

# Emotion regulation strategies moderate stress trajectories during app-based meditation training

Cecilia Nam<sup>1</sup>, Amun Asnani<sup>2</sup>, Wendy Lau<sup>1</sup>, Tammi Kral<sup>1</sup>, Richard J. Davidson<sup>1,3</sup>, Simon B. Goldberg<sup>1,4</sup>

<sup>1</sup>Center for Healthy Minds, University of Wisconsin-Madison, Madison, WI, USA; <sup>2</sup>Department of Psychiatry, Washington University in St. Louis, St. Louis, MO, USA; <sup>3</sup>Department of Psychology, University of Wisconsin-Madison, Madison, WI, USA; <sup>4</sup>Department of Counseling Psychology, University of Wisconsin-Madison, Madison, WI, USA



## Introduction

Emotion regulation strategies are consistently linked to stress. Individuals who use practice **more cognitive reappraisal and less emotion suppression generally report lower stress.**<sup>1</sup>

Digital meditation-based interventions (MBIs) have also been shown to **reduce stress and strengthen adaptive emotion regulation skills.**<sup>2</sup> However, it remains unclear whether individuals' baseline emotion regulation strategies influence how stress changes over the course of such interventions.

**Research Question:** Do baseline emotion regulation strategies moderate stress trajectories during a 4-week digital MBI?

**Hypothesis:** Higher reappraisal and lower suppression will predict steeper stress reductions.

## Method

**Study:** Data were drawn from the **Advancing Dynamic and Personalized Training (ADAPT)** randomized controlled trial evaluating the impact of various treatment elements of a digital MBI.

**Participants:** U.S. adults ( $N = 764$ ) with elevated depressive symptoms ( $\text{PHQ-9}^3 \geq 5$ ).

### Measures:

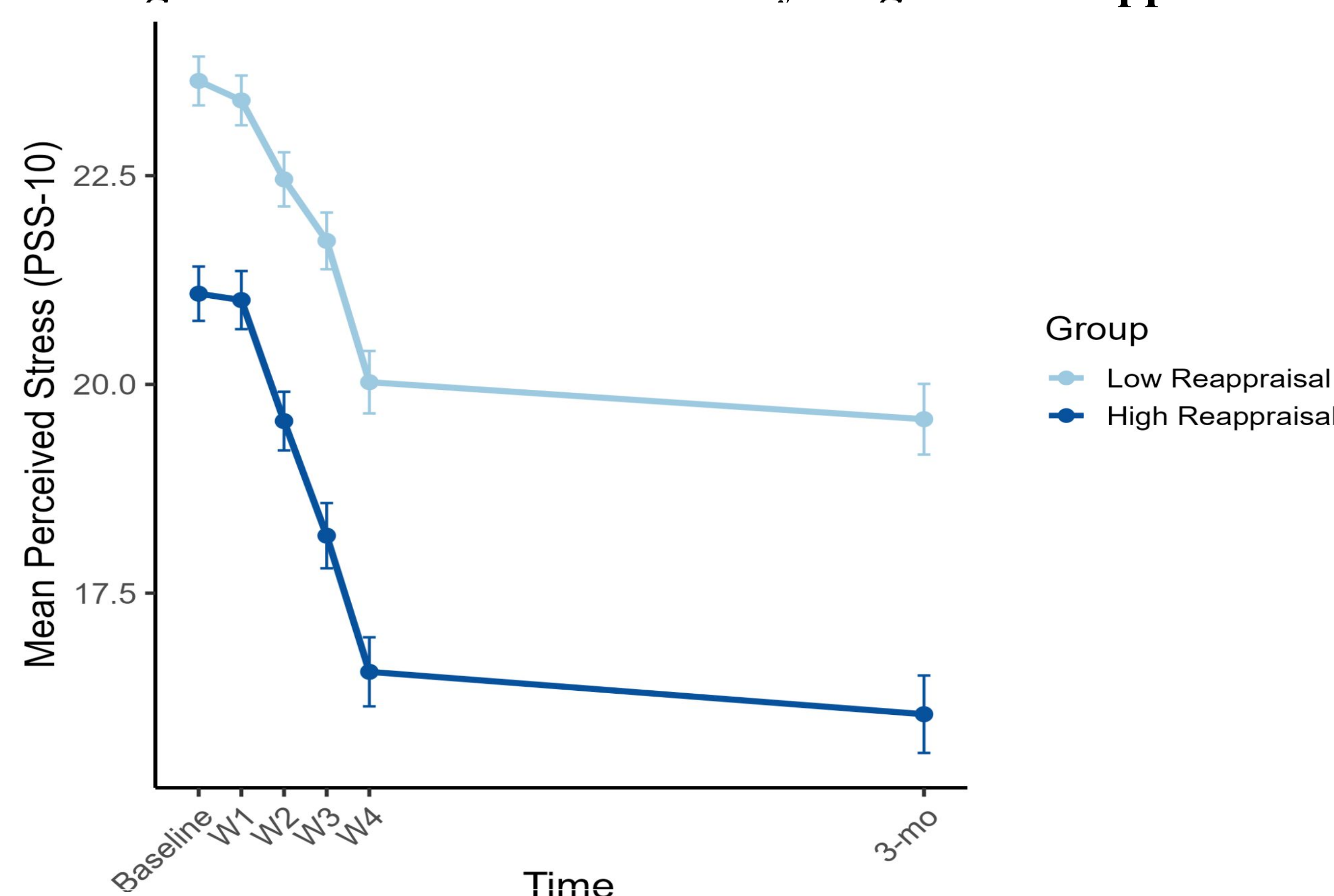
- Baseline emotion regulation was assessed using the **Emotion Regulation Questionnaire (ERQ)**<sup>1</sup>.
- **Perceived stress (PSS-10)**<sup>4</sup> was assessed weekly during the 4-week intervention and again at 3-month follow-up.

