

# The Effects of the Transcendental Meditation Technique on PTSD and Its Comorbidities

TM<sup>®</sup> for Veterans

Operation Warrior Wellness  
A Division of the David Lynch Foundation

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## Executive Summary

Post-Traumatic Stress Disorder (PTSD) is a serious and disabling condition that affects approximately 6% to 7% of adults in the U.S. over their lifespan. The incidence is at least two to three times greater in veterans and active-duty personnel who have seen combat. PTSD is associated with co-morbidities such as major depression, substance abuse, suicide, and poor physical health. It is widely recognized that current pharmacological and psycho-therapeutic approaches to treating PTSD are not fully adequate, because of limitations in both effectiveness and acceptability. As a consequence, there is an acknowledged need to identify new approaches to treating PTSD that are both effective and acceptable.

The Transcendental Meditation® technique (TM®) is a simple, non-religious, and easy-to-learn meditation practice that has been extensively researched and learned by millions of Americans. The more than 420 peer-reviewed studies conducted on TM over the last 50 years have demonstrated that the TM technique is effective at treating stress-related conditions, such as hypertension, anxiety, and depression, as well as enhancing physical health, energy and cognitive function. This white paper summarizes the research that has been done on the TM technique and PTSD. For this analysis we located 14 studies on the effects of TM practice on PTSD symptoms: 11 peer-reviewed and 3 non-peer-reviewed. Nine of these are on veterans and active military. Four with veterans are randomized controlled trials (RCT) and two with civilians are RCT. Major conclusions of this research are as follows:

- Research on the TM technique shows large effect sizes that appear comparable to current first-line therapies for treating PTSD. This finding is consistent across study design, PTSD population, and researcher affiliations.
- TM works quickly. Research that measured very short-term effects of practice found clinically significant reductions in PTSD symptoms within two to four weeks of learning.
- TM is acceptable to veterans. In the past decade, more than 4,000 veterans, active-duty personnel, and cadets have learned TM. Intent-to-treat research has shown that compliance with TM practice is at least equivalent to other treatment programs. Because TM is widely practiced for resilience-building and growth in corporate and educational settings, it lacks the stigma associated with psychotherapeutic treatments.
- The published research on the TM technique and PTSD and over a dozen federally funded studies on heart health and mental health have not found treatment-related adverse events, indicating the safety of TM practice.
- Published data indicate generally larger effect sizes for the TM technique than for other meditation programs on improving stress-related conditions (anxiety, depression, and hypertension). A review of published PTSD research shows that Mindfulness Based Stress Reduction has a moderate effect and TM practice has a large effect on reduction of PTSD symptoms.
- TM simultaneously treats the comorbidities associated with PTSD. TM practice has a large effect on reducing PTSD-related depression and has significant effects on reducing anxiety, substance abuse, sleep disorders, and hypertension.
- There are potential cost savings from introducing the TM technique as a first-line PTSD treatment both from its ameliorating effects on PTSD and comorbid conditions. Prior research in the general population shows that TM practice leads to significant reductions in health care costs.

The body of research taken as whole, including published RCTs, indicates the use of the TM technique as a first-line treatment for PTSD and comorbid conditions.

## The Problem

Post-Traumatic Stress Disorder (PTSD) is a serious and disabling condition that affects approximately 6% to 7% of adults in the U.S. over their lifespan.<sup>1</sup> The incidence is much greater in veterans and active-duty personnel. PTSD is estimated to affect 14% deployed in our wars in Afghanistan and Iraq<sup>2</sup> and studies place rates of PTSD as up to 30% lifetime prevalence for Vietnam Veterans.<sup>3</sup> Currently 26.7% of Iraq and/or Afghanistan veterans who seek care from the Veterans Health Administration receive a PTSD diagnosis.<sup>1</sup>

PTSD takes a severe toll on the mental, physical, and financial wellbeing of veterans and their families.<sup>4,5</sup> PTSD is associated with co-morbidities such as major depression, substance abuse, suicide, and poorer physical health. Furthermore, there is an increased cost of disability.<sup>6,7,8</sup> The estimated two-year cost for PTSD is up to around \$10,000 per person, when considering lives lost to suicide<sup>2</sup>. This rises to around \$17,000 when co-morbid depression is present. These figures do not account for other costs such as associated substance abuse, homelessness, and domestic violence, which may account for up to around \$6 billion dollars in lost productivity a year.<sup>2</sup> Taken together, these findings highlight the need for increased and persistent attention to finding effective treatments for PTSD.

## Need for New Approaches

The two most commonly used forms of treatment for PTSD involve the use of pharmaceuticals, and/or forms of Cognitive Behavioral Therapy (CBT). Both of these have their limitations. Drugs can be targeted toward particular symptoms, such as depression, anxiety, insomnia, nightmares, etc., but it is generally recognized that there is no drug or drug cocktail that is specific for, or can effect a cure in, post-traumatic stress.<sup>9</sup> Sertraline, in a 2018 study, was found to have comparable effects to Prolonged Exposure therapy,<sup>132</sup> but it also has many side effects.<sup>135</sup>

There are many forms of CBT, but two of them have become recognized as the “gold standard” treatments, and essentially are the standard of care for psychological interventions for PTSD within the Veterans Administration and the Department of Defense. These two are Prolonged Exposure (PE) and Cognitive Processing Therapy (CPT). In a 35-year review of randomized controlled trials (RCTs) from 1980 to 2015, researchers found that the two gold standard treatments did produce clinically meaningful symptom improvement in 49%-70% of participants; however, two-thirds of veterans with PTSD treated with PE or CPT retained their diagnosis after completing treatment.<sup>10</sup> In addition, dropout rates among patients receiving PE treatment shown in randomized trials and clinic-based visits can be high, ranging from 30% to 44%.<sup>10,11</sup> These relatively high dropout rates in PE may be due to the discomfort and anxiety often reported by patients completing the therapy.<sup>10</sup> A number of other studies that look more at how an intervention performs in a “real world” setting have shown that many veterans find the “best” treatments intolerably uncomfortable; completion rates can be extremely low, even 10% or less.<sup>12-14</sup>

A further problem with the psycho-therapeutic approaches to PTSD is the issue of stigma. When one engages in these therapies, one is admitting to the condition, and PTSD is associated with mental illness. For some people, therapy is associated with weakness; others want to avoid it because of the perceptions that others have of people with PTSD as unpredictable, incompetent, or even dangerous. Seeking therapy can also have job implications. The Questionnaire for

National Security Clearance, for example, asks, “In the last seven years, have you consulted with a health care professional regarding an emotional or mental health condition, or were you hospitalized for such a condition?” Individuals do not want to engage in treatments that could create doubts about their reliability or judgment. The Department of Defense is trying to recast the seeking of treatment as a “strength,”<sup>15</sup> but there is wide perception that a PTSD diagnosis can impair career growth.

Given the limitations of existing treatments, many health professionals and researchers recognize the need to identify new approaches to treating PTSD: “There is a need for improvement in existing PTSD treatments and for development and testing of novel, evidence-based treatments, both trauma-focused and non-trauma-focused.”<sup>10</sup> The Transcendental Meditation (TM) technique is a new approach that now has a body of research and implementation record to justify use as a first-line treatment for PTSD.

### *The Transcendental Meditation Technique*

The Transcendental Meditation technique is described as a simple, natural, effortless technique that is practiced twice a day for 15-20 minutes. It has been learned by more than three million Americans of all religions and backgrounds. It has been taught in many settings, including schools, businesses, VA Centers, universities, substance abuse centers, and prisons.<sup>35</sup> Clinical reports indicate that the TM technique can easily be learned by individuals of any age, level of education, occupation, or cultural background.<sup>16-20</sup> TM practitioners are instructed to sit in a comfortable position, with eyes closed. TM practice does not involve breath control procedures or specific breathing patterns.<sup>21</sup>

The practice of TM is considered safe and does not involve adopting any system of spirituality or belief. No adverse events were reported in an efficacy review of 20 randomized controlled trials that included 397 experimentally treated subjects,<sup>22</sup> and no safety concerns were raised in a report examining 813 studies of meditation practices for health, including the TM technique.<sup>23</sup> These findings supported the safety and potential efficacy of this meditation practice for treating certain illnesses, particularly in nonpsychotic trauma and stress-related disorders such as PTSD. Importantly, the NIH-sponsored clinical trials using TM for treating PTSD did not find any adverse effects from TM practice.<sup>24</sup>

### *Research on the TM Technique and Stress Reduction*

The TM technique targets stress generally rather than being trauma focused. This is significant because it allows TM simultaneously to address PTSD and comorbid conditions that are stress related. It also allows TM practice to be used as a resilience-building tool to prevent stress-related conditions, in addition to being used as a treatment for these conditions. Multiple studies on neurophysiological changes during TM practice indicate that it produces changes counter to the stress response.

The stress response involves complex neuroendocrine changes characterized by increased sympathetic activation. TM practice has been found to reduce baseline levels of stress hormones.<sup>25-27</sup> It facilitates a more adaptive response to stress by the unique deep metabolic rest gained during the practice, in which the body’s homeostatic mechanisms normalize malfunctions in the system. A meta-analysis of 32 studies performed during and outside the TM technique

found consistent evidence for reductions in sympathetic nervous system (SNS) activation, as indicated by acute reductions during TM practice in respiratory rate and plasma lactate and increased basal skin resistance compared with eyes-closed rest in control subjects. There were also lower baseline levels of heart rate, respiratory rate, plasma lactate, and spontaneous skin resistance responses outside of meditation,<sup>28</sup> suggesting that regular TM practice habituates the system to function in a calmer style outside of meditation. Related studies have indicated reduced turnover of the stress hormones norepinephrine and epinephrine, which also reflect reduced SNS activity due to TM practice.<sup>29</sup> These factors may contribute to reduced total peripheral resistance and, subsequently, to reduced high blood pressure and cardiovascular disease risk.<sup>30</sup>

The hypothalamic-pituitary-adrenocortical (HPA) axis provides mechanisms by which emotions and stress produce hormones that impact the body. For example, mental stress and elevated baseline levels of plasma cortisol, a major stress hormone in humans, are associated with a greater prevalence of heart disease.<sup>31</sup> Prospective and randomized studies of the TM technique indicate that it has acute as well as longitudinal effects on reducing baseline cortisol and on reducing average cortisol across stress sessions.<sup>27,32</sup>

Other stress-related hormones of the HPA axis, aldosterone and dehydroepiandrosterone sulfate (DHEAS), also change with TM practice. Aldosterone, a hormone that increases the absorption of sodium and water in the kidneys, decreases with TM practice, suggesting another mechanism by which the practice may reduce blood volume and normalize blood pressure.<sup>31</sup> DHEAS levels tend to be elevated in TM practitioners.<sup>33,34</sup> Lower levels of DHEAS are a significant predictor of cardiovascular disease and ischemic heart disease, controlling for other risk factors.

The impact of TM practice on the sympathetic-adrenal-medulla system, crucial in an organism's physiological response to outside stimuli, was studied by examining plasma catecholamine levels at two different times of day. Morning and evening levels of the stress hormones norepinephrine and morning epinephrine were significantly lower in the TM group compared with control subjects, suggesting a reduced hormonal response to daily stress caused by sympathetic tone regulation.<sup>26</sup>

In addition to this physiological research, which suggests a physiological mechanism for the effects of TM on PTSD, there is extensive psychological research on TM, independent of the research specifically on PTSD, showing that TM practice produces effects counter to the DSM-5 symptoms associated with PTSD. The table below presents the four clusters of symptoms that DSM-5 associates with PTSD<sup>136</sup> and research on the TM technique, showing reductions in those symptoms.

<b>DSM-5 Symptoms</b>	<b>Sample Relevant <i>TM</i> Research</b>
<u>Re-experiencing the event</u> : Recurrent memories of the event, traumatic nightmares, dissociative reactions, prolonged psychological distress	<ul style="list-style-type: none"> <li>• Increased autonomic stability and decreased obsessive thoughts (120, 121)</li> <li>• Increased emotional stability and decreased tension (122)</li> <li>• Decreased anxiety (133, 65)</li> </ul>
<u>Alterations in arousal</u> : Aggressive, reckless or self-destructive behavior, sleep disturbances, hypervigilance	<ul style="list-style-type: none"> <li>• Reduction in use of illegal drugs, alcohol, and cigarettes (127)</li> <li>• Improved sleep (128, 129)</li> <li>• Decreased hostility and impulsive behavior (140, 141)</li> </ul>
<u>Avoidance</u> : Distressing memories, thoughts, or reminders of the event	<ul style="list-style-type: none"> <li>• Increased ability to live more fully in the present and to connect past and present meaningfully; increased self-actualization (124)</li> <li>• Increased field independence (142)</li> <li>• Decreased over-sensitivity (123)</li> </ul>
<u>Negative alterations in cognition and mood</u> : Persistent negative beliefs, distorted blame, or trauma-related emotions; feelings of alienation and diminished interest in life	<ul style="list-style-type: none"> <li>• Reduced psychological distress, anxiety, and depression; improved coping ability (125, 126)</li> <li>• Improved ability to focus (137, 138)</li> <li>• Reduced cognitive distortion (139)</li> <li>• Increased self-actualization (124)</li> </ul>

Appendix 2 lists the 20 DSM-5 PTSD criteria and presents TM research relevant to each. The bottom line is that there is extensive research, both physiological and psychological, showing the ability of the TM technique to positively impact conditions associated with PTSD and suggesting a mechanism by which this might occur.

