Effect of Background Music on Pulmonary Nodule Evaluation on Chest Computed Tomography

Joud Obri[1], Adela Pouzar, M.D.[2], Braeden Estes, M.D.[2], Kiran Nandalur, M.D.[2,3], Sayf Al-Katib, M.D.[2,3]

[1]Oakland University William Beaumont School of Medicine
[2]Department of Diagnostic Radiology, Corewell Health William Beaumont University Hospital
[3]Department of Diagnostic Radiology and Molecular Imaging, Oakland University William Beaumont School of Medicine

Introduction

- Listening to **Mozart's Sonata for Two Pianos (MS)** has been linked to short-term improvements in spatial reasoning.[1]
- Its relevance to diagnostic radiology (DR) remains untested.
- **Purpose:** Examine whether brief background music influences diagnostic accuracy or interpretation time during chest computed tomography (CT) interpretation of pulmonary nodules.
- Understanding whether background music affects diagnostic accuracy may inform radiology workstation environments and optimize conditions for resident learning and concentration.

Aims and Objectives

Aim:

- Evaluate whether short-term background music alters radiology resident performance on pulmonary nodule detection.

Objectives:

- Compare diagnostic accuracy between music and silence.
- Compare interpretation time between conditions.
- Assess whether case difficulty affects the observed results.

Methods

Design: Randomized two-period crossover study.

Participants: 24 Diagnostic Radiology residents (PGY-2-5).

Location: Private image-reading station within a quiet, enclosed room at Corewell Health William Beaumont University Hospital, Royal Oak (CHRO).

Procedure:

- Each resident interpreted three chest CT cases (multiple pulmonary nodules).
- Case 1 = practice (no data collected).
- Cases 2 and 3 = music vs silence, order randomized and balanced.
- *Music:* Mozart's Sonata for Two Pianos, K. 448 via headphones.
- *Silence:* Noise-cancelling headphones, no sound.

Outcomes:

- **Accuracy:** % of nodules correctly identified.
- **Time:** Interpretation duration in seconds.

Statistical analysis: Paired *t*-tests (α = 0.05). Sensitivity analysis assessed whether the case order affected outcomes.

Results

- All 24 residents completed both conditions. No adverse events.
- **Accuracy:** Music 54.17% ± 16.28 vs Silence 56.21% ± 19.80 (Δ = –2.04 pp; 95% CI –9.36 to 5.28; p = 0.57).
- **Time:** Music 424.0 ± 160.2 s vs Silence 440.6 ± 146.7 s (Δ = –16.6 s; 95% CI –76.0 to 42.8; p = 0.57).
- **Sensitivity analysis:** Within-participant differences varied by which case had music (accuracy –16.75 vs +12.67 pp; time –79.9 vs

Figure 1. Mean accuracy and interpretation time by condition (± SD).

Accuracy (% correct)	56.21 ± 19.80	54.17 ± 16.28	−2.04 pp	[−9.36, 5.28]	0.57
Time (seconds)	440.63 ± 146.73	424.03 ± 160.21	−16.60 s	[−75.97, 42.76]	0.57

Table 1. Summary of mean accuracy and interpretation time for music and silence conditions.

Conclusions

- Background music did **not significantly** affect diagnostic accuracy or interpretation time.
- Differences between cases suggest performance variation was due to **case difficulty**, not auditory condition.
- Background music can be considered **neutral** in radiology resident chest CT interpretation.
- **Limitations:** the small sample size and single-institution design.
- **Future work:** Include attending radiologists and more imaging modalities.

References

1. Rauscher FH, Shaw GL, Ky KN. Music and spatial task performance. Nature. 1993;365(6447):611. doi:10.1038/365611a0

Acknowledgements

- We thank Dr. Sayf Al-Katib (Embark mentor), the radiology residents, CHRO, and the OUWB Embark Program.