Which Music is Preferable While Learning?

A Field Experiment on Music Preference During Learning

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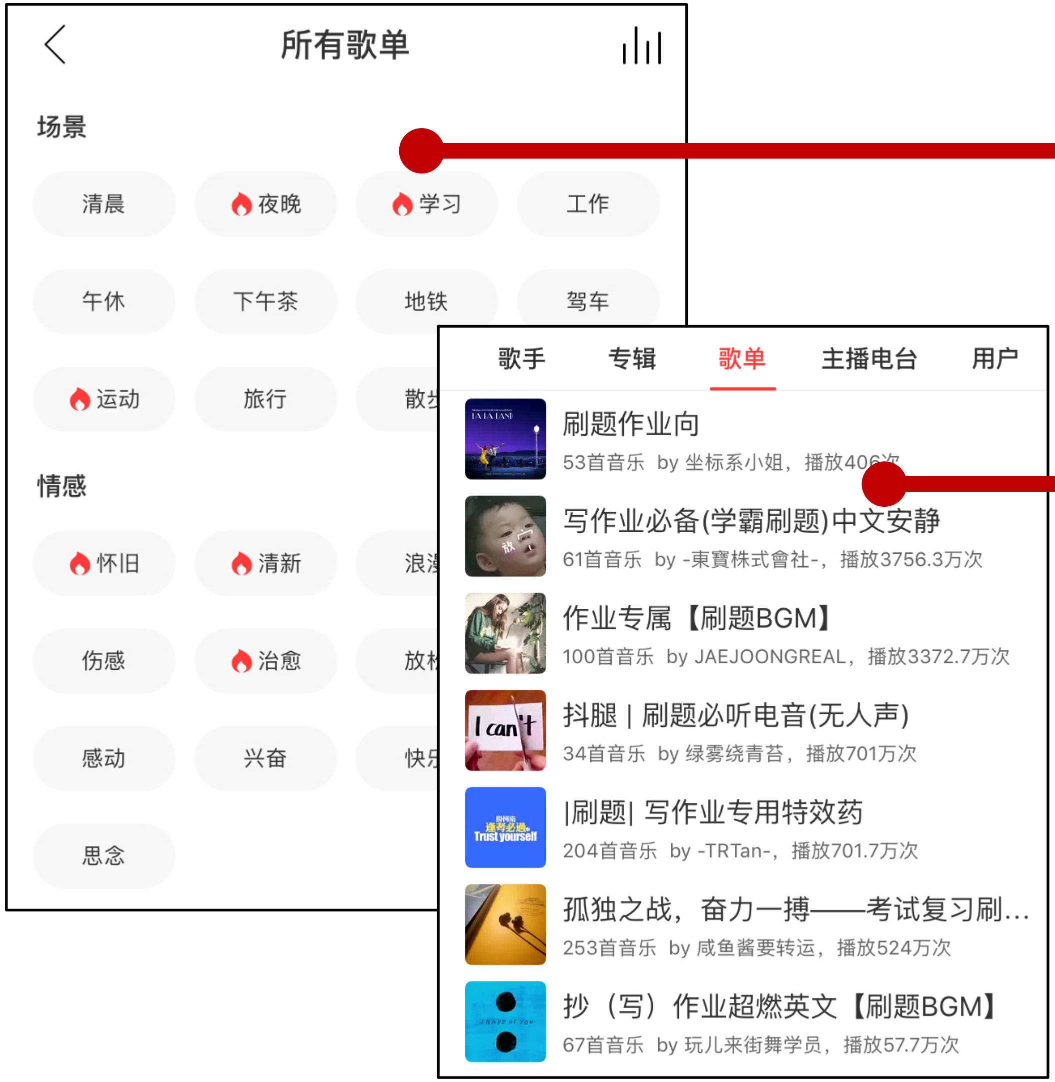
Introduction



