

IMPACT OF MEDITATION ON SUBCONSCIOUS EMOTIONAL PATTERNS: A PSYCHOPHYSIOLOGICAL STUDY

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Abstract

Meditation is a practice of contemplation which is available and is currently under investigation in the impacts of conscious and subconscious processing of emotions. This experiment has explored the hypothesis of whether an eight-week mindfulness meditation program alters subconscious patterns of emotion as reflected by psychophysiological and implicit-association indices. Sixty healthy adults (22-45 years) of Raipur, India were recruited using purposive sampling and randomly assigned to an experimental group (n= 30), who received daily 30-minute mindfulness sessions, and a waitlist control group (n= 30). Psychological measurements were made on DASS-21 and Five Facet Mindfulness Questionnaire; physiological measures were salivary cortisol, heart-rate variability (RMSSD) and EEG alpha theta power; subconscious emotional bias measured on an emotional Implicit Association Test (IAT D-score). The hypothesis was that meditation would decrease implicit negative affect and physiological reactivity of stress. Paired-sample t-tests and ANCOVA showed a significant decrease in salivary cortisol, IAT D-scores and DASS-21 anxiety, and high RMSSD and frontal alpha power after interventions. These results indicate that a programmatic approach to meditation can reorganize automatic, non-conscious emotional schemas via a combination of autonomic, endocrine and cortical mechanisms, justifying the inclusion of meditation in evidence-based mental-health programs. The consequences are carried to preventive psychiatry and school-based programs of well-being.

Keywords: Meditation¹, Subconscious Emotion², Psychophysiology³, Heart Rate Variability⁴, Implicit Association Test⁵

1. Introduction

Emotions have strong impacts on human behaviour, but much of the emotional processing is carried out unconsciously. In modern affective neuroscience, one can make the distinction between explicit and reportable feelings and implicit and automatic emotional responses represented in limbic and associative networks. Habitual appraisals, biases and physiological arousal are a result of these subconscious patterns which are formed through early learning, exposure to repeated stress and cultural conditioning even in the case where the individual has consciously hold opposing beliefs (Greenwald and Banaji, 1995). Since these trends are not easily captured through a verbal report, interventions which address the lower levels of the emotional life are of special

scientific and clinical interest. One such intervention that is under increased investigation is meditation, a family of mental training methods that have their origins in Indian meditation practices and are now practiced worldwide (Tang et al., 2015). The contemporary psychophysiological equipment has been able to view the impact of meditation on the autonomic nervous system as well as the cerebral cortex. Electroencephalography (EEG), heart-rate variability (HRV), salivary cortisol measurements and event-related potentials (ERPs) reveal that meditation leads to discernible changes in cortical oscillations, parasympathetic tone and neuroendocrine activity (Kral et al., 2018; Pascoe et al., 2017). Recent invasive measures of the amygdala and hippocampus during loving-kindness meditation have shown rapid changes at the state level of beta and gamma activities indicating that meditation accesses deep emotional circuits even in newcomers (Maher et al., 2025). These results reinforce the hypothesis that meditation has the ability to remodel the neural substrates of automatic emotional reactivity.

Though there is mounting evidence, the majority of empirical research has been on explicit self-reports of mood and stress and little has been done on the impact of meditation on implicit emotional patterns. The Implicit Association Test (IAT) provides a valid measure of automatic emotional associations by tabulating differences in reaction-times between congruent and incongruent combinations of self-related and affective stimuli (Greenwald et al., 2003). The IAT can be used in conjunction with physiological markers, allowing the simultaneous measurement of cognitive, autonomic and endocrine changes to generate an integrated psychophysiological profile. The Indian populations are still underrepresented in this literature, despite the fact that meditation interventions like Vipassana, Sudarshan Kriya and mindfulness have strong cultural grounding in the area and present encouraging mental-health results (Telles et al., 2019). The current research fills this gap by investigating the question of whether an eight weeks mindfulness meditation programme can alter subconscious emotional patterns in healthy Indian adults. The proposed investigation will offer a multi-level account of how meditation transforms the covert structure of emotion by incorporating implicit cognitive measurements, autonomic indices and cortical activity with implications of promotion of mental-health, education and clinical practice in modern India.

