

Meditation for Adults with Fibromyalgia: Does Virtual Reality Improve Outcomes?

Aliza Spielman, OT/s, Robert Edwards, PhD, Nancy A. Baker, ScD, MPH, OTR, FAOTA

Introduction

- Chronic Pain affects more than 20% of adults in the US
- Fibromyalgia (FM)** is a particularly debilitating chronic pain condition which needs non-pharmacological interventions
- Meditation** has been shown to reduce affective pain for many populations, but data supporting it for FM has been equivocal
- Virtual Reality (VR)** can enhance the meditation experience in several ways and has also been shown to reduce acute pain
- Further research is indicated for VR and meditation for FM

Purpose

To evaluate the feasibility and effectiveness of a guided meditation program for improving pain, affect, and physiological vital stats in adults with FM

Aim

To assess the feasibility of using virtual reality to enhance the meditation experience

Hypothesis

The VR will facilitate greater improvements in pain, affect, and physiological vital stats as compared to the non-VR meditation

Methods

Recruitment Methods: Online research recruitment platform, emails and phone calls to prior study participants with FM

Participation:

- Two 60–90-minute visits to:
 - Non-Immersive meditation (NIm)**
 - Virtual Reality meditation (VRm)**
- Provide data on pain, affect, and experience pre- and post-meditation
- Order of visits were *randomized* and separated by 6+ days



Measures:

- Baseline Survey
- Fibromyalgia Impact Questionnaire (FIQ)
- Pain Intensity Numerical Rating Scale (NRS)
- Positive and Negative Affect Scale (PANAS)
- User Engagement Scale (UES)
- Meditation Experience Questionnaire (MEQ)
- Simulator Sickness Questionnaire (SSQ)
- Quantitative Sensory Testing (QST)
- Pain Pressure Threshold (PPT)
- Temporal Summation (TS)
- Vital Signs
- Blood Pressure (BP)
- Heart Rate (HR)



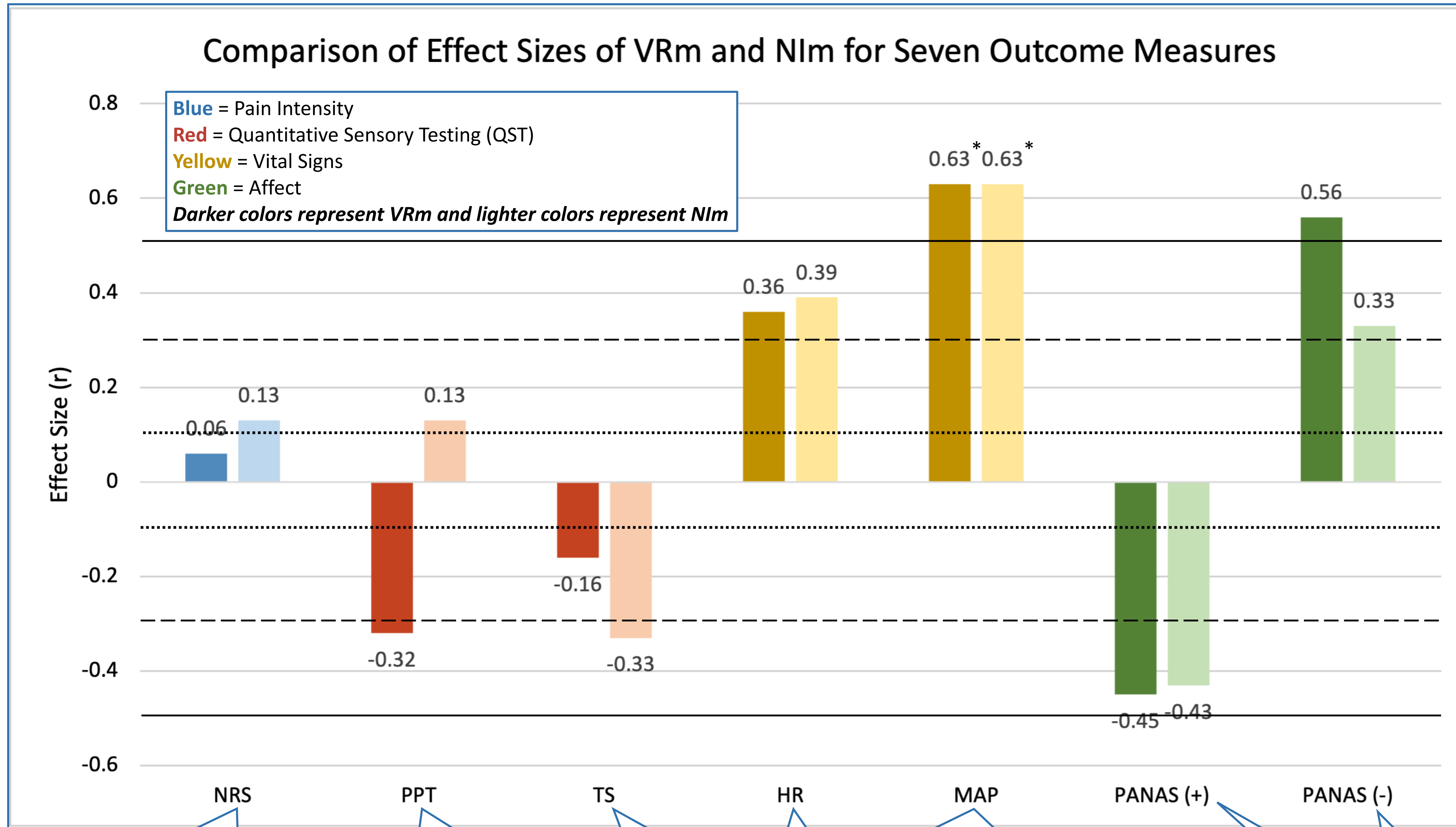
Scan for more details on collected measures