所有歌单

场景

清晨 夜晚 学习 工作
午休 下午茶 地铁 驾车
运动 旅行 散

情感

怀旧 清新 浪
伤感 治愈 放
感动 兴奋 快
思念

歌手 专辑 歌单 主播电台 用户

刷题作业向
53首音乐 by 坐标系小姐，播放406次

写作业必备(学霸刷题)中文安静
61首音乐 by -東寶株式會社-，播放3756.3万次

作业专属【刷题BGM】
100首音乐 by JAEJOONGREAL，播放3372.7万次

抖腿 | 刷题必听电音(无人声)
34首音乐 by 绿雾绕青苔，播放701万次

|刷题| 写作业专用特效药
204首音乐 by -TRTan-，播放701.7万次

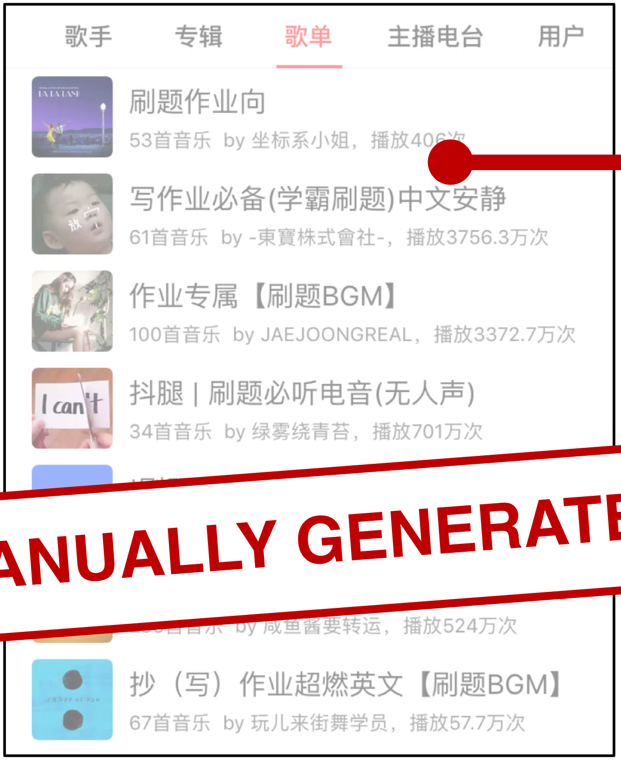
孤独之战，奋力一搏——考试复习刷…
253首音乐 by 咸鱼酱要转运，播放524万次

抄（写）作业超燃英文【刷题BGM】
67首音乐 by 玩儿来街舞学员，播放57.7万次

Learning: one of the hottest occasions for music listening

Plenty of user-generated **playlists** for learning activities

Introduction



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MANUALLY GENERATED

Plenty of **user-generated playlists** for learning activities

Introduction

Why the current MIR systems fail to recommend music to learners in a more intelligent and personalized way?

- Any technological obstacles?

Introduction

Why the current MIR systems fail to recommend music to learners in a more intelligent and personalized way?

- ~~Any technological obstacles~~ Actually not!

