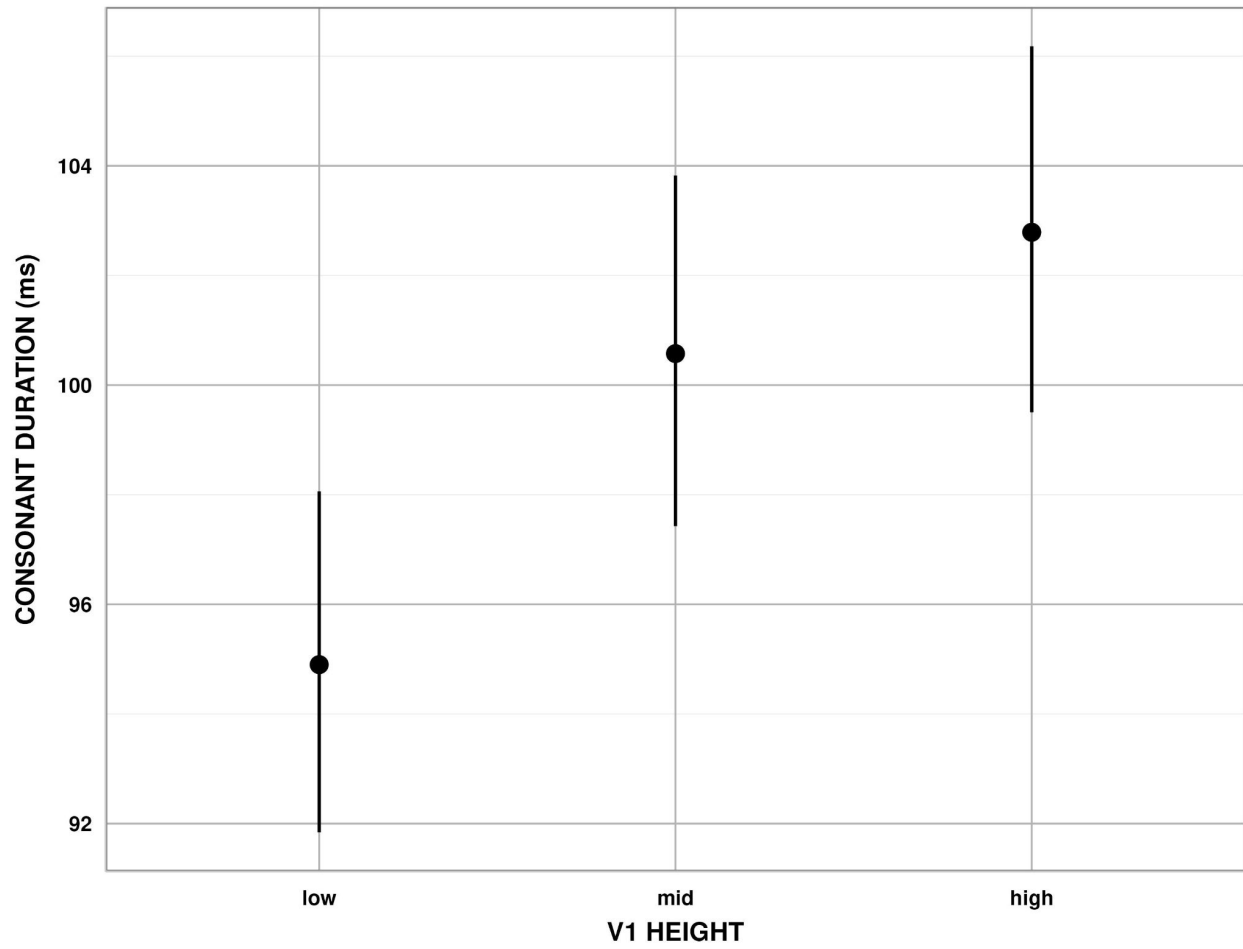
**Supplementary Materials, Table 3. Pairwise comparisons ordered by effect size for Percent Voicing**



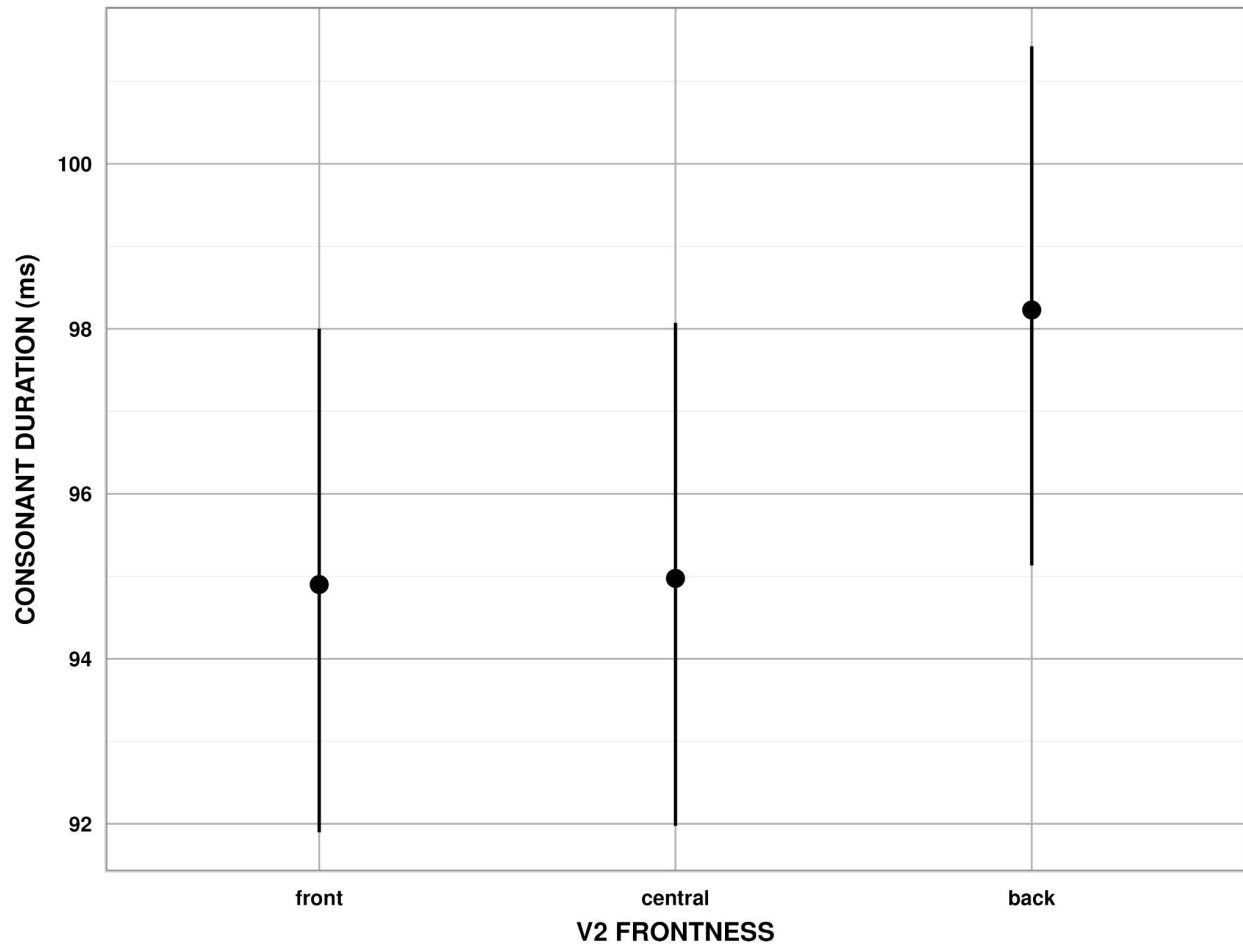
**Supplementary Materials, Figure 1.** Model-predicted means for STRESS for the outcome CONSONANT DURATION. Error bars mark the 95% confidence intervals around each predicted mean value.



