

Effect of Meditation on Emotional Intelligence and Perceived Stress in the Workplace: A Randomized Controlled Study

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ABSTRACT

Context: Research highlights the role of emotional intelligence and perceived stress as important factors associated with mental and physical health and organizational effectiveness.

Objective: To determine whether a mind-body technique, the Transcendental Meditation^a (TM) program, delivered in the context of a workplace wellness program, could significantly decrease perceived stress and improve emotional intelligence in government employees.

Design: Ninety-six central-office staff at the San Francisco Unified School District were randomly assigned to either an immediate start of the TM program or to a wait-list control group.

Main Outcome Measures: The Bar-On Emotional Quotient Inventory and the Perceived Stress Scale were administered at baseline and at 4-month posttest.

Results: Findings indicate a significant increase in emotional intelligence total score ($p < 0.003$) and a significant decrease in perceived stress ($p < 0.02$) in TM participants compared with controls. A significant increase in general mood, stress management, adaptability, intrapersonal awareness, and reality testing composite scales for emotional intelligence were observed ($p < 0.05$); a significant increase was not observed in the interpersonal scale. Compliance with meditation practice was high (93%). Because of the sex composition in this study, results are most generalizable to female employees.

Conclusion: The TM program was effective as a workplace wellness program to improve emotional intelligence and reduce perceived stress in employees.

INTRODUCTION

According to the World Health Organization, psychological stress is one of the most common occupational health problems affecting workers worldwide.¹ Psychological stress, including perceived stress, adversely affects organizational commitment, work engagement, and productivity, as well as contributes to poor mental and physical health.²⁻⁴

Emotional intelligence has gained considerable attention in the workplace because of its positive association with mental and physical health and with social-emotional competencies.^{5,6} Emotional intelligence refers to the ability to perceive emotions in oneself and others, and to understand, regulate, and use such information in productive ways toward

successful environmental adaptation and problem solving.⁷⁻⁹

Study findings indicate that emotional intelligence has a moderating effect on psychological well-being and mental health.^{10,11} It is further linked to organizational effectiveness, social-emotional competencies such as the ability to manage stress, organizational awareness, and self-confidence associated with work productivity and effective leadership.¹²⁻¹⁹

Recent developments in neurocognition reveal that decisions and actions cannot be undertaken without engaging both the emotional and thought-processing areas of the brain.²⁰ Research on decision making and brain functioning supports the notion that emotional-social intelligence is distinctly different from

cognitive intelligence.^{7,20} Emotional intelligence can be developed over time through training programs, coaching, and psychosocial therapy.^{13,18-21} Emotional intelligence is also associated with better recovery from work-related stressors and better mental health in clinical populations.^{22,23}

The impact of self-development and mind-body programs such as the practice of meditation has been studied in the fields of health and management. One such program that has received wide attention is the Transcendental Meditation^a (TM) program, a neuropsychological technique for mind-body integration. This traditional form of meditation is generally described in the research literature as an automatic self-transcending technique for brain integration.^{24,25}

Research on TM has shown that practitioners of TM achieve a high level of brain integration both during and after practice.^{26,27} Practice of the TM technique shows increased electroencephalographic alpha coherence and synchrony, especially in the frontal area of the brain, responsible for cognition related to emotional self-awareness and stability.^{24,27-29} In randomized controlled research, increased structural and functional connectivity between brain areas and decreased reactivity to stress are observed in those practicing the TM technique compared with controls.²⁶

Other randomized controlled trials of TM have found significant reductions in perceived stress in employees,³⁰ patients with chronic illness,^{31,32} and young adults.³³ Meta-analyses on the TM program have indicated increased

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self-actualization and decreased anxiety, factors associated with emotional intelligence and perceived stress.³⁴⁻³⁷

On the basis of prior research, a randomized controlled study was conducted to evaluate the effects of the TM program on emotional intelligence and perceived stress in administrators and staff. It was hypothesized that there would be a significant decrease in perceived stress and an increase in emotional intelligence resulting from TM practice compared with controls during a 4-month intervention period.

