



# Alterations in stress physiology following yogic breathing and cognitively based psychosocial workshops for college students: A randomized controlled trial

Michael R. Goldstein, MA<sup>1</sup>, Rivian K. Lewin<sup>1</sup>, E. Fiona Bailey, PhD<sup>2</sup>, John J.B. Allen, PhD<sup>1</sup>

Departments of Psychology<sup>1</sup> and Physiology<sup>2</sup>, University of Arizona, Tucson AZ



## Introduction

- College and graduate school are periods in life often filled with challenges and transitions.
- Multi-component psychosocial approaches to stress management and student wellness are likely to offer the greatest benefit, while individual responses to these approaches are expected to differ.
- This study aims to evaluate subjective well-being and stress physiology before and after completion of a stress-management and wellness workshop. \*Only baseline data analyzed thus far\***

## Methods

### Design:

- Randomization to workshop group (YES+ or WOW!, see below)
- Lab visit measures:** EKG, respiratory belts, Visual Analog Scale (VAS) subjective ratings of 'pain/discomfort' and 'distress' separately, hand surface temperature via handheld infrared thermometer, salivary cortisol in response to stress induction; collection of questionnaires

### Participants (N = 35 for current analyses):

- Age 20.6 ± 2.5 years** (range 18-29), 71.2% female
- Inclusion criteria:** student (undergrad, grad, etc.); age 18-35
- Exclusion criteria:** current psychotropic medication; history of panic disorder; psychosis, or mania; current substance dependence

