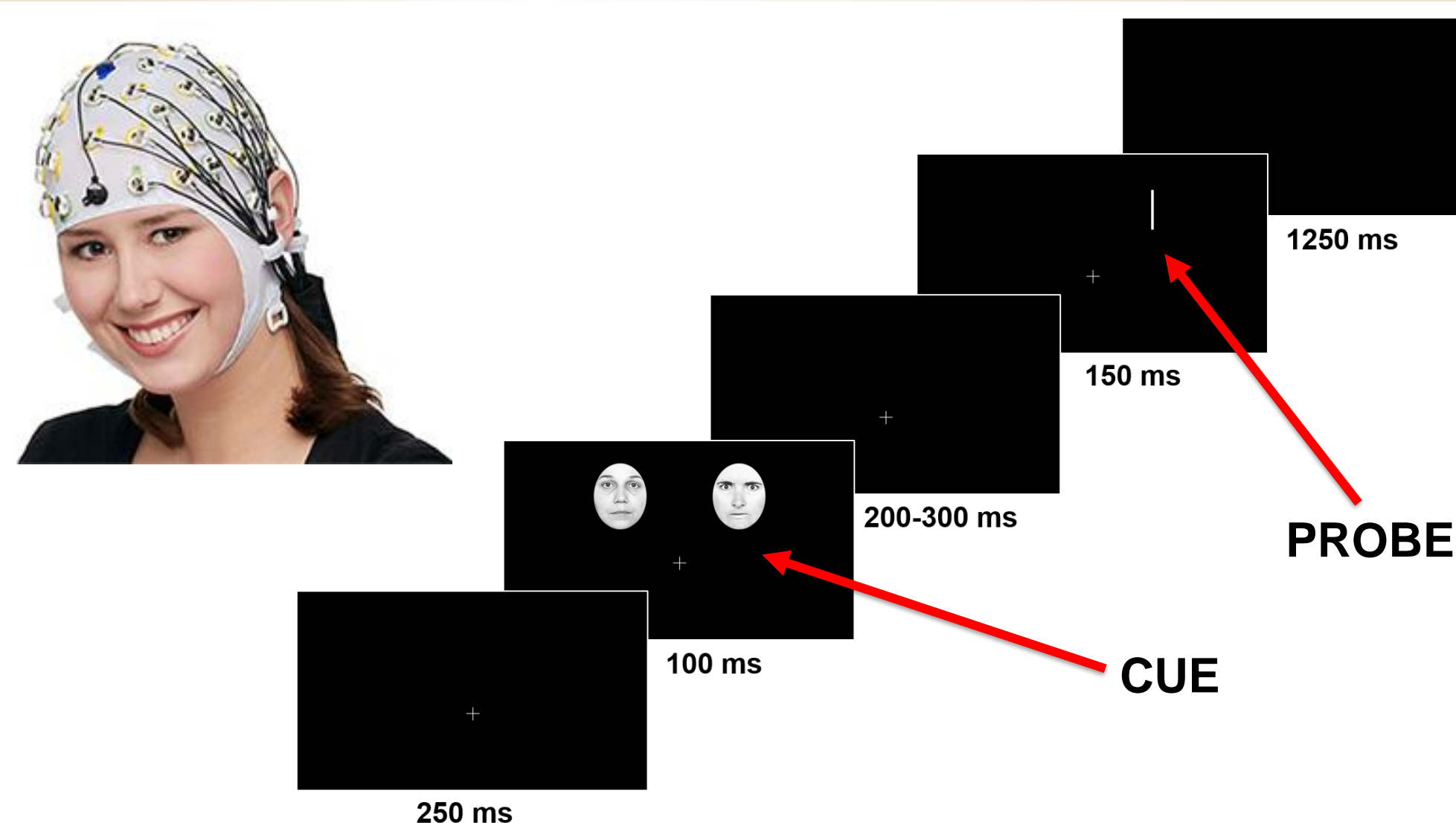


INTRODUCTION

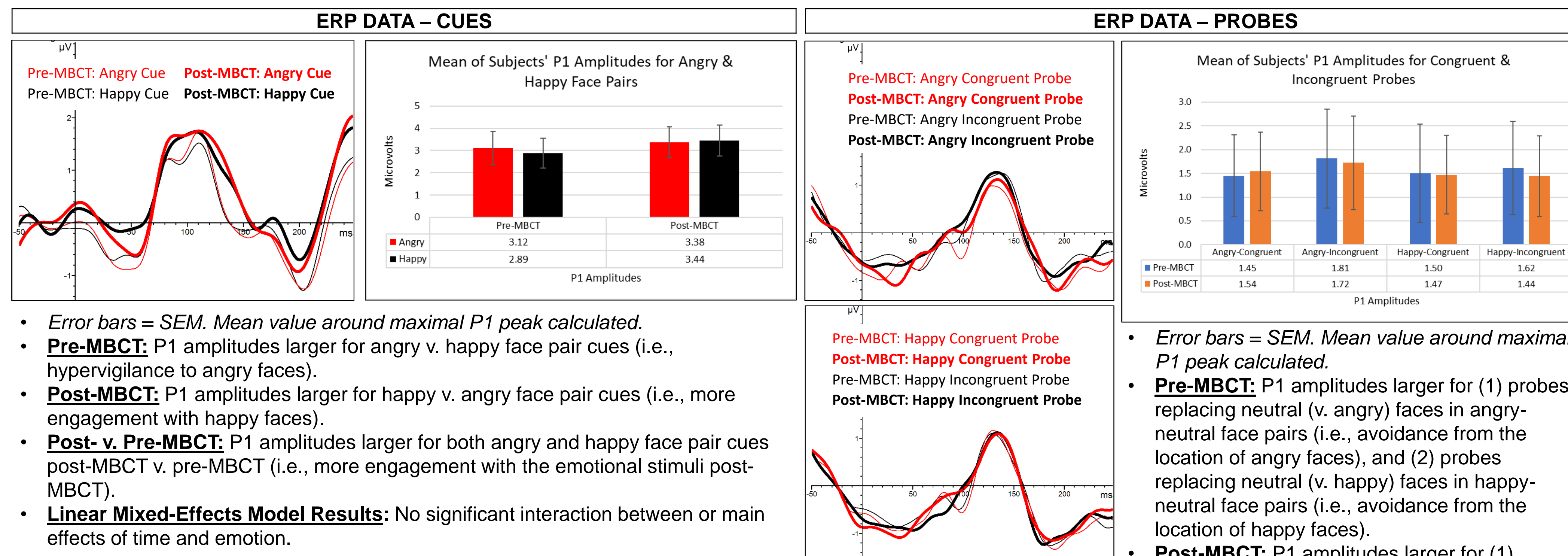
- **Threat-related attentional bias**, defined as the preferential tendency to allocate attention toward or away from threatening stimuli¹, may prolong anxiety states by placing inordinate priority on potential threats in the environment, thus intensifying anxious mood states^{2,3}.
- Using a dot-probe task, **Mueller et al., 2009⁴** demonstrated that individuals with social anxiety disorder display (1) potentiated P1 amplitudes to angry-neutral versus happy-neutral face pairs, suggesting hypervigilance to threat at early stages of processing, and (2) decreased P1 amplitudes to probes replacing emotional (angry and happy) versus neutral faces, suggesting reduced visual processing of emotionally salient locations at later stages of processing—potentially a manifestation of attentional avoidance.
- **Mindfulness-Based Cognitive Therapy (MBCT)** teaches individuals to cultivate an accepting, non-evaluative approach to distressing thoughts and feelings; thus, it is a promising intervention to decrease avoidance and prevent the escalation of negative thinking patterns at times of potential relapse or recurrence⁵. A meta-analysis has also shown that MBCT can reduce anxiety symptoms⁶.
- **The present research aims to determine whether an 8-week MBCT intervention modifies P1 threat-related attentional bias markers in anxious participants.**

METHODOLOGY



- Anxious individuals with scores ≥ 40 on the **State-Trait Anxiety Inventory, Trait Scale** were recruited from the Nashville, TN community.
- Pre- and post-MBCT intervention, P1 marker amplitudes to cues and probes in the dot-probe task (shown above) were monitored.
- **A 64-channel actiCAP and average reference were used. ERP results are presented from electrode site PO8⁴.**