2. Literature Review

The psychophysiological effects of meditation have become the subject of scholarly interest that has grown at a swift pace over the last twenty years. The operationalization of mindfulness presented by Kabat-Zinn (2003) as moment-by-moment, non-judgmental awareness made it possible to develop standardized interventions like Mindfulness-Based Stress Reduction (MBSR), which have been widely tested in both clinical and non-clinical populations. The analysis of 47 trials including 3,515 individuals indicated moderate evidence of decreased anxiety, depression and pain by mindfulness programmes with effect sizes of 0.38, 0.30 and 0.33 at eight weeks (Goyal et al., 2014). These findings are indicative of the fact that even relatively short meditation programmes can have a quantifiable psychological impact on a wide range of people. Neuroimaging has been used to complement behavioural results and has shown morphological and functional changes in the brain. Hohlzel et al. (2011) revealed eight weeks of MBSR enhanced the grey-matter concentration in left hippocampus, and regions of the anterior cingulate cortex and temporoparietal junction that are central to learning, self-referential processing and emotion regulation. Davidson et al. (2003) previously found left frontal EEG asymmetry an indicator of positive affect following mindfulness training, as well as increased antibody response. In an intracranial study with chronic electrodes in the amygdala and hippocampus, a single session of loving-kindness meditation showed both significant effects on gamma power and reductions in the duration of beta oscillations, demonstrating a direct neural regulation of emotion-related regions even in non-experienced meditators (Maher et al., 2025).

Autonomic and endocrine alterations related to meditation have been brought into limelight by psychophysiological work. Tang et al. (2007) proved that cortisol reactivity was lessened and attention and mood improved by five days of integrative body-mind training. Amihai and Kozhevnikov (2014) found meditation-specific changes in sympathetic and parasympathetic balance, and Ooishi et al. (2021) demonstrated that focused-attention meditation caused a rise in parasympathetic activity (RMSSD) but that open-monitoring meditation caused a decrease in salivary cortisol. The moderate impact of meditation on cortisol reduction in healthy adults has been verified by meta-analysis (Sanada et al., 2016). Kirk and Axelsen (2020) also reported improvement in HRV of 85% of Shamatha meditators as well as an 18.7 per cent increase in sustained attention. There is less but increasing research on subconscious or implicit emotional processing. Koole et al. (2009) noted that implicit and explicit self esteem were more aligned among Zen practitioners. Strick et al. (2012) also found that meditators were able to access information in the unconscious better on the Remote Associates Test. Event related potentials indicate that the late positive potential (LPP) to negative stimuli decreases after mindfulness, indicating reduced automatic reactivity (Lin et al., 2020). The neural activity of IAT performance shows that semantic and emotional congruence plays a role in the implicit bias by the N400 and LPP modulations (Williams and Themanson, 2011). There is Indian research work that has added its own contribution on this field. Telles et al. (2019) have discovered that cyclic meditation improves the P300 amplitude of oddball tasks and Malipeddi et al. (2024) reported that advanced Isha Yoga practitioners have increased theta and alpha-theta power in breath meditation. Although these have been developed, there is a scarcity of research that combines subconscious IAT-based assessment and multi-system physiology in Indian populations, highlighting the scientific importance of the current study.

3. Objectives

1. To examine the effect of an eight-week mindfulness meditation intervention on subconscious emotional patterns measured through the Implicit Association Test, in comparison with a waitlist control group.
2. To evaluate associated psychophysiological changes (salivary cortisol, heart-rate variability and EEG alpha–theta power) and their relationship with implicit emotional reactivity.

4. Methodology

The quasi-experimental pre-test/post-test design was adopted, which included a non-equivalent control group, which is suitable to earlier studies on meditation intervention (Kim et al., 2013). Institutional and community notices were used to recruit 60 healthy adults aged 22-45 years (mean age 32.4 years; 32 women, 28 men) in Raipur, Chhattisgarh. Inclusion criteria excluded psychiatric diagnosis, no current psychotropic medication and never practiced regular meditation of over six months. The exclusion criteria were cardiovascular disease, endocrine disorders and pregnancy. The participants were randomly assigned to the experimental group (n = 30) and waitlist control group (n = 30). The institutional review board gave ethical clearance and the informed consent was obtained in written form. The experimental group meditated 30 minutes daily guided by mindfulness meditation over a period of eight weeks, based on a structured program of MBSR modified to suit Indian patients. Sessions incorporated focused-attention breathing, body-scan awareness and open-monitoring elements. Group classes (90 minutes per week) were complemented by practice at home that was monitored using a practice diary. Control group did not change their routine and was also provided with the intervention at the end of the study. The Depression, Anxiety and Stress Scale-21 (DASS-21) and Five Facet Mindfulness Questionnaire (FFMQ) were used as psychological measures. The main subconscious scale was an emotional Implicit Association Test that contrasted self/other with positive/negative affective words; the index of the implicit negative affective bias was the D-score. To control the diurnal variation, physiological measurements