### Research on *TM* and PTSD

We located 11 peer-reviewed studies on the effects of the TM technique on PTSD symptoms: six studies on war veterans [Brooks & Scarano, 1985<sup>49</sup>; Heffner et al., 2014<sup>24</sup>; Herron and Rees, 2018<sup>101</sup>; Kang et al., 2018<sup>102</sup>; Nidich et al., 2018<sup>37</sup>; Rosenthal et al., 2011<sup>103</sup>], two studies on war refugees [Rees et al., 2013<sup>104</sup>; Rees et al., 2014<sup>105</sup>], two studies on prison inmates [Nidich et al., 2016<sup>106</sup>; Nidich et al., 2017<sup>107</sup>], and one on university students [Bandy et al., 2019<sup>108</sup>]. In addition, we found three unpublished studies on TM for veterans with PTSD: one RCT that has just been submitted for publication,<sup>112</sup> and internal reports on programs run by Boulder Crest Retreat Center<sup>38</sup> and the Annapolis Veterans Center.<sup>111</sup>

A summary of the study characteristics of these studies is found in Table 1 below. More detailed information on each study is found in text below the chart. In summary, all of the studies showed that the TM technique had a large effect on reducing PTSD symptoms, and those studies that

included assessment of depression also found a large effect on reducing this salient comorbidity of PTSD.

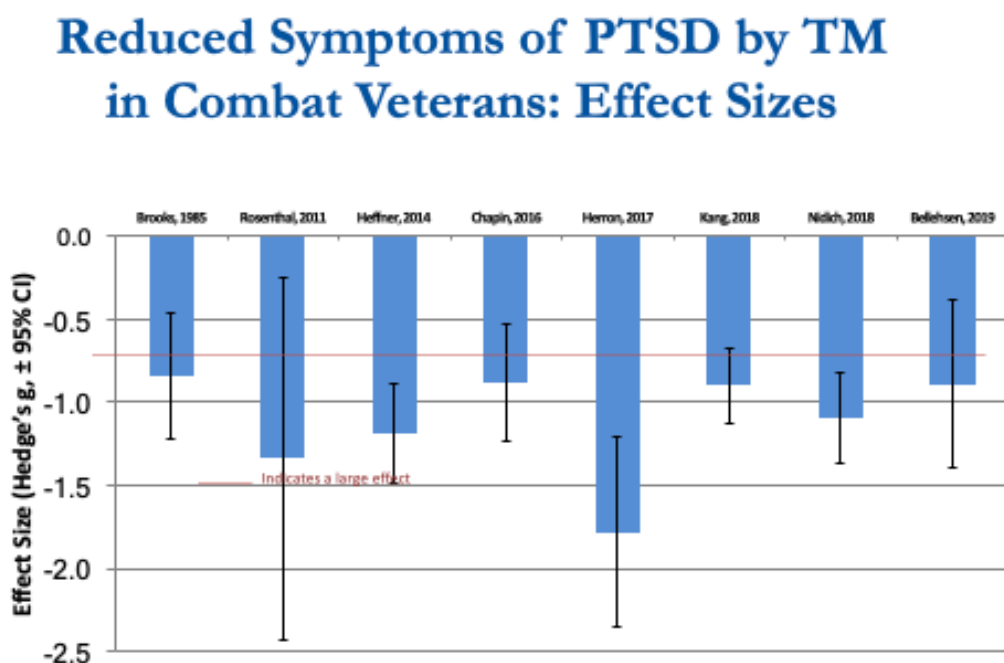
**Table 1. Study Characteristics: The *Transcendental Meditation* technique**

<i>Study ID</i>	<i>Location</i>	<i>Population/ Trauma Type</i>	<i>Study design</i>	<i>Comparator</i>	<i>PTSD measures</i>	<i>Age</i>	<i>Sample size (Total)</i>	<i>% Males</i>	<i>Duration (wk)*</i>
Brooks, 1985	Denver VA	War Vets/ Combat- trauma	RCT	Psychotherapy “Eclectic” Group Therapy	DSM III PTSD Criteria	33	18	100	12
Rosenthal, 2011	Capital Clinical Research Associates, Rockville, MD	War Vets/ Combat- trauma	Pre- Post	None	PCL-M CAPS-M BDI, QLES-Q	25-40	5	100	12
Heffner, 2014 Saginaw, MI	Saginaw MI VA	War Vets/ Combat- trauma	RCT	MM, PCT	PCL CAPS	54.4	65	74	8
Herron, 2017	TM Centers nationally	War Vets/ Combat- trauma	Pre- Post	None	PCL-M	51	46	66	4,12
Kang, 2018 (Minneapolis)	Minneapolis MN VA	War Vets/ Combat- trauma	Pre- Post	None	PCL-M, CAPS	59 (12.8)	29	79.3	9, 17
Nidich, 2018	San Diego VA	War Vets/ Combat- trauma	RCT	Prolonged Exposure, Health Ed	CAPS, PCL-M	47	203	83	4, 6, 8, 10, 13
Rees, 2013	Kampala, Uganda	War Refugees/ Combat Trauma	CT	Matched Controls	PCL-C	32.8	21	65	4,19
Rees, 2014	Kampala, Uganda	War Refugees/ Combat Trauma	Pre- Post	None	PCL-C	33.2	11	73	1.4, 4
Nidich, 2016	Oregon State Penitentiary	Men Prison Inmates: Interpersonal violence	RCT	Treatment as Usual	Trauma Check List, Perceived Stress Scale	29	181	100	16
Nidich, 2017	Coffee Creek Correctional Facility in Wilsonville, OR	Women Prison Inmates: Interpersonal violence	RCT	Wait List Control	PCL-C	44.5	22	0	16
Bandy, 2019	Johannesburg, South Africa	College Students	CT	Students in a Comparable College	PCL-C BDI	21	68	29.4	2, 4, 15
Bellehsen, submitted	Northwell Veterans Behavioral	Veterans/PTSD	RCT	Treatment as Usual	CAPS-5 PCL-5 BDI, BAI ISI,	51	40	85	12



	Health Center L. Island, NY				Q-LES				
Tedeschi & Moore, 2019	Boulder Crest Retreat Center, Virginia	War Vets/ Combat Trauma	Pre- Post	None	PCL-5	NA	49		52,78
Chapin, 2016	Annapolis Vet Center, Maryland	War Vets/ Combat Trauma	Pre- Post	None	PCL-M OQ-45	NA	12	NA	8

## Trials on the *TM* Technique and PTSD in Veteran Populations



**Figure 1.** Effect Sizes of Research on the *TM* Technique and PTSD with Combat Veterans

As this summary chart shows, the various research studies on the *TM* technique and PTSD in veteran populations consistently show that *TM* has a large effect<sup>1</sup> (>.80) on reducing PTSD symptoms. Details on the studies follow.

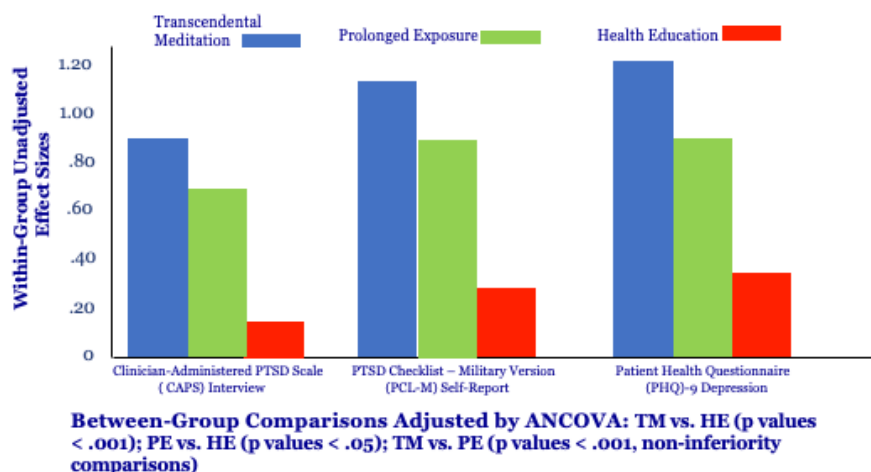
<sup>1</sup> Effect size in statistics provides a quantitative measure of the magnitude (or effect) of a treatment. An effect size of .2 is considered small, .5 medium, and .8 or greater large.

## Randomized Trials

*Nidich et al., 2018 (37)*

This study, funded by the Department of Defense and published in *The Lancet Psychiatry*, is the largest RCT on TM practice and PTSD. It was a non-inferiority trial, designed to assess whether TM was non-inferior to Prolonged Exposure (PE), considered the “gold-standard” therapy for treating PTSD. Both the TM technique and PE were compared to an active Health Education (HE) treatment. The study randomly assigned 203 veterans with clinical PTSD (CAPS score > 45) to either Transcendental Meditation practice (N=68), PE (N=68), or HE (N=67). Each treatment provided 12 sessions, 90 minutes each, over 12 weeks, in addition to daily home practice. The table and figures below show the results for PTSD symptoms and depression. All 202 eligible patients randomly assigned to treatment were included in the intent-to-treat analyses regardless of treatment dropout or missing post-test data. The study found that both the TM technique and PE were significantly more effective than HE. TM practice was significantly non-inferior to PE for CAPS, PCL-M, and depression (PHQ-9) scores when using baseline dependent score, number of PTSD medications, sex, and number of years since discharge from the armed forces as covariates (p=0.0002).

**Reduction in PTSD Symptoms and Depression: Comparison of Transcendental Meditation, Prolonged Exposure and Health Education**



**Figure 2.** Comparison of the *TM* Technique, Prolonged Exposure, and Health Education on PTSD and Depression

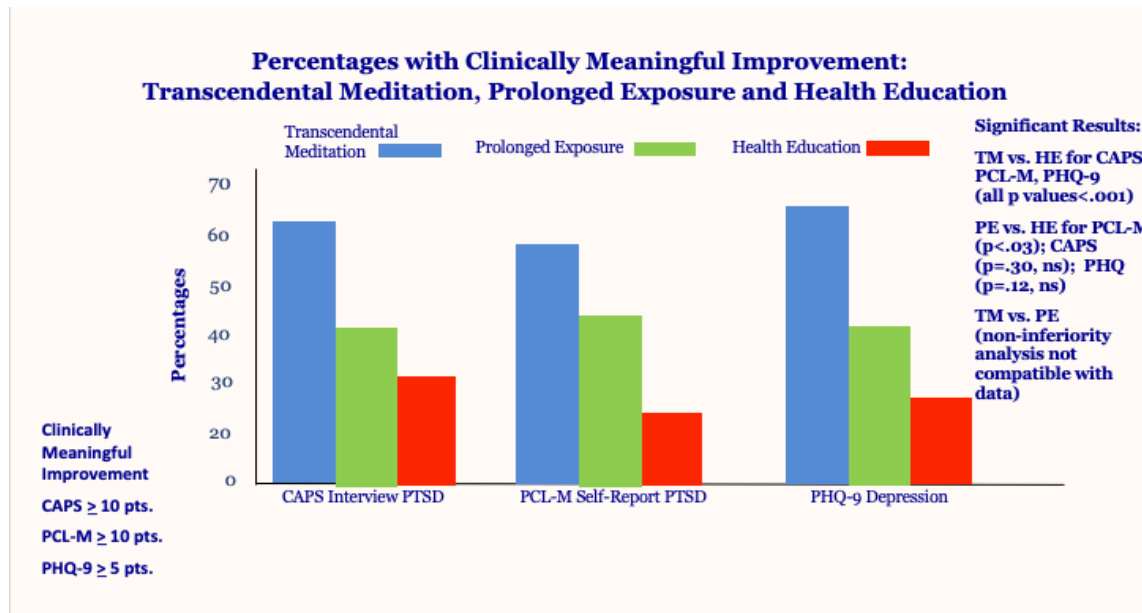
**Table 2: Between-group changes in primary and secondary outcomes**

Outcome	<i>TM</i> vs HE			PE vs HE			<i>TM</i> vs PE		
	Mean <sup>1</sup>	CI	Effect Size	Mean <sup>1</sup>	CI	Effect Size	Mean <sup>1</sup>	CI	Effect Size
CAPS	-14.6 **	[-23.3, -5.9]	0.82	-8.7 †	[-17.0, -0.32]	0.49	-5.9 **	[-14.3, 2.4]	0.30
PCL-M	-10.0 **	[-15.0, -5.05]	0.82	-6.6 *	[-11.4 to -1.7]	0.54	-3.5***	[-8.4 to 1.4]	0.26
PHQ-9 depression	-4.6 ***	[-6.8, -2.5]	0.83	-2.6 *	[-4.6 to -0.5]	0.46	-2.1***	[-4.1 to 0.2]	0.37

†p<0.05; \*p<0.025; \*\*p<0.001; \*\*\*p<0.0001

Notes: <sup>1</sup>Mean change adjusted for baseline measure, number of PTSD medications, gender, and number of years since discharge from the armed forces; 95% confidence intervals are given for each mean; <sup>2</sup>effect size based on Cohen's d; <sup>3</sup>statistical significance for differences between TM vs. PE based on a non-inferiority comparison.