METHODS

Participants

Approval was given on August 31, 2009, by the institutional review board of Maharishi University of Management, Fairfield, IA, before the start of the study. Participants of the study were recruited from Fall 2009 through Spring 2010 from administrators and staff working in the central offices of the San Francisco Unified School District who were interested in being part of a workplace wellness program. Interested participants were asked to attend an informational meeting to learn about the wellness project. Those who wanted to join were then scheduled for baseline testing. Ninety-six supervisors and administrative staff completed written informed consent, followed by baseline testing, and were then randomly assigned to either an immediate start of the TM program ($n = 48$) or a delayed-start wait-list control group ($n = 48$; Figure 1).

Group allocation was concealed by an off-site member of the research group, using a computer-generated random number sequence (SPSS 2009, IBM Corp, Armonk, NY). The off-site member assigned the participant to treatment and notified the study coordinator, who informed the participant of his/her allocation. Participants completed psychological measures via the Internet. Final statistical analyses were conducted with blinding to group assignments. Senior investigators and the study statistician were blinded throughout the study.

Inclusion criteria included age 18 years or older, being an employee of the San Francisco Unified School District, attendance at an informational meeting on

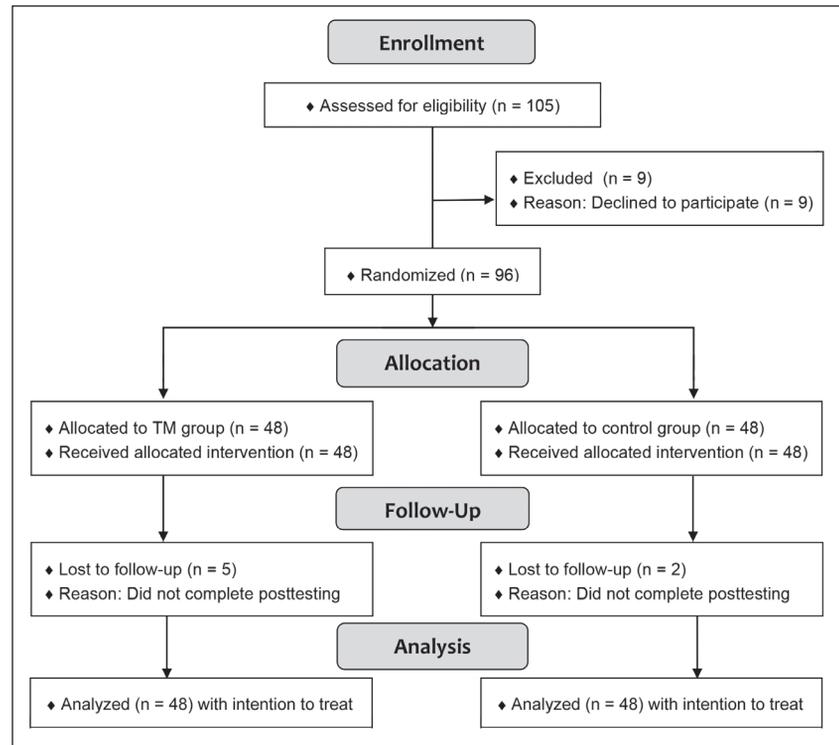


Figure 1. Consolidated Standards of Reporting Trials (CONSORT) flow diagram of study enrollment. TM = Transcendental Meditation.

the TM program, and willingness to be randomly assigned to either active treatment or the control group. Exclusion criteria included having already learned TM.