were carried out between 9:00 and 11:00 a.m. Salivettes were used to collect salivary cortisol which was analysed using enzyme-immunoassay kits. A 5 minutes recording of HRV at rest was taken on a Polar H10 chest strap plugged into Kubios HRV software with RMSSD as the main parasympathetic index. EEG was captured with a 16-channel Emotiv EPOC+ device; the value of frontal alpha (812 Hz) and theta (48 Hz) power were calculated. With SPSS v.26, descriptive statistics, paired-sample t-tests, independent-sample t-tests and ANCOVA (adjusting to baseline values) were utilized with $p = .05$ being considered significant.

5. Results

Table 1. Demographic Characteristics of Participants

Variable	Experimental (n=30)	Control (n=30)	t/ χ^2	p-value
Mean age (years)	32.6 ± 6.2	32.2 ± 6.8	0.24	.812
Female : Male	16 : 14	16 : 14	0.00	1.000
Education (graduate+, %)	86.7	83.3	0.13	.718
Employed (%)	76.7	73.3	0.09	.762

Source: Primary study data, compiled following demographic frameworks used in Kim et al. (2013).

Table 1 shows baseline demographic features of the two groups. There were no statistically significant differences in terms of age ($t = 0.24$, $p = .812$), gender distribution ($X^2 = 0.00$, $p = 1.000$), education or employment status. This establishes a successful random allocation and provides between-group comparability, thus minimizing the risks of confounding by demographic variables on future outcomes.

Table 2. Pre-Post Changes in DASS-21 Scores (Experimental Group)

Subscale	Pre-Mean (SD)	Post-Mean (SD)	Mean Diff.	t (df=29)	p-value
Depression	11.47 (3.82)	6.83 (2.91)	4.64	6.82	<.001
Anxiety	12.10 (4.14)	6.57 (2.74)	5.53	7.41	<.001
Stress	15.63 (4.58)	9.47 (3.18)	6.16	8.05	<.001

Source: Primary study data; normative ranges based on Lovibond and Lovibond (1995).

Table 2 shows that the experimental group experienced significant post-intervention decreases in all the DASS-21 subscales. Depression decreased by 4.64 points ($t = 6.82$, $p < .001$), anxiety by 5.53 points ($t = 7.41$, $p < .001$) and stress by 6.16 points ($t = 8.05$, $p < .001$). These reductions are statistically significant with moderate to large effect sizes (Cohen's $d \approx 0.91.5$) that support the clinical significance of these changes and are consistent with those by Goyal et al. (2014).

Table 3. Salivary Cortisol Levels Pre- and Post-Intervention (nmol/L)

Group	Pre-Mean (SD)	Post-Mean (SD)	F (1,57)	p-value
Experimental	15.82 (3.24)	10.47 (2.68)	28.41	<.001
Control	15.64 (3.41)	15.21 (3.12)	—	—

Source: Primary study data; assay methodology adapted from Sanada et al. (2016).

Table 3 demonstrates that the levels of salivary cortisol decreased significantly in the experimental group (15.82 to 10.47 nmol/L) whereas the control group was almost stable. ANOVA, with a control of baseline values, resulted in $F(1,57) = 28.41$, $p < .001$, which proves the presence of a significant group effect. This is similar to Tang et al. (2007) and justifies the suppression of HPA-axis activity, by meditation practice.

Table 4. Heart-Rate Variability Indices (RMSSD in ms)

Group	Pre-Mean (SD)	Post-Mean (SD)	Mean Diff.	t-value	p-value
Experimental	34.26 (7.41)	48.82 (8.63)	+14.56	7.82	<.001
Control	34.91 (7.85)	35.47 (7.92)	+0.56	0.31	.761

Source: Primary study data; HRV protocol based on Ooishi et al. (2021).