IOT

AI

……

Enable

MUSIC RECOMMENDATION

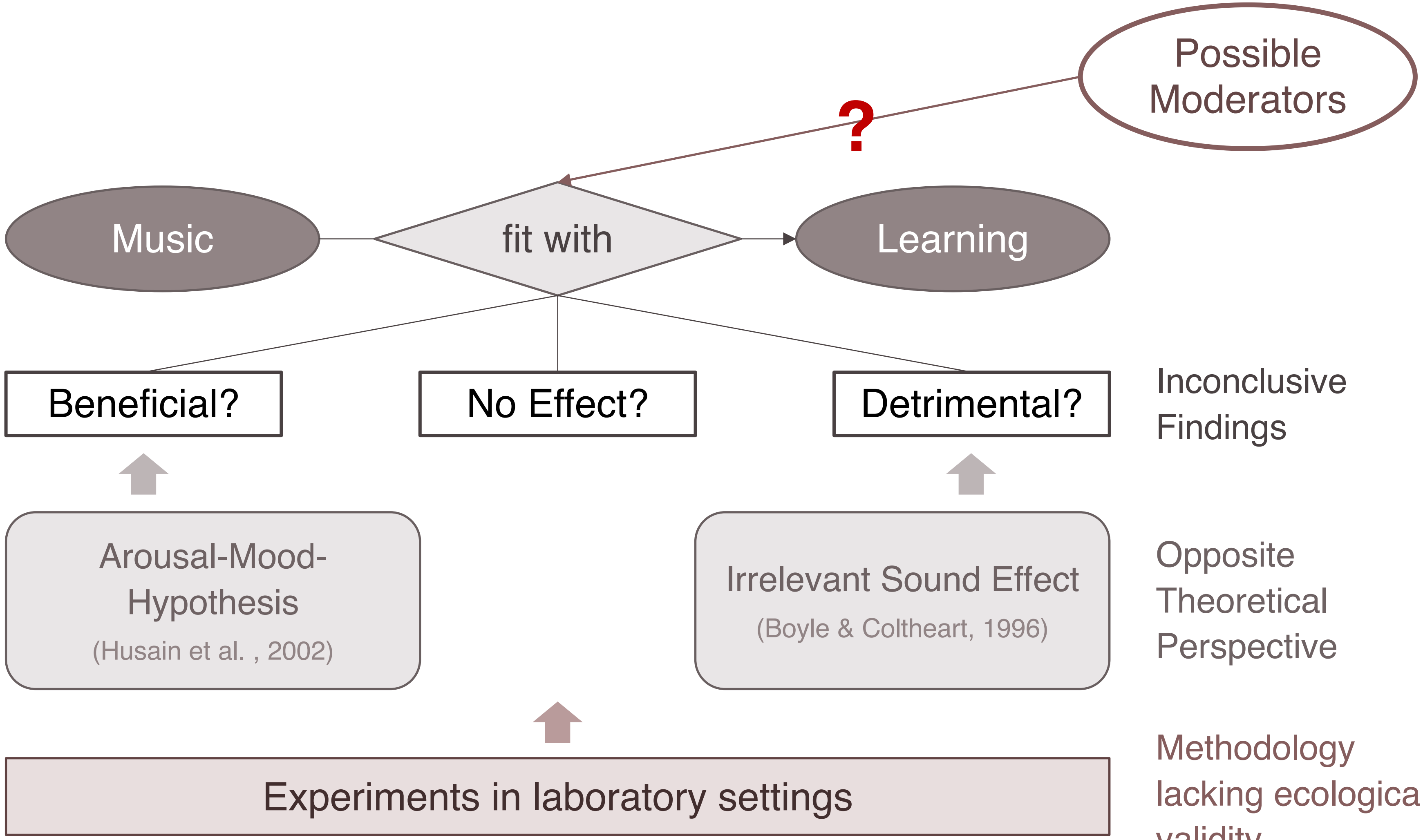
- Context-Aware
- User-Adaptive

The crux is that ……

Scientific evidence of which types of background music are preferable in learning activities remains unclear.

Literature Review

Theoretical Basis



Possible Moderators

Music

fit with

Learning

Beneficial?

No Effect?

Detrimental?

Inconclusive Findings

Arousal-Mood-Hypothesis

(Husain et al. , 2002)

Irrelevant Sound Effect

(Boyle & Coltheart, 1996)

