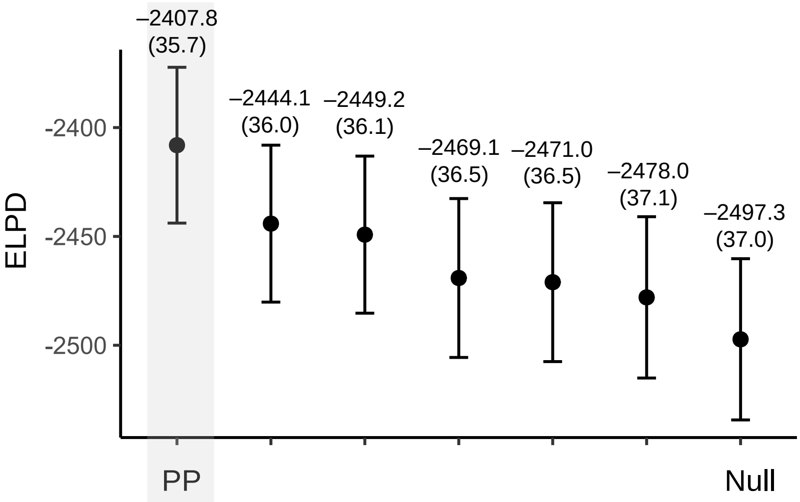
Supplementary Information

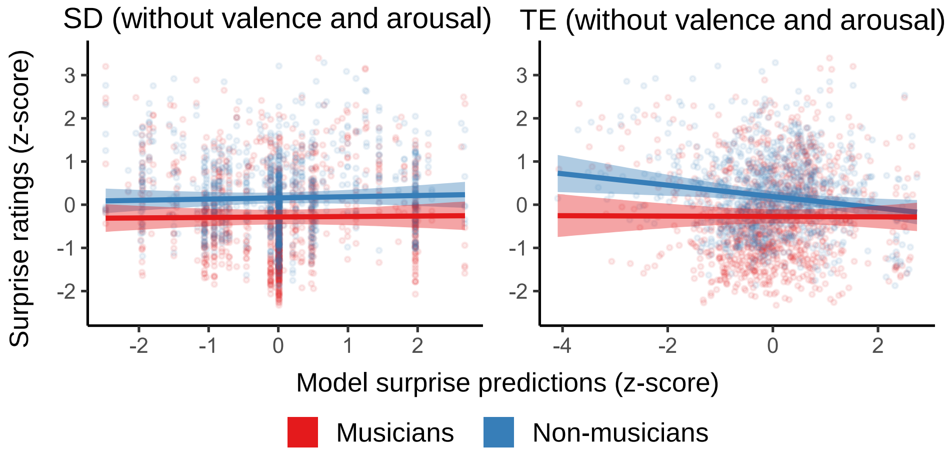
Cognitive and Sensory Expectations Independently Shape Musical Expectancy and Pleasure

Vincent K.M. Cheung, Peter M.C. Harrison, Stefan Koelsch, Marcus T. Pearce, Angela D. Friederici, and Lars Meyer

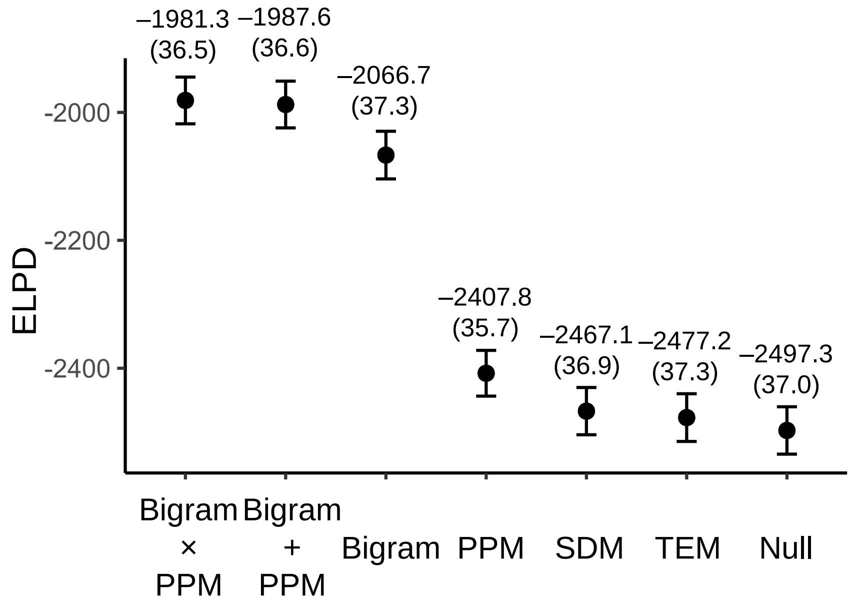


LPI decay (s)	0.5	0.1	0.5	0.5	0.1	0.1
GPI decay (s)	4.0	4.0	2.5	1.5	2.5	1.5
dELPD from Null	89.4	53.1	48.1	28.2	26.2	19.3
SE of dELPD	(14.9)	(11.9)	(11.0)	(8.6)	(8.5)	(6.7)

Supplementary Figure 1. Comparing predictive accuracy of PP for different parameters of the global and local pitch images. For all combinations, predictive performance was higher than the null model, indicating that our observed sensory contribution to chord expectancy finding was robust.



Supplementary Figure 2. For SD and TE, we estimated additional varying-slopes models that excluded both valence and arousal, and included only the intercept, musicianship, SD or TE, and musicianship*SD or musicianship*TE as predictors. Echoing the main results, we did not detect a meaningful relationship between surprise and SD in musicians (β = 0.011, 95%CrI = [–0.095, 0.117]) or non-musicians (β = 0.028, 95%CrI = [–0.077, 0.130]), between surprise and TE in musicians (95%CrI = [–0.113, 0.106]), and identified a negative relationship between surprise and TE in non-musicians (β = –0.132, 95%CrI = [–0.226, –0.035]).



Supplementary Figure 3. To rule out the possibility that the larger variance explained by IDyOM on surprise ratings was due to the model considering a longer musical context length, we fitted a bigram variant of IDyOM trained on the McGill Billboard dataset. Although this model only takes the preceding chord as context, model comparisons nevertheless still revealed improved out-of-sample accuracy of the bigram model against the other computational models.

Caption for Supplementary Audio 1. Sample isochronous chord stimulus. Chord progression taken from “Ob-La-Di-Ob-La-Da” by The Beatles. Each chord was 2.4 s long and featured a synthetic timbre with a repeated background rhythm counterbalanced across subjects.