

# Online Appendix:

## On the Interrelation between Listener Characteristics and the Perception of Emotions in Classical Orchestra Music

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### Abstract

This document contains an appendix to the article “On the Interrelation between Listener Characteristics and the Perception of Emotions in Classical Orchestra Music”, reporting more detailed results.

### Index Terms

emotion perception in music, classical music, audio analysis, personality, user study, agreement and correlation in music perception



### DESCRIPTION

This document is an extension to the paper “On the Interrelation between Listener Characteristics and the Perception of Emotions in Classical Orchestra Music”. It provides the actual agreement scores, measured by Krippendorff’s  $\alpha$ , between listener groups and perceptual aspects of Beethoven’s 3<sup>rd</sup> symphony, also known as “Eroica”. For a more detailed explanation of the material and conducted user studies, we kindly refer the reader to the main article.

TABLE 1: Extension of Table 9 in the main manuscript: Actual agreement scores (Krippendorff’s  $\alpha$ ) for each perceptual aspect (columns) for user groups defined based on *demographics and music expertise* (rows), in the UPF/MTG study. The first row shows the agreement scores among all participants. The following rows indicate agreement for the respective user groups. Bold face is used to highlight differences of more than 0.05 to the overall agreement score. Abbreviations: y = year.

	<i>n</i>	Trans.	Peace.	Power	Joyful.	Tension	Sadness
All subjects	26	-0.017	0.096	0.040	0.121	0.123	0.045
Age $\leq$ 36	13	-0.022	<b>0.150</b>	<b>0.125</b>	<b>0.282</b>	<b>0.273</b>	<b>0.127</b>
Age $>$ 36	13	-0.032	<b>0.183</b>	0.072	<b>0.065</b>	<b>0.045</b>	0.046
Gender: Male	12	-0.046	0.092	0.050	0.107	0.093	0.036
Gender: Female	14	-0.033	0.066	-0.006	0.125	0.118	0.035
General musical experience: $\leq$ 5 y	14	-0.061	0.049	0.028	0.170	0.115	0.038
General musical experience: $>$ 5 y	12	-0.021	0.101	0.015	0.091	0.079	0.024
Listening classical: Infrequent (few times/year or less)	11	-0.054	0.067	0.067	0.156	0.163	0.065
Listening classical: Frequent (few times/month or more)	15	-0.022	0.103	-0.001	0.109	0.076	0.010
Familiar with “Eroica”: No	11	-0.035	<b>0.037</b>	0.001	<b>0.239</b>	0.115	<b>0.101</b>
Familiar with “Eroica”: Somewhat	11	-0.015	<b>0.165</b>	0.074	<b>0.041</b>	<b>0.069</b>	0.007
Familiar with “Eroica”: Very	4	<b>-0.072</b>	0.092	-0.069	<b>0.012</b>	0.074	-0.044

TABLE 2: Extension of Table 10 in the main manuscript: Actual agreement scores (Krippendorff’s  $\alpha$ ) for each perceptual aspect (columns) for user groups defined based on *demographics and music expertise* (rows), in the JKU/CP study. The first row shows the agreement scores among all participants. The following rows indicate agreement for the respective user groups. Bold face is used to highlight differences of more than 0.01 to the overall agreement score. Abbreviations: h = hour, w = week, y = year.