Opposite Theoretical Perspective

Experiments in laboratory settings

Methodology lacking ecological validity

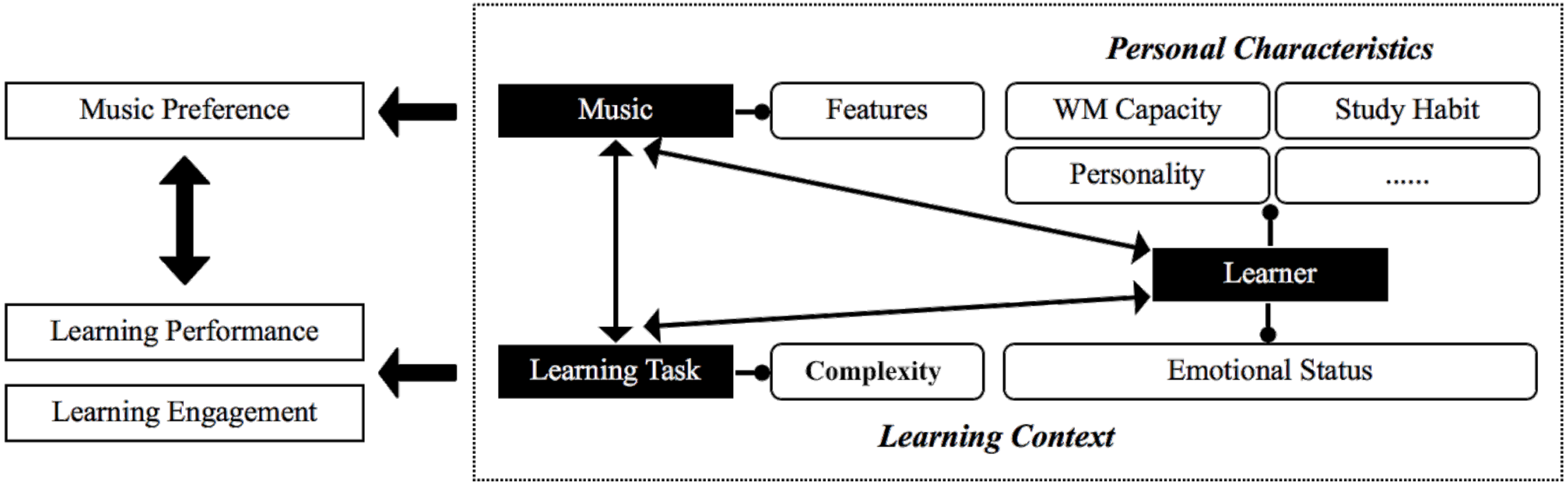
Possible moderators identified by relevant studies:

- task complexity
- working memory capacity
- personality
- study habits
- music preference
- ……

(Jäncke & Sandmann, 2010; Kiger, 1989; Küssner, 2017; Lehmann & Seufert, 2017)

Objectives

Which types of music are preferable while learning?


Personal Characteristics
Music Preference
Music
Features
WM Capacity
Study Habit
Personality
......
Learner
Learning Performance
Learning Engagement
Learning Task
Complexity
Emotional Status
Learning Context

An experiment in naturalistic settings

Research Questions

RQ1

Does music preferred by learners share some **common characteristics** (e.g., genre, rhythm, pitch, timbre, harmony, etc.)?

Research Questions

RQ1

Does music preferred by learners share some **common characteristics** (e.g., genre, rhythm, pitch, timbre, harmony, etc.)?

- Do **personal characteristics** and **learning context** play a role in learners' music selection?

Research Questions

RQ2

Does learners’ preferred music increase learners’ **task engagement** and **task performance**?

