



# Personality Correlates of Music Audio Preferences for Modelling Music Listeners

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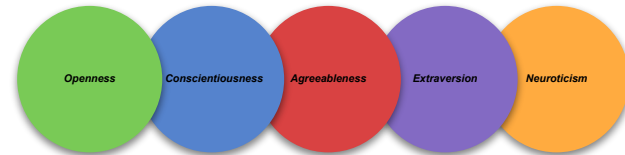
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# Introduction

- Personality has significant associations with music tastes.
- Past studies considered genres or styles as music preferences.
- In this paper, music preferences are expressed in terms of audio features such as:
  - Energy
  - Loudness
  - Tempo
  - etc.
- Personality is expressed through the five-trait (OCEAN) model.
- **Are there significant correlations between listeners' personality traits and the audio features of the music they listen to? And if so, how strong are these correlations?**
- Example application: Cold-start scenario in music recommendation systems.



# Data Acquisition and Processing

- Dataset containing personality and listening history of 1,470 users. 35 million listening events and 2.5 million tracks with audio features.
  - Subset of the MyPersonality dataset.
  - Listening histories are crawled from Last.fm.
  - 12 Audio features are retrieved from Spotify.
- Reduced to 1,346 users for ensuring quality of the results (see later).
- Dataset is publicly available<sup>1</sup>.

- *Acousticness*
- *Danceability*
- *Duration*
- *Energy*
- *Instrumentalness*
- *Liveness*
- *Loudness*
- *Speechiness*
- *Tempo*
- *Valence*
- *Mode*
- *Popularity*

1] <https://gitlab.cp.jku.at/alessandro/pers-corr>

# Methodology

- For each user we build a **music preference profile**.
  - We aggregate the audio features of the tracks the user has listened to.
  - For each feature, we compute the mean, standard deviation, and the skewness. For binary features, we compute the percentage.
  - Tracks listened multiple times will contribute more than tracks listened only once.
- We ensure a minimum number of listening events per user.
  - Drop all users with fewer than 30 listening events.
- We then analyse the relationship between the traits and the aggregated audio features.
  - Spearman's correlations with confidence values 5%, 1%, 0.1%.
  - False Discovery Rate (FDR) with q-value 5%.



$track_1, track_2, track_3, \dots$

(mean, std, skew) x feature



mean feat. 1	std feat. 1	skew feat. 1	...
3.5	0.01	0.2	...

# Results

	# listening events	# tracks	popularity mean	popularity std	popularity skew	acousticness mean	acousticness std	acousticness skew	danceability mean	danceability std	danceability skew	duration ms mean	duration ms std	duration ms skew	energy mean	energy std	energy skew
ope	0.051	0.095***	-0.133***	-0.048	0.102***	0.284***	0.297***	-0.281***	0.007	0.215***	-0.014	0.106***	0.205***	0.149***	-0.283***	0.281***	0.263***
con	-0.092***	-0.097***	0.011	0.041	-0.022	0.003	-0.024	-0.001	0.03	-0.049	-0.06	0.013	-0.058	-0.045	-0.012	-0.038	0.011
ext	-0.102***	-0.091***	0.047	0.042	-0.056	0.014	-0.03	-0.019	0.13***	0.011	-0.021	-0.074**	-0.072**	-0.056	-0.016	-0.076**	0.038
agr	-0.071**	-0.074**	0.059	0.017	-0.053	0.082**	0.067*	-0.083**	0.051	-0.041	-0.081**	-0.07*	-0.07*	-0.023	-0.076**	0.037	0.073**
neu	0.079**	0.067*	0.015	-0.038	0.006	-0.057	-0.026	0.06	-0.073**	-0.029	0.069*	-0.027	0.005	0.017	0.051	-0.007	-0.066*

	instrumentalness mean	instrumentalness std	instrumentalness skew	liveness mean	liveness std	liveness skew	loudness mean	loudness std	loudness skew	speechiness mean	speechiness std	speechiness skew	tempo mean	tempo std	tempo skew	valence mean	valence std	valence skew	% minor
ope	0.186***	0.182***	-0.179***	-0.104***	-0.018	0.147***	-0.313***	0.269***	0.139***	-0.079**	0.023	0.121***	-0.22***	-0.051	0.086**	-0.065*	0.172***	0.058	0.0
con	-0.035	-0.035	0.038	-0.048	-0.036	0.057	-0.005	-0.023	0.029	-0.051	-0.072**	-0.009	-0.029	-0.024	0.004	0.008	-0.018	0.011	0.004
ext	-0.079**	-0.079**	0.081**	-0.014	-0.018	0.02	0.03	-0.09***	0.056	0.05	0.062	-0.088**	-0.027	-0.035	0.01	0.111***	-0.016	-0.115***	-0.022
agr	-0.078**	-0.063	0.081**	-0.096***	-0.085**	0.079**	-0.009	-0.008	0.063	-0.074**	-0.033	0.046	0.006	0.035	-0.052	0.031	-0.003	-0.012	-0.107***
neu	0.011	0.001	-0.013	0.025	0.007	-0.019	0.04	-0.016	-0.063	-0.017	-0.043	0.01	0.049	-0.009	-0.013	-0.045	0.007	0.035	0.018

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . p-values adjusted with FDR at q-value of 5% .

# Conclusion and Future Work

- There are significant correlations between listeners' personality traits and the audio features of the music they listen to.
- Future work:
  - Predict the personality of the user from listening behavioural data.
  - Quantify the effect of personality in both cold- and warm-start scenarios in music recommender systems.
  - Study if users with different personality are treated equally by recommender systems.

**Thank you for your attention!**