The Differential Effects of Algorithmic Recommendations on User Experience

Enjoyment and Serendipity in Everyday Music Streaming

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Introduction

Algorithmic Curation in Music Streaming

- **Recommender systems** shape media experiences across platforms (e.g., TikTok, Netflix, Spotify)[1, 2, 3]

- Spotify emphasizes personalization as *key to the experience*[4]

- Yet balancing algorithmic recommendations is complex and can reduce UX[5, 6]
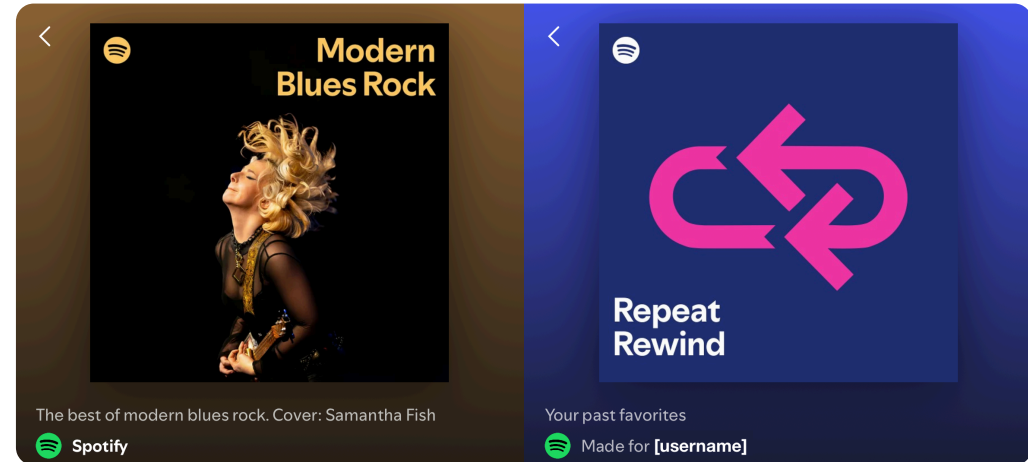

Figure 1 from manuscript: Spotify playlists without (left) and with (right) interface cues.

1. Eg, R., Demirkol Tønnesen, Ö., & Tennfjord, M. K. (2023). A scoping review of personalized user experiences on social media: The interplay between algorithms and human factors. *Computers*

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3. Sundar, S. S. (2020). Rise of machine agency: A framework for studying the psychology of human–AI interaction (HAII). *Journal of Computer-Mediated*

4. Spotify (2021, October 13). *Adding that extra "you" to your discovery: Oskar Stål, Spotify vice president of personalization, explains how it works*. Spotify. https://newsroom.spotify.com/2021-10-13/adding-that-extra-you-to-your-discovery-oskar-stal-spotify-

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Research Gap

Understanding Enjoyment and Serendipity

- Negative algorithmic experiences reduce engagement and well-being[1, 2]

- Need to distinguish **functional** vs. **perceptual** components of algorithmic curation[3]

- Focus on two facets of UX:

  - **Enjoyment** (pleasure, entertainment value)[4]

  - **Serendipity** (unexpected yet relevant discoveries)[5]

Image generated with FLUX.1-schnell: "A TV screen showing a person listening to music as a black and white cartoon"

1. Chapman, H., & Abraham, A. (2024). Recommended for you: Explicit motivations and recommender

2. Hutmacher, F., & Appel, M. (2023). The psychology of personalization in digital environments: From

3. Dietrich, F., Arenz, A., & Reinecke, L. (2024). What constitutes experiences of autonomy in digital technology use?

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Research Questions

Linking Functional and Perceptual Components

To what extent do…

- **functional** (prevalence of personalized suggestions) and
- **perceptual** (interface transparency, subjective perception, algorithmic awareness)

components of algorithmically curated music listening

- **RQ1** …contribute to situational **enjoyment**?
- **RQ2**: …contribute to situational experiences of **serendipity**?

Method

Linkage Design: ESM + Digital Trace Data

- **Sample**: 144 students (M = 21.7 years) from European universities
- **Design**:
  - 14 days
  - 6 daily ESM prompts
  - 6,920 situational measures
  - 40% preceeded by Spotify listening session
- **Data Sources**:
  - Experience Sampling Method[1] (situational self-reports)
  - Spotify API[2] digital trace data (listening sessions)

If | P INSTITUT für PUBLIZISTIK

Sie haben am 15.03. von 13:07 Uhr bis 15:33 Uhr Musik gehört, unter anderem das Lied 'Daylight in Your Eyes' von 'No Angels' und 'Wild Blue' von 'John Mayer'.

Bitte geben Sie ihre (Haupt-)Aktivität an, während der Sie im oben genannten Zeitfenster Musik gehört haben.