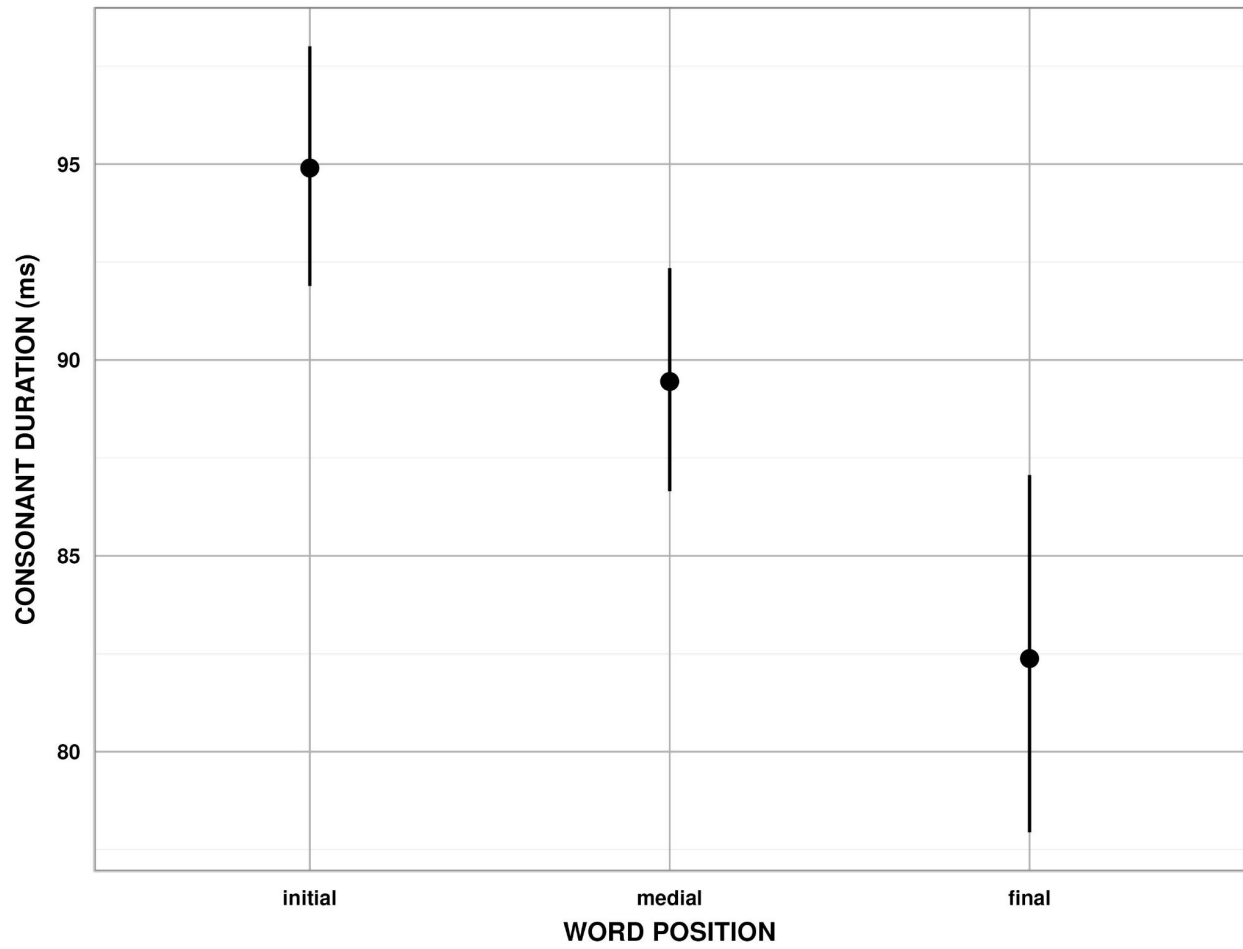
**Supplementary Materials, Figure 2.** Model-predicted means for V1 FRONTNESS for the outcome CONSONANT DURATION. Error bars mark the 95% confidence intervals around each predicted mean value.



**Supplementary Materials, Figure 3.** Model-predicted means for V1 HEIGHT for the outcome CONSONANT DURATION. Error bars mark the 95% confidence intervals around each predicted mean value.