Percentages of participants with clinically significant improvement on the CAPS ( $\geq 10$  point reduction) were TM=62%, PE=42%, and HE=32%.



**Figure 3.** Clinically Meaningful Improvement—PTSD and Depression—TM and PE vs HE

The study also looked at effects of these programs on mood disturbance and quality of life. The TM technique was also non-inferior to PE on these variables.

**Table 3: Between-group changes on mood disturbance and quality of life**

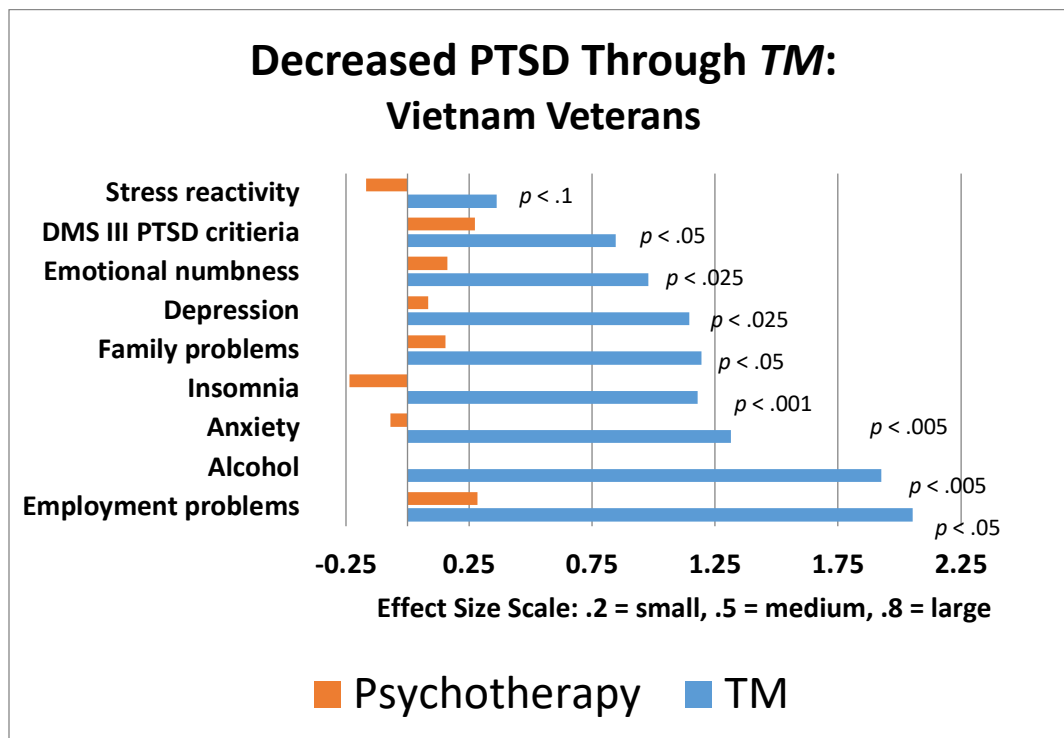
	<i>TM</i> vs. <i>HE</i>		<i>PE</i> vs. <i>HE</i>		<i>TM</i> vs. <i>PE</i>	
	Mean Change (95% CI)	Effect size (95% CI)	Mean Change (95% CI)	Effect size (95% CI)	Mean Change (95% CI)	Effect size (95% CI)
<b>POMS TMD</b>	-17.0 (-30.9 to -3.2) p=.015	0.50 (0.09 to 0.90)	-13.9 (-27.2 to -0.7) p=.038	0.41 (0.02 to 0.79)	-3.1 (-16.8 to 10.6) p=.0013	0.09 (-.031 to 0.49)
<b>QLES</b>	0.39 (0.08 to 0.71) p=.015	0.45 (0.09 to 0.81)	0.24 (-0.06 to 0.54) p=.12	0.27 (-0.07 to 0.62)	0.15 (-0.16 to 0.47) p=.033	0.18 (-0.18 to 0.53)

*Brooks and Scarano, 1985 (49)*

This was one of the first published studies to show the positive effect of a treatment on PTSD symptoms. The study, conducted at the Veterans Outreach Program in Denver, Colorado, assigned every other eligible veteran to either the TM technique (N = 10) or psychotherapy (N =

8).<sup>2</sup> The treatment period was three months. Clients assigned to the therapy group participated in weekly individual psychotherapy sessions and were given the option to participate in group or family counseling. The psychotherapeutic treatments were eclectic and included behavioral, existential, cognitive, somatic, and psychodynamic treatment, according to the training of the therapist.

Figure 1 shows the within-group changes (pretest to posttest) over the three months for individual dependent variables. TM practice had strong effects on all PTSD-related variables, particularly on variables impacting quality of life: depression, family problems, anxiety, alcohol consumption, and employment problems. The study also found a trend for faster habituation of the GSR stress response to loud tones in the TM group compared to controls, ( $p < .1$ ).



**Figure 4.** Comparison of the Transcendental Meditation technique and psychotherapy in Vietnam veterans at the Denver VA Center, 1985, on multiple PTSD-related variables. (Note: There is no orange bar for alcohol because the effect of psychotherapy was zero).

[Hefner et al., 2014 \(24\)](#)

This study was conducted on PTSD patients at the Aleda E. Lutz VA Medical Center, Saginaw, Michigan. Qualifying patients were randomly assigned to one of three possible treatments: The TM technique (N = 19), Adopted Mantra Meditation (N=22), and Present-Centered Therapy (N=24).

<sup>2</sup> Assigning every other person to the two treatments is not strictly randomization. The Cochrane Collaboration refer to it as *quasi-randomization*. Since there is no obvious reason why it would introduce bias, we included it for completeness. Sensitivity analysis indicates that leaving this study out has only a negligible effect on the overall synthesis and conclusions.

Adapted Mantra Meditation is a standardized, group-based teaching method for Mantra Meditation described as a non-spiritual style of meditation, with all members using the same generic mantra during their instruction and daily practice. Present-Centered Therapy (PCT) is a non-trauma focused treatment for PTSD, originally developed as a strong comparator treatment that captured many of the effective components of "good psychotherapy."<sup>143</sup> The study assessed PTSD using the CAPS and the PTSD Checklist-S (PCL-S; Specific identified event version), which is highly correlated with the CAPS ( $r > .9$ ). For the ES's in our meta-analyses, we used g's reported in Table S1 (24).

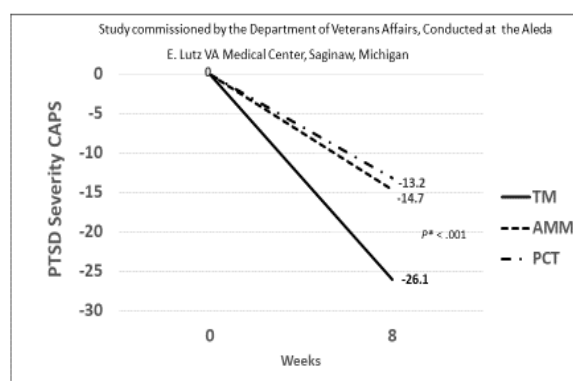
The study concluded that: "For both the clinician administered and the self-administered measures of PTSD severity, Veterans in the Adapted Mantra and Present-Centered Therapy programs showed decline of a medium magnitude while Veterans in the Transcendental Meditation program showed statistically large declines" (24, p. 68). The effects sizes for change in the groups were: TM =  $-.88$ , AMM =  $-.65$ , PCT =  $-.48$ . Comparing treatments, the TM technique had moderately strong effects compared to AMM and PCL (TM vs. AMM =  $-.75$ , TM vs. PCL =  $-.66$ ). There was only a slight difference between AMM and PCL (AMM vs PCL =  $-.1$ ).

The test of group differences in change across time was significant; CAPS ( $F(2,62) = 33.33$ ,  $p < .001$ ) and PCL ( $F(2,59) = 32.92$ ,  $p < .001$ ). For the CAPS, the change was clinically meaningful (10 or more points) for all treatments, with TM practice almost twice as effective as the other PCT and AM (see Figure 5).

*Bellehsen, submitted (112)*

Forty veterans at Northwell Health's Unified Behavioral Health Center for Military Veterans and their Families on Long Island, New York, diagnosed with PTSD, were randomly assigned to three months of TM instruction or treatment as usual (TAU). The primary outcome measure was the Clinician Administered PTSD Scale for DSM-5 (CAPS-5). Secondary outcome measures included the PTSD Checklist-5 (PCL-5), the Beck Depression Inventory, 2<sup>nd</sup> edition (BDI-II), the Beck Anxiety Inventory (BAI), the State Anger Scale of the Spielberger State Trait Anger Expression Inventory (STAXI-2), the Insomnia Severity Index (ISI), and the Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (Q-LES-Q-SF). The following table summarizes the results of analyses comparing changes in the TM group with changes in the control group. There were statistically significant differences for all outcomes except anger, and the effect size was also large ( $> .80$ ) for all outcomes, except anger. There was also a statistically significant difference on loss of diagnosis status. Upon post-test, 50% ( $n=10$ ) of the TM group

**Randomized Controlled Trial 2: PTSD Severity, CAPS**  
Comparison of Transcendental Meditation, Adopted Mantra Meditation, and Present-Centered Therapy for Treating PTSD in War Veterans



TM = Transcendental Meditation, AMM = Adopted Mantra Meditation, P-CP = Present-Centered Therapy. \* Test of group differences in change across time,  $F(2,62) = 33.33$ ,  $p < .001$ . ES: TM =  $-.88$ , AMM =  $-.62$ , PCT =  $-.49$ . TM vs. AMM =  $-.45$ , AMM vs PCL =  $-.03$ , TM vs. PCL =  $-.47$ .

Reference. Heffner, K. L., Caine, E. D., Crean, H., Franus, N., Moynihan, J. A., & Talbot, N. (2014).

**Figure 5. TM vs. Adapted Mantra Meditation and Present Centered Therapy**

had lost their diagnosis of PTSD as evaluated by the CAPS-5. Only 10% (n=2) of the TAU group lost their diagnosis over the course of the study (p=.018).

**Table 4: Independent t tests comparing changes in the TM group with changes in the control group.**

Outcome	Difference in change scores	df	t	p	d	95% CI
CAPS-5 (PTSD)	9.65	38	2.93	.006	.93	2.98, 16.32
PCL-5 (PTSD)	12.55	38	2.54	.015	.80	2.54, 22.56
BDI (Depression)	11.55	38	3.20	.003	1.01	4.24, 18.86
BAI (Anxiety)	10.15	38	3.33	.002	1.05	3.98, 16.31
ISI (Insomnia)	3.67	37	2.63	.012	.84	0.84, 6.50
S-Anger	-0.44	34	-0.14	.890	.05	-6.90, 6.01
Q-LE (Quality of Life)	-6.30	38	-3.02	.005	.96	-10.53, -2.07

## Non-Randomized Studies on *TM* and PTSD in Veteran Populations

### *Kang, 2018 (102)*

This was an 8-week, pre-post study with 2-month follow-up at Week 17, conducted at the Minneapolis VA, with 29 veterans who met DSM-IV diagnostic criteria for PTSD. This was a treatment-resistant population in that all patients had completed prior therapy trails, including PE and CPT. It used both the PCL-M (primary) and CAPS to measure PTSD symptoms, as well as EEG to measure brain changes. In addition, the study measured depression (PHQ-9), somatic symptoms (PHQ-15), experiential avoidance (AAQ- II), quality of life (WHOQOL), and mindfulness (FFMQ). There were significant changes on all variables in the positive direction and effect size was strong for PTSD reduction and moderate to strong on the other variables. The maintenance of treatment effects at 2-month follow-up demonstrated the durability of TM training effects.

**Table 5: Baseline and post-intervention scores on primary and secondary variables**

Measures	Baseline (week 0 [W0])	Post-intervention (week 9 [W9])	2-month follow-up (week 17 [W17])	Effect size (W0-W9)	Effect size (W0-W17)
PCL	63.0	51.5**	49.8**	-.92	-.92
CAPS	69.4	51.0*	47.3**	-.72	-.96
PHQ-9 (depression)	15.3	11.9*	10.7**	-.60	-.76
PHQ-15 (somatic symptoms)	13.2	9.8**	9.5*	-.77	-.67
AAQ II (experiential avoidance)	36.8	29.4**	29.5*	-.97	-.76
WHOQOL (quality of life)	78.0	89.0**	87.3*	.94	.72
FFMQ (mindfulness)	99.3	122.8**	125.8**	.93	.97

•  $p < .01$       \*\*  $p < .001$

The EEG analysis measured Delta/Theta brain waves (1-7 Hz). These low frequencies in the EEG have been associated with sustained attention for monitoring (109) and attentional processes (110), and had been found to increase in mindfulness meditation EEG studies. The TM meditators had progressive increase in these low frequencies, suggesting a neurophysiological basis for improved cognitive controls and enhanced internally directed attention associated with increased mindfulness. However, the increased Delta/Theta power was not consistently related to reduction in clinical symptoms.