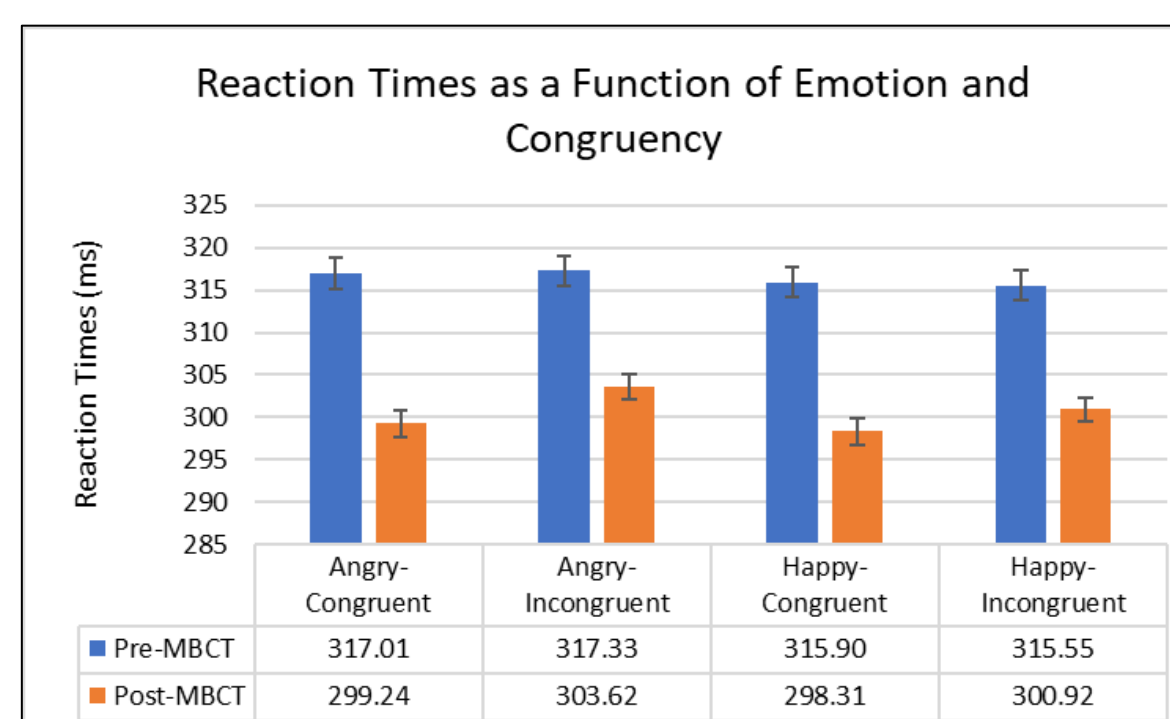
PRE & POST-MBCT ERP RESULTS & CONCLUSIONS (N=13)



- *Error bars = SEM. Mean value around maximal P1 peak calculated.*
- **Pre-MBCT:** P1 amplitudes larger for angry v. happy face pair cues (i.e., hypervigilance to angry faces).
- **Post-MBCT:** P1 amplitudes larger for happy v. angry face pair cues (i.e., more engagement with happy faces).
- **Post- v. Pre-MBCT:** P1 amplitudes larger for both angry and happy face pair cues post-MBCT v. pre-MBCT (i.e., more engagement with the emotional stimuli post-MBCT).
- **Linear Mixed-Effects Model Results:** No significant interaction between or main effects of time and emotion.

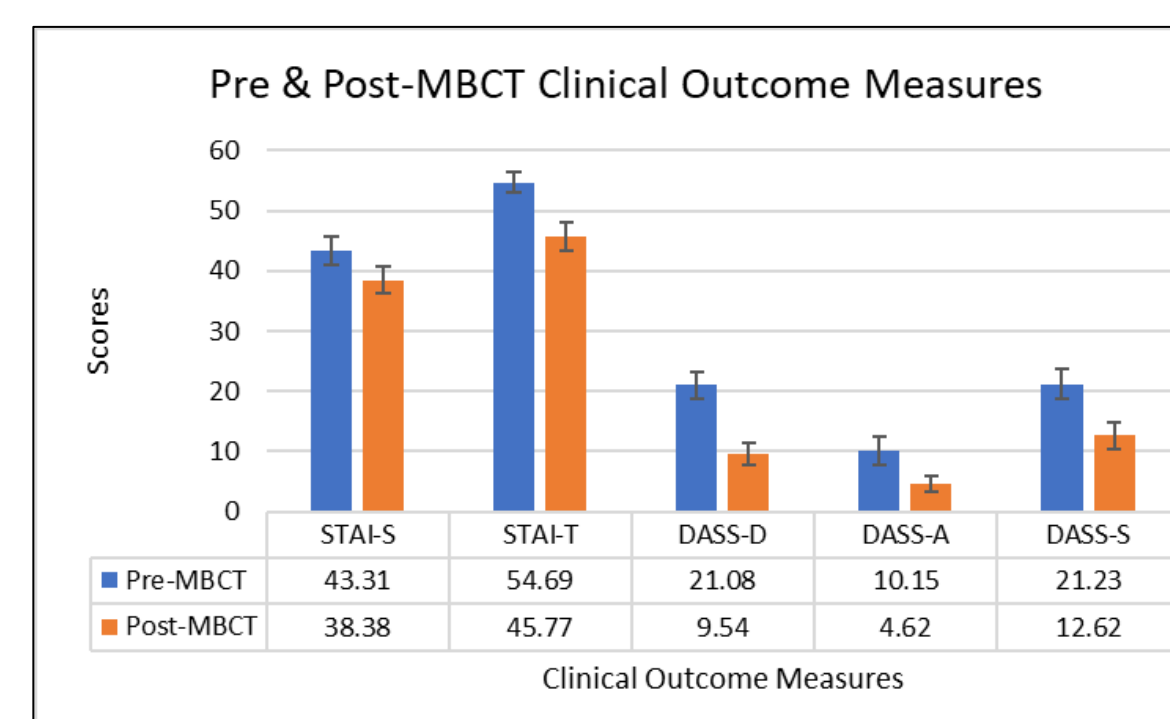
- *Error bars = SEM. Mean value around maximal P1 peak calculated.*
- **Pre-MBCT:** P1 amplitudes larger for (1) probes replacing neutral (v. angry) faces in angry-neutral face pairs (i.e., avoidance from the location of angry faces), and (2) probes replacing neutral (v. happy) faces in happy-neutral face pairs (i.e., avoidance from the location of happy faces).
- **Post-MBCT:** P1 amplitudes larger for (1) probes replacing neutral (v. angry) faces in angry-neutral face pairs (i.e., avoidance from the location of angry faces), and (2) probes replacing happy (v. neutral) faces in happy-neutral face pairs (i.e., engagement with the location of happy faces).
- **Post- v. Pre-MBCT:** P1 amplitudes (1) larger (i.e., more engagement) for angry congruent probes post-MBCT v. pre-MBCT, and (2) smaller (i.e., less engagement) for happy congruent probes post-MBCT v. pre-MBCT.
- **Linear Mixed-Effects Model Results:** No significant interactions between or main effects of time, emotion, and congruency.