	<i>n</i>	Trans.	Peace.	Power	Joyful.	Tension	Sadness	Anger	Disgust	Fear	Surprise	Tender	Tempo	Compl.	Instr.
All subjects	241	0.005	0.427	0.432	0.303	0.206	0.284	0.280	0.106	0.259	0.049	0.304	0.419	0.103	0.051
Age $\leq$ 25	124	0.008	0.429	0.429	0.298	<b>0.195</b>	0.288	0.280	0.111	0.260	0.059	0.295	0.419	<b>0.122</b>	0.047
Age $>$ 25	117	-0.001	0.425	0.436	0.307	<b>0.217</b>	0.281	0.277	0.100	0.256	<b>0.038</b>	0.310	0.417	<b>0.083</b>	0.052
Gender: Male	123	0.001	0.423	0.436	0.294	<b>0.192</b>	0.291	<b>0.258</b>	0.096	<b>0.243</b>	<b>0.060</b>	0.301	<b>0.405</b>	0.112	<b>0.040</b>
Gender: Female	118	0.007	0.431	0.428	<b>0.314</b>	<b>0.227</b>	0.277	<b>0.304</b>	0.116	<b>0.279</b>	<b>0.035</b>	0.308	<b>0.432</b>	0.094	0.059
Listening classical: $\leq$ 1 h/w	153	0.005	0.418	0.434	<b>0.316</b>	<b>0.218</b>	0.277	<b>0.279</b>	0.110	0.260	0.055	<b>0.317</b>	<b>0.403</b>	0.100	0.052
Listening classical: $>$ 1 h/w	88	-0.003	<b>0.442</b>	0.429	<b>0.287</b>	<b>0.184</b>	<b>0.301</b>	0.290	0.103	0.259	0.040	<b>0.279</b>	<b>0.447</b>	0.106	0.047
Listening non-classical: $\leq$ 8 h/w	129	0.007	<b>0.441</b>	<b>0.416</b>	0.302	<b>0.194</b>	<b>0.258</b>	0.275	0.112	0.257	0.039	0.297	<b>0.433</b>	<b>0.116</b>	0.049
Listening non-classical: $>$ 8 h/w	112	0.000	<b>0.410</b>	<b>0.449</b>	0.301	<b>0.219</b>	<b>0.315</b>	0.285	0.098	0.259	0.058	0.310	<b>0.402</b>	<b>0.087</b>	0.049
Playing instrument: 0 h/w	127	0.010	<b>0.397</b>	0.433	<b>0.291</b>	<b>0.191</b>	<b>0.254</b>	0.271	0.106	0.256	0.046	<b>0.291</b>	<b>0.404</b>	0.099	0.052
Playing instrument: $>$ 0 h/w	114	0.001	<b>0.463</b>	0.431	<b>0.314</b>	<b>0.225</b>	<b>0.316</b>	<b>0.292</b>	0.104	0.264	0.050	<b>0.316</b>	<b>0.433</b>	0.105	0.044
Musical education: $\leq$ 5 y	122	0.002	<b>0.412</b>	0.430	0.299	<b>0.195</b>	<b>0.274</b>	<b>0.269</b>	<b>0.093</b>	<b>0.233</b>	0.055	<b>0.335</b>	<b>0.389</b>	0.113	0.054
Musical education: $>$ 5 y	241	0.005	0.427	0.432	0.303	0.206	0.284	0.280	0.106	0.259	0.049	0.304	0.419	0.103	0.051
Concerts classical: $\leq$ 1/y	152	0.005	<b>0.409</b>	<b>0.417</b>	<b>0.288</b>	<b>0.196</b>	<b>0.270</b>	0.280	0.107	0.261	0.050	<b>0.320</b>	<b>0.391</b>	0.097	0.046
Concerts classical: $>$ 1/y	89	0.003	<b>0.461</b>	<b>0.461</b>	<b>0.324</b>	<b>0.225</b>	<b>0.306</b>	0.283	0.099	0.256	0.043	<b>0.275</b>	<b>0.466</b>	<b>0.121</b>	0.057
Concerts non-classical: $\leq$ 2/y	137	0.007	0.434	0.432	<b>0.285</b>	0.216	0.276	0.272	<b>0.095</b>	<b>0.231</b>	0.047	<b>0.319</b>	0.412	<b>0.115</b>	0.052
Concerts non-classical: $>$ 2/y	104	0.000	<b>0.417</b>	0.430	<b>0.324</b>	<b>0.192</b>	0.293	0.288	0.115	<b>0.301</b>	0.050	<b>0.283</b>	0.426	<b>0.089</b>	0.044
Familiar with “Eroica”: No	72	0.010	0.418	0.426	0.300	0.210	<b>0.270</b>	<b>0.260</b>	0.099	0.261	<b>0.039</b>	<b>0.294</b>	<b>0.398</b>	<b>0.070</b>	0.048
Familiar with “Eroica”: Somewhat	137	0.006	0.418	<b>0.446</b>	<b>0.321</b>	<b>0.218</b>	0.288	<b>0.304</b>	<b>0.125</b>	0.267	0.048	<b>0.316</b>	<b>0.429</b>	<b>0.124</b>	0.050
Familiar with “Eroica”: Very	32	-0.015	<b>0.487</b>	<b>0.394</b>	<b>0.248</b>	<b>0.143</b>	<b>0.295</b>	<b>0.234</b>	<b>0.042</b>	<b>0.216</b>	0.056	<b>0.260</b>	0.418	<b>0.073</b>	<b>0.040</b>

TABLE 3: Extension of Table 12 in the main manuscript: Agreement scores (Krippendorff’s  $\alpha$ ) for each perceptual aspect (columns) for user groups defined based on *personality traits* (rows), for the JKU/CP study. The first row shows the agreement scores among all participants. The following rows indicate agreement for the respective user groups. Bold face is used to highlight differences of more than 0.01 to the overall agreement score.