Interventions

Transcendental Meditation Program

The TM technique is a simple, natural, effortless technique that allows the mind to experience a state of “restful alertness” associated with a more integrated style of brain functioning.^{29,36} Four certified instructors taught TM to the study participants using standardized procedures for teaching.^{38,39}

After initial introductory and preparatory lectures and a brief personal interview with the teacher, participants attended an individual personal instruction session, followed by group meetings to verify the correctness of practice and to provide additional knowledge about the practice. The personal instruction and follow-up group meetings were held during 4 consecutive days (about 90 minutes each day). Participants were instructed to practice their meditation program at home, sitting

comfortably with their eyes closed, twice a day for 20 minutes each session, for the duration of the project (4 months). Follow-up group sessions were offered 2 times each month during the 4-month intervention to review experiences, verify the correctness of practice, and support participants’ regular home practice.

Control Group

Members of the control group served as wait-list controls and were eligible to learn the TM technique after completion of the four-month study. Both the control and TM group participants continued with their usual daily work routines during the study.

Outcome Measures

The Emotional Quotient Inventory (EQ-i, Multi-Health Systems Inc, Toronto, Ontario, Canada) is a widely used measure of emotional intelligence that evaluates a broad range of noncognitive, social-emotional skills, influencing one’s ability to positively cope with environmental demands and pressures.^{20,40} The EQ-i has a total Emotional Quotient (EQ) score

and 6 composite scales (intrapersonal, interpersonal, stress management, adaptability, reality testing, and general mood) with 14 subscales. Scale scores indicate the degree of effectiveness in understanding oneself, relating well to people, and adapting to and coping with one's immediate surroundings.^{7,20,40} The Cronbach α for the total EQ scale is 0.97, the composite scales range from 0.88 to 0.93, and subscales are all above 0.77.⁴⁰

The Perceived Stress Scale (PSS, 14-item version) measures the degree to which situations in one's life are appraised as stressful. The Cronbach α is reported to be 0.85. The PSS shows good discriminative validity with meditation.⁴¹

Procedures

All participants were tested at baseline, after giving written informed consent and before the start of meditation training, and were then randomly assigned to either the TM program or wait-list control groups. Participants were then posttested 4 months later, at the end of the intervention period. Each participant took the EQ-i and PSS online. The EQ-i was scored by Multi-Health Systems, the publisher of the EQ-i. The total EQ, composite, and subscale scores for each participant were then electronically transmitted to the research staff for inclusion in the study database. The PSS was scored by the study statistician.

Statistical Analysis

The sample size was determined using statistical power calculation software (G*Power 3.1.3, available at www.gpower.hhu.de/en.html). We based the sample size on previous studies,^{30,40} which reported effect sizes for TM vs control groups on outcome measures similar to our study: Experiential intelligence as measured by the Constructive Thinking Inventory ($\delta = 0.62$) and the PSS ($\delta = 0.94$). The power calculation showed that a sample size of 48 per group would provide at least 90% power to detect treatment effects similar to those reported in these previous studies, assuming a 2-sided test for between-group differences at the 0.05 significance level.

The main outcomes of the study were the total EQ and perceived stress scores.

Secondary outcomes were the EQ composite scales—intrapersonal, interpersonal, stress management, adaptability, reality testing, and general mood. Data were analyzed using repeated-measures analysis of variance according to the intention-to-treat principle; all randomized participants were included. Missing data were imputed using the software programs SAS PROC MI (SAS Institute Inc, Cary, NC), a multiple imputation using the Markov Chain Monte Carlo method, and SAS PROC MIANALYZE. Alpha was set at 0.05, 2-tailed, for the primary outcomes and at 0.01, 2-tailed, for the secondary outcome scales. Additional secondary analyses were conducted for the subscales (comprising the 6 main scales), with the α level set at 0.01, 2-tailed. Effect sizes

(Cohen δ) were computed for the PSS and total EQ and composite scales, using the difference in mean change scores divided by pooled standard deviation. Effect sizes are: Small ($\delta = 0.20$), medium ($\delta = 0.50$), and large ($\delta = 0.80$).

