The Mind Behind the Music: AI, Intention, and the Perception of Musical Narrative

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Background

Music Perception

People glean meaning from abstract stimuli, including music

How? Two main accounts[1]:

- *Physical stance:* Consider low-level properties like pitch and tempo
- *Intentional stance:* Consider how (and by whom) the music was created

Reactions to AI-Produced Art

Consistent with the intentional stance:

- People prefer human-made over AI-produced art[2]
- Musical pieces believed to be human-composed (vs. AI-composed) elicit greater activity in the 'mentalizing network' of the brain[3]

Narrative Listening

Tendency to infer a narrative when listening to certain sound patterns—a fundamental aspect of music perception

A recent series of studies[4-6] found that narrative listening depends critically on cultural exposure, not just low-level music properties

Our Question

Is narrative listening also linked to intuitions about the "mind" behind the music?

Overview

Participants

U.S. MTurkers (N = 793 across 3 experiments)

General Procedure

Listen to 6-8 clips of human-composed music (S1-S3) and AI-composed music (S3), framed as human- or AI-composed (S2-S3)

Dependent measures:

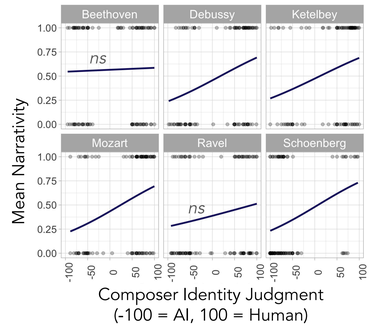
- Who do you think composed this piece: a human or an AI system? (S1 only)
- Did you imagine a story? (*narrativity*)
- How vivid was your imagined story? (*narrative engagement*)
- What was the content of your imagined story?

Study 1

Is music that triggers a narrative more likely to elicit attributions to a human (vs. AI) composer?

Stimuli: Human-composed music by Beethoven, Debussy, Ketelbey, Mozart, Ravel, and Schoenberg

Results: For pieces judged as more likely to have been human-composed, participants:
(1) were more likely to imagine a story (see figure)
(2) perceived their imagined story as more vivid
(slope: M = 0.007, SD = 0.004), $t(5)$ = 4.34, p = .007, d = 1.77

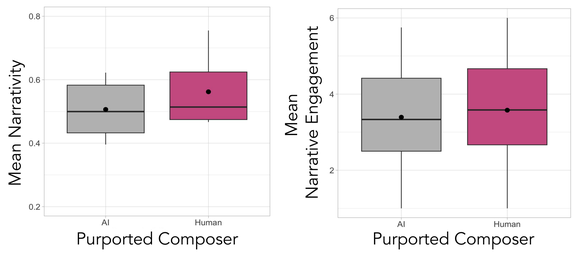


Study 2

Does music believed to be human-composed (vs. AI-composed) elicit more narrative listening?

Study 2a: Each clip from S1 was framed as human- or AI-composed:

> *[A human composer wrote/An AI system generated] this piece of music after [hearing/being given] many examples of Impressionist piano pieces. [He/It] identified patterns among the different pieces to emulate the same exuberant, burbling sound.*



Study 2b: Same design, but using only classical-sounding clips rated as equally human-/AI-like

- **Results:** No significant differences in narrative listening
- Ineffective manipulation? Details in cover stories (e.g., "exuberant, burbling") sometimes conflicted with participants' impressions

Study 3

Does narrative listening depend more on beliefs about the composer or features of the music itself?

