DEEP NEURAL NETWORKS BASED ARTIFICIAL INTELLIGENCE FOR OPTIMIZED MUSIC SELECTION FOR EFFECTIVE STRESS REDUCTION IN CANCER PATIENTS

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BACKGROUND

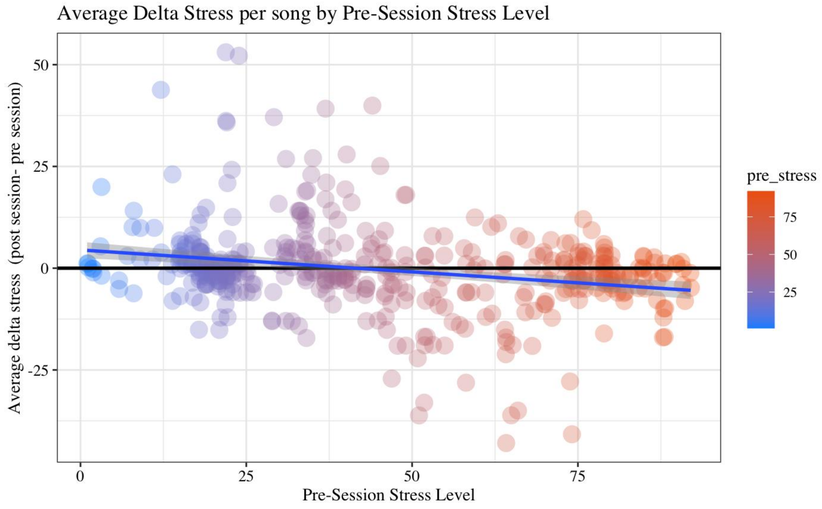
- Receiving a cancer diagnosis is a life-altering event for patients and their families that causes significant stress and emotional distress. In this context, music-based interventions (MBI) have been shown to reduce stress levels, anxiety, and depression.
- Despite the proven effectiveness of music-induced relaxation, one of the main limitations regarding its effectiveness is choice of music.
- There is a need for cost-efficient, effective, and individualized MBI for patients receiving a cancer diagnosis.
- Rubato Life™ (RL) is a low cost and effective MBI using a proprietary self-learning deep neural network-based algorithm for music selection that improves by correlating heart rate variability feedback recorded by a wearable device to music choice.

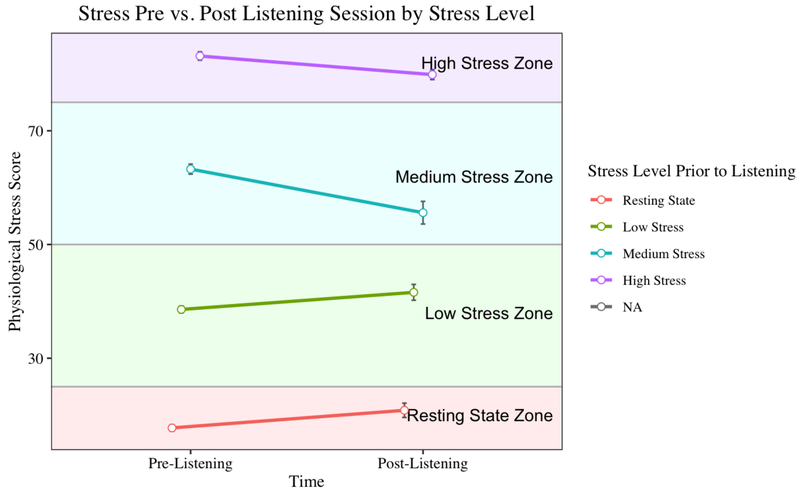
OBJECTIVE

- To optimize music choice for stress reduction beyond providers' or even patients' capabilities by correlating patients' physiologic response to a self-learning deep neural network-based algorithm for music selection.

DESCRIPTION OF TECHNOLOGY

- The RL app utilizes Deep Neural Networks (DNN) based Artificial Intelligence in conjunction with wearable technology that records heart rate variability vectors on a large scale to identify and cluster different musical attributes to quantify music's effect.
- RL analyzes a music listener's cardiac rhythms, trends, and variability, and matches those to key music attributes like tempo, key, scale, and structure. Based on a proprietary analysis method, it determines a clinical match between music and physiologic data and generates personal music recommendation that is self-improving the more the cancer patients listens to the music. Finally, a highly effective playlist is created.





METHODS

- To test this new technology, an IRB approved clinical trial is currently being conducted.
- Postoperative surgical oncological patients are randomly selected, and after obtaining consent, given a wearable and the RL app.
- Then, they are asked to listen to at least 45 minutes of music per day (or a total of 12 hours) for 2 weeks prior to their follow up appointment.
- Anxiety levels pre and post intervention are measured based in the State Trait Anxiety Inventory (STAI) questionnaire.

PRELIMINARY RESULTS

- 7 patients meeting inclusion criteria were enrolled, 5 patients were female, and the average age was 63 years.
- The interventions that patients underwent were: Partial hepatectomy, pancreatoduodenectomy and distal pancreatectomy; and the average time of music listening was 200 minutes per week per patient.
- There was a significant difference in the mean state trait anxiety score before and after the use of Rubato life app: 36.71 vs 26.57 (p=0.028), pre and post intervention respectively

CONCLUSIONS/FUTURE DIRECTIONS

- Preliminary findings suggest that Rubato Life is uniquely effective in reducing stress and anxiety.
- Confirming its effectiveness will prompt further optimization of the DNN algorithm using demographic and music experience data.
- Integration into routine clinical care will be explored upon reaching the calculated number needed to treat (NNT) for study enrollment.