- Nur Musik hören
- (Schreibtisch-)Arbeit
- Hobbies (z.B. Sport, kreative Tätigkeit, Gaming)
- Soziale Aktivitäten (z.B. mit Freund:innen, Familie, Partner:innen)
- Ausruhen/(Ein-)Schlafen
- Unterwegs sein/Pendeln (zu Fuß/Bus/Zug/Auto)
- Alltagstätigkeiten erledigen (z.B. Einkaufen, Haushalt, Hygiene, Essen)
- Andere Mediennutzung
- Anderes

- Die Angaben sind falsch. Ich habe in diesem Zeitraum die angezeigte Musik nicht gehört.
- Technischer Fehler: Mir werden keine Informationen zu meiner letzten Musiknutzung angezeigt.
- Da stimmt etwas nicht. Ich habe bereits Angaben zu exakt dieser Hörsession in genau diesem Zeitraum beantwortet.

MusikStreamingStudie Mainz, Johannes Gutenberg Universität Mainz – 2022

Method

Measures

- **Enjoyment** (single-item rating)[1]

- **Perceived serendipity** (novelty + usefulness)[2]

- **Algorithmic curation** (prevalence, cues, perception[3])

- **Trait algorithmic awareness**[4]

  - Content filtering awareness

  - Automated decision-making awareness

  - Human-algorithm interplay awareness
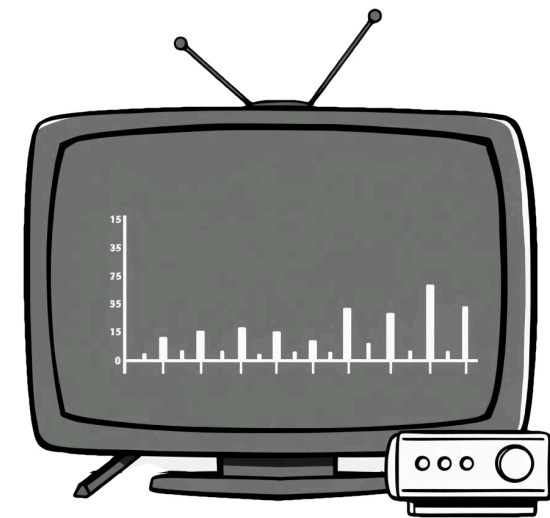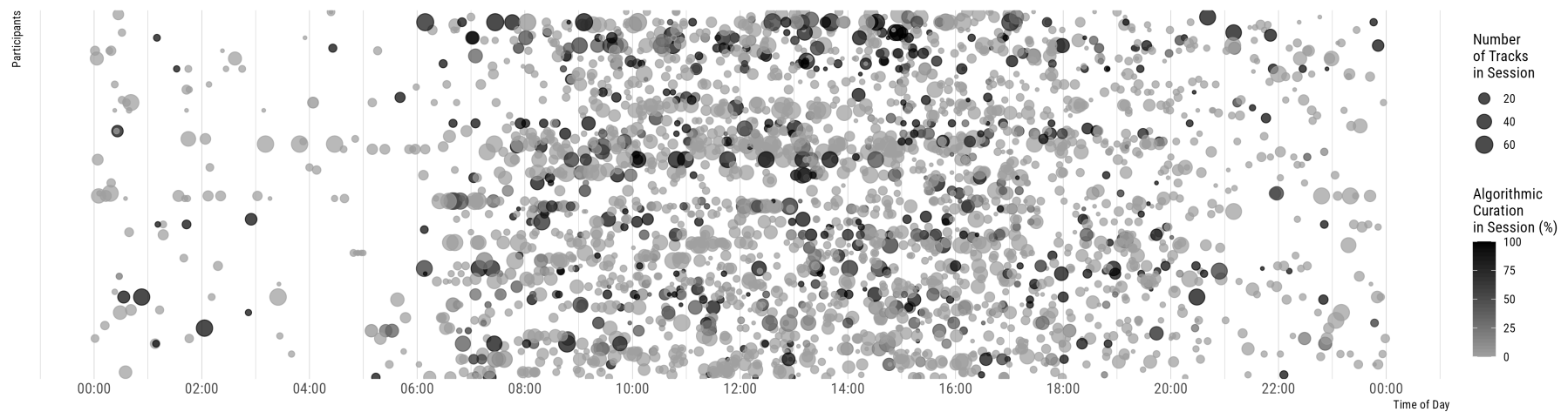
  - Transparency concerns

Image generated with FLUX.1-schnell: "A time series graph on TV as a black and white cartoon"

Results

- Tracked degree of algorithmic curation (M = 16.95%, SD = 34.31%, Range = 0-100%, ICC = .27)

