Mastering Music:
Music as a Data Source in I/O Psychology

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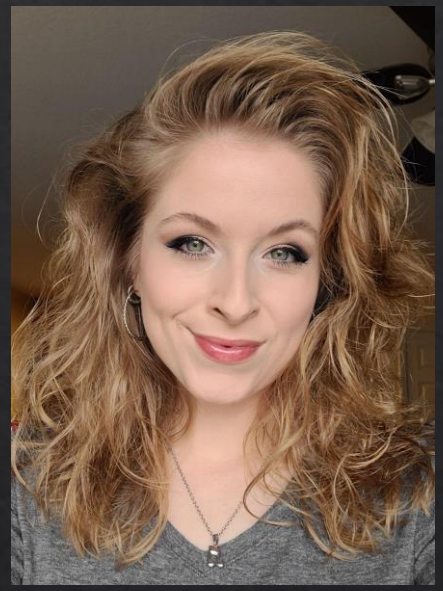
About Us



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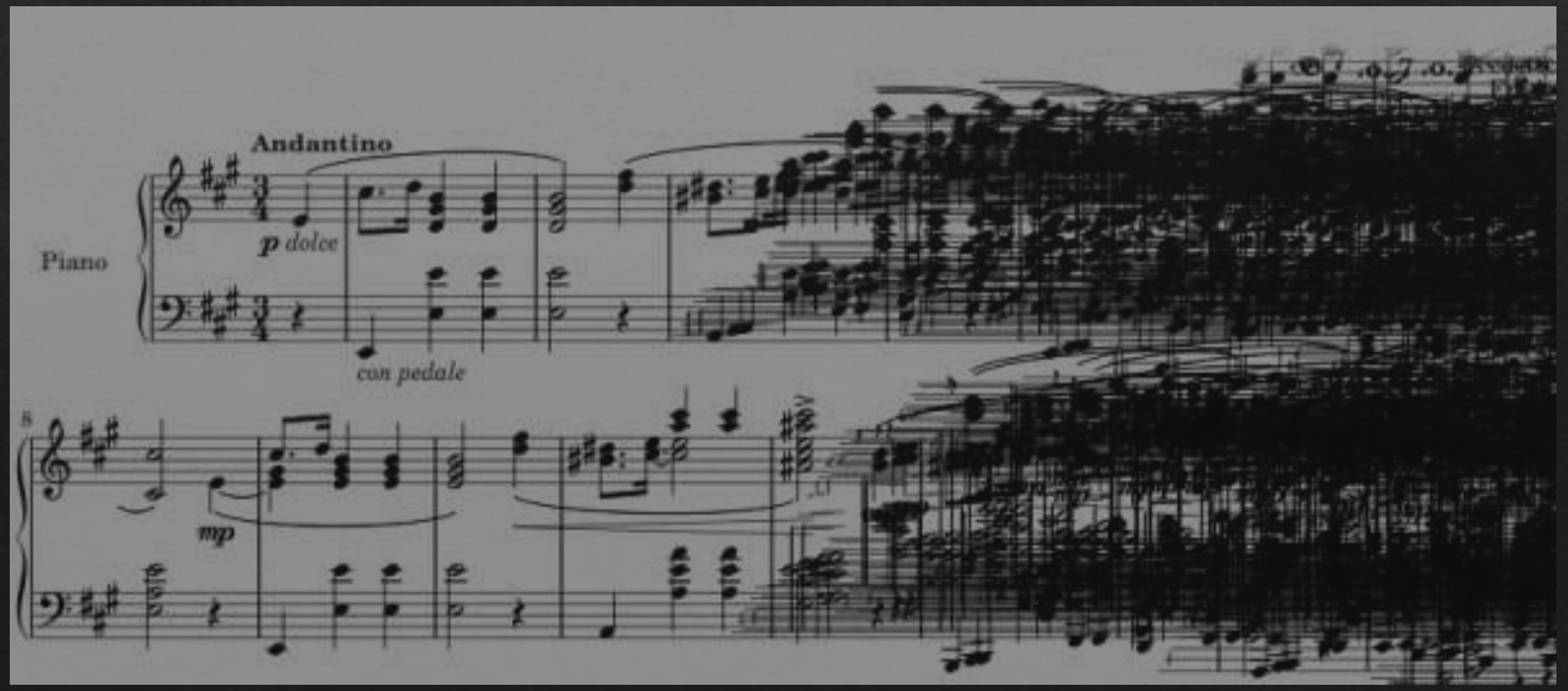
Overview