*Rosenthal, 2011 (103)*

This small, uncontrolled pilot study with 5 veterans was the first study on the TM technique and PTSD with Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) veterans. All subjects had combat-related PTSD. Efficacy of treatment was assessed using the Clinician Administered PTSD Scale (CAPS) as the primary outcome measure. Secondary outcome measures were the PTSD Checklist—Military Version (PCL-M), the Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q), the Beck Depression Inventory (BDI), the Clinical Global Impression-Severity (CGI-S), and Clinical Global Impression—Improvement (CGI-I) scales. Changes are summarized in the table below.

**Table 6: Mean changes on primary and secondary outcomes**

Measure	Mean change score (8 weeks)	Level of statistical significance
CAPS (PTSD)	-31.4	$p = .02$
PCL-M (PTSD)	-24.0	$p = .02$



BDI (Depression)	-11.2	$p = .14$
QLES-Q (Quality of life)	13	$p = .01$
CGI-S (Clinical global impression severity)	1.60	$p = .04$

*Herron & Rees, 2018 (101)*

This is a 90-day, pre-post study that followed 41 veterans and 5 active-duty military personnel with provisional PTSD (score >33) as measured by the PTSD Checklist-5 (PCL-5). This study had two features that distinguish it from the other TM and PTSD studies: 1) recruitment was national and TM instruction took place in *TM* Centers around the country, rather than in institutions serving veterans; 2) the study included a dose-response analysis.

After one month of TM practice, 46 veterans averaged a 28 point decline in PTSD symptoms (–54.5%;  $P < 0.0001$ , ES 2.01); 40 (87%) had clinically significant declines (>10 points) in PTSD symptoms, and 37 (80%) dropped below the clinical level (<33). At the 90 days post-test, scores continued to drop, and 3 more dropped below the 33 threshold. Thirty-one veterans completed a 90-day post-test and their PCL-5 mean decreased from 49.45 (SD: 11.69) in the pre-intervention period to a post-intervention mean of 20.84. The difference between the pretest and posttest averages was 28.61 points (SD: 15.79; C.I. 22.82 – 34.41; Effect Size: –1.83;  $P < 0.0001$ ). The median decline on their PCL-5 scores was from 48 to 17, a decrease of 31 points (–64.58%). The 15 subjects who did not complete the 90-day evaluation had an average 33.4 point drop on PTSD score at 30 days, and 13 dropped below the clinical threshold for PTSD ( $\leq 33$ ). An intent-to-treat (ITT) analysis using the Last Observation Carried Forward method showed a 30.17 point average drop (SD: 15.54; C.I. 25.56–34.79; Effect Size: –1.94;  $p < 0.0001$ ).

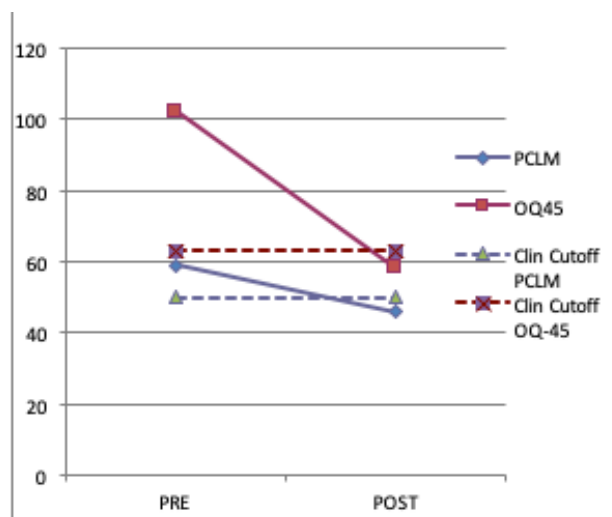
A dose-response effect suggested a causal relationship. The full-dose group (two 20-minute TM sessions per day,  $n=36$ ) exhibited larger mean declines in PTSD symptoms than the half-dose group (one 20-minute TM session per day). Although the full-dose and the half-dose groups both showed clinically and statistically significant declines in average PTSD symptoms, the full-dose group exhibited larger mean declines in PTSD symptoms than the half-dose group. After 1 month of TM practice, mean full-dose PTSD scores declined 30 points, whereas half-dose scores declined 20 points. There was no statistically significant difference between the two groups in the Pre-TM period. After 30 days of TM practice, the difference between the full-dose and half-dose groups' PTSD scores trended toward significance. After 90 days of TM practice, among the responders, there was a statistically significant difference between the full-dose and half-dose groups ( $p = 0.044$ ). The ITT analysis that accounted for the 15 missing responses in the 90-day posttest showed a larger statistically significant difference between the full-dose and half-dose groups ( $p = 0.02$ ).



*Chapin, 2016 (111)*

This small, internal program evaluation, conducted at the Annapolis Vet Center, assessed the effects of TM practice over 8 weeks on PTSD and general psychiatric symptoms (including anxiety and depression) on 14 veterans. The study used the PTSD Checklist-Military (PCL-M) and the Outcome Questionnaire (OQ-45). At pretest, group averages were above clinical cutoffs for both measures. At posttest, group averages declined to levels below clinical cutoffs for both instruments. The report stated that “Our clients enjoyed learning and practicing TM” and also expressed the view that TM would be a valuable adjunctive tool for veterans engaged in exposure

therapies because of its effectiveness as a tool for emotional regulation. Effect size of TM impact on both variables, PTSD and general symptoms, was large (.88 and 1.58 respectively).



**Figure 6.** Effects of *TM* on PTSD and general psychiatric symptoms

*Warrior PATHH, 2018 (38)*

The Warrior PATHH (Progressive and Alternative Training for Healing Heroes) program offered by the Boulder Crest Retreat Center is for combat veterans suffering from the psychological wounds of war. It is a free 18-month program that begins with a 7-day intensive and immersive in-residence phase that focuses on initiating post-traumatic growth and includes weekly follow-ups thereafter. During this first in-residence phase of the program, all veterans learn the TM technique as one of the modalities to help them heal. The Warrior PATHH curriculum includes an 18-month longitudinal program evaluation, assessing the effectiveness of the program over the short, medium, and long-term. The program evaluation is comprised of 24 measurement tools measuring symptom reduction, quality of life/stress management, post-traumatic growth, and cognitive flexibility. Students are surveyed prior to attending Warrior PATHH, following the 7-day initiation, and at the 30-day, 90-day, 180-day, 1-year, and 18-month marks. The results from the first 18-month program evaluation in the table below reflect the combined effects of the different elements of the program, not just TM. Of particular importance is the strong support network created by the program that encourages participants to continue to use the positive practices learned in the 7-day program launch. These results are consistent with what TM practice alone has been found to produce over shorter periods of time.

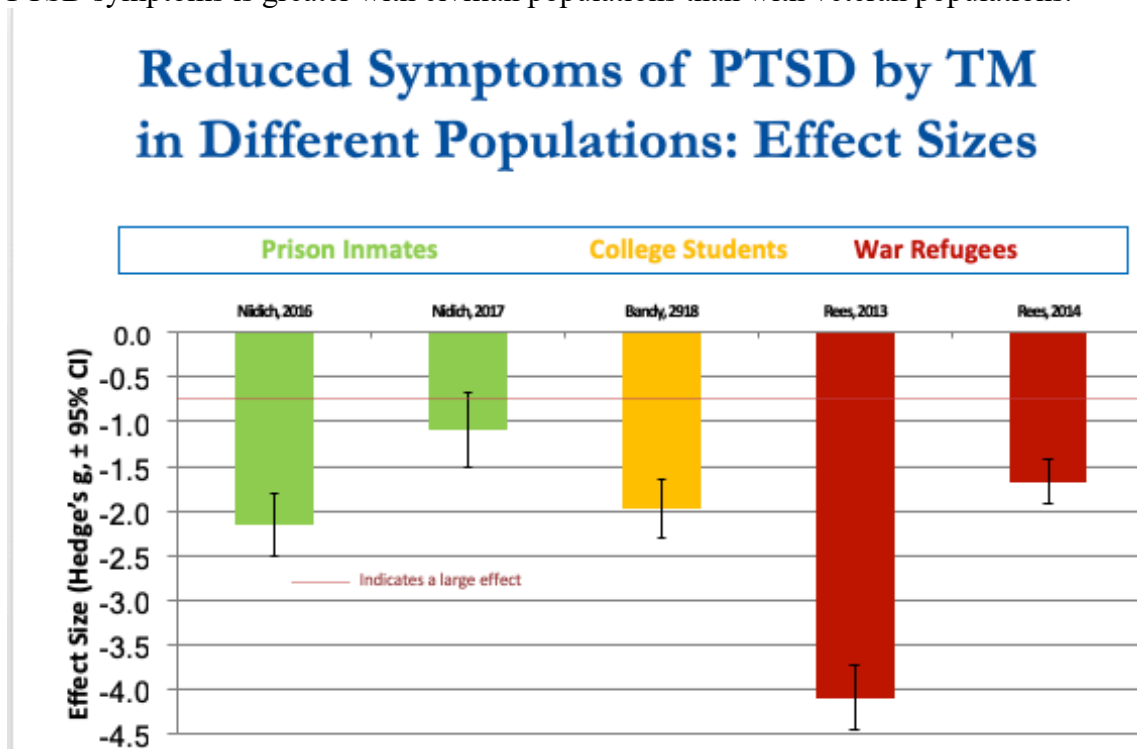
**Table 7: Improvements on Psychological Variables from Warrior PATHH Program**

Instrument	18-months (n=49)
PCL-5 (PTSD)	-54%
DASS-21 (Depression)	-52%
DASS-21 (Anxiety)	-41%

DASS-21 (Stress)	-35%
Insomnia Severity Index	-39%
Suicidality	-66%
Perceived Stress Reactivity Scale	-33%

### Studies on *TM* and PTSD in Non-Veteran Populations

Five studies have been conducted using *TM* practice as a trauma treatment in non-veteran populations. These include two done in the U.S. on prison populations and three done in Africa, one with college students and two with war refugees. As with the research on veteran populations, the effect of *TM* practice on reducing PTSD symptoms is large. Consistent with prior research on PTSD with other treatment modalities,<sup>10</sup> effects of *TM* practice on reduction of PTSD symptoms is greater with civilian populations than with veteran populations.



**Figure 7.** Studies of effects of *TM* on PTSD in non-veteran populations.

#### Prison Inmates

##### Nidich 2016--Prison Inmates (106)

The objective of this study was to evaluate the effects of *TM* practice on trauma symptoms in male inmates. The study randomly assigned 181 male inmates in the Oregon state correctional system to either the *TM* technique ( $n=90$ ) or a no-treatment control ( $n=91$ ). Evaluation measures included the Perceived Stress Scale and the Trauma Symptom Checklist, including a total trauma score and anxiety, dissociation, depression, and sleep disturbance subscales. The study looked both at the total group and a high-trauma subgroup (32 *TM* and 41 control) over a 4-month

period. Results on all instruments and subscales were highly significant ( $p < .001$ ) for both the total group and the high-trauma subgroup comparisons. Effect sizes were moderate to large and larger for the analyses with the high trauma subgroup (see below).

<b>Table 8: Effect sizes for 4-month adjusted posttest scores for trauma-associated symptoms</b>		
<b>Variable</b>	<b>Effect Size (d) Total group comparison</b>	<b>Effect Size (d) High trauma subgroup comparison</b>
Perceived Stress Scale	.75	.89
<b>Trauma Symptom Checklist</b>		
Total Trauma	.57	.74
Dissociation subscale	.50	.79
Depression subscale	.56	.78
Anxiety subscale	.50	.67
Sleep problems subscale	.63	.75

#### [Nidich, 2017—Women Inmates \(107\)](#)

This study was designed to evaluate the effects of TM practice on trauma symptoms in female offenders. Twenty-two inmates at the Coffee Creek Correctional Facility in Oregon were randomized to either a TM group or a wait-list control. The primary outcome for this study was the Posttraumatic Stress Disorder Checklist-Civilian (PCL-C) total trauma scale. Secondary outcomes included the intrusions, avoidance, and hyper-arousal subscales of the PCL-C. TM practice had a statistically significant and large effect on reducing total trauma score and moderate to large effects on the trauma subscales (see below).

<b>Table 9: Four-month adjusted posttest PCL scores by group</b>				
<b>Variable</b>	<b>TM Scores</b>	<b>Control Scores</b>	<b>p value</b>	<b>d</b>
Total trauma score	29.08	41.02	0.036	0.85
Intrusions subscale	9.00	13.30	0.026	0.99
Avoidance subscale	11.97	15.83	0.139	0.65
Hyperarousal subscale	8.14	11.86	0.043	0.82

## College Students

*Bandy, 2019 (108)*

This study assessed the effect of the Transcendental Meditation technique on reducing PTSD in college students in South Africa. Students at a university where all students practice TM and students at another university in Johannesburg were given the PCL-C to determine probable PTSD. Those with probable PTSD were then evaluated by a trained clinician using the criteria of DSM-IV for diagnosis of PTSD. Thirty-four participants from each of the two institutions met both the criteria for having PTSD and were included in the study. Study instruments included the PCL-C and the BDI for measuring depression. Posttests were administered at 15 days (only for PCL-C), 60 days, and 105 days. TM practice had a large effect on reducing both PTSD ( $ES = -1.85$ ) and depression ( $ES = -1.66$ ). As the following table shows, reductions in PTSD and depression were very rapid, with very large reductions within 15 days. Regularity of TM practice was correlated to a greater reduction in PTSD and depression symptoms, further strengthening the causal connection between TM and these outcomes.