RESULTS

Baseline Data

Table 1 shows the baseline characteristics of the study participants. The average age was 45.5 years (standard deviation = 10 years), and 83% of the participants were women. There were no statistically significant differences between groups at baseline in age, sex composition, race/ethnicity, administrator/staff status, baseline emotional intelligence, and perceived stress.

Table 1. Baseline characteristics by group

Variable	Control (n = 48)	Transcendental Meditation (n = 48)	p value
Age, y, mean (SD)	45.5 (9.4)	45.5 (11.0)	0.992
Female sex, no. (%)	40 (83)	40 (83)	0.999
Administrator vs staff, no. (%)	40 (83)	37 (77)	0.442
Race/ethnicity, no. (%)			
White (non-Hispanic)	18 (38)	16 (33)	0.937
African American	5 (10)	5 (10)	
Asian American	12 (25)	12 (25)	
Hispanic	11 (23)	14 (29)	
Other	2 (4)	1 (2)	
Emotional intelligence total score, mean (SD)	97.2 (15.4)	96.7 (15.4)	0.879
Perceived Stress Scale, mean (SD)	22.9 (7.4)	23.3 (7.6)	0.766

SD = standard deviation.

Table 2. Pretest and posttest scores for Perceived Stress Scale (PSS) and Emotional Quotient (EQ) total and major scales by group^a

Variable	Control (n = 48)		Transcendental Meditation (n = 48)		p value	Effect size ^c
	Pretest	Posttest ^b	Pretest	Posttest ^b		
PSS	22.9 (7.4)	22.2 (8.1)	23.4 (7.6)	18.8 (7.1)	0.015	-0.51
EQ total	97.2 (15.4)	96.6 (16.0)	96.7 (15.4)	101.8 (14.2)	0.003	0.37
EQ composite scales						
Intrapersonal	96.6 (16.2)	96.7 (16.3)	96.9 (16.1)	102.2 (15.4)	0.004	0.33
Interpersonal	100.1 (15.1)	100.6 (12.4)	100.2 (16.0)	101.7 (12.6)	0.613	0.07
Stress management	98.9 (14.8)	98.9 (15.2)	98.8 (12.4)	103.7 (12.4)	0.022	0.36
Adaptability	97.1 (15.8)	96.6 (16.1)	96.4 (14.8)	100.0 (12.4)	0.033	0.27
Reality testing	100.8 (15.2)	100.3 (16.8)	99.3 (14.4)	102.8 (14.0)	0.035	0.27
General mood	94.8 (14.5)	92.8 (16.3)	94.7 (13.7)	99.9 (13.3)	0.001	0.51

^a Data are presented as mean (standard deviation).

^b Based on intention-to-treat analysis.

^c Cohen δ .

EQ total = emotional intelligence total score.

Pretest-Posttest Change

Intention-to-treat analysis indicated a significant improvement in total EQ score in those practicing TM compared with controls: $F(1,94) = 5.95, p < 0.02$. A significant decrease in perceived stress owing to the TM treatment compared with controls was also found: $F(1,94) = 9.12, p < 0.003$; Table 2.

Multivariate analysis of variance showed significant improvement in the composite scales comprising the total EQ score (Wilks $\lambda = 0.835, p = 0.009$). Univariate tests showed significant effects for intrapersonal [$F(1,94) = 8.29, p = 0.004$]; stress management [$F(1,94) = 5.29, p < 0.03$]; adaptability [$F(1,94) = 4.54, p < 0.04$]; reality testing [$F(1,94) = 4.45, p < 0.04$]; and general mood [$F(1,94) = 11.42, p = 0.001$] composite scores during the 4-month intervention period. Table 2 shows the pretest and posttest scores by group for total EQ and the composite EQ scores.

The largest effect sizes for the main scales in the study were for perceived stress ($\delta = -0.51$) and EQ general mood

composite score ($\delta = 0.51$). The effect size for the total emotional intelligence main scale was $\delta = 0.37$.