Table 4 shows that the experimental group has significantly increased RMSSD compared to the control group (+14.56 ms; $t = 7.82$, $p < .001$) and the control group has not changed significantly. This implies significant improvement in parasympathetic heart regulation, aligning with Kirk and Axelsen (2020), and the ability of meditation to restore the balance in the work of autonomic nervous system.

Table 5. EEG Frontal Alpha and Theta Power (μV^2) – Experimental Group

Band	Pre-Mean (SD)	Post-Mean (SD)	Mean Diff.	t-value	p-value
Alpha (8–12 Hz)	5.64 (1.28)	8.92 (1.74)	+3.28	9.14	<.001
Theta (4–8 Hz)	4.12 (1.03)	6.38 (1.41)	+2.26	7.95	<.001

Source: Primary study data; EEG analysis following Malipeddi et al. (2024).

Table 5 shows that there were substantial changes in frontal alpha (+3.28 μV^2 , $p < .001$) and theta (+2.26 μV^2 , $p < .001$) power positively after the meditation intervention. They are oscillatory variations which are indicative of relaxed alertness and internalized attention, consistent with Malipeddi et al. (2024) and Aftanas and Golocheikine (2001). These cortical changes are regarded as electrophysiological demonstrations of more profound meditative absorption.

Table 6. Implicit Association Test (IAT) D-scores – Subconscious Negative Affect

Group	Pre-Mean (SD)	Post-Mean (SD)	Mean Diff.	F (1,57)	p-value
Experimental	0.58 (0.14)	0.31 (0.11)	-0.27	35.62	<.001
Control	0.56 (0.15)	0.54 (0.14)	-0.02	—	—

Source: Primary study data; IAT scoring algorithm based on Greenwald et al. (2003).

Table 6 indicates a strong decrease in IAT D-scores in the experimental condition (0.58 -0.31) and means that the subconscious self-negative association was significantly attenuated ($F(1,57) = 35.62$, $p < .001$), but not in the control condition. This also lends credence to the hypothesis that meditation changes the automatic emotional patterns, which in turn confirms the findings of Koole et al. (2009) and Strick et al. (2012).

6. Discussion

The current study presents cumulative evidence that eight weeks of mindfulness meditation has a significant impact on altering subconscious emotional patterns of healthy Indian adults, which is the first goal of the study. The significant decrease in the IAT D-scores (0.58 to 0.31) shows a dilution in the automatic association of self-negativity, which is only hardly described by self-report measures alone. The finding is in agreement with Koole et al. (2009) who found that meditation increased congruence levels between implicit and explicit self-assessment, and Strick et al. (2012), who found better access to unconscious information following meditative practice. The IAT provides a peephole into emotional mechanisms that act beyond conscious control (Greenwald and Banaji, 1995) and the present decrease indicates that meditation reconfigures the affective-associative networks that govern implicit cognition and does not simply have an effect on explicit attitudes. The results of the psychophysiological measures directly answer the second objective. The notable decrease in salivary cortisol (15.82-10.47 nmol/L) is consistent with the meta-analytic findings of moderate meditation-induced cortisol reduction (Sanada et al., 2016) as well as with experimental results that cortisol reactivity is lowered by even a short meditative training (Tang et al., 2007). Increased RMSSD (by 14.56 ms) means an improved tone of the vagus and a predominance of the parasympathetic, a physiological condition that is associated with the ability to flexibly regulate emotions. Ooishi et al. (2021) also found greater parasympathetic indices following focused-attention meditation, whereas Kirk and Axelsen (2020) found evidence of HRV improvement in 85% of Shamatha meditators. Collectively, these similar findings reinforce the finding that mindfulness does indeed lead to real autonomic restructuring, and not temporary effects of state.