	<i>n</i>	Trans.	Peace.	Power	Joyful.	Tension	Sadness	Anger	Disgust	Fear	Surprise	Tender	Tempo	Compl.	Instr.
All subjects	241	0.005	0.427	0.432	0.303	0.206	0.284	0.280	0.106	0.259	0.049	0.304	0.419	0.103	0.051
Extraverted: $\leq$ 5	163	0.009	0.428	0.425	0.296	0.205	0.279	0.275	0.110	0.260	0.053	<b>0.285</b>	<b>0.406</b>	0.096	0.043
Extraverted: $>$ 5	78	-0.007	0.429	<b>0.449</b>	<b>0.316</b>	0.211	<b>0.295</b>	0.287	<b>0.092</b>	0.255	0.039	<b>0.348</b>	<b>0.449</b>	<b>0.116</b>	<b>0.063</b>
Critical: $\leq$ 5	155	0.005	0.436	<b>0.444</b>	0.309	0.208	0.284	0.288	<b>0.124</b>	<b>0.282</b>	<b>0.038</b>	<b>0.324</b>	<b>0.433</b>	0.095	0.048
Critical: $>$ 5	86	0.003	<b>0.412</b>	<b>0.413</b>	<b>0.288</b>	0.205	0.281	<b>0.264</b>	<b>0.071</b>	<b>0.214</b>	<b>0.071</b>	<b>0.264</b>	<b>0.392</b>	<b>0.120</b>	0.055
Dependable: $\leq$ 6	198	0.006	0.418	<b>0.418</b>	0.306	0.202	0.283	0.285	0.101	0.260	0.050	0.307	0.425	0.106	0.048
Dependable: $>$ 6	43	-0.004	<b>0.471</b>	<b>0.493</b>	<b>0.283</b>	<b>0.231</b>	0.284	<b>0.256</b>	<b>0.121</b>	0.256	<b>0.038</b>	0.296	<b>0.393</b>	<b>0.081</b>	0.051
Anxious: $\leq$ 3	146	0.004	<b>0.440</b>	<b>0.452</b>	<b>0.320</b>	0.207	<b>0.301</b>	0.278	0.106	0.259	0.040	0.313	0.429	0.107	0.042
Anxious: $>$ 3	95	0.007	<b>0.407</b>	<b>0.403</b>	<b>0.274</b>	0.201	<b>0.257</b>	0.280	0.103	0.258	<b>0.061</b>	<b>0.291</b>	<b>0.402</b>	0.096	0.060
Open to new exp.: $\leq$ 6	180	0.010	0.422	0.432	0.305	0.207	0.292	0.273	0.104	0.254	0.051	<b>0.318</b>	0.414	<b>0.091</b>	0.054
Open to new exp.: $>$ 6	61	0.005	<b>0.440</b>	0.429	0.295	0.199	<b>0.258</b>	<b>0.302</b>	0.110	<b>0.272</b>	0.043	<b>0.261</b>	<b>0.430</b>	<b>0.139</b>	<b>0.038</b>
Reserved: $\leq$ 5	156	0.002	0.422	<b>0.445</b>	<b>0.319</b>	0.203	0.291	0.281	0.101	0.252	0.043	0.306	<b>0.435</b>	<b>0.116</b>	0.054
Reserved: $>$ 5	85	0.005	0.434	<b>0.408</b>	<b>0.274</b>	0.211	<b>0.270</b>	0.274	<b>0.117</b>	0.269	<b>0.060</b>	0.298	<b>0.390</b>	<b>0.080</b>	<b>0.040</b>
Sympathetic: $\leq$ 6	195	0.007	<b>0.417</b>	0.440	0.301	0.199	0.290	0.278	0.112	0.259	0.047	0.305	0.412	0.101	0.047
Sympathetic: $>$ 6	46	-0.005	<b>0.472</b>	<b>0.399</b>	0.312	<b>0.233</b>	<b>0.258</b>	<b>0.292</b>	<b>0.074</b>	0.261	0.056	0.300	<b>0.442</b>	0.109	<b>0.061</b>
Disorganized: $\leq$ 2	130	0.007	<b>0.440</b>	<b>0.464</b>	<b>0.287</b>	<b>0.219</b>	0.282	0.271	0.109	0.261	0.040	<b>0.337</b>	<b>0.451</b>	<b>0.124</b>	0.052
Disorganized: $>$ 2	111	0.001	<b>0.412</b>	<b>0.395</b>	<b>0.319</b>	<b>0.189</b>	0.286	<b>0.291</b>	0.099	0.256	0.056	<b>0.269</b>	<b>0.382</b>	<b>0.085</b>	0.045
Calm: $\leq$ 6	207	0.005	0.425	<b>0.422</b>	0.302	0.204	0.279	<b>0.269</b>	0.104	0.251	0.046	0.306	0.421	0.102	0.047
Calm: $>$ 6	34	0.003	<b>0.454</b>	<b>0.502</b>	0.304	<b>0.219</b>	<b>0.311</b>	<b>0.353</b>	0.108	<b>0.310</b>	<b>0.075</b>	0.305	<b>0.400</b>	0.104	<b>0.072</b>
Conventional: $\leq$ 2	125	0.003	<b>0.451</b>	<b>0.462</b>	0.311	<b>0.223</b>	<b>0.304</b>	<b>0.302</b>	0.109	<b>0.248</b>	0.042	<b>0.328</b>	<b>0.438</b>	0.112	<b>0.066</b>
Conventional: $>$ 2	116	0.007	<b>0.403</b>	<b>0.404</b>	0.294	<b>0.186</b>	<b>0.264</b>	<b>0.256</b>	0.099	<b>0.273</b>	0.052	<b>0.280</b>	<b>0.401</b>	<b>0.090</b>	<b>0.033</b>