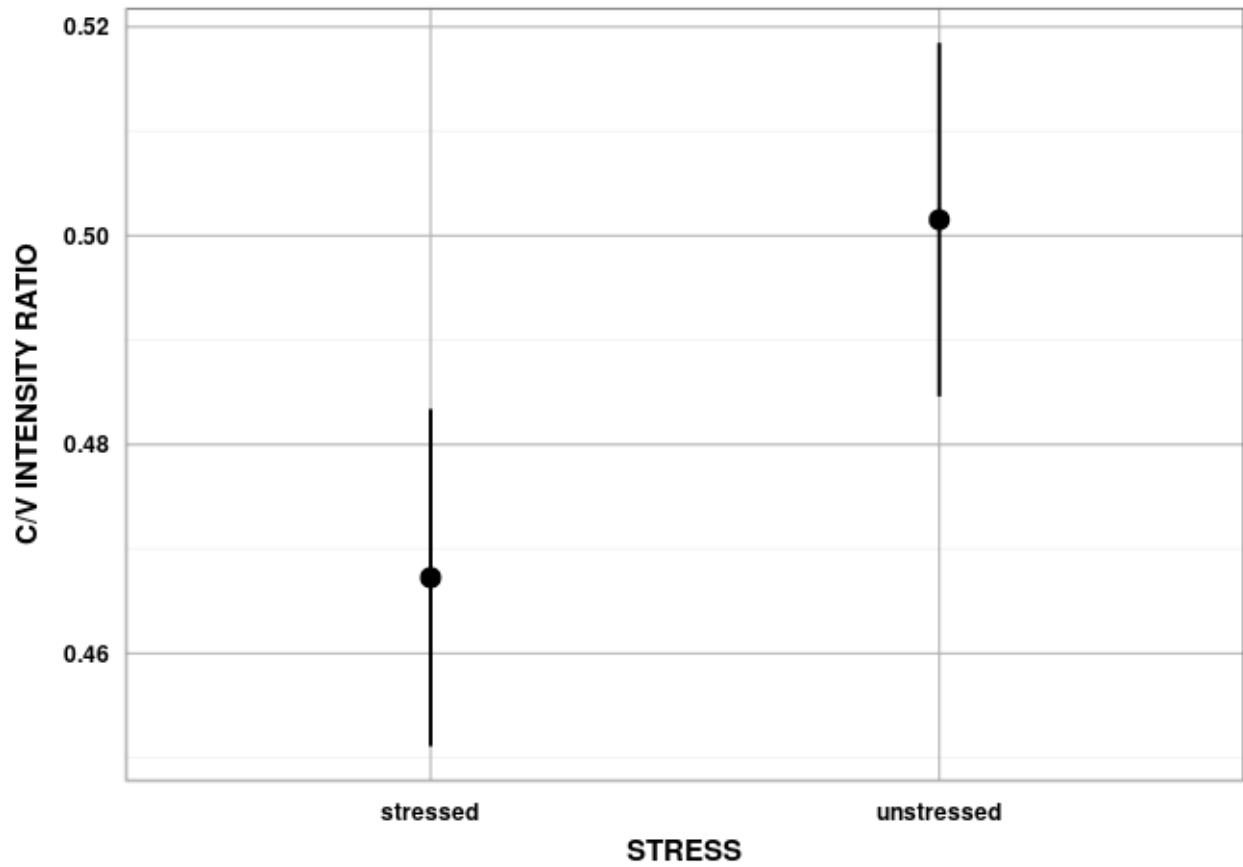


**Supplementary Materials, Figure 4.** Model-predicted means for V2 FRONTNESS for the outcome CONSONANT DURATION. Error bars mark the 95% confidence intervals around each predicted mean value.

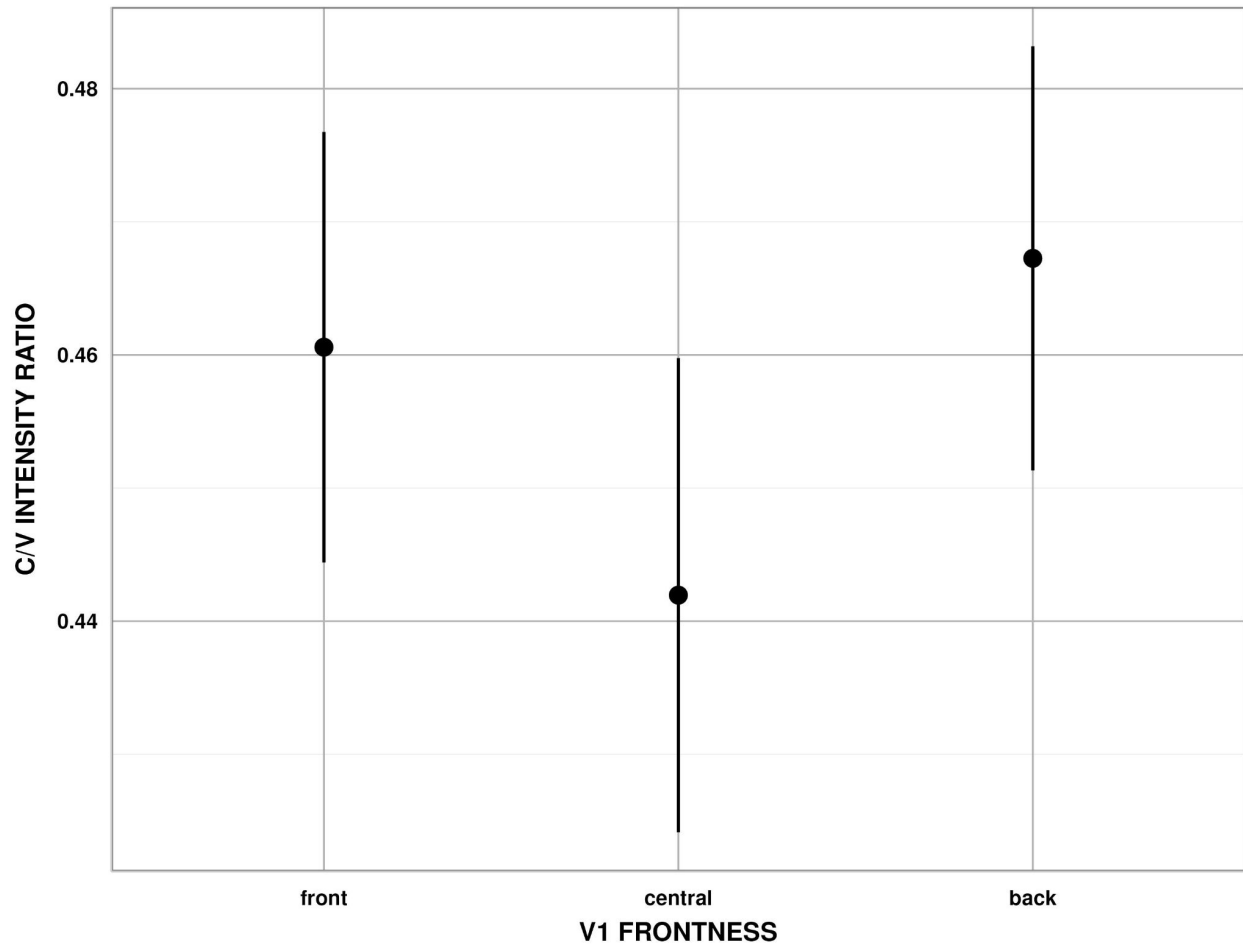


**Supplementary Materials, Figure 5.** Model-predicted means for WORD POSITION for the outcome CONSONANT DURATION. Error bars mark the 95% confidence intervals around each predicted mean value.