The EEG results also support the multi-level reorganization of the emotional architecture. The presence of more frontal alpha and theta power are sure indicators of relaxed alertness, internalized attention and positive affect (Aftanas and Golocheikine, 2001). Malipeddi et al. (2024) also showed a similar increase in alpha-theta in Isha Yoga practitioners, with a quick effect appearing within 7-10 minutes of practice. In the current sample, eight-week chronic training resulted in significant trait-level changes, indicating a progressive cortical consolidation. Since alpha and theta oscillations have been identified to be involved in top-down control of limbic reactivity, these spectral increments are likely to mediate the reduction in implicit negative bias that was found on the IAT. Neural support of this interpretation is given by recent intracranial data of Maher et al. (2025) that meditation induced gamma modulation in the amygdala and hippocampus. These findings are reinforced by psychological results. The significant changes in depression, anxiety and stress scores of DASS-21 are replicative of the moderate changes reported by Goyal et al. (2014), and generalized to an Indian non-clinical population. This psychological-physiological pattern is in line with the report of MBSR-induced grey-matter enhancement of the hippocampal and prefrontal regions (Hölzel et al., 2011) which are structures that facilitate learning-based regulation of emotional responses. The current findings therefore concur with a neurocognitive theory where mindfulness training enhances top-down control systems, which provides the potential to restructure implicit affective schemas.

This research has the culturally significant value of the Indian context. Meditation is incorporated into local traditions, which can help to engage and adhere to home practice (Telles et al., 2019). The results, however, have broader implications educational establishments, workplaces and preventative mental-health care might use formal mindfulness courses to reduce subconsciousness in stress reactivity before it can turn into a clinical pathology (Kral et al., 2018). Limitations consist of small sample, lack of active comparison and long-term follow-up. In future studies, bigger multicentre samples, active control condition and longitudinal evaluation of the sustainability of subconscious reorganisation of emotions should be considered. However, the hypothesis that meditation results in combined psychological, autonomic, endocrine and cortical modifications that cumulatively recreate the subterranean fabric of emotion is proven by the current study.

7. Conclusion

The authors conclude that eight-week mindfulness meditation program brings about significant and multi-dimensional change in the subconscious emotional patterns of healthy Indian adults. D-score decreases in IAT, and a decrease in salivary cortisol, increased in RMSSD and higher frontal alpha-theta power indicate that meditation remodels implicit affective processing via coordinated psychological, autonomic, endocrine and cortical processes. These results justify the inclusion of structured meditation programmes in preventive mental-health programmes, school curricula and workplace health and wellness programs, especially in Indian socio cultural contexts where meditation practices are culturally well received.

8. References

- 1 Aftanas, L. I., & Golocheikine, S. A. (2001). Human anterior and frontal midline theta and lower alpha reflect emotionally positive state and internalized attention: High-resolution EEG investigation of meditation. *Neuroscience Letters*, *310*(1), 57–60. [https://doi.org/10.1016/S0304-3940\(01\)02094-8](https://doi.org/10.1016/S0304-3940(01)02094-8)
- 2 Amihai, I., & Kozhevnikov, M. (2014). Arousal vs. relaxation: A comparison of the neurophysiological and cognitive correlates of Vajrayana and Theravada meditative practices. *PLoS ONE*, *9*(7), e102990. <https://doi.org/10.1371/journal.pone.0102990>
- 3 Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., Urbanowski, F., Harrington, A., Bonus, K., & Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, *65*(4), 564–570. <https://doi.org/10.1097/01.PSY.0000077505.67574.E3>
- 4 Goyal, M., Singh, S., Sibinga, E. M. S., Gould, N. F., Rowland-Seymour, A., Sharma, R., Berger, Z., Sleicher, D., Maron, D. D., Shihab, H. M., Ranasinghe, P. D., Linn, S., Saha, S., Bass, E. B., & Haythornthwaite, J. A. (2014). Meditation programs for psychological stress and well-being: A systematic review and meta-analysis. *JAMA Internal Medicine*, *174*(3), 357–368. <https://doi.org/10.1001/jamainternmed.2013.13018>
- 5 Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, *102*(1), 4–27. <https://doi.org/10.1037/0033-295X.102.1.4>
- 6 Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, *85*(2), 197–216. <https://doi.org/10.1037/0022-3514.85.2.197>
- 7 Hölzel, B. K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S. M., Gard, T., & Lazar, S. W. (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging*, *191*(1), 36–43. <https://doi.org/10.1016/j.psychresns.2010.08.006>
- 8 Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, *10*(2), 144–156. <https://doi.org/10.1093/clipsy.bpg016>
- 9 Kim, S. H., Schneider, S. M., Bevans, M., Kravitz, L., Mermier, C., Qualls, C., & Burge, M. R. (2013). PTSD symptom reduction with mindfulness-based stretching and deep breathing exercise. *Journal of Clinical Endocrinology & Metabolism*, *98*(7), 2984–2992. <https://doi.org/10.1210/jc.2012-3742>
- 10 Kirk, U., & Axelsen, J. L. (2020). Heart rate variability is enhanced during mindfulness practice: A randomized controlled trial involving a 10-day online-based mindfulness intervention. *PLoS ONE*, *15*(12), e0243488. <https://doi.org/10.1371/journal.pone.0243488>
- 11 Koole, S. L., Govorun, O., Cheng, C. M., & Gasper, K. (2009). Pulling yourself together: Meditation promotes congruence between implicit and explicit self-esteem. *Journal of Experimental Social Psychology*, *45*(6), 1220–1226. <https://doi.org/10.1016/j.jesp.2009.05.018>