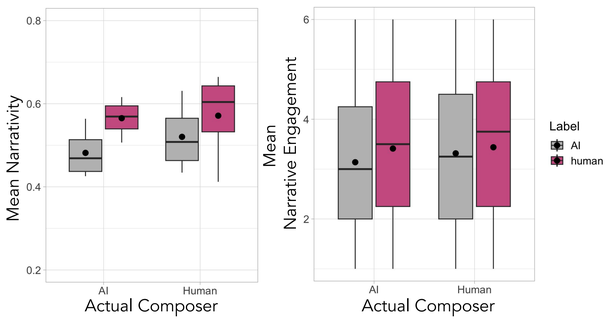
Stimuli: Clips based on Study 2b stimuli generated using an AI music composition tool (AIVA)

Method: Composer beliefs instantiated with labels ("Human" or "AI") rather than full cover stories

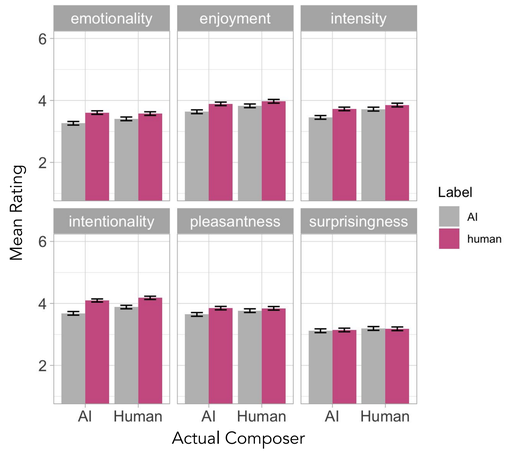
- Within-subjects design: 2 (Actual Composer: Human or AI) × 2 (Label: Human or AI)

Results: Linear mixed-effects models (fixed: Actual Composer, Label; random: Participant, Item)

- Label: ps < .001; no other significant effects



"Human"-labeled clips were also perceived as more emotional, enjoyable, intense, intentional, and pleasant than "AI"-labeled clips (ps < .005), yet these properties were no different across conditions



Conclusions

In this first investigation of the relationship between perceptions of AI-composed music and narrative listening, we found:

- Attributions to a human composer predicted greater narrativity and narrative engagement (S1)
- Framing music as human-composed (vs. AI-composed) via a cover story describing its purported creation had no significant impact on narrative listening (S2)
- Framing via the label "Human" (vs. "AI") elicited greater narrativity and narrative engagement, *regardless of whether the music was actually human- or AI-composed* (S3)

Believing that music was AI-composed shapes the listening experience, over and above features of the music itself

Our content analyses were inconclusive, but could be improved by collecting descriptions of imagined story events *when they are perceived in the music*

Our findings have implications for human-AI co-creativity and policies on the disclosure of algorithmic presence[7]

Future research: What mechanism (e.g., perceived intention, attitudes toward AI) drives the link between composer beliefs and narrative listening? Might implicit measures of music perception help us find out? How would people perceive this music without labels?

References

1. Dennett, D. C. (1989). *The intentional stance*. MIT Press.
2. Shank, D. B., Stefanik, C., Stuhlsatz, C., Kacirek, K., & Belfi, A. M. (2022). AI composer bias: Listeners like music less when they think it was composed by an AI. *Journal of Experimental Psychology: Applied*.
3. Steinbeis, N., & Koelsch, S. (2009). Understanding the intentions behind man-made products elicits neural activity in areas dedicated to mental state attribution. *Cerebral Cortex*.
4. Margulis, E. H., Wong, P. C., Simchy-Gross, R., & McAuley, J. D. (2019). What the music said: Narrative listening across cultures. *Palgrave Communications*.
5. Margulis, E. H., Wong, P. C., Turnbull, C., Kubit, B. M., & McAuley, J. D. (2022). Narratives imagined in response to instrumental music reveal culture-bounded intersubjectivity. *Proceedings of the National Academy of Sciences*.
6. Margulis, E. H., Williams, J., Simchy-Gross, R., & McAuley, J. D. (2022). When did that happen? The dynamic unfolding of perceived musical narrative. *Cognition*.
7. Köbis, N., & Mossink, L. D. (2021). Artificial intelligence versus Maya Angelou: Experimental evidence that people cannot differentiate AI-generated from human-written poetry. *Computers in Human Behavior*.

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