<b>Table 10: Baseline and Post-test Means for PTSD and Depression</b>				
Test Condition	Baseline Mean (SD)	15 Days Mean (SD)	60 Days Mean (SD)	105 Days Mean (SD)
PCL-C				
TM (n=34)	53.3* (7.1)	39.1** (9.9)	36.2** (11.5)	32.0** (10.5)
Comparison (n=34)	57.0 (6.9)	54.1 (8.5)	55.9 (9.4)	56.9 (7.7)
BDI (Depression)				
TM (n=33)	19.9 (7.1)	9.5 (5.8)	9.2** (7.9)	7.4** (6.2)
Comparison (n=34)	16.9 (6.9)		16.3 (6.3)	17.3(6.0)

\* $p < .05$  \*\* $p < .0001$

## War Refugees

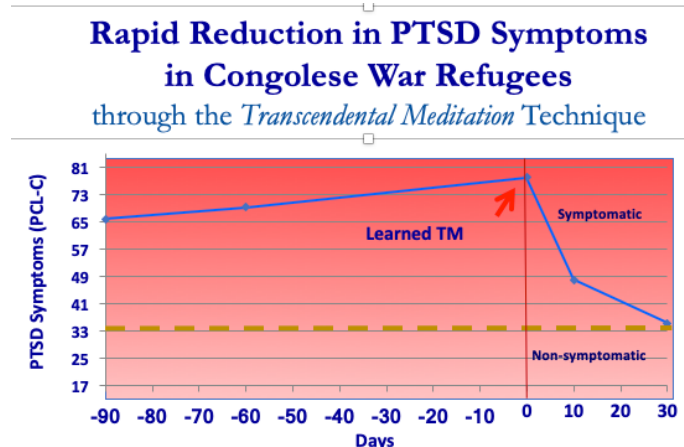
*Rees, 2013 (104)*

This matched single-blind pilot study tested the effect of Transcendental Meditation practice on symptoms of post-traumatic stress (PTS) in Congolese refugees who had been exposed to combat, sexual assault, torture, and/or forced to witness the abuse or killing of loved ones. After initial random assignment to the TM group, 30 refugees who revealed that they were unable or unwilling to learn TM and to attend all meetings were eliminated from the study. The remaining 21 TM group participants were then instructed in the TM technique and matched with refugees in the control group on age, sex, and baseline scores. Efficacy of treatment was assessed using the PTSD Checklist-Civilian (PCL-C), which was administered at baseline, 30 days and 135 days. All TM subjects had clinically significant changes (a drop greater than 10 points) in their PTSD Checklist-Civilian (PCL-C) scores at 135 days, while none of the controls did. (Average scores increased.) The PCL scores in the TM group dropped an average of 37.7 points over 135 days, compared to an increase of 6 points in the control group. Ninety percent of the TM group realized a drop to non-symptomatic levels (a score below 35) at both 30 and 135 days. These changes were highly statistically significant ( $p < .001$ ); the effect size was large  $>1.0$ .

<b>Table 11: Baseline and post-test means on PCL-C</b>				
	Controls (n = 21)		TM (n = 21)	
Time point	M	SD	M	SD
Baseline	67.8	6.5	65.2	7.3
30 days	74.6	7.1	29.2	6.1
135 days	73.8	5.2	26.5	5.4

*Rees, 2014 (105)*

This is a follow-up study to Rees, 2013 with Congolese war refugees in which members of the control group from the original study learned the TM technique. The Posttraumatic Stress Disorder Checklist–Civilian (PCL-C) was administered to non-matched wait-list controls three times over a 90-day period. Within 8 days of the third baseline measure from the Rees 2013 study, 11 refugees were taught TM, then re-tested 10 days and 30 days after instruction. Average PCL scores dropped 29.9 points from 77.9 to 48.0 in 10 days, then dropped another 12.7 points to 35.3 at 30 days. Both the PTSD drops from baseline to 10 days ( $p < .001$ ) and from 10 days to 30 days ( $p < .006$ ) were statistically significant. Effect size at 10 days was high ( $d = 4.05$ ). Many individuals reported rapid relief from PTSD symptoms after learning TM. This study documents that TM practice can have a large effect on relief from symptoms in the first two weeks of learning.



**Figure 8.** PTSD and Congolese War Refugees

Both the PTSD drops from baseline to 10 days ( $p < .001$ ) and from 10 days to 30 days ( $p < .006$ ) were statistically significant. Effect size at 10 days was high ( $d = 4.05$ ). Many individuals reported rapid relief from PTSD symptoms after learning TM. This study documents that TM practice can have a large effect on relief from symptoms in the first two weeks of learning.

### Effectiveness of TM in Treating Comorbidities of PTSD

Approximately 80% of individuals with PTSD meet criteria for at least one other psychiatric diagnosis, and a substantial number have three or more other psychiatric diagnoses<sup>42, 43</sup>. Chief among these are depressive, substance abuse, and anxiety disorders<sup>43</sup>. Sleep disorders are also very prevalent—75% of veterans surveyed by the Wounded Warrior Project in 2017 reported sleep problems.<sup>44</sup> A non-psychiatric comorbidity of PTSD is damage to heart health. Veterans with PTSD have 77-85% greater likelihood of developing high blood pressure than those without PTSD<sup>45</sup>. These comorbidities compound the effects of PTSD, leading to greater disability, greater cost, and greater suffering. There is a large body of research showing the effectiveness of TM practice in treating these conditions, including with military populations, which strengthens the justification for including the TM technique as a first-line treatment for PTSD.

### Depression

A meta-analysis of the five TM studies focused on combat veterans with PTSD that included depression as a dependent variable shows that TM practice has a large average effect ( $-.96$ ) on reducing depression in this population. (See Figure 9 below.) Randomized controlled trials on patient populations have found that the TM technique reduced depression in patients with chronic heart failure,<sup>46</sup> ventricular hypertrophy,<sup>47</sup> HIV,<sup>48</sup> and in prison inmates<sup>50</sup> and pre-

hypertensive young adults.<sup>51</sup>

Controlled trials on the general population have found that TM practice reduced depression in business managers,<sup>52</sup>

Japanese industrial workers,<sup>53</sup> high school students,<sup>54</sup> and school teachers suffering from burnout.<sup>55</sup> Subgroup analysis of the RCT on cardiovascular events in patients with coronary heart disease demonstrated that the high-stress subgroup had significant reductions in a composite index of hostility, depression, and anger.<sup>56</sup>

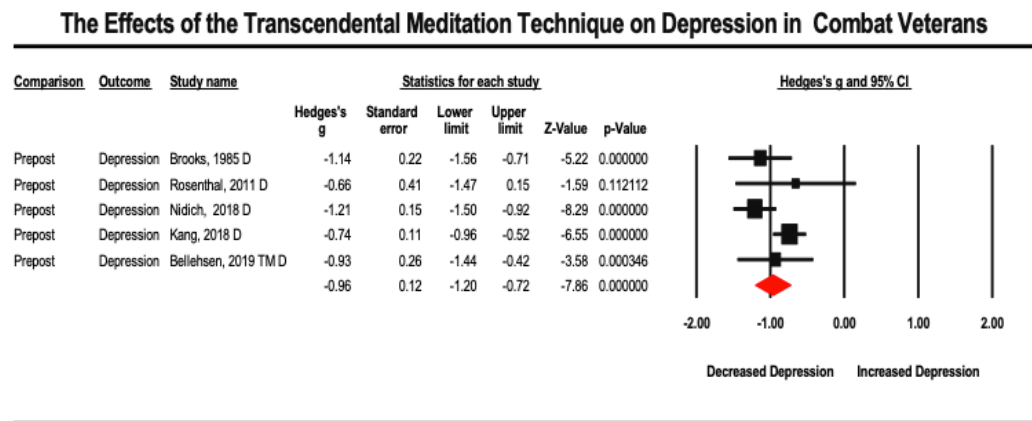
### Substance-Use Disorder

In meta-analyses, the TM technique was more effective in reducing smoking, alcohol consumption, and illicit drug use than conventional programs, whether or not these were combined with relaxation techniques.<sup>57</sup> In a randomized controlled study of 118 chronic male alcoholics undergoing in-residence rehabilitation treatment, patients practicing TM for 18 months showed significantly fewer drinking days than other groups, including patients receiving EEG neurotherapy and conventional addiction counseling.<sup>58</sup> In another RCT, male college students practicing TM significantly reduced alcohol abuse compared to controls over a 3-month period.<sup>59</sup> Patients in a residential rehabilitation program for alcohol use disorder who were closely adherent to twice-daily practice of TM (recommended schedule) were significantly less likely than controls to resume any drinking (25% vs 59%) or heavy drinking (0% vs. 47%) post-discharge.<sup>60</sup>

### Anxiety

A meta-analysis of 146 independent outcomes performed by Eppley of Stanford University compared the effects on psychosocial stress (anxiety) of all stress-reduction and relaxation techniques that had been reported in the scientific literature. Techniques studied included the Transcendental Meditation technique, other stress-reduction techniques, and relaxation techniques. The TM technique reduced anxiety to a significantly greater extent than other forms of meditation, relaxation, or stylized rest. These differences were found after adjustment for experimental design, duration of treatment, expectancy of benefits, and experimenter attitude.<sup>61</sup> This meta-analysis has been critically reviewed.<sup>62,63</sup>

A further meta-analysis of 30 studies found that TM practice was more effective in reducing trait anxiety than mindfulness or other meditation techniques.<sup>64</sup> A meta-analysis of 16 randomized controlled trials found the TM practice to be especially effective in reducing anxiety in people



**Figure 9.** Effects of *TM* on Depression

with elevated anxiety, including prisoners, war veterans and war refugees, with rapid reductions in anxiety within the first two weeks of practice.<sup>65</sup> A 3-month randomized controlled study of secondary school teachers in Vermont found that TM practice significantly reduced perceived stress, depression, and overall teacher burnout.<sup>55</sup> Two months of regular TM practice significantly reduced perceived stress and mood disturbance in family caregivers, including reductions in anxiety, depression, anger, confusion, and fatigue, and increase in spiritual well-being.<sup>66</sup>

### Sleep Disorders

A 3-month randomized controlled trial found TM practice improved sleep in war veterans with PTSD compared to psychotherapy.<sup>49</sup> A controlled longitudinal study reported improved sleep as well as reduced hostility and decreased neuroticism in incarcerated offenders.<sup>67</sup> A five-month controlled study of 735 Japanese industrial workers found that TM reduced the number of workers with delayed sleep onset by 30% and those with middle of the night insomnia by 26%.<sup>53</sup> TM practice has been shown to reduce cortisol levels, a major factor associated with insomnia, throughout the 24-hour cycle, including during the night.<sup>27,31</sup>

### Hypertension

Although no published studies to date have reported blood pressure outcomes in veterans with PTSD, a series of nine randomized clinical trials have demonstrated that the Transcendental Meditation technique significantly reduces blood pressure in persons with hypertension.<sup>68-75</sup> A meta-analysis of 107 independent studies on stress-reduction and hypertension found that the Transcendental Meditation technique reduced blood pressure to a significantly greater extent than other mind-body interventions that have been studied in this regard.<sup>76</sup> Further independent meta-analyses have confirmed that TM reduces blood pressure.<sup>77,78</sup> A scientific statement from the American Heart Association (AHA) in 2013 found evidence that TM practice reduces blood pressure and states that “TM may be considered in clinical practice to lower BP.” In contrast, the AHA report found insufficient evidence to recommend other meditation techniques.<sup>79</sup>

### Comparison of TM and Mindfulness Meditation

Meditation practices are different and have different physiological and psychological effects. Mindfulness meditation is the meditation practice most widely used in the VA today. It is quite different from the Transcendental Meditation technique.