Table 3 shows the post hoc findings for each of the emotional intelligence subscales comprising the composite scores. The largest effect sizes were for happiness ($\delta = 0.49$) and stress tolerance ($\delta = 0.45$).

Further analyses of both EQ total score and perceived stress showed no significant group by sex interaction ($p = 0.21$ and $p = 0.79$, respectively, on the dependent variables perceived stress and total EQ score). Thus, there was no evidence that the treatments varied significantly by sex subgroups. In a separate analysis, the group by administrator/staff status interaction also showed no significant effects ($p = 0.97$ and $p = 0.25$, respectively, on the dependent variables perceived stress and total EQ score). Hence, there was no evidence that the treatments varied significantly by administrator/staff status.

Overall, change in perceived stress inversely correlated with change in total EQ ($r = -0.613, p < 0.01$).

Compliance

Regularity in TM practice was defined as home practice of the TM program of at least once a day, on average, by self-report at posttest. Compliance with the meditation program was high, with 93% of participants meeting the criteria for study practice regularity. A dose response was observed, with those meditating more regularly scoring lower on perceived stress ($r = -0.33, p = 0.032$) and higher on total EQ ($r = 0.28, p = 0.067$) at posttest. No adverse events were reported for either group.

The findings on perceived stress are consistent with prior randomized controlled studies showing decreased psychological distress and burnout because of TM practice.

DISCUSSION

The results of this study suggest beneficial effects of the TM program on perceived stress and emotional intelligence in workplace administrators and staff. The findings on perceived stress are consistent with prior randomized controlled studies showing decreased psychological distress and burnout because of TM practice.³⁰ The findings on increased emotional intelligence are consistent with previous research on TM showing improved constructive thinking and emotional and behavioral coping ability.^{33,39} The present study advances this prior research by demonstrating such beneficial effects in the context of the workplace. Prior studies demonstrate an inverse relationship between perceived stress and emotional intelligence, thus supporting the importance of reducing stress in the workplace.⁴²

Prior research on TM found reduced psychological and physiologic response to stress factors, including decreased sympathetic nervous system and hypothalamic-pituitary-adrenal axis overactivation, and reductions in elevated cortisol levels.^{43,44} Research also showed a more coherent and integrated style of brain functioning, evidenced by electroencephalographic imaging associated with lower stress reactivity.²⁶ These physiologic factors owing to TM practice may provide possible

Table 3. Pretest and posttest scores for Emotional Quotient (EQ) subscales by group^a

Variable	Control (n = 48)		Transcendental Meditation (n = 48)		p value	Effect size ^c
	Pretest	Posttest ^b	Pretest	Posttest ^b		
Intrapersonal subscales						
Self-regard	94.8 (15.5)	94.9 (14.9)	96.0 (15.0)	101.1 (13.6)	0.004	0.33
Emotional self-awareness	102.6 (14.7)	101.3 (15.0)	100.5 (17.2)	103.8 (14.4)	0.031	0.29
Assertiveness	96.3 (15.7)	96.9 (16.3)	95.1 (16.2)	99.4 (16.2)	0.082	0.23
Independence	97.5 (15.6)	98.7 (17.5)	101.6 (14.3)	103.1 (14.4)	0.919	0.01
Self-actualization	96.2 (16.0)	96.1 (16.1)	95.4 (15.9)	101.2 (15.2)	0.003	0.37
Interpersonal subscales						
Empathy	103.3 (13.6)	102.6 (12.3)	100.0 (14.2)	101.2 (13.8)	0.314	0.14
Social responsibility	102.3 (11.9)	101.6 (10.3)	100.6 (12.2)	100.1 (12.1)	0.929	0.02
Interpersonal relationships	101.5 (13.4)	98.5 (15.1)	100.3 (14.9)	102.4 (13.8)	0.034	0.37
Stress management subscales						
Stress tolerance	92.7 (16.6)	91.7 (19.6)	95.5 (14.6)	101.5 (14.0)	0.006	0.45
Impulse control	105.8 (15.2)	106.6 (12.2)	102.3 (13.0)	105.2 (12.7)	0.267	0.15
Reality testing subscales						
Flexibility	97.1 (16.2)	95.0 (15.4)	98.7 (13.2)	99.4 (12.1)	0.203	0.19
Problem solving	94.4 (16.2)	95.6 (14.4)	92.4 (16.2)	97.1 (13.7)	0.157	0.21
General mood subscales						
Optimism	94.1 (15.5)	92.9 (17.8)	94.0 (14.2)	98.5 (14.1)	0.006	0.38
Happiness	96.7 (15.0)	94.9 (15.7)	96.7 (13.9)	101.9 (13.0)	0.006	0.49