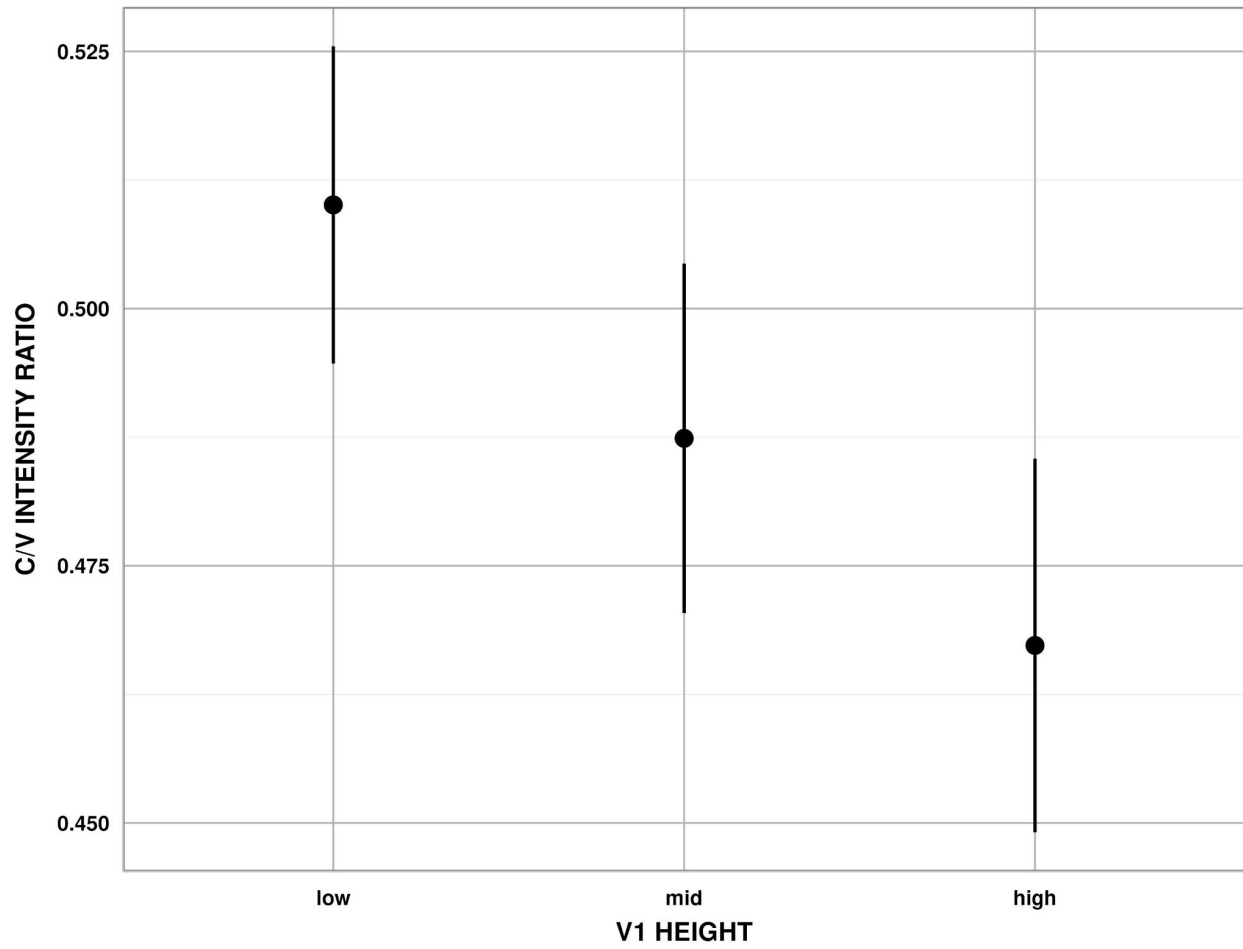




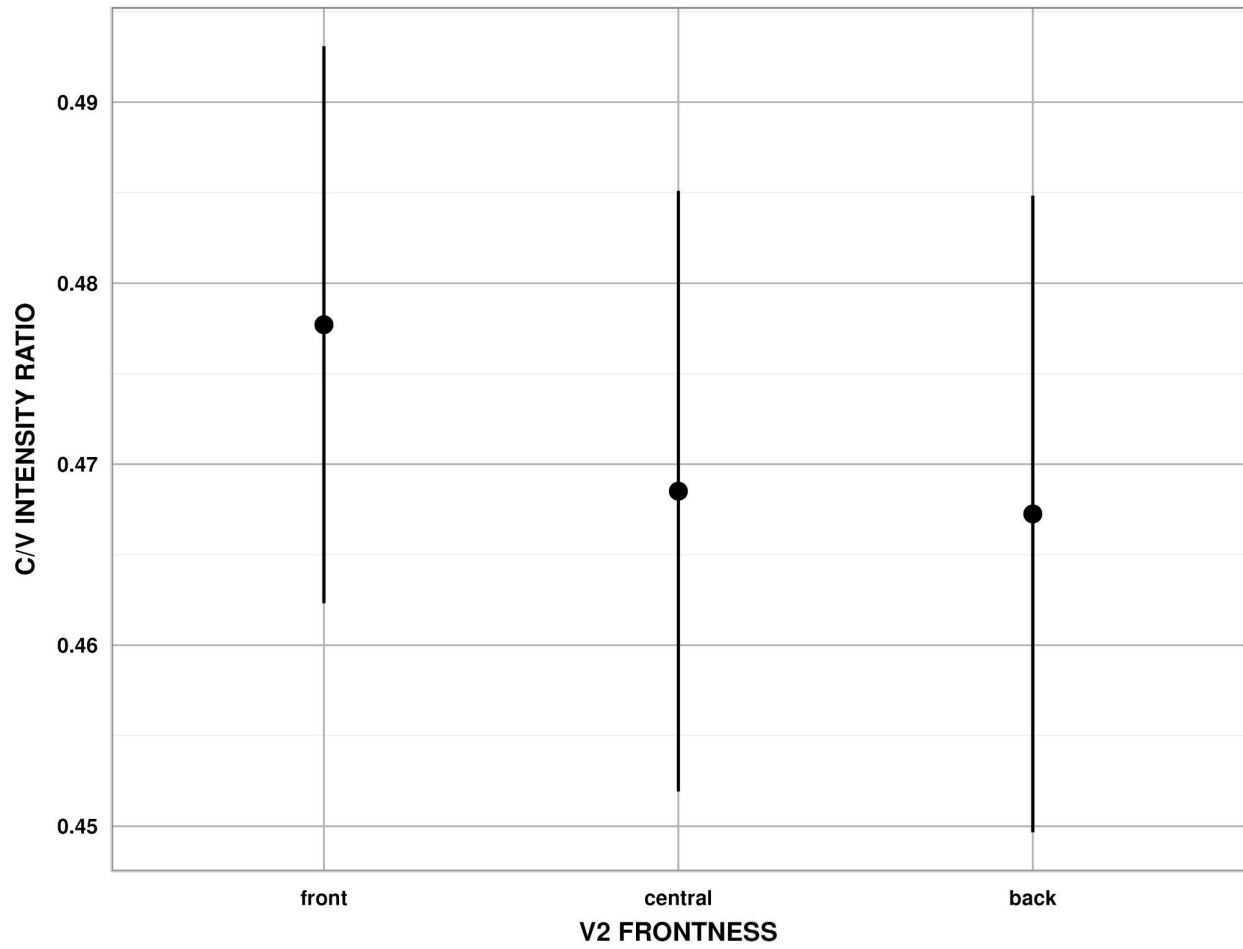
**Supplementary Materials, Figure 6.** Model-predicted means for STRESS for the outcome C/V INTENSITY RATIO. Error bars mark the 95% confidence intervals around each predicted mean value.