- **Purpose:** To describe how music can offer additional psychological factor in future research
- **Agenda:**
  - Music as a Big Data Source
  - Why Music is Relevant to IO Psychology Theories (Approx. 30 mins)
  - How to Collect Music Data (45 minutes)
    - Connecting to API
    - Get Sonic Features
    - Analyze Lyrics
  - Applications to Research (10 minutes)
    - Research Questions
    - Analyzing Data
  - Future directions & Questions (10 minutes)

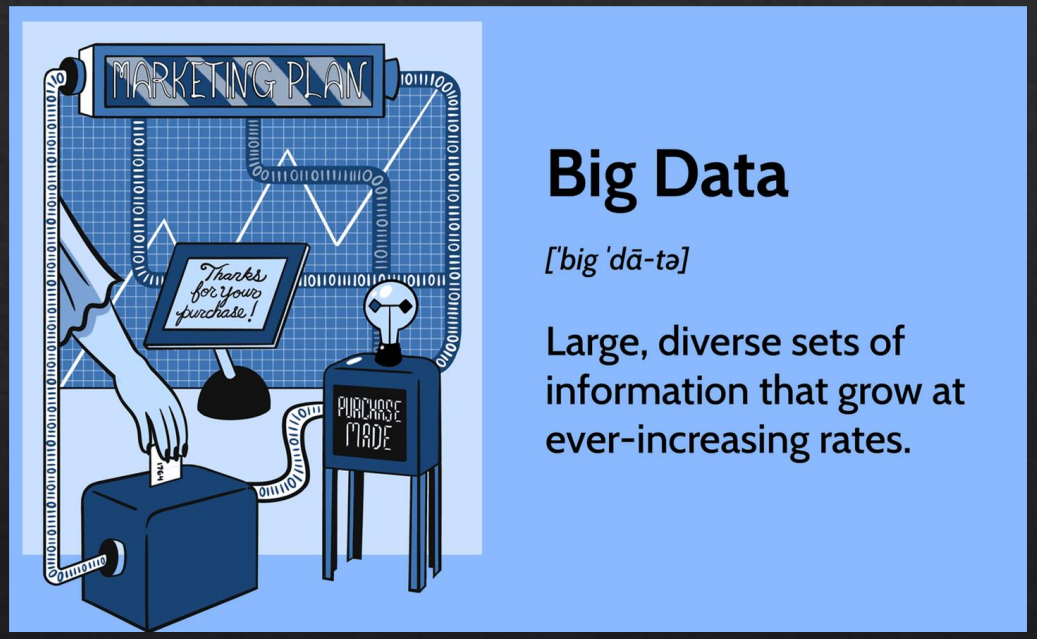
Music as a Big Data Source



Big Data

- Researchers are trying to move past conventional ways of collecting data.

- Big data is becoming popular
  - Text
  - Speech
  - Video
  - Images
  - Smartwatches
  - Social Media Engagement



Music as a Data Source

- **Music listening data:** The songs an individual (in)voluntarily is exposed to in the social world and associated listening behaviors.

- **Examples of music listening data:**
  - Spotify Listening history
  - Playlists and song audio features
  - Tiktok feed
  - Ambient environment

Benefits to Music as a Data Source

- Benefits:
  - Captures information that scales may miss
  - Reduced demand characteristics
  - Less costly, but rich data collection
  - No attrition

Why is Music Relevant to I-O Psychology Theories

Why Music?

- A variety of workers listen to music at work (e.g., mailman, surgeons, office workers, etc.)
- Millions of songs
  - Individual preference
  - Discrete listening
- Influence during the workday and recovery times

Music as a form of Communication

- Direct communication
  - Lyric content and sentiment
  - Culture
  - Identity
- Indirect communication (like non-verbal cues)
  - Audio features like key, tempo, and volume
  - Patterns in music listening behavior
  - Sequence of listening in relation to IO variables of interest

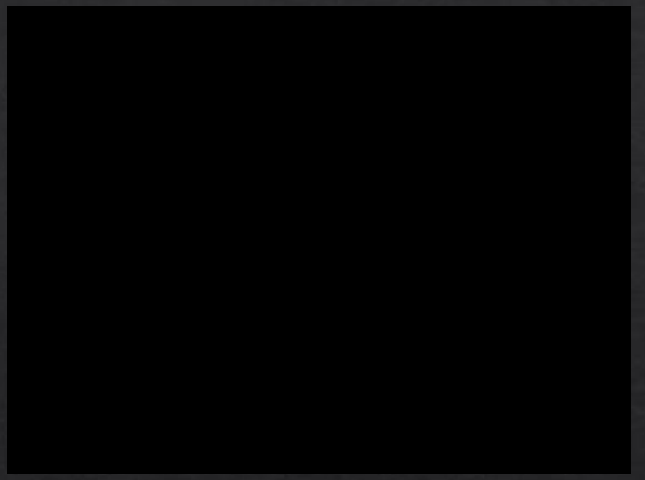
Understand the opportunities offered by studying music within organizational research