- Self-reported perception of algorithmic curation (M = 1.85, SD = 1.23, Range = 1-5, ICC = .25)

- $r_{\text{within-person}}$ = .33*

- $r_{\text{between-person}}$ = .44*

Prevalence of personalized suggestions (i.e., algorithmic curation) in listening sessions across study participants and time of day. Larger dots indicate longer sessions, darker dots indicate sessions with higher prevalence of algorithmic curation.
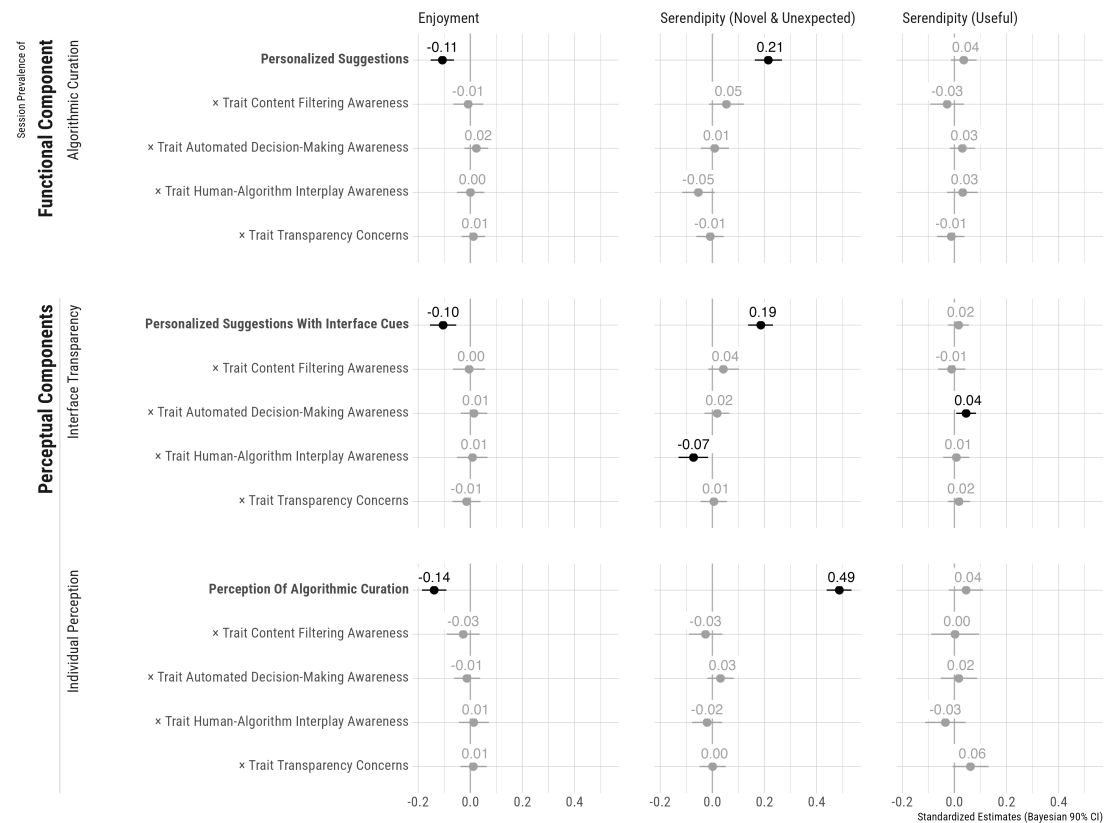
Results

Effects on Enjoyment and Serendipity

- **Enjoyment**:
  - More algorithmic curation → lower enjoyment
  - Effect slightly weaker with interface cues

- **Serendipity**:
  - More algorithmic curation → more novelty/unexpectedness
  - Evaluated more positively only by users high in automated decision-making awareness

Discussion

Implications for UX and Human-AI Interaction

- Algorithmic curation has **differential effects**:
    - Reduces enjoyment
    - Increases serendipity (partially)
- **User awareness** and **interface transparency** important to shape these effects[1, 2, 3]
- **Practical implications** for streaming platforms:
    - Overreliance on algorithmic personalization may harm UX
    - Value of user agency and transparency in fostering positive experiences

Image generated with FLUX.1-schnell: "A TV screen showing a person listening to music as a black and white cartoon"

Conclusion

Towards Human-Centered Algorithmic Curation

- **Contributions**:
  - First linkage study combining ESM and digital trace data to examine UX in Spotify listening
  - Findings highlight need for nuanced design of recommender systems
- **Future directions**:
  - Experimental manipulations of algorithmic features
  - Broader samples beyond students
  - Applications across other entertainment platforms

Thank you very much!

I am happy to answer any questions

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