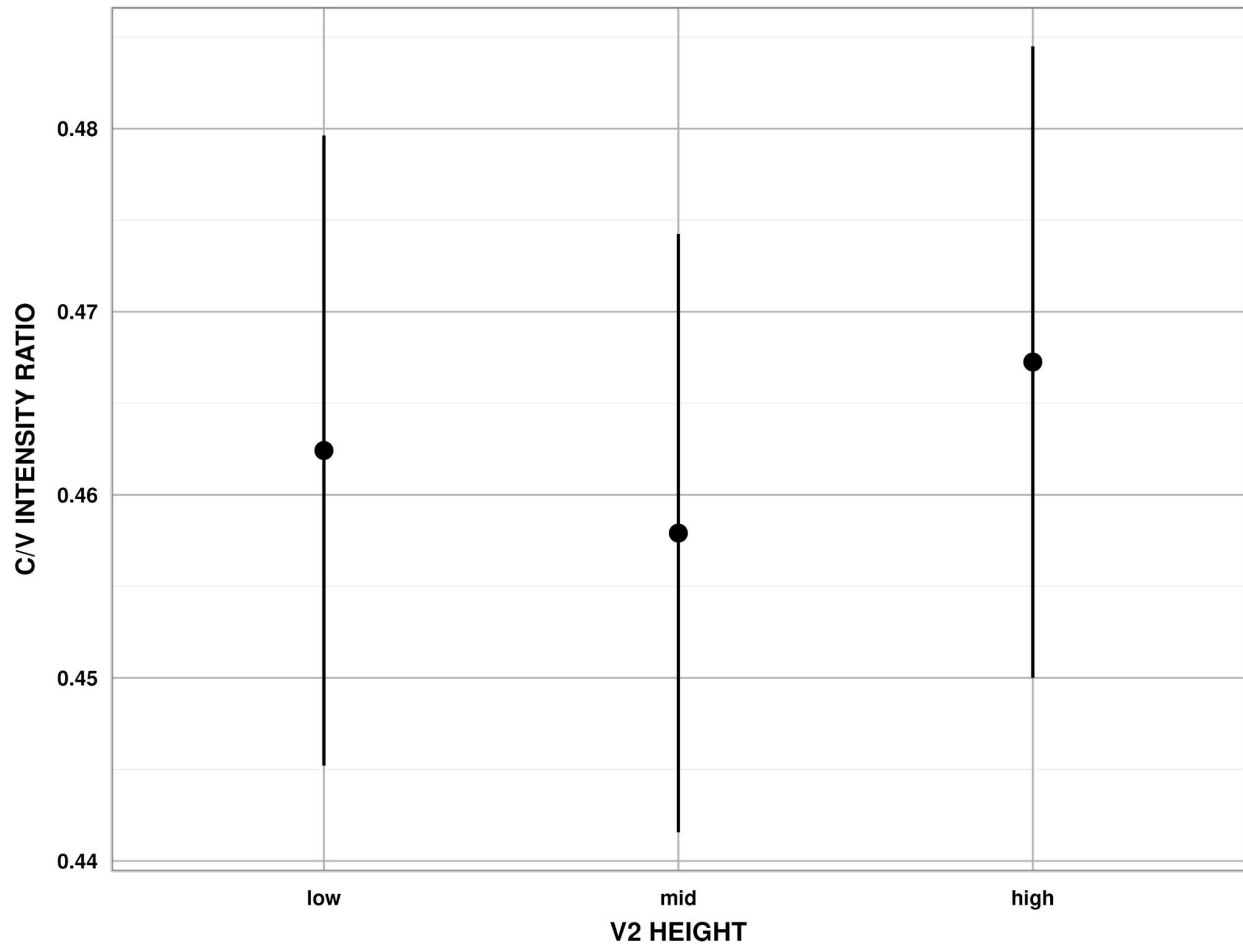
**Supplementary Materials, Figure 7.** Model-predicted means for V1 FRONTNESS for the outcome C/V INTENSITY RATIO. Error bars mark the 95% confidence intervals around each predicted mean value.



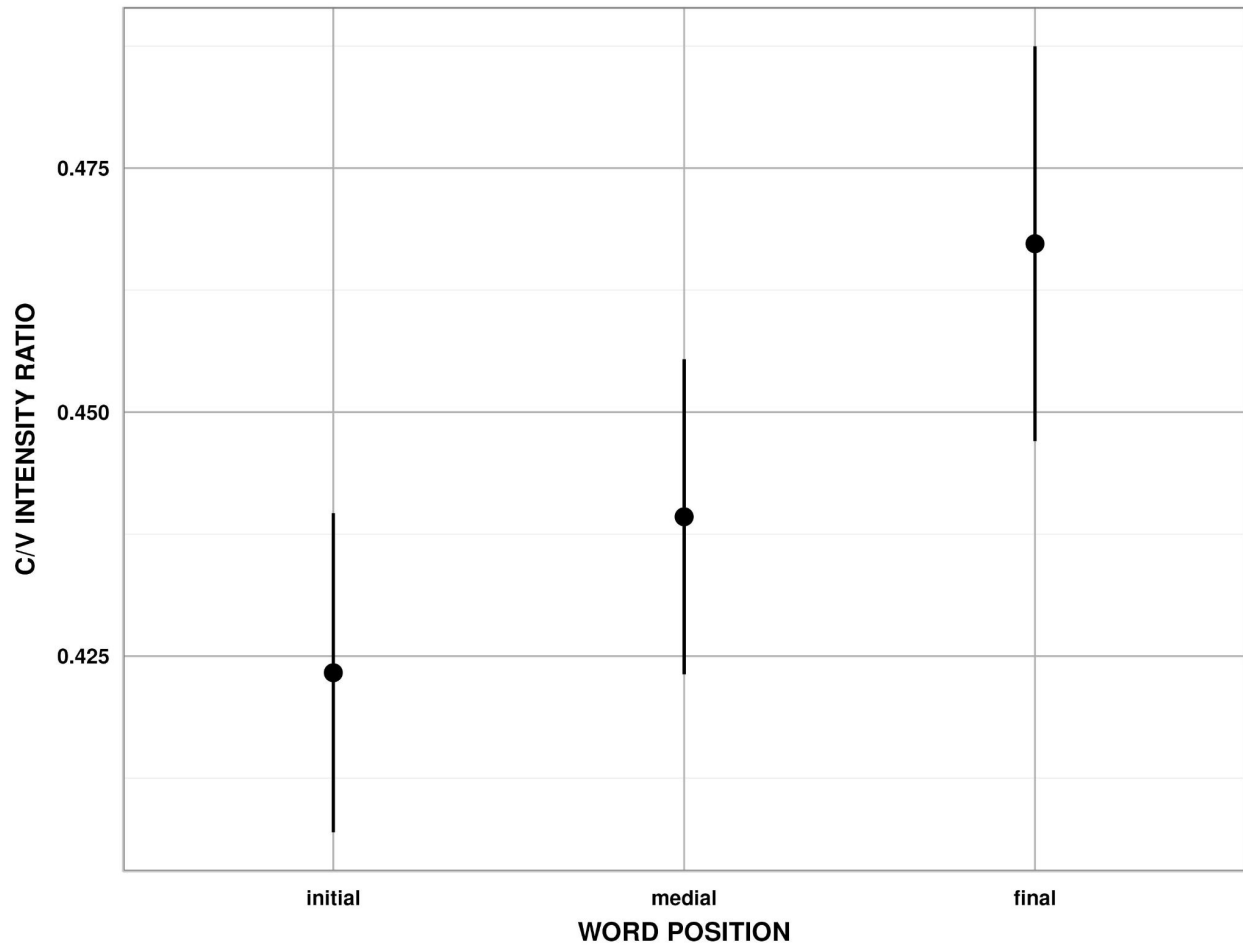
**Supplementary Materials, Figure 8.** Model-predicted means for V1 HEIGHT for the outcome C/V INTENSITY RATIO. Error bars mark the 95% confidence intervals around each predicted mean value.