Participants

- n = 9 female adults (age: 49.9 ± 15.5; min 31 – max 70)
- 100% Diagnosis of FM (6-25 years of pain)
- 100% Non-Hispanic; 89% White
- 22% (2/9) had used VR before this study

Results

- All results have been adjusted so that a positive *r* indicates that the score improved, and a negative *r* indicates that the score worsened after the meditation
- Dotted black lines indicate a small effect size, dashed black lines indicate a moderate effect size, and solid black lines indicate a large effect size
- * indicates a significant change between pre-meditation scores and post-meditation scores of $p \leq 0.05$



NRS
Numerical Rating Scale measures pain intensity from 0 (no pain at all) to 10 (worst pain imaginable)

PPT
QST: Pain Pressure Thresholds are a measure of sensitivity to pressure stimuli

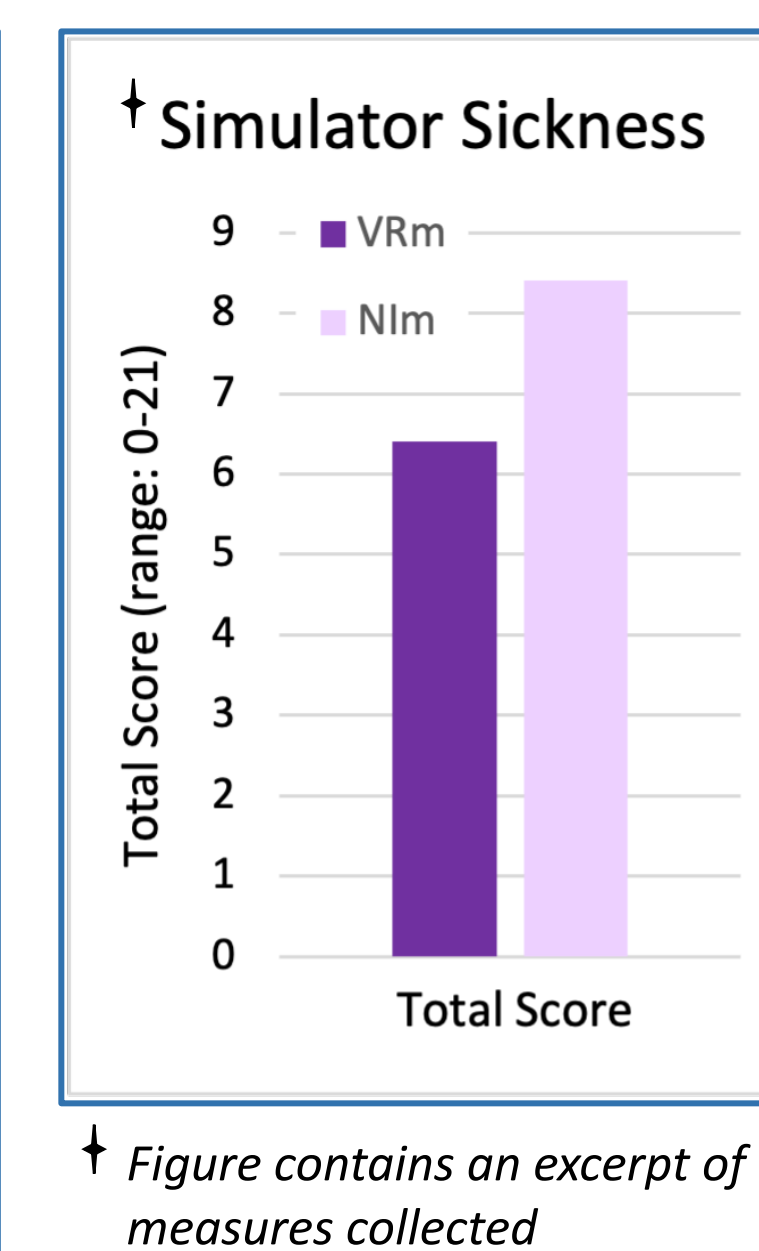
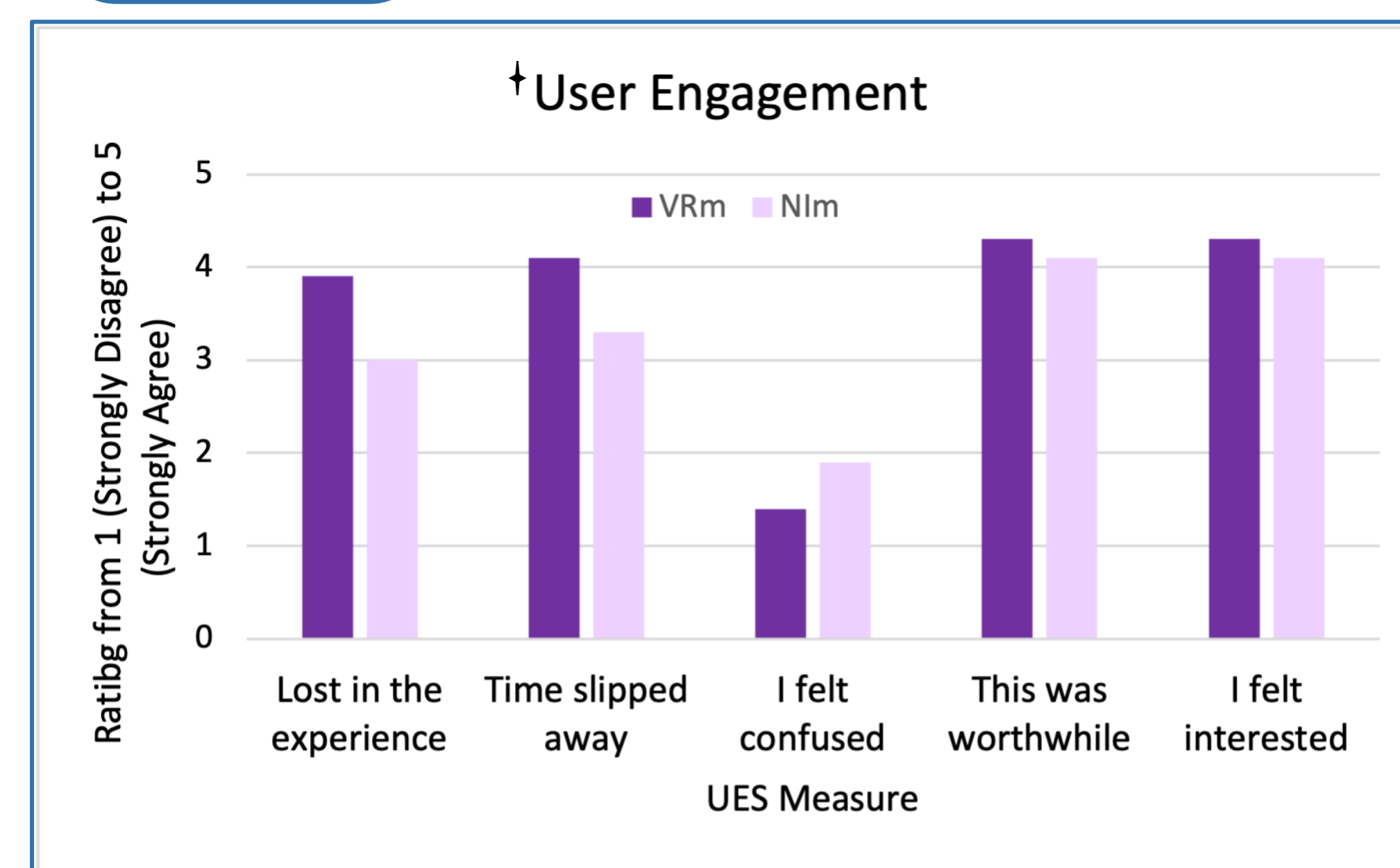
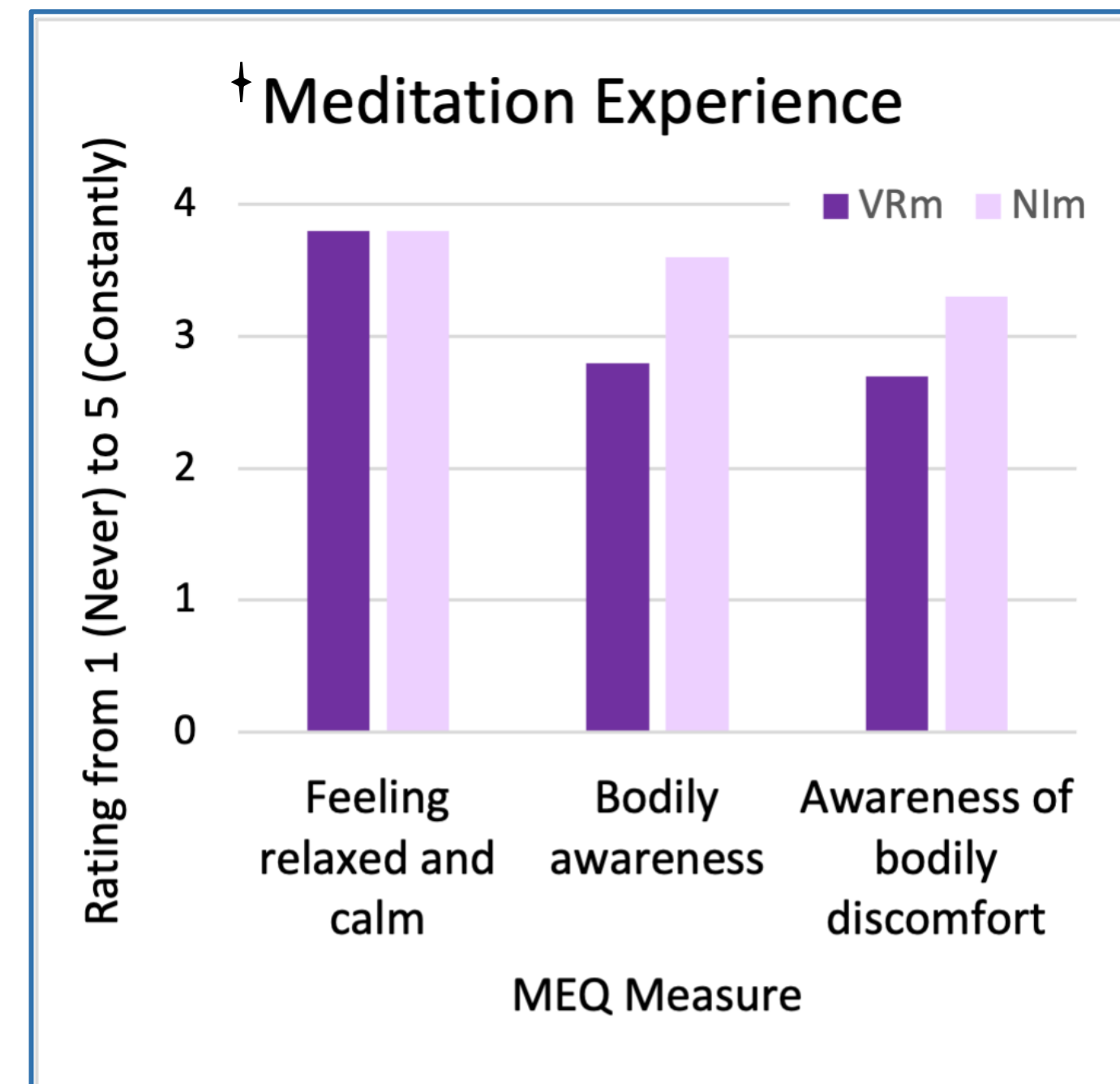
TS
QST: Temporal Summation measures the buildup of pain when stimuli are repeated