Research Questions

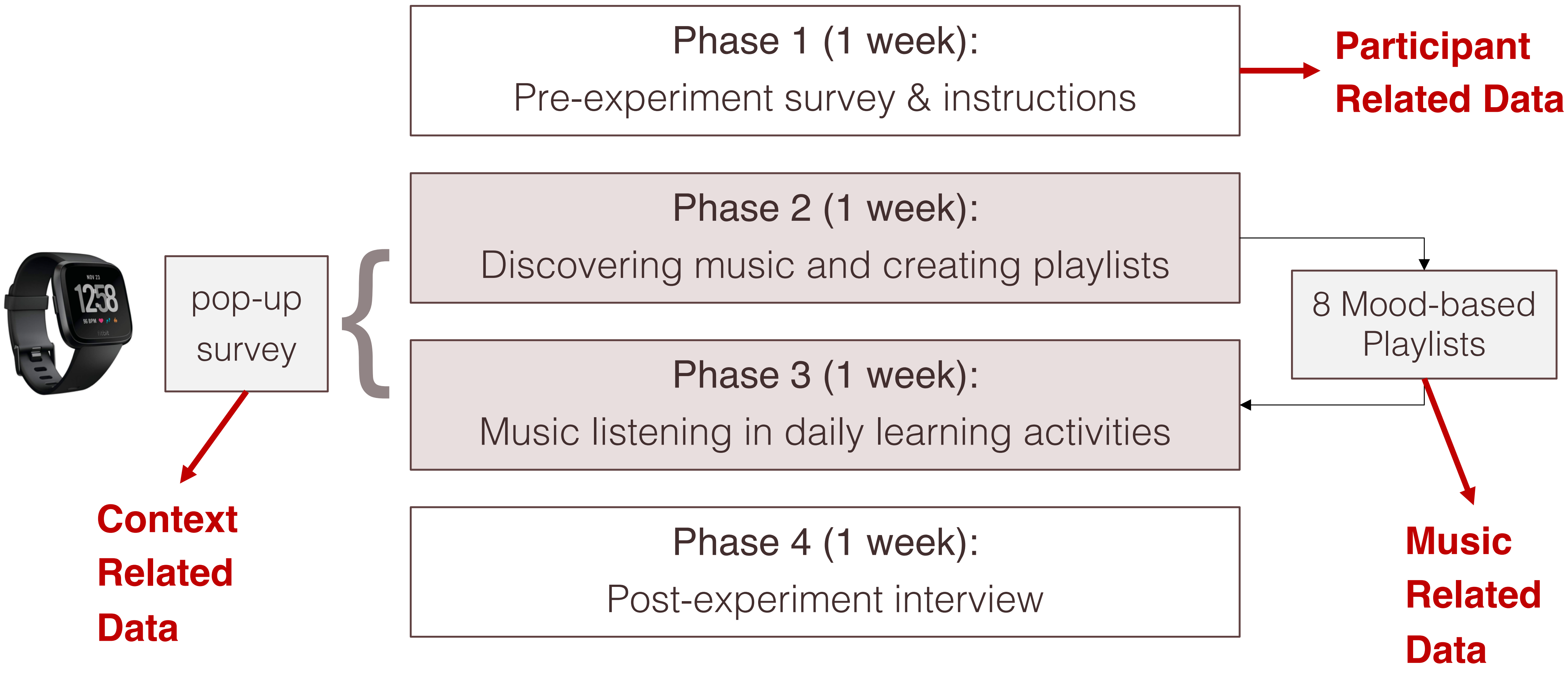
RQ2

Does learners' preferred music increase learners' **task engagement** and **task performance**?

- **In which circumstances** does learners' preferred music increase learners' task engagement and task performance?

Experiment Design

Procedure



Phase 1 (1 week):

Pre-experiment survey & instructions

Participant Related Data

Phase 2 (1 week):

Discovering music and creating playlists

Phase 3 (1 week):

Music listening in daily learning activities

pop-up survey

Context Related Data

8 Mood-based Playlists

Music Related Data

Phase 4 (1 week):

Post-experiment interview

Experiment Design

Phase 1: Pre-survey

Data	Measures & Collection
Participant-related	
Working Memory Capacity	N-Back Test (Jaeggi et al., 2003)
Multitasking Ability	Multitasking Test (Gijsbert et al., 2013)
Personality	Ten Item Personality Inventory (TIPI) (Gosling et al., 2003)
Demographics	Pre-experiment Questionnaire
Study Habit	
Music Listening Frequency	
Genre Preference	
Music Training Background	

Experiment Design

Phase 2 & 3: Interact with Moody

PH2: Listening to system-selected music → PH3: Listening to self-identified music

Data

Music-related
- Music Features
- Listening Histories
- User-Generated Playlists
- Users' Music Ratings

Context-related
- Emotional status
- Mental workload
- Learning performance
- Learning engagement

LibROSA

Rhythm, harmony, etc.

Fitbit Versa

Heart rate, etc.

System Log

Moody App

Pop-up Survey

Future Work

Research Questions	Data Analysis Strategies
RQ1.1: Does music preferred by learners share some common characteristics?	1. MANOVA 2. Discriminant Function Analysis 3. Clustering
RQ1.2: Do personal characteristics and learning context play a role in learners' music selection?	1. MANCOVA 2. Association Rule Mining 3. Decision Tree Modeling 4. Support Vector Machine
RQ2.1: Does learners' preferred music increase learners' task engagement and task performance?	1. Paired Samples t-Test 2. McNemar Bowker Test
RQ2.1: In which circumstances does learners' preferred music increase learners' task engagement and task performance?	1. Association Rule Mining 2. Decision Tree Modeling 3. Support Vector Machine

Any Questions?

Thanks for Listening