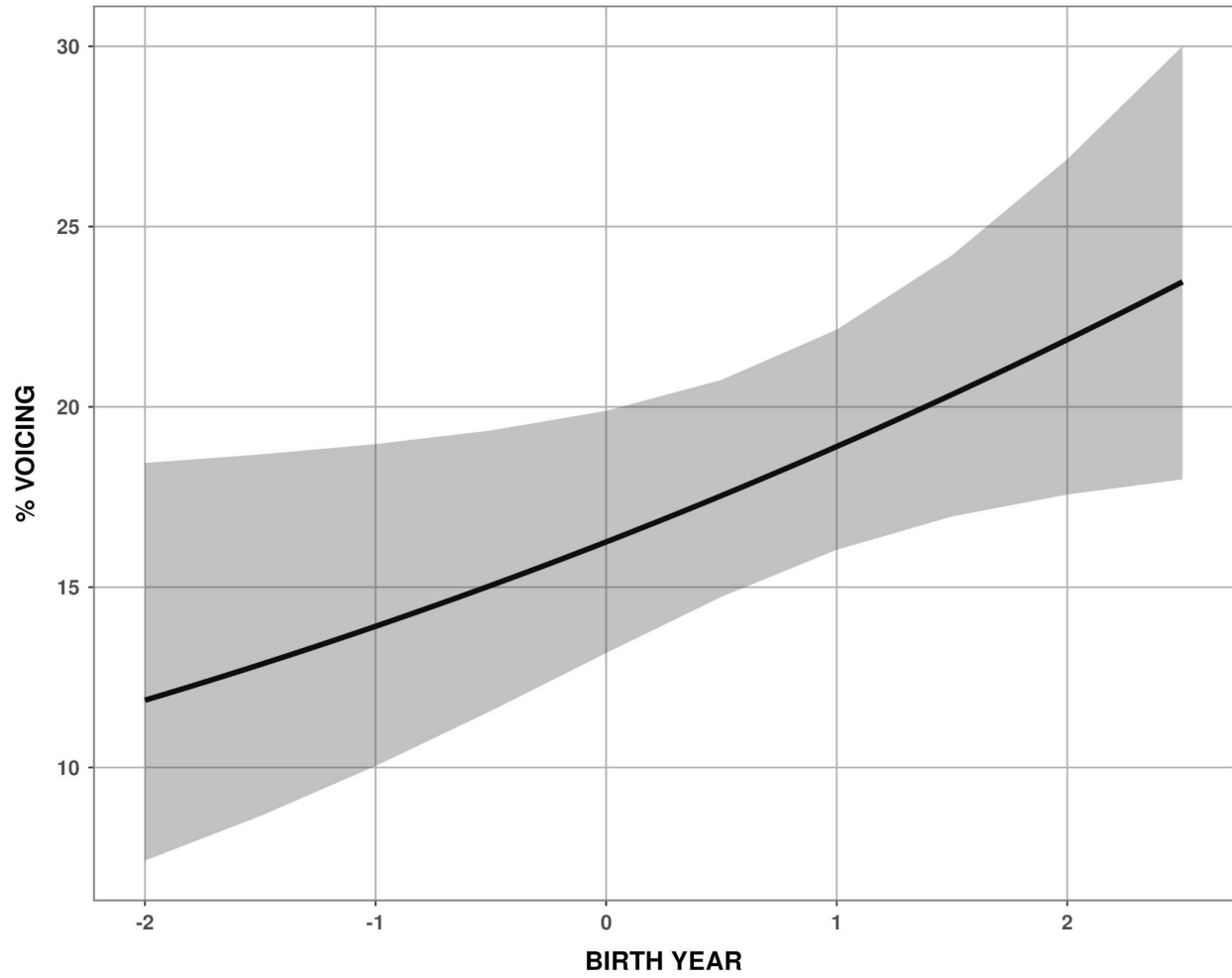
**Supplementary Materials, Figure 9.** Model-predicted means for V2 FRONTNESS for the outcome C/V INTENSITY RATIO. Error bars mark the 95% confidence intervals around each predicted mean value.



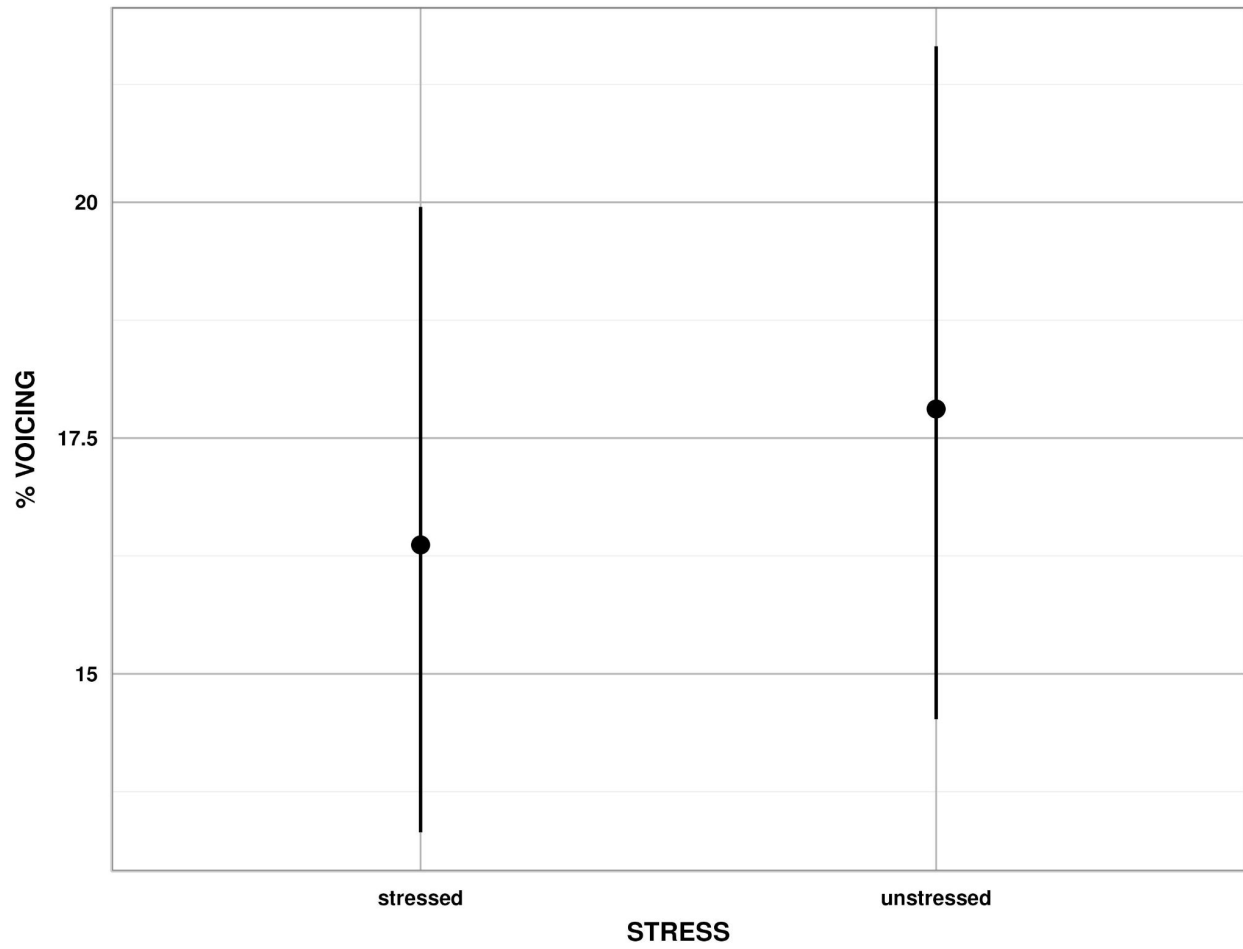
**Supplementary Materials, Figure 10.** Model-predicted means for V2 HEIGHT for the outcome C/V INTENSITY RATIO. Error bars mark the 95% confidence intervals around each predicted mean value.