^a Data are presented as mean (standard deviation).

^b Based on intention-to-treat analysis.

^c Cohen δ .

mechanisms for the results found in this study on decreased perceived stress and increased emotional competencies. However, further direct research is needed.

Recent research highlights the importance of emotional intelligence as a predictor of important work-related factors such as stress management, job performance, negotiation, leadership, emotional labor, trust, and work-family conflict.⁴⁵⁻⁵⁰ Emotional intelligence further adds incremental predictive validity beyond general mental abilities and the Five-Factor Model of Personality regarding job performance.⁵¹

Strengths and Limitations

The study presented was a randomized controlled trial of 96 administrators and staff working in the same organizational setting. One major advantage of a wait-list control is that all participants can eventually receive the intervention. This, in turn, can facilitate both recruitment and retention. Use of an active control group with matched treatment sessions and daily home practice would have helped control for time and attention factors. Other possible confounders such as participant expectations, treatment preference, and possible social support influence could be addressed using an active control group. All participants were tested under the same conditions, using self-administered, Internet-based measures although sole use of self-report measures for study outcomes is a possible limiting factor. Future workplace studies should consider adding supervisor and colleague rating scales for emotional intelligence and workplace behaviors. Because of the sex composition of the San Francisco Unified School District administrators and staff in their central offices, the findings are most generalizable to female administrators.

Future research is encouraged to use a larger-designed, multisite study, with a more active control group in additional workplace settings. Future studies also may want to have an equal balance of male and female participants to more adequately evaluate the effects of meditation on sex. In addition, a measure of job performance may be useful to determine relationships between mental health factors (eg, emotional intelligence and perceived stress) and job performance.

CONCLUSION

The results of this study indicate decreased perceived stress and improved emotional intelligence in administrators and staff associated with practice of TM. Total EQ and stress management, general mood, intrapersonal, adaptability, and reality testing composite scales of the EQ-i were found to significantly improve in the TM group compared with controls. These results have implications for organizations interested in improving the mental health and social-emotional competencies of employees. ❖

* Transcendental Meditation and TM are service marks registered in the US patent and trademark office, licensed to Maharishi Foundation USA, a nonprofit 501(c)(3), and used under sublicense.

Disclosure Statement

The author(s) have no conflicts of interest to disclose. None of the study funders played any role in the design of the study, in the collection, analysis, or interpretation of data, in the writing of the report, or in the decision to submit the report for publication.

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Authors' Contributions

Laurent Valosek; Sanford Nidich, EdD; and Janice Link, MA, participated in the study design, supervision of the study, and drafting and critical review of the final manuscript. Arthur Konrad, PhD, participated in the management of data, and critical review of the manuscript. Paul Mills, PhD, participated in the critical review of the final manuscript. Maxwell Rainforth, PhD, participated in the analysis of data and critical review of the manuscript. All authors have given final approval to the manuscript.

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Spirits and Health

I find my spirits and my health affect each other reciprocally—that is to say, everything that decomposes my mind produces a correspondent disorder in my body; and my bodily complaints are remarkably mitigated by those considerations that dissipate the clouds of mental chagrin.

— Tobias Smollett, 1721-1771, Scottish poet and author