- 12 Kral, T. R. A., Schuyler, B. S., Mumford, J. A., Rosenkranz, M. A., Lutz, A., & Davidson, R. J. (2018). Impact of short- and long-term mindfulness meditation training on amygdala reactivity to emotional stimuli. *NeuroImage*, *181*, 301–313. <https://doi.org/10.1016/j.neuroimage.2018.07.013>
- 13 Lin, Y., Eckerle, W. D., Peng, L. W., & Moser, J. S. (2020). On variation in mindfulness training: A multimodal study of brief open monitoring meditation on error monitoring. *Brain Sciences*, *9*(9), 226. <https://doi.org/10.3390/brainsci9090226>
- 14 Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335–343. [https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)
- 15 Maher, C., Tortolero, L., Jun, S., Cummins, D. D., Saad, A., Young, J., Martinez, L. N., Schulman, Z., Marcuse, L., Waters, A., Mayberg, H. S., Davidson, R. J., Panov, F., & Saez, I. (2025). Intracranial substrates of meditation-induced neuromodulation in the amygdala and hippocampus. *Proceedings of the National Academy of Sciences*, *122*(6), e2409423122. <https://doi.org/10.1073/pnas.2409423122>
- 16 Malipeddi, S., Sasidharan, A., P. N., R., Mehrotra, S., John, J. P., & Kutty, B. M. (2024). Relaxed alertness in novice and advanced meditators: A neurophysiological and psychological study of Isha Yoga practices. *Frontiers in Psychology*, *15*, 1283311. <https://doi.org/10.3389/fpsyg.2024.1283311>
- 17 Ooishi, Y., Fujino, M., Inoue, V., Nomura, M., & Kitagawa, N. (2021). Differential effects of focused attention and open monitoring meditation on autonomic cardiac modulation and cortisol secretion. *Frontiers in Physiology*, *12*, 675899. <https://doi.org/10.3389/fphys.2021.675899>
- 18 Pascoe, M. C., Thompson, D. R., & Ski, C. F. (2017). Yoga, mindfulness-based stress reduction and stress-related physiological measures: A meta-analysis. *Psychoneuroendocrinology*, *86*, 152–168. <https://doi.org/10.1016/j.psyneuen.2017.08.008>
- 19 Sanada, K., Montero-Marín, J., Alda Díez, M., Salas-Valero, M., Pérez-Yus, M. C., Morillo, H., Demarzo, M. M. P., García-Toro, M., & García-Campayo, J. (2016). Effects of mindfulness-based interventions on salivary cortisol in healthy adults: A meta-analytical review. *Frontiers in Physiology*, *7*, 471. <https://doi.org/10.3389/fphys.2016.00471>
- 20 Strick, M., van Noorden, T. H. J., Ritskes, R. R., de Ruiter, J. R., & Dijksterhuis, A. (2012). Zen meditation and access to information in the unconscious. *Consciousness and Cognition*, *21*(3), 1476–1481. <https://doi.org/10.1016/j.concog.2012.02.010>
- 21 Tang, Y. Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., Yu, Q., Sui, D., Rothbart, M. K., Fan, M., & Posner, M. I. (2007). Short-term meditation training improves attention and self-regulation. *Proceedings of the National Academy of Sciences*, *104*(43), 17152–17156. <https://doi.org/10.1073/pnas.0707678104>