HR
Heart Rate measured in beats per minute (bpm)

MAP
Mean Arterial Pressure is a calculation of systolic and diastolic blood pressures using the following formula:
$$MAP = \frac{2 * DBP + SBP}{3}$$

PANAS (+)
Positive Affect as measured by the PANAS

PANAS (-)
Negative Affect as measured by the PANAS



Discussion & Conclusion

- This research suggests that:
 - VR-enhanced meditation is not effective for reducing pain for people with FM
 - Meditation can facilitate bodily relaxation (as indicated by physiological vital signs)
 - Meditation can improve negative affect
- Unexpectedly, positive affect worsened
 - However, this result is likely due to the meditation itself as its stated aim was to invoke “Zen” (a sense of calmness)
- Participants reported that:
 - During both meditations, they felt “relaxed and calm”
 - In the non-VR meditation, their minds wandered more, and they were more aware of their own body and bodily discomfort.
 - In the VR meditation, time seemed to slip away, and they felt “lost” in the experience
 - The VR meditation was more “interesting” and “worthwhile” while the non-VR was more “confusing”
 - They felt greater simulator sickness/discomfort in the non-VR meditation
- This research supports prior literature:
 - Meditation was not effective method of pain reduction for FM
 - However, meditation may be useful for the affective aspect of FM
 - VR is a feasible way to enhance the meditation experience

Limitations:

- Sample size (n = 9)
- Uniformity within sample
- Carryover Effects

Future Directions:

- Assessing the benefits of using VR in other ways with people with FM
- Investigate the connection between meditation and affect

References & More

Scan for References list



Funding

Medical & Graduate Student Preceptorship: Daniel J. Wallace, MD Graduate Student Preceptorship Endowment Rheumatology Research Foundation

Contact Information

Aliza Spielman – aliza.spielman@tufts.edu
Nancy Baker – nancy.baker@tufts.edu
Robert Edwards – redwards@bwh.harvard.edu