PRE & POST BEHAVIORAL RESULTS & CONCLUSIONS (N=13)



- *Error bars = SEM.*
- **Post- v. Pre-MBCT:** RTs significantly shorter post-MBCT v. pre-MBCT (i.e., faster responses in all conditions post-MBCT).
- **Pre-MBCT:** RTs approximately equal for (1) probes replacing angry and neutral faces in angry-neutral face pairs, and for (2) probes replacing happy and neutral faces in happy-neutral face pairs.
- **Post-MBCT:** RTs shorter for probes replacing emotional (angry and happy) v. neutral faces in angry-neutral and happy-neutral face pairs (i.e., hypervigilance toward the emotional faces).
- **Linear Mixed-Effects Model Results:** Significant main effect of time ($p=3.6938e-08$).

PRE & POST CLINICAL OUTCOME MEASURE RESULTS & CONCLUSIONS (N=13)



- *Error bars = SEM.*
- **STAI-S = State-Trait Anxiety Inventory, State Scale; STAI-T = State-Trait Anxiety Inventory, Trait Scale; DASS-D = Depression Anxiety Stress Scale-Depression; DASS-A = Depression Anxiety Stress Scale-Anxiety; DASS-S = Depression Anxiety Stress Scale-Stress.**
- **Post- v. Pre-MBCT:** Clinical outcome measure scores lower post-MBCT v. pre-MBCT.
- **Paired T-Test Results:** Significant changes in STAI-T ($p=0.0015$), DASS-D ($p=0.0025$), DASS-A ($p=0.0133$), and DASS-S ($p=0.0044$) scores.

ACKNOWLEDGMENTS

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REFERENCES

1. Mogg, K. & Bradley, B. P. Anxiety and threat-related attention: Cognitive-motivational framework and treatment. *Trends Cogn. Sci.* 22, 225–240 (2018).
2. Mogg, K., Bradley, B. P., De Bono, J. & Painter, M. Time course of attentional bias for threat information in non-clinical anxiety. *Behav. Res. Ther.* 35, 297–303 (1997).
3. Mathews, A. Why worry? The cognitive function of anxiety. *Behav. Res. Ther.* 28, 455–468 (1990).
4. Mueller, E. M. et al. Electrophysiological evidence of attentional biases in social anxiety disorder. *Psychol. Med.* 39, 1141–1152 (2009).
5. Kuyken, W. et al. How does mindfulness-based cognitive therapy work? *Behav. Res. Ther.* 48, 1105–1112 (2010).
6. Chiesa, A. & Serretti, A. Mindfulness based cognitive therapy for psychiatric disorders: A systematic review and meta-analysis. *Psychiatry Res.* 187, 441–453 (2011).