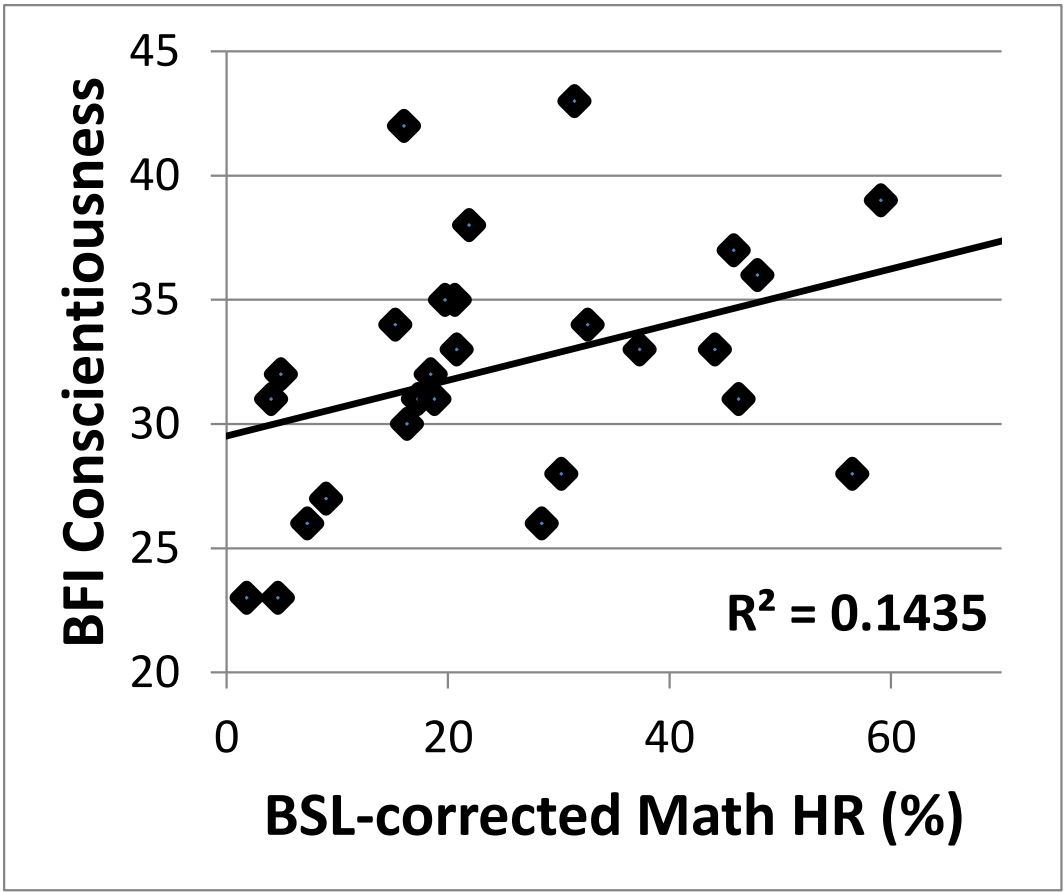
### Workshop Descriptions

#### "Your Enlightened Side (plus more)" [YES+] workshop