<b>Mindfulness</b>	<b>Transcendental Meditation</b>
A number of practices, including but not limited to meditation, that have the effect of strengthening attention and reducing judgmental perspectives	One clearly defined and highly standardized meditation practice overseen by a national organization
Can be taught without certification	Only taught by certified teachers who have attended 5 months in-residence training
Involves effort and direction of the mind	Is effortless
Works through practice of desired effects, such as attention or compassion	Works through neurophysiological changes produced by the experience of restful alertness in meditation



In addition to these differences, the Transcendental Meditation technique produces different physiological effects during the practice. Key areas of difference in physiological effect include:

- **Type of brain waves:** Mindfulness produces Theta (4-8 Hz) brain wave patterns; TM practice produces predominantly Alpha 1 (8-10 Hz) brain waves.<sup>81</sup>
- **Patterns of coherence:** Mindfulness produces increased coherence in the Theta and Alpha 2 (10-12 Hz) range, whereas TM produces coherence in the Alpha 1 range. The TM technique produces a global coherence not seen in the other meditations.<sup>85,86,81</sup>
- **Blood flow in the brain:** Mindfulness increases blood flow to the anterior cingulate gyrus, which indicates attention directing. It reflects that with mindfulness one is constantly changing the beam of attention from one thought or object of experience to another.<sup>83</sup> TM practice increases blood flow in the prefrontal cortex, indicating increased inner awareness, together with decreased blood flow in the pons, brain stem, and cerebellum, consistent with deep rest.<sup>84</sup>
- **Default mode network:** This is a system between the frontal and parietal areas of the brain which becomes active when the mind is not engaged in focused activity (think free flow of the mind when taking a relaxing shower). Mindfulness and other meditation techniques decrease the DMN activity, indicating that they require focused attention. TM increases activity in the default mode network, and it also increases coherence in the system.<sup>82</sup>

These differences are consistent with the ease of the TM practice, the deep level of physiological rest that it produces, and the unique state of restful alertness that is achieved during the practice.

As a result of the different neurophysiological effects of the practices, TM has been found to have robust impact on ameliorating stress-related conditions, including PTSD. A scientific statement from the American Heart Association in 2013 found evidence that TM reduces blood pressure and states that “TM may be considered in clinical practice to lower BP.” In contrast, the AHA report found insufficient evidence to recommend other meditation techniques.<sup>79</sup> A meta-analysis of 30 studies found that TM practice was more effective in reducing trait anxiety than mindfulness or other meditation techniques.<sup>64</sup>

In the area of PTSD, MBSR (Mindfulness-Based Stress Reduction) is the mindfulness program with the most studies on PTSD symptoms and thus most open to comparison with the TM technique. The following analysis compares the six peer-reviewed TM

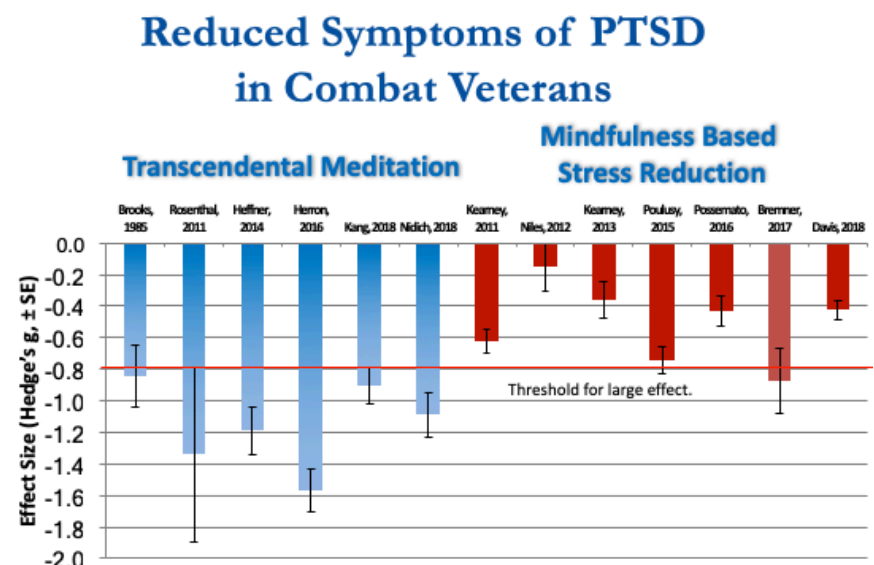
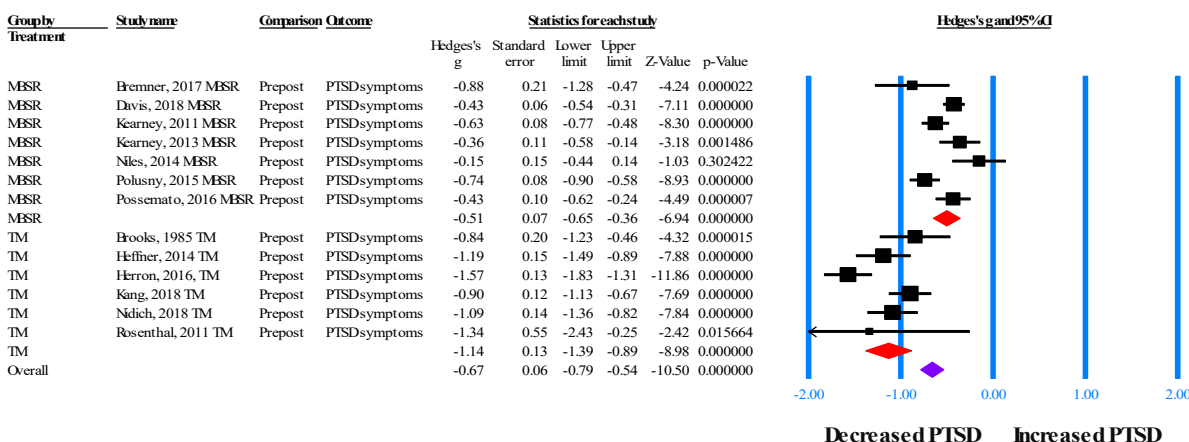


Figure 10. Within-group effect sizes for TM and MBSR



studies, shown in Table 1 (Herron and Rees, 2018, Kang et al., 2018, Brooks and Scarano, 1985, Nidich et al., 2018, Heffner et al., 2014, Rosenthal et al., 2011); and seven studies on MBSR [Bremner, et al, 2017<sup>113</sup>, Possemato, et al., 2016<sup>114</sup>, Kearney et al, 2012<sup>115</sup>, Kearney, et al, 2013<sup>116</sup>, Niles et al, 2012<sup>117</sup>, Polusny et al., 2015<sup>118</sup>, Davis et al., 2018<sup>119</sup>.] Figure 10 shows the within-group changes from pretest to posttest for the PTSD Check List. It would be great if you could decrease the font size for the title of the chart.

## Comparison of TM and MBSR for PTSD in Combat Veterans



### Random Effects Model

**Figure 11.** Forest Plot comparing MBSR and the TM technique

The above forest plot shows the results of a meta-analysis that provides average effects of MBSR and TM practice on reducing PTSD. The summary effect for MBSR was  $g = -.51$   $(-.65, -.36)$ ,  $Z = 6.94$ ,  $p < .00001$ , and medium effect (upper red diamond in Figure 17). TM had twice as large an effect,  $g = -1.14$   $(-1.39, -.89)$ , lower red diamond, Figure 17). The difference between TM practice and MBSR is  $g = -.61$ , a medium effect, which is highly statistically significant,  $Q(1) = 18.5$ ,  $p = 1.7E-05$ ,  $Z^3 = -9.98$ ,  $p < .00001$ . The conclusion from these eleven studies is that TM has a significantly greater effect on reducing PTSD than does MBSR. The overall effect size for all eleven studies, the TM technique and MBSR combined, shown as the lavender diamond, is  $-.67$   $(-.79, -.54)$ ,  $Z = 10.5$ ,  $p < .000001$ , indicating that meditation in general has a moderate to strong effect on reducing PTSD symptoms.

### Comparison to First-Line Treatments and Value-Added with TM Practice

The research findings from the different studies on the TM technique and PTSD are summarized in Table 12 below. This research shows that TM consistently has a large effect on reducing PTSD symptoms and also has a large effect on reducing depression, perhaps the most-costly comorbidity of PTSD. The effects of the TM technique are non-inferior to those produced by the two first-line trauma-focused therapies, cognitive processing therapy (CPT) and prolonged exposure (PE). Steenkamp<sup>10</sup>, in her review of psychotherapy for military-related PTSD, found the following:

- Within group post-treatment effect sizes were large (Cohen  $d$  range, 0.78-1.10)
- Forty-nine to 70% attained clinically meaningful PTSD symptom improvement
- Approximately two-thirds retained their PTSD diagnosis

The results from TM are comparable to these (see Table 12 below).

**Table 12: Summary of Research Outcomes**

<b><i>Study ID</i></b>	<b>Population /Trauma Type</b>	<b>Study design</b>	<b><u>CAPS</u> ES (95% CI) Pre-Post</b>	<b><u>PCL/ Other</u> ES (95% CI) Pre-Post</b>	<b><u>Depression</u> ES (95% CI) Pre-Post</b>	<b>Clinically Significant Reduction PTSD</b>	<b>Probable Loss PTSD Diagnosis</b>	<b>Other (Significant Findings)</b>
Brooks, 1985	War Vets/ Combat-trauma	RCT		This study was pre-PCL. Constructed from DSM-IV criteria -1.24	-1.2	*	*	Reductions in family problems, insomnia, anxiety, alcohol, employment problems
Rosenthal, 2011	War Vets/ Combat-Trauma	Pre-Post	-1.34	-1.34	BDI 42% reduction	100%	60%	QLES Improved quality of life
Heffner, 2014 Saginaw, MI	War Vets/ Combat-Trauma	RCT	-.88	-1.19		*	*	
Herron, 2017	War Vets/ Combat-Trauma	Pre-Post		-1.83		87%	80%	
Kang, 2018 (Minneapolis)	War Vets/ Combat-Trauma	Pre-Post	-.96	-.92		61%	*	
Nidich, 2018	War Vets/ Combat-Trauma	RCT	-.90	-1.10	PHQ-9 -1.22	60%	*	POMS Total Mood; QLES quality of life
Bellehsen, Submitted	War Vets/ Combat-Trauma	RCT	-.93	-.80	BDI -1.01	*	50%	
Tedeschi & Moore, 2019	War Vets/ Combat-Trauma	Pre-Post		56% reduction	DASS 21 50% reduction	*	*	Anxiety, Stress, Insomnia, Suicidality, Stress Reactivity
Chapin, 2016	War Vets/ Combat-Trauma	Pre-Post		-.88	OQ-45 -1.58	58%	40% (plus 20% on the line)	
Rees, 2013	War Refugees/ Combat Trauma	Pre-Post		-4.1		100%	90%	

Reese, 2014	War Refugees/ Combat Trauma	Pre-Post		-2.6		*	*	
Nidich, 2016	Men Prison Inmates: Interpersonal violence	RCT		Trauma Symptom Checklist -.74 (high trauma group)	Trauma Symptom Checklist -.78 (high trauma group)	*	*	Perceived stress, anxiety, sleep
Nidich, 2017	Women Prison Inmates: Interpersonal violence	RCT		-.85		80%	*	
Bandy, 2019	College Students/ Violence, sexual abuse	CT		-1.85	BDI -1.66	*	79%	

- Indicates not reported

### Value-Added of the TM Technique

While TM practice produces PTSD outcomes comparable to those of first-line treatment programs, it also offers a value-added not provided by these programs. This value-added makes TM particularly attractive as a first-line treatment.

### Speed of Effect

While trauma-focused therapies have large effects on reducing PTSD symptoms, these effects are most clearly seen after the first month of treatment and symptoms can worsen in the initial weeks. With the TM technique, effects for many people are experienced almost immediately (see Appendix 1, Veteran Experiences with TM). Research reviewed above has shown that TM practice produces clinically meaningful reductions in PTSD at 10 days<sup>105</sup> and two weeks.<sup>108</sup> Nidich (see Figure 12) found that reduction in PTSD, as measured by the PCL-M, occurred more quickly than with PE.<sup>37</sup>

### No Adverse Effects

Pharmacological treatments for PTSD can have multiple side effects. Setraline, for example, which has been shown recently to have positive effects on PTSD symptoms,<sup>132</sup> can have side-effects, including decreased sexual desire or ability, diarrhea, dizziness, drowsiness, dry mouth, headache, loss of appetite, nausea, nervousness, sleep disturbance, and tremors.<sup>135</sup> Trauma-focused therapies can increase symptoms in early stages of therapy, which makes these treatments unacceptable to some people. TM practice, in extensive research, has been found not to have negative side effects. As noted earlier, no adverse events were reported in an efficacy review of 20 randomized controlled trials that included 397 experimentally treated subjects,<sup>22</sup> and no safety concerns were raised in a report examining 813 studies of meditation



Figure 12

practices for health, including the TM technique.<sup>23</sup> Importantly, the NIH-sponsored clinical trials conducted using TM did not find any adverse effects from TM practice.<sup>24</sup>

### *Breadth of Effect*

Because the TM technique works through a general stress-reduction mechanism and increases resilience generally,<sup>134</sup> it can serve as a prophylactic against the full range of stressors and positively impact the range of stress-related conditions. Trauma-focused therapies are effective at reducing the stress associated with the focal trauma but don't have the broader impact that TM practice has on, for example, general anxiety<sup>133</sup> and preventing heart disease.<sup>56</sup> Because veterans often suffer from multiple ailments, learning TM can have a positive impact on areas other than PTSD. (See Appendix 3: Selected Research on the *Transcendental Meditation* Program.)