**Supplementary Materials, Figure 11.** Model-predicted means for WORD POSITION for the outcome C/V INTENSITY RATIO. Error bars mark the 95% confidence intervals around each predicted mean value.

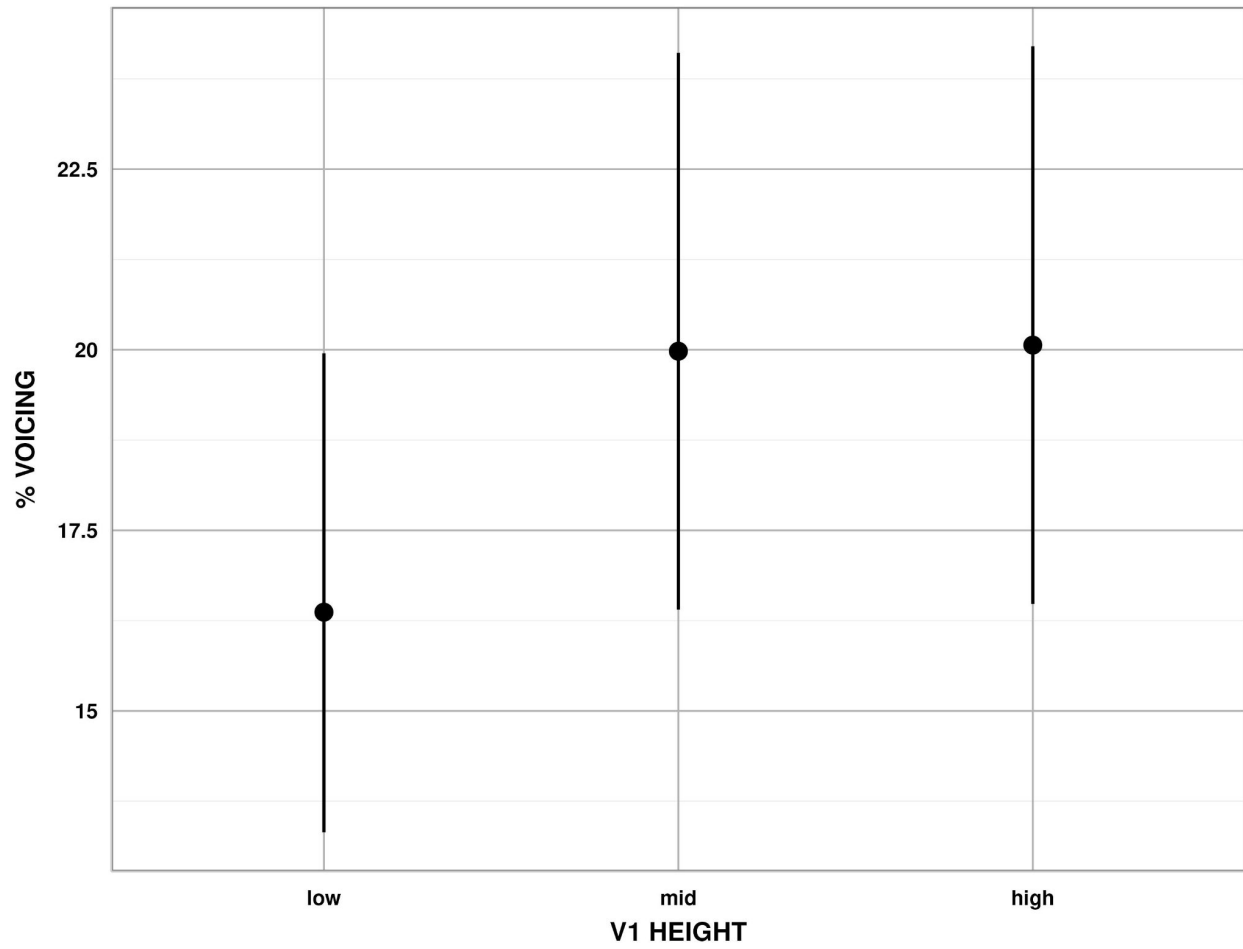


**Supplementary Materials, Figure 12.** Model-predicted mean for z-transformed BIRTH YEAR for the outcome PERCENT VOICING. Error band marks the 95% confidence intervals around the predicted effect.