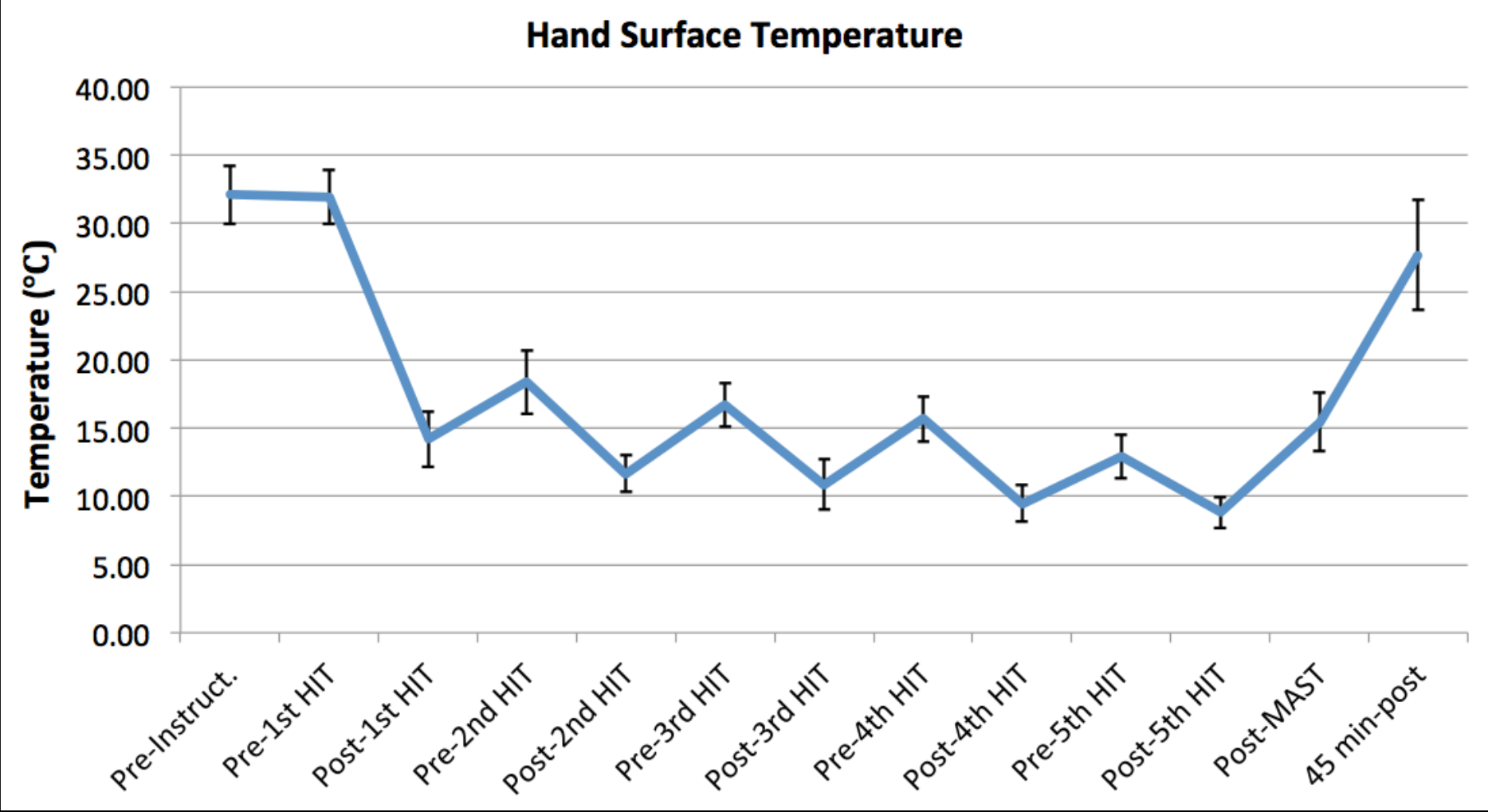
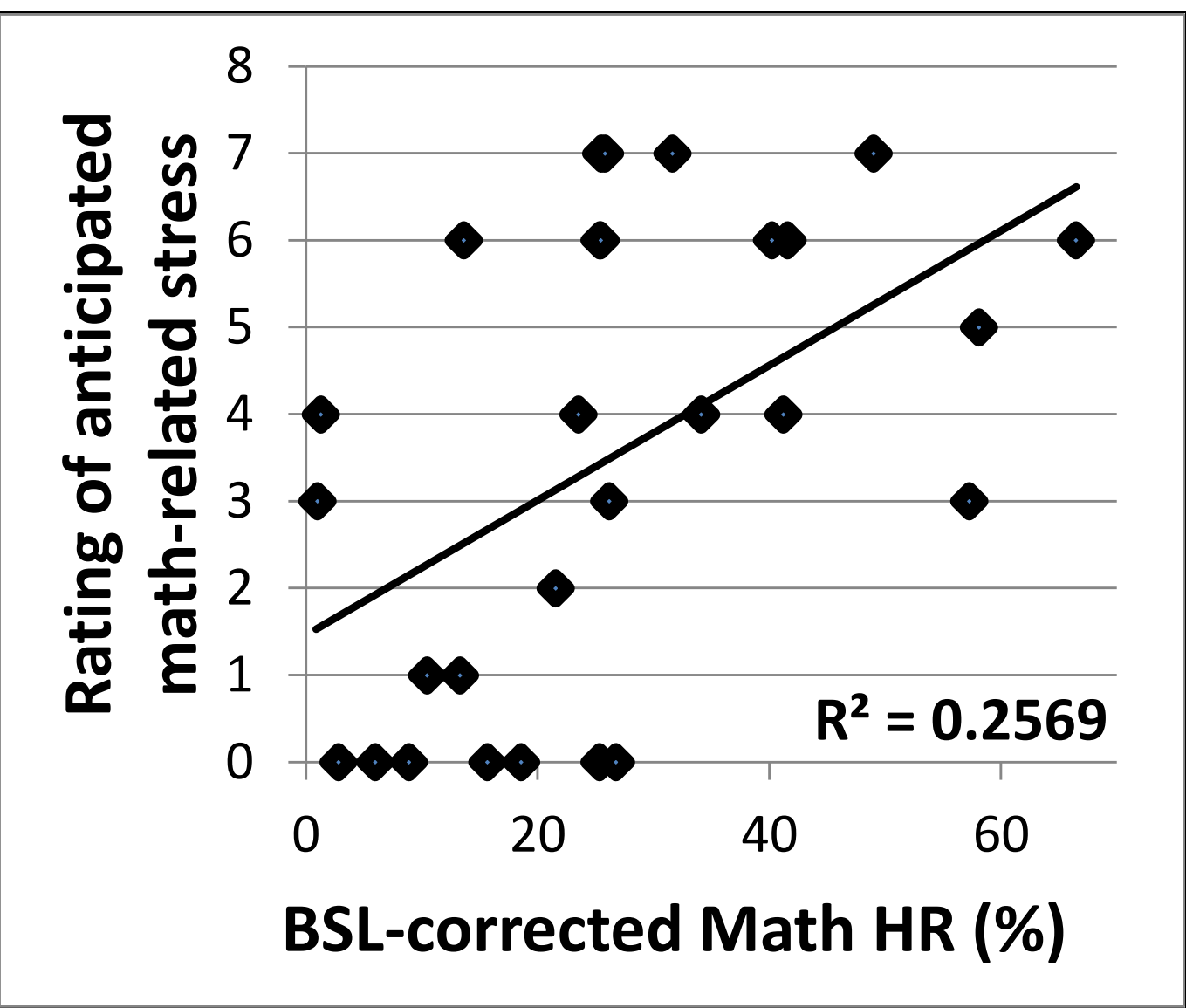
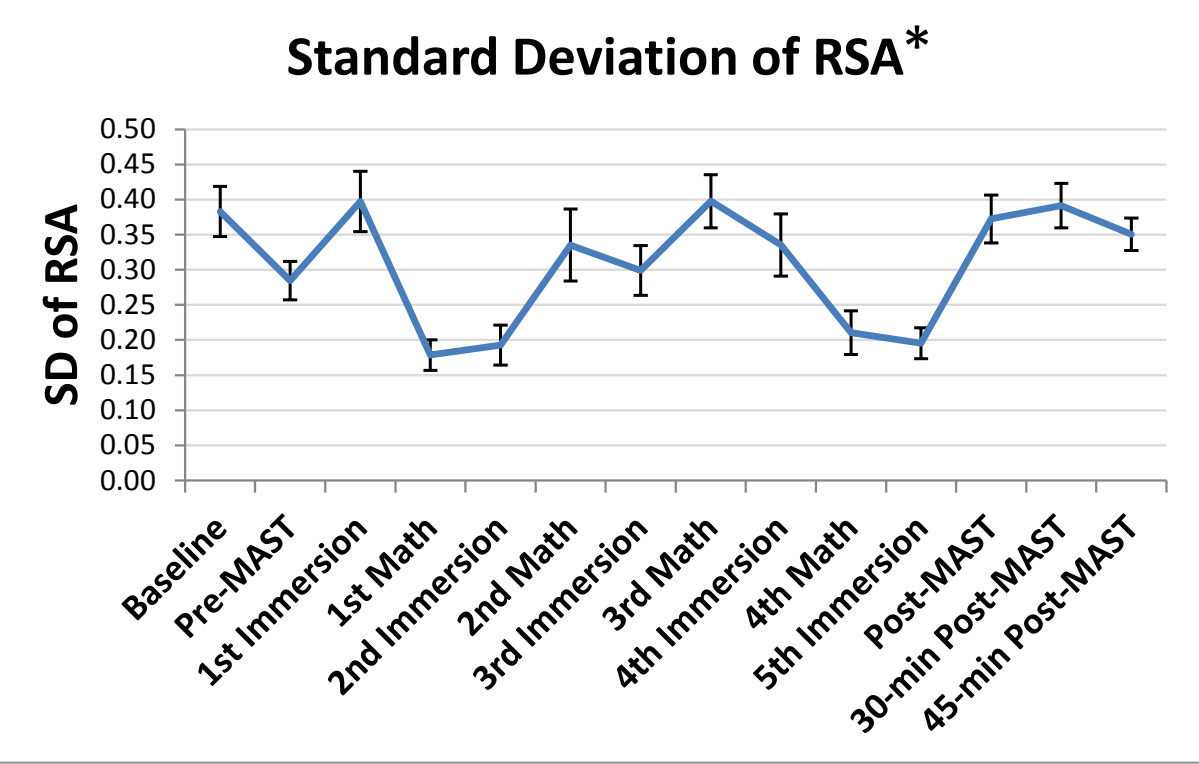
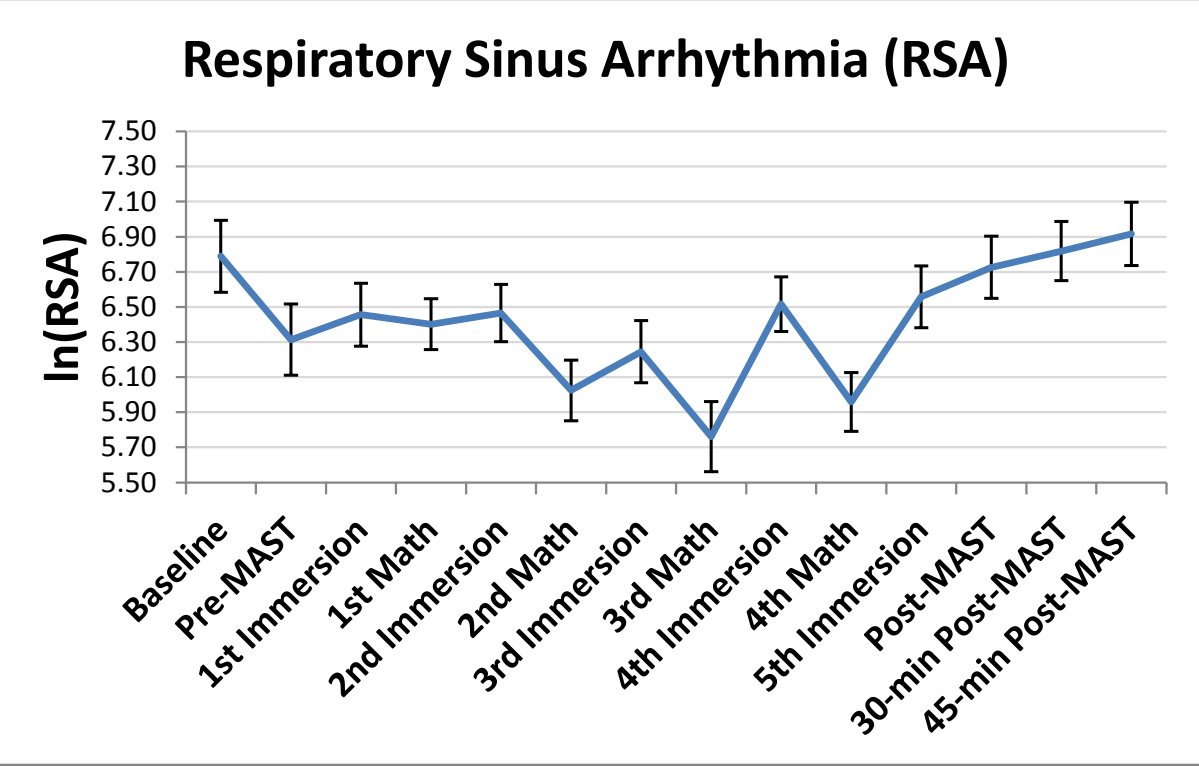