### *Lack of Stigma*

Despite efforts to counteract this, there is a stigma associated with engaging in trauma-focused therapies. Doing so is an acknowledgement of weakness, and there are potential implications for promotion. While the TM technique may suffer from being perceived as weird or unusual, it is not stigmatized as a treatment for sick people. TM is used widely for purposes of growth and stress reduction in schools, businesses, and the general population. It is practiced by corporate leaders, prominent athletes, and entertainers. As such, it is something that healthy people do. The fact that one can be self-sufficient with the practice after learning is also helpful. Self-sufficiency is a trait valued by many veterans and allows one to be private about the practice, if desired.

### *Acceptability of TM to Veterans*

The research shows that the TM technique is effective at reducing PTSD symptoms and other stress-related conditions. But will veterans choose to learn and practice it? A 2014 report sponsored by the Department of Veteran Affairs<sup>24</sup> concluded, despite powerful reductions in PTSD symptoms, that TM was not acceptable based on interviews with two veterans who had been adversely affected by material they found on the internet after learning. Today there is a great deal of evidence showing that TM is acceptable and will be learned by the great majority of veterans if presented properly.

The general acceptability of TM can be seen by the broad range of people who have learned, and institutions that have implemented, the technique. These include army generals, congressmen, members of the clergy of many religions, world-class athletes, entertainers, and CEOs of companies. Institutions include public schools in a number of states, VA centers, prisons, and corporate settings.<sup>35</sup> More than 3 million Americans from all walks of life and backgrounds have learned the TM technique. General acceptance of meditation is growing rapidly in the U.S. A 2018 report from the Centers for Disease Control and Prevention said that 14.2% of American adults surveyed in 2017 said they had practiced meditation at least once in the past year. This is up dramatically from 2012 when only 4.1% of adults said they practiced meditation.<sup>36</sup>

There is also ample evidence that TM practice is acceptable specifically to veterans. More than 4,000 veterans, active-duty soldiers, and military cadets have learned TM in the last decade through organized programs associated with the David Lynch Foundation and TM for Veterans. Thousands more have learned independent of these programs. Boulder Crest Retreat Center, an award-winning retreat center for veterans with PTSD operating in Virginia and Arizona, has

made the TM technique a cornerstone of its program, and all veterans who attend learn TM. More than 300 veterans have learned through this program, and the reaction to learning TM has been consistently positive.

Research data also supports the acceptability of the TM technique. In the 2018 *The Lancet Psychiatry* study comparing TM to Prolonged Exposure therapy,<sup>37</sup> the non-completion rate from individuals in the Prolonged Exposure group was 38% vs. 25% for the TM group. This indicates that TM practice is at least as acceptable as what is now considered the gold standard treatment for PTSD used in VA Medical Centers around the country.

### Feasibility of Program Implementation

The Transcendental Meditation technique is taught in a program involving a core course and follow-up. The core course involves four consecutive days of 75-90 minutes per day. The first day includes one-on-one training in TM; the three subsequent days are group classes focused on intellectual understanding of correct practice. Basic mastery of and comfort with TM practice is gained in this course. Follow-up varies but in structured institutional programs generally involves weekly follow-up for four weeks and then weekly or bi-weekly follow-ups for the next two months. These sessions last an hour and serve to refine and support students in establishing regular TM practice. Following formal training, people who have learned TM have access to life-time follow-up for their practice from certified TM teachers for no charge at *TM* Centers around the country.

The TM technique has been taught effectively to veterans and active-duty military personnel in a variety of different program settings—in-residence, out-patient, and through local *TM* Centers. Two in-residence programs for veterans using TM practice are the Boulder Crest Retreat Center and the VA-funded National Substance Use Disorder Pilot Program. Out-patient institutional programs have occurred in numerous VA Centers and the Eisenhower Medical Center at Fort Gordon, Georgia. As a resilience-building technique, TM has been successfully introduced to over 1,000 cadets at Norwich University and to more than 100 officers at the National Defense University in Washington, D.C. As the data from Herron (2018) demonstrates, TM has also been taught with excellent results through *Transcendental Meditation* Centers around the country.

### Boulder Crest Retreat Warrior PATHH Program

The Boulder Crest Retreat Center Warrior PATHH program takes veterans with PTSD in cohorts of six to eight for a one-week period. It then provides technology-based follow-up for these cohorts for a period of 18 months after the initial retreat. TM is a foundational component of the rich multi-modal Warrior PATHH program that aims to provide wounded warriors with the tools and knowledge to achieve meaningful post-traumatic growth. Between 2016 and 2018 more than 300 veterans have learned TM at BCRC. As the discussion on outcomes of the Warrior PATHH program above showed, eighteen-month evaluation of the first 8 cohorts has shown excellent results:<sup>38</sup>

Dusty Baxley, former Army Ranger and executive director of the Boulder Crest Retreat, refers to TM as the “secret sauce” that helps make everything else work. “As a combat veteran myself, I know what it is like to be on both sides of feeling down and filled with anxiety and being able to

find peace and calm,” says Baxley. “Transcendental Meditation is life-changing, especially for combat veterans.”

#### [Eisenhower Army Medical Center, Fort Gordon, Georgia](#)

Fort Gordon in Augusta, Georgia, is home to Dwight D. Eisenhower Army Medical Center. Since 2012, the Transcendental Meditation technique has been taught at the state-of-the-art Traumatic Brain Injury (TBI) Clinic at the Eisenhower Army Medical Center. The focus of this program for the TBI clinic is as an adjunctive treatment to the evidenced-based therapies for PTSD. The program was initially supported by funding from the David Lynch Foundation and now, because of the success of the program, it is being funded through contracts from the Department of the Army. Between 2012 and 2018, 173 active-duty military learned TM. Published research conducted at the Center showed significant reductions in the use of medications in soldiers who learned TM compared to controls, and significant reductions in stress.<sup>39</sup>

#### [National Substance Use Disorder Pilot Program](#)

The VA has begun a program called the National Substance Use Disorder Pilot Program for treating veteran patients with SUDs that combines counselling, medication, technology, and the TM technique in a one-stop-shop approach. The program provides treatment in both inpatient and outpatient facilities. Treatment is funded by the VA. Patients for whom meditation is indicated learn the TM technique as part of an average 10-day inpatient acute detox stay. Patients then transfer to outpatient care where treatment continues for several months, including robust follow-up for meditation. The program began in September 2018, and there are no hard outcomes at this point. Acceptance of TM practice by patients, however, has been high.

#### [Veteran Affairs Medical Centers](#)

The TM technique has now been taught in a number of VAMCs around the country. The largest current programs are at the Manhattan, Bronx, and Brooklyn VAMCs in New York, where over 230 veterans learned TM with scholarships provided by the David Lynch Foundation between 2016 and the end of 2018.

#### [Norwich University](#)

The TM technique is both an effective treatment for stress-related disorders and a resilience-builder that provides a prophylactic against stress. Because protecting against and managing stress is so important to success in the military and all areas of life, there is a strong rationale for including TM in educational and training programs. The TM technique was introduced at Norwich University beginning in 2011, and more than 1,000 cadets and staff have learned TM there as of 2018.

TM practice was first introduced at Norwich as part of a randomized study with meditating students in one platoon and non-meditating students in another. President Richard Schneider, Rear Admiral USCGR (Ret.), recalls that “within four or five weeks, the kids who didn’t get the training were complaining that the other kids had an advantage over them.” Within 90 days, the platoon that learned TM was outperforming the control platoon in every measurable functional area.<sup>40</sup> These results were substantiated by psychological and neurophysiological tests conducted by the faculty at Norwich. The research found significant reductions in depression, anxiety, and

stress in the TM platoon and significant increases in constructive thinking, behavioral coping and resilience. This study was replicated the next year at Norwich, and they found the same results.<sup>41</sup>

#### National Defense University

More than 100 career military officers learned the Transcendental Meditation technique at the National Defense University in 2017 and 2018.

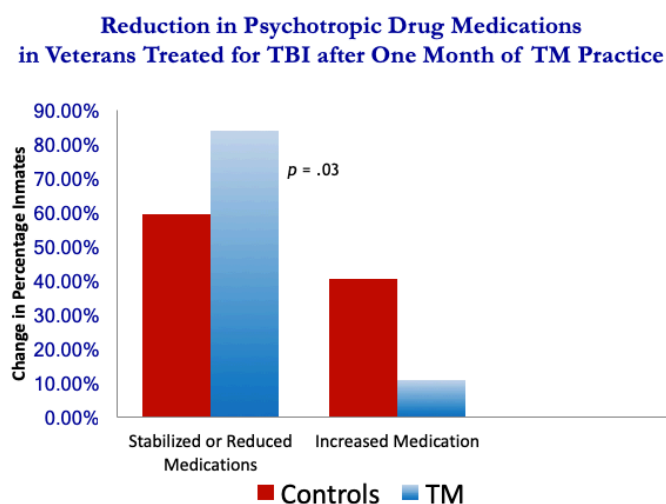
#### TM Center-based instructions

One of the strengths of the TM technique as a treatment for PTSD and comorbid conditions is that a national network of *TM* Centers currently exists for delivering the course and for providing life-time follow-up for veterans and active-duty military who have learned. As data from the Herron research indicate,<sup>101</sup> veterans who learn at *TM* Centers have results comparable to those who learn in formal institutional settings. The primary difference between institutional and Center-based programs is that follow-up is more systematized in institutional settings.

The success of implementation of the TM technique in these diverse settings shows the robustness of the technique. Instruction can be successfully accommodated to different settings and different populations.

#### Cost Effectiveness of the *Transcendental Meditation* Technique

The Congressional Budget Office in 2012 calculated that the average 4-year cost of treating a veteran with PTSD through a VA facility was \$20,200. The PTSD-specific treatment for veterans amounted to \$10,000, nearly half of the total cost of treatment for veterans with PTSD at the VA. These costs are front-loaded with cost of PTSD-specific treatment being \$4,100 in the first year.<sup>87</sup> The lifetime cost of the Transcendental Meditation technique is \$960, \$1,500, or \$2500 per veteran depending on implementation option—at a *TM* Center, out-patient at a VAMC/medical clinic, or inpatient with long-term follow-up, respectively. Even recognizing that using Transcendental Meditation practice as a first-line treatment for PTSD would not eliminate all other diagnostic and treatment costs of PTSD, there are significant potential cost efficiencies from using the TM technique as a primary PTSD treatment. One source of savings is a reduction in drug costs. Research conducted on active duty personnel with PTSD or anxiety disorder at the Eisenhower Medical Center at Fort Gordon in Augusta, Georgia, found that individuals who learned TM had increased stabilization or reduction of medication use and reduced percentage with increased medication usage at one month and maintained at 6 months.<sup>130</sup>



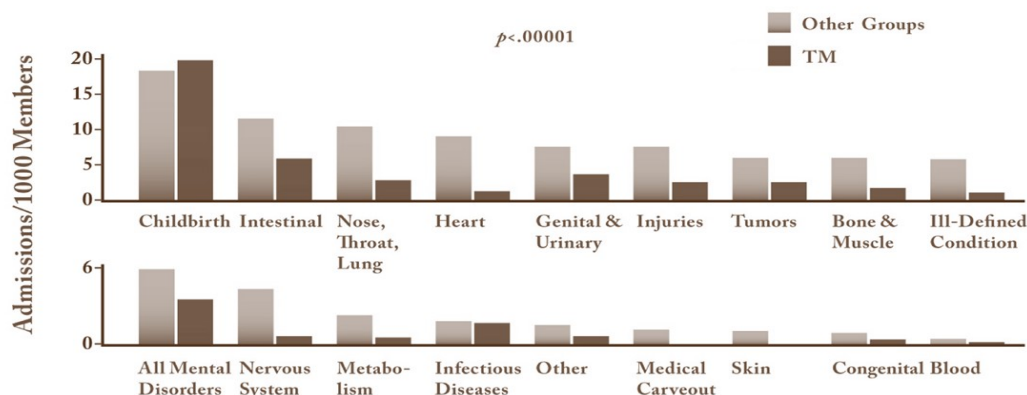
**Figure 13.** Reduction in Psychotropic Drug Medications



These cost-savings are augmented by the effectiveness of TM practice in treating comorbid conditions. While the exact cost-saving potential of using TM as a PTSD treatment cannot be determined independent of a specifically-designed study, the following research on health care cost reductions through the TM technique suggests that these savings could be considerable.

Since most veterans with PTSD have comorbidities, it is important to understand that TM practice affects a wide range of medical care use. Chronic stress causes, aggravates, or contributes to a wide array of costly mental and physical disorders. Because the TM technique very effectively decreases stress, it is not surprising that a study by Orme-Johnson found that TM practitioners had reduced hospital admissions in all disease categories.<sup>88</sup>

## TM decreases hospital admissions in all categories of disease.



**Reference:** Orme-Johnson DW. Medical care utilization and the Transcendental Meditation program. *Psychosomatic Medicine*. 1987;49:493-507.