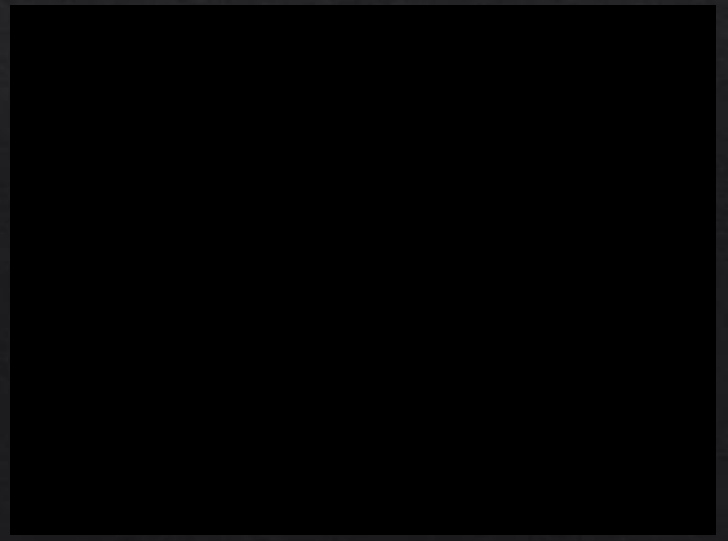
- Music is pervasive in daily life including work
- Music is data with analyzable features that have meaning in psychological research
  - Lyrical content and sentiment
  - Genre type
  - Amount of instrumentation
  - Tempo
  - Amount and timing of listening behavior

Understand the opportunities offered by studying music within organizational research

- These audio features can represent psychological constructs of interest in IO
  - Identity building and empowerment
  - Need to belong
  - Need for recovery
  - Personality (McCown et al., 1997)
  - Mood and emotion (Schafer et al., 2013)

Songs that Have Distinct Psychological Features





How to Collect Music Data

How to collect music data

- Sources of music data through API and web scraping techniques:
  - Spotify
  - Billboard Charts
  - Passive audio recorders (e.g., Electronically Activated Recorder)

Accessing Music Listening via the Spotify API

- Presenters will guide, in real time, the process of setting up an application in the Spotify API
  - Tokens
  - Requests
  - Endpoints

https://psych.x10host.com/music

Analyzing the content of music – Sonic Features

- More sonic and lyrical information regarding each track
- Psychosocial connections between sonic attributes (obtained from Spotify API) and which dimension of affect they can approximate
- Data can be saved into tabular format for analyses in major statistical software

Sonic Features

Feature	Description
Acousticness	Absence of electronic instruments
Danceability	Rhythm, stability, and beat strength
Energy	Perceived intensity and energy
Instrumentalness	Lack of vocals
Liveness	Presence of an audience in the track
Loudness	Volume of the track in decibels
Mode	Major or minor key
Speechiness	Prominence of spoken words (versus music)
Tempo	Speed or pace of a given piece
Valence	Positiveness (cheerfulness, happiness) conveyed by a track.

Applications to Research

Example Research Questions

- Example: Do those with highly demanding jobs listen to more high-tempo music throughout their workday?

Music variables	IO variables
Genre (instrumentation, vocals, etc)	Work engagement
Tempo	Recovery (process or need)
Major/Minor Key	Mood/Affect/Emotion
Lyric Sentiment and Valence	Work stress
Sequence of music listening	Work performance
How long participant listened	Job satisfaction
Loudness (Volume)	Self-regulation
Autonomy	Spillover (between work and life domains)

Analyzing the content of music – Lyrical Content

- Large language models can be applied to examine lyrical content of music
  - EmoRoBERTa (Kamath, 2022)
    - Supervised learning natural language processing model which receives text as an input and provides numeric scores on emotional dimensions of interest
- ChatGPT can provide summaries for each song on thematic dimensions of interest
- https://psych.x10host.com/analyzemusic

Future Directions

Consider Future Directions

Acoustic Feature Sources

Genre identification: https://everynoise.com

Lyric Sources

Song Meanings: https://genius.com

Ambient Song Identification

Shazam: https://www.shazam.com

Questions & Comments

Contact

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