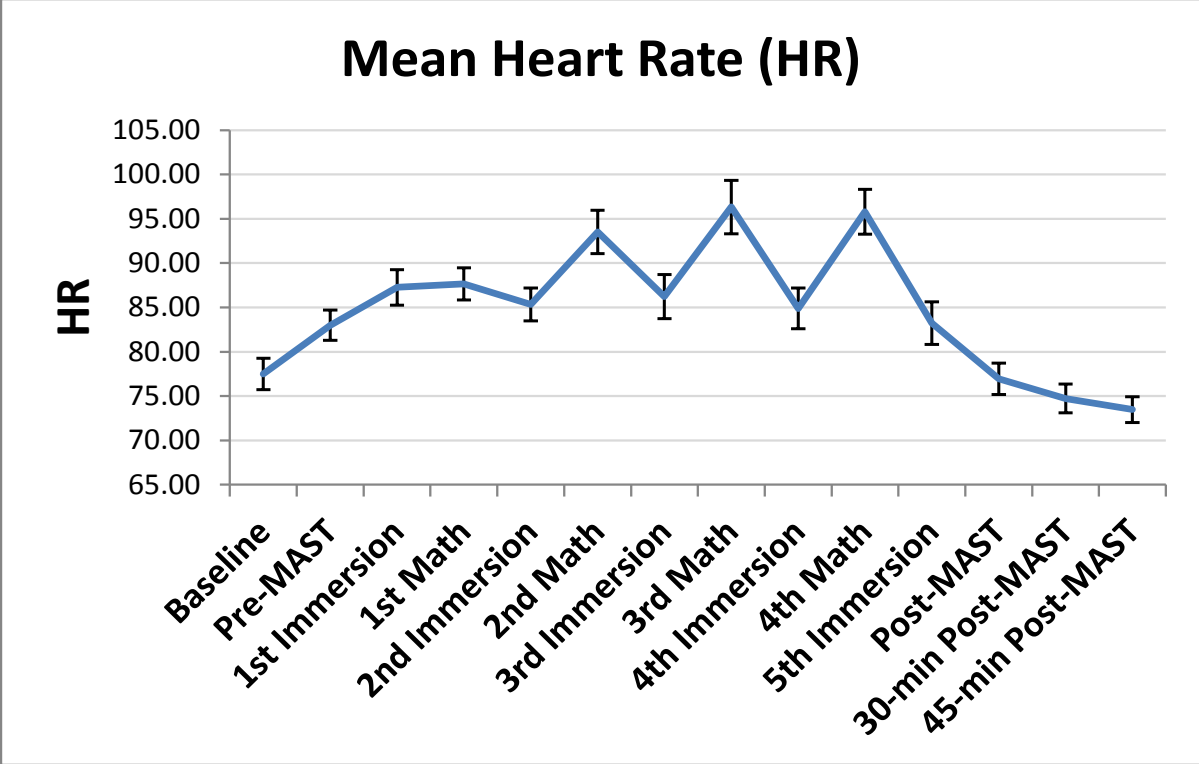
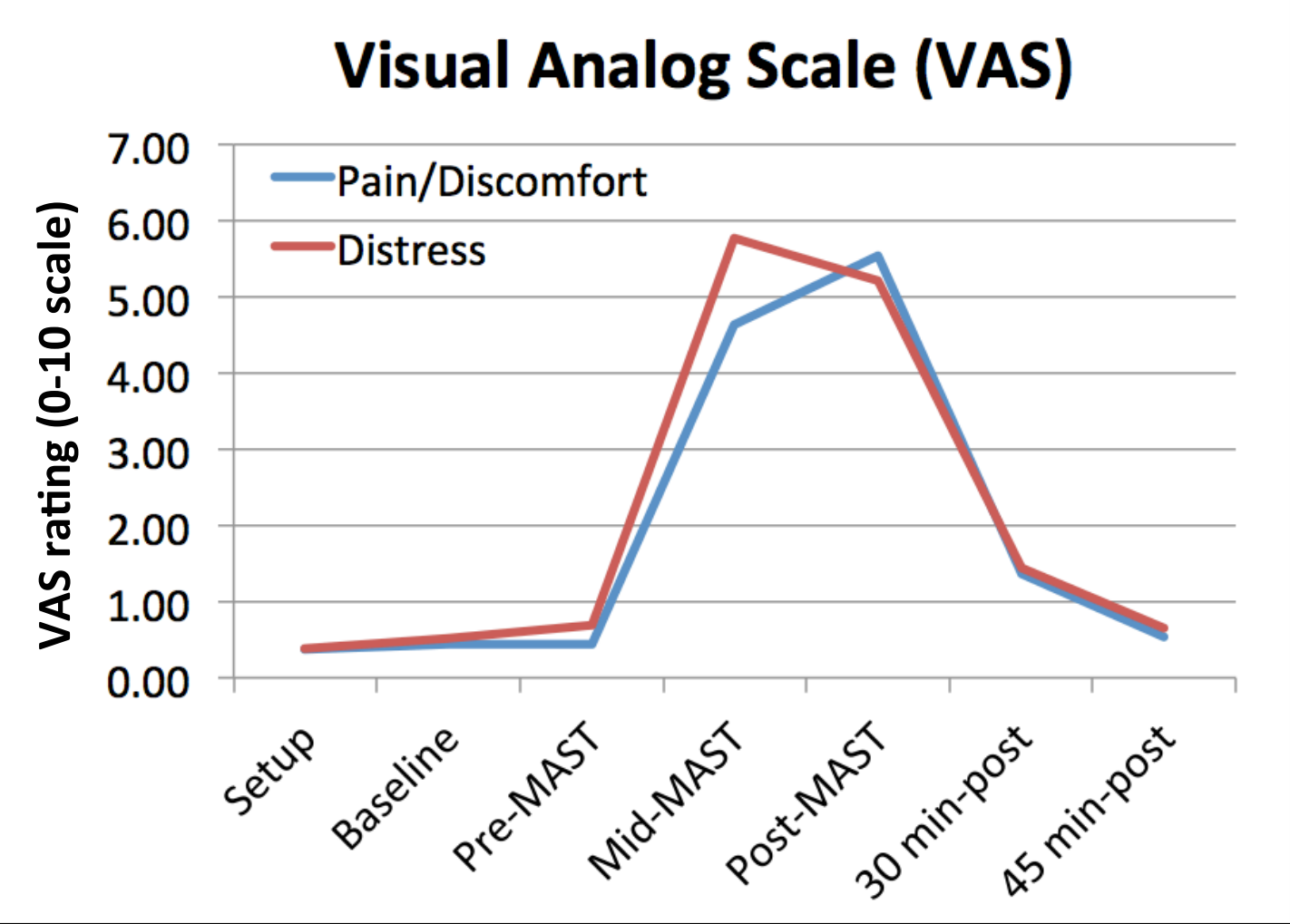
- 4 consecutive days, 18 hrs total
  - Thursday & Friday 6:00-9:30pm, Saturday & Sunday 10am-3:30pm
- Certified instructor w/ 1,000+ hours prior experience
- Focuses on breathing technique called Sudarshan Kriya
- Includes meditation, yoga, and interpersonal practices that encourage social connectedness