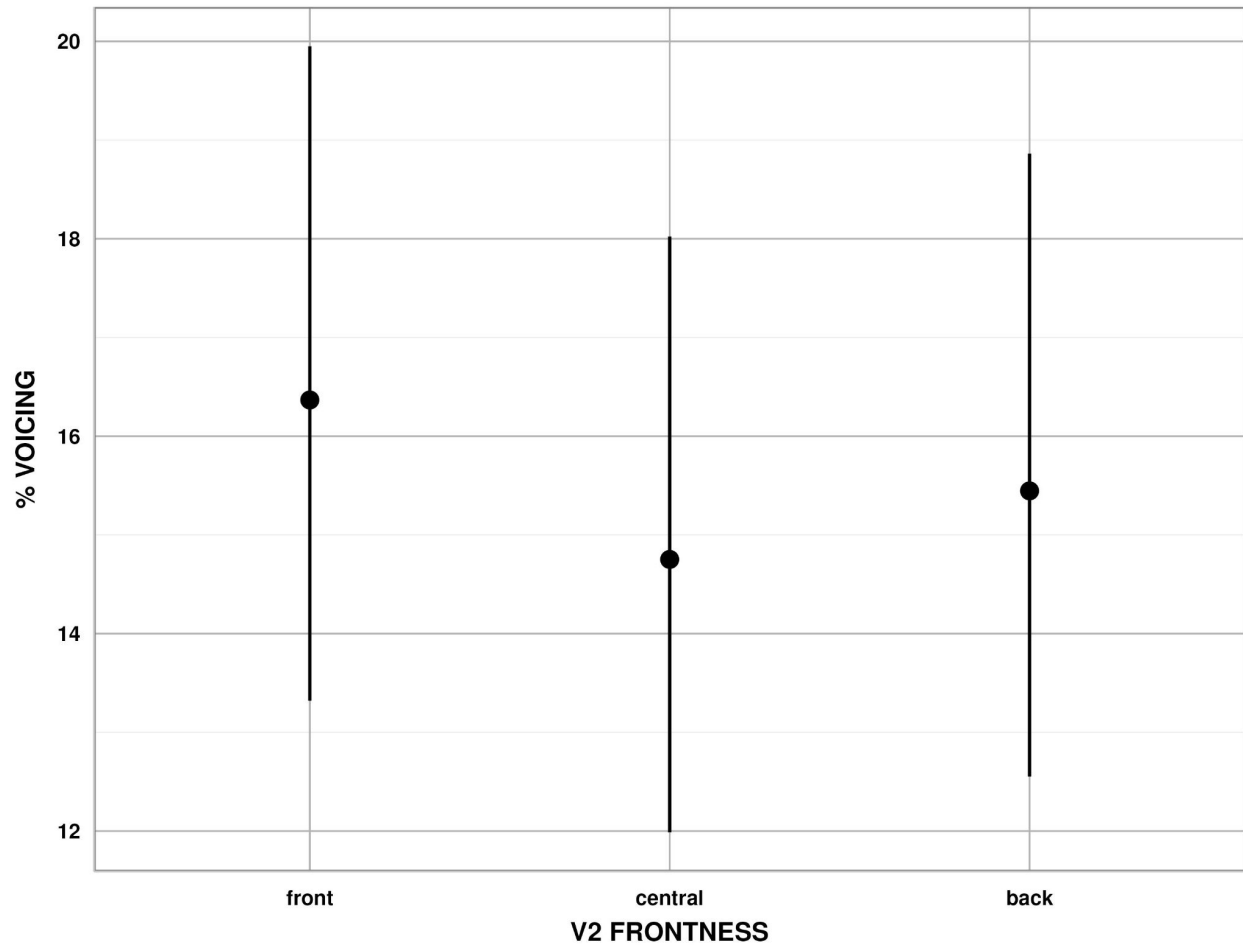


**Supplementary Materials, Figure 13.** Model-predicted means for STRESS for the outcome PERCENT VOICING. Error bars mark the 95% confidence intervals around each predicted mean value.

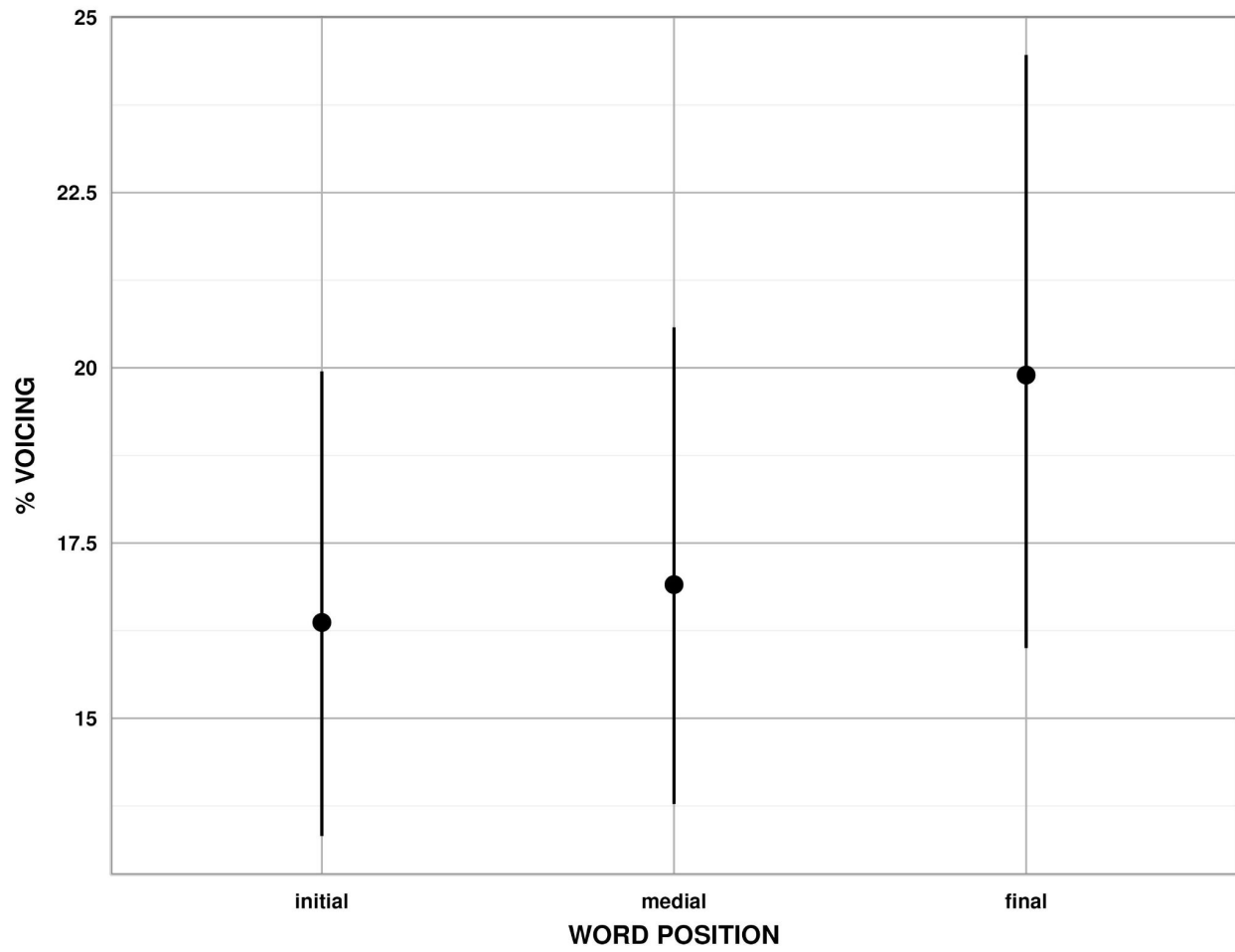




**Supplementary Materials, Figure 14.** Model-predicted means for V1 HEIGHT for the outcome PERCENT VOICING. Error bars mark the 95% confidence intervals around each predicted mean value.



**Supplementary Materials, Figure 15.** Model-predicted means for V2 FRONTNESS for the outcome PERCENT VOICING. Error bars mark the 95% confidence intervals around each predicted mean value.



**Supplementary Materials, Figure 16.** Model-predicted means for WORD POSITION for the outcome PERCENT VOICING. Error bars mark the 95% confidence intervals around each predicted mean value.