**Intervention:** Participants completed the **Healthy Minds Program (HMP) app**, a digital MBI designed to promote psychological well-being through guided meditation practices and psychoeducational content.

**Analysis:** **Linear growth curve models** (lmer) tested whether baseline ERQ scores moderated changes in perceived stress over time (Time  $\times$  ERQ interactions).

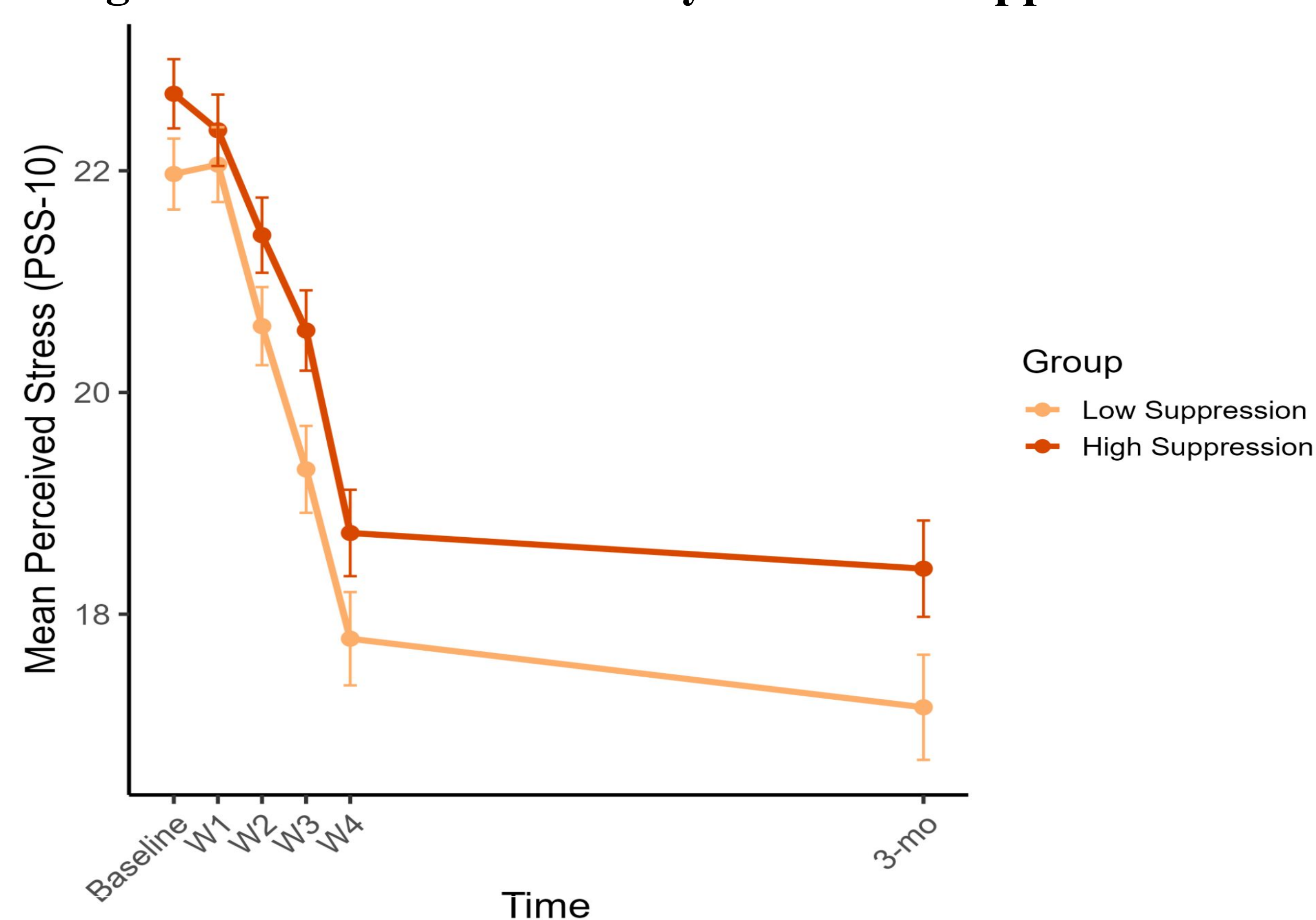
## Results

**Figure 1. Changes in PSS-10 moderated by cognitive reappraisal at baseline**



*Note.* The baseline cognitive reappraisal  $\times$  time interaction predicted steeper declines in perceived stress across the intervention and follow-up periods ( $b = -0.006$ ,  $p = .016$ ). Groups shown in the plot are for illustrative purposes only.

**Figure 2. Changes in PSS-10 moderated by emotional suppression at baseline**



*Note.* The baseline emotional suppression  $\times$  time interaction was not a significant predictor of changes in perceived stress ( $b = 0.0001$ ,  $p = .986$ ). Groups shown in the plot are for illustrative purposes only.

## Discussion

Baseline reappraisal amplified stress reductions during the intervention and follow-up, suggesting that individuals who habitually reframe emotional experiences may be better positioned to benefit from MBIs.

This pattern may reflect overlap between reappraisal and mechanisms commonly targeted in MBIs, such as attentional regulation, cognitive reframing, and decentering.<sup>2</sup> In contrast, suppression, an avoidance-oriented strategy, may be less directly engaged during short-term meditation practice.

Reappraisal may function as an individual difference factor influencing responsiveness to digital MBIs. Considering baseline emotion regulation could therefore inform personalization strategies in digital mental health interventions.

## References

1. Gross & John (2003). *J Pers Soc Psychol*, 85, 348–362
2. Gu et al. (2015) *Clin Psychol Rev*, 37, 1-12.
3. Kroenke et al. (2001). *Journal of Gen Internal Med*, 16(9), 606-613.
4. Cohen et al. (1983). *Journal of Health and Social Behavior*, 24, 385-396.

## Acknowledgements

We thank the ADAPT study team and collaborators at the Center for Healthy Minds and Humin for their contributions to study design, implementation, and data collection. This project was supported by the Templeton World Charity Foundation (Grant #32566).