#### "Wisdom On Wellness" [WOW!] workshop

- Same time scheduling as YES+
- Focuses on physiological and cognitive components of stress
- Includes activities related to cognitive reappraisal, thought-tracking, etc.
- Group discussions similar to YES+
  - Though only large-group format without partner interaction
- No physical activities or contemplative practices taught in YES+



\*Within-subject variance across 24-second windows averaged for each recording block



## Discussion/Next Steps

- These preliminary results from baseline data of this RCT suggest that the MAST yields robust, stress-related effects on a variety of heart rate metrics, offering a valuable platform to evaluate intervention-related changes in stress physiology.
- EKG processing and analysis, including HRV metrics and rate-to-recovery slopes both within MAST (below, B) as well as across post-MAST recovery
- Detailed examination of immediate and long-term outcomes in response to each intervention

A. Example analysis from stationary bicycle challenge (Goldstein et al., *Int J Yoga*, 2016)

B. IBI series from representative participant in current study: black circle indicates MAST portion of the lab visit (drops in IBI correspond to subtraction task)

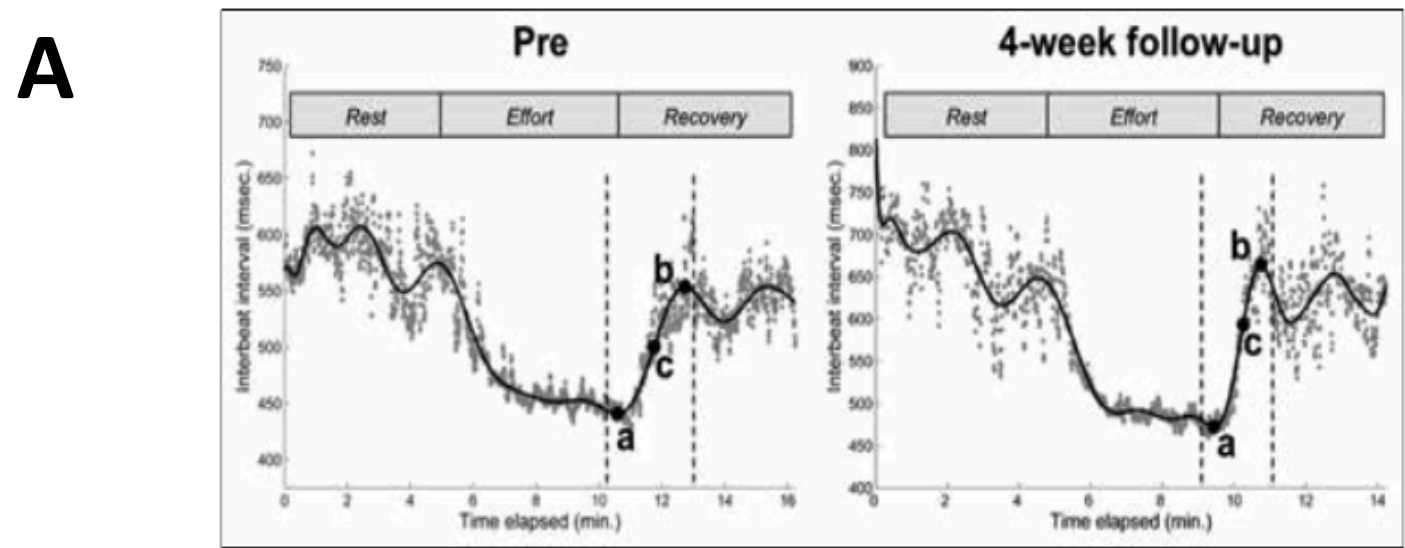
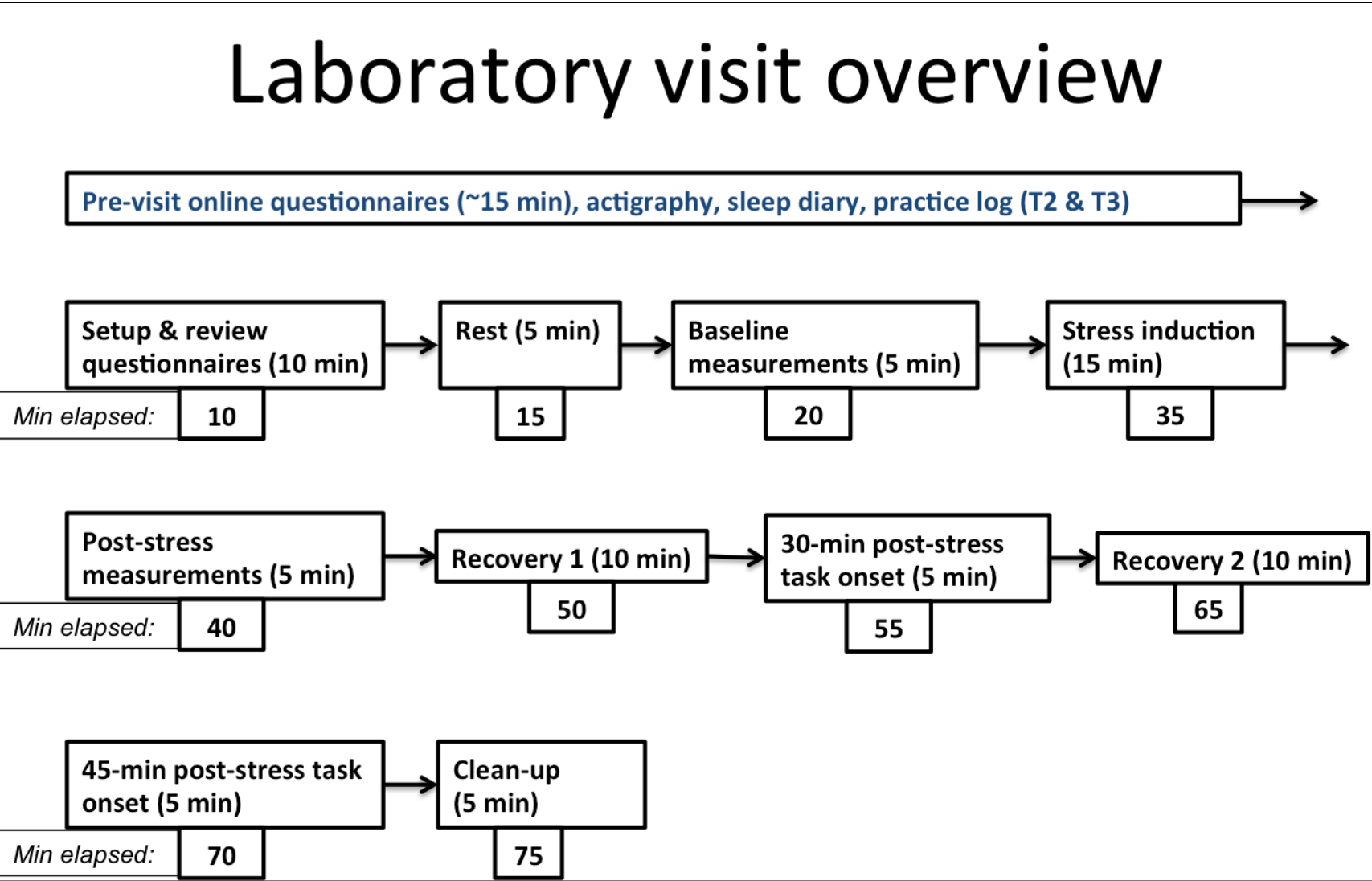
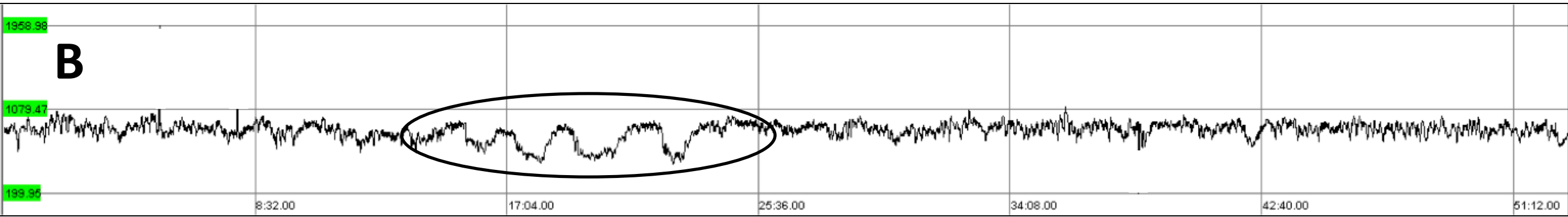


Figure 2: Inter-beat interval across rest, stationary bicycle effort, and recovery periods for a representative participant from Study 2 at preworkshop and 4-week follow-up time points. A least-squares polynomial of best fit was calculated for each recording. Within each effort to recovery transition window (dotted lines), the local minimum (a) and maximum (b) were determined, between which the inflexion point (c) was used to derive maximal linear point-slope of the curve as a measure of recovery rate. Across participants with available data at both time points (n = 11), mean point-slope increased from preworkshop to 4-week follow-up (P = 0.077).



This research was funded by a Mind and Life Institute Varela Award and National Science Foundation Graduate Research Fellowship (MRG). Authors would like to acknowledge the contributions of Dr. Richard Bootzin for support in the early development of this project.

Contact: [mgoldstein@email.arizona.edu](mailto:mgoldstein@email.arizona.edu)  
Handouts: [www.psychofizz.org](http://www.psychofizz.org)