**Figure 14.** The TM technique and health care utilization in a general population

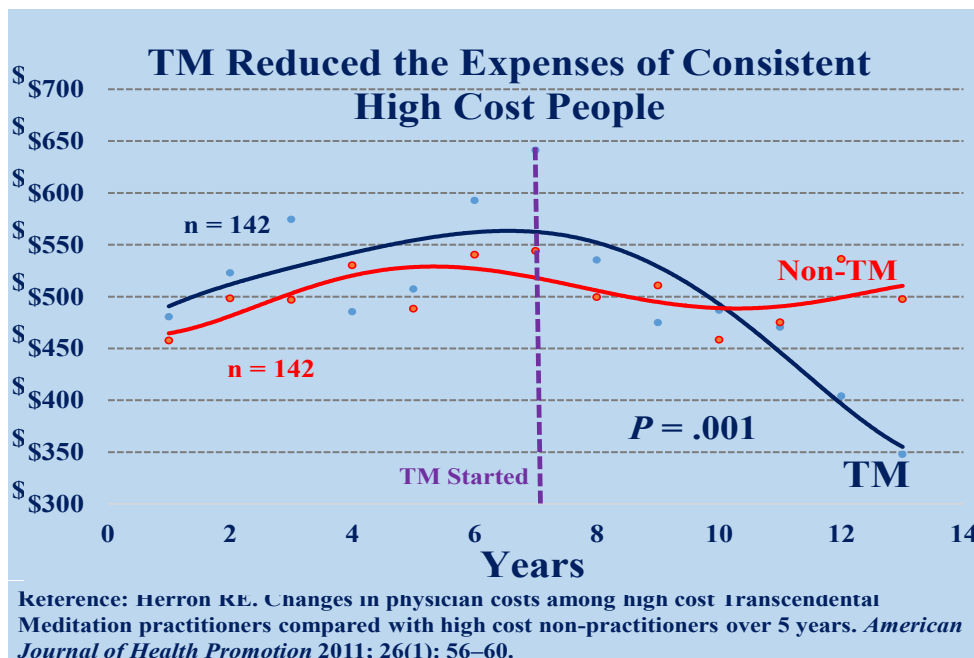
Chronic stress also contributes to the unhealthy lifestyles of veterans with PTSD. These factors converge to cause increased illnesses and high medical costs for these people. They are at risk of becoming persistent high-cost patients over many years, even decades.<sup>89,90</sup> The effect of TM on reducing unhealthy behaviors, such as substance use and smoking,<sup>96,97</sup> can help us to understand this impact on overall health costs.

### High-Cost Groups

In most populations, a small fraction of people account for the majority of health care expenses. In the United States, the highest spending 10% in the general population has incurred 60% to 70% of total medical expenditures annually.<sup>91-93</sup> There is a similar phenomenon in the VA medical system. A study found that in 2010, approximately 5% of VA patients incurred nearly half of all medical treatment expenses.<sup>89</sup> These high-cost veterans had three or more chronic conditions.<sup>89</sup> In addition, Yoon et al. found that the percentage of VA patients with four or more



chronic conditions has been increasing; it grew from 15% in 2000 to 22% in 2008.<sup>94</sup> While consistent high-cost patients with PTSD present financial challenges to the VA medical system, there are also opportunities for reducing overall medical spending.



**Figure 15.** The TM technique and health care costs in high-cost population

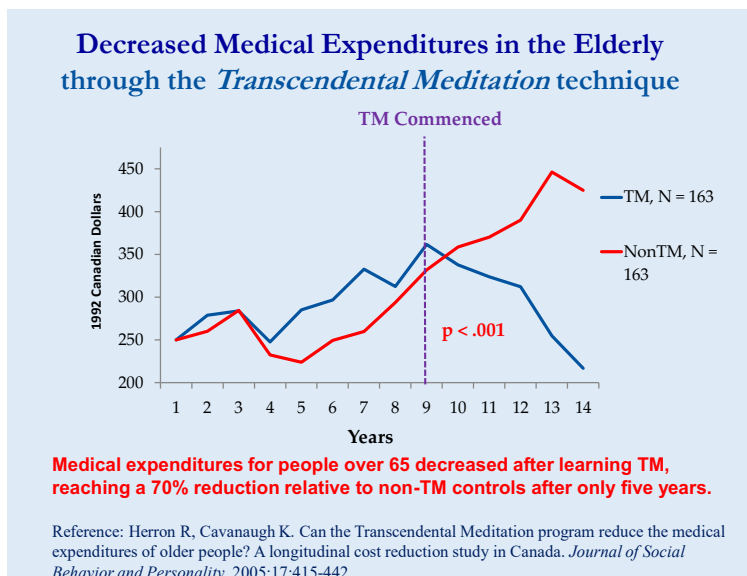
Research on TM practice has found that it is effective in bringing down health care costs in high-cost populations. A study conducted in Canada followed two high-cost groups over a period of about 12 years. The TM group started TM in Year 7. Before starting meditation, the yearly rate of increase in payments to physicians between the two high-cost groups was not significantly different. After commencing meditation, the TM group's mean payments declined annually ( $p = .004$ ), whereas the Non-TM comparison group's payments exhibited nonsignificant changes. After 1 year, the TM group's physician expenses decreased 11%, and after five years, their cumulative reduction was over 28%.<sup>95</sup> A reduction in the medical expenses of the small percentage of people who consistently incur the majority of costs means that overall expenditures can be dramatically decreased.

#### Elderly populations

Almost half of the veterans who receive medical care from the VA system are over age 65. Vietnam veterans comprise most of this category. Marmar et al found: "Approximately 271,000 Vietnam theater veterans have current full PTSD plus subthreshold war-zone PTSD, one-third of whom have current major depressive disorder, 40 or more years after the war. These findings underscore the need for mental health services for many decades for veterans with PTSD symptoms."<sup>98</sup> The TM technique could fulfill that need.

A study in Quebec, Canada, compared the payments to physicians of 163 people over age 65 who practiced the TM with 163 matched seniors who did not meditate. After starting the TM technique, payments were significantly reduced in the TM group compared with non-TM

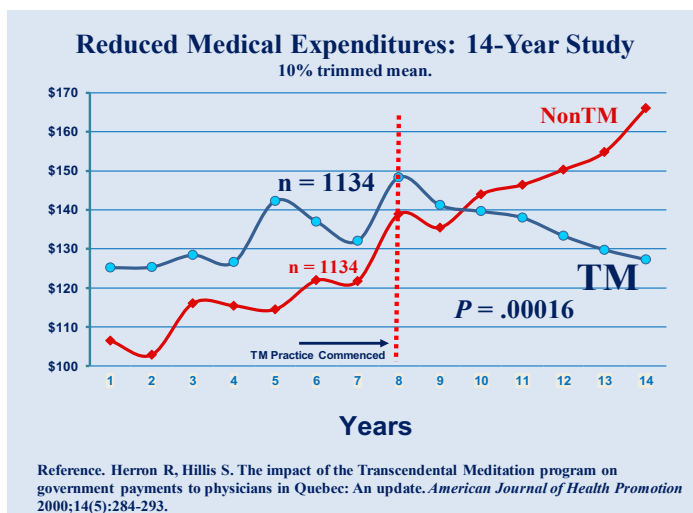
comparison subjects, with a five-year cumulative reduction of 70% relative to the comparison group at the end of the study.<sup>99</sup>



**Figure 16.** The TM technique and health care costs with elderly populations

### Non-Elderly Populations

Approximately half of our veterans are under age 65. Most of these veterans served in Iraq and Afghanistan. Research also suggests that TM practice reduces the medical expenses of those who are under age 65. A 14-year study with 2,836 participants enrolled in the Quebec health insurance program evaluated monthly payments to doctors. The average age of the participants was 38 years. After learning the technique, the TM group's payments declined over 6 years compared with controls. The average annual difference was 5% to 13%, leading to a cumulative reduction of 55% after 6 years.<sup>1</sup>



**Figure 17.** The TM technique and health care costs in non-elderly populations

This research on the effect of the TM technique on reducing health care costs generally and for specific sub-populations is consistent with the clinical research showing the effects of TM on improving stress-related conditions ranging from heart disease to depression. This research suggests that instruction in TM would have broader positive impacts on reducing health care costs of veterans with PTSD than simply the costs associated with PTSD treatment.

### Conclusion

Post-Traumatic Stress Disorder is a serious and disabling condition that is taking a high psychological and financial toll. Because the number of PTSD-related suicides in veterans now far outstrips battlefield deaths, finding effective treatments has a particular urgency. There is a widely recognized need to identify new approaches to treating PTSD that are both effective and acceptable to veterans. The research presented in this white paper shows clearly that the Transcendental Meditation technique is such an approach. The research suggests that TM is as effective at reducing PTSD symptoms as currently utilized approaches. Because it works through a general stress reduction mechanism, it is also effective at dealing with the stress-related comorbidities of PTSD—depression, anxiety, substance abuse, insomnia, hypertension. Unlike trauma-focused therapies, TM can provide a treatment and prophylactic for multiple stress-related conditions. Because it is a take-home technique, individuals who learn it continue to get the stress-reduction and mind-enhancing benefits.

TM practice also has the advantage that it is not stigmatized as only a treatment for a psychological disorder. Because of its stress-reducing and cognitive-enhancing benefits, it is used by students and individuals in the corporate sector, including students at the National Defense University. It can be learned without stigma and also outside of VA Centers, reducing patient backlog and increasing accessibility to veterans. The costs associated with TM instruction are in line with or lower than the costs associated with currently-used therapies. The published research showing that TM practice reduces health care costs suggests that introduction of TM on a broad scale would lead to considerable cost savings.

The thousands of veterans who have learned the TM technique confirm that the practice is acceptable to them. Even if they are skeptical or unsure before they learn, the ease of practice and prompt results often makes them committed to the practice (see Appendix 1: Veteran Experiences with TM). The variety of settings where it has been introduced suggests that it is feasible to implement widely in VA and DOD health care systems.

Decisions about clinical application and policy should be based on the convergence of evidence from a variety of sources that arrive at the same conclusion. More than 400 scientific studies, including more than 50 on PTSD and its comorbidities, have documented the benefits of TM practice for mind, body, and behavior. When considering all of the research on the impact of the TM technique in reducing psychological and physiological stress, the convergence of evidence suggests that TM practice offers an effective first-line or adjunct method for treating PTSD and reducing attendant expenses. The Transcendental Meditation technique has the evidence behind it to justify inclusion as a primary or adjunctive treatment for PTSD in programs funded by the Department of Defense and Veterans Health Administration.

## Notes

1. Ostacher M, Cifu A, Management of Posttraumatic Stress Disorder. *JAMA*. 2019 321(2): 200-201.
2. Tanielian T, Jaycox L. Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery. Santa Monica, California: RAND Corporation; 2008.
3. <https://medlineplus.gov/magazine/issues/winter09/articles/winter09pg10-14.html>
4. Kulka R, Schlenger W, Fairbank J, et al. Trauma and the Vietnam War Generation: Report of Findings From the National Vietnam Veterans Readjustment Study. New York, NY: Brunner/Mazel, 1990.
5. Hoge CW, Terhakopian A, Castro CA, Messer SC, Engel CC. Association of posttraumatic stress disorder with somatic symptoms, health care visits, and absenteeism among Iraq war veterans. *Am J Psychiatry* 2007; 164(1): 150-3.
6. Kessler RC, Posttraumatic stress disorder: the burden to the individual and to society. *J Clin Psychiatry*, 2000. 61 Suppl 5: 4-12; discussion 13-4.
7. Wagner AW, Wolfe J, Rotnitsky A, Proctor SP, and Erickson DJ, An investigation of the impact of posttraumatic stress disorder on physical health. *J Trauma Stress*, 2000. 13(1): 41-55.
8. Engelhard I, Van Den Hout M, Weerts J, Hox J, and Van Doornen L, A prospective study of the relation between posttraumatic stress and physical health symptoms. *International Journal of Clinical and Health Psychology*, 2010. 9: 365-372.
9. Davidson JR. Pharmacologic treatment of acute and chronic stress following trauma: 2006. *J Clin Psychiatry*. 2006;67 Suppl 2:34-9.
10. Steenkamp MM, et al. Psychotherapy for Military-Related PTSD: A Review of Randomized Clinical Trials. *JAMA*. August 2015; 314 (5) 489-500
11. Jeffreys MD, Reinfeld C, Nair PV, Garcia HA, Mata-Galan E, Rentz TO. Evaluating treatment of posttraumatic stress disorder with cognitive processing therapy and prolonged exposure therapy in a VHA specialty clinic. *J Anxiety Disord* 2014; 28(1): 108-14.
12. Najavits LM. The problem of dropout from “gold standard” PTSD therapies. *F1000Prime Rep*. 2015 Apr 2;7:43. doi: 10.12703/P7-43. eCollection 2015.
13. Mott JM, Hundt NE, Sansgiry S, Mignogna J, Cully JA. Changes in psychotherapy utilization among veterans with depression, anxiety, and PTSD. *Psychiatr Serv*. 2014;65:106–12. doi: 10.1176/appi.ps.201300056.
14. Seal KH, Maguen S, Cohen B, Gima KS, Metzler TJ, Ren L, Bertenthal D, Marmar CR. VA mental health services utilization in Iraq and Afghanistan veterans in the first year of receiving new mental health diagnoses. *J Trauma Stress*. 2010;23:5–16. doi: 10.1002/jts.20493.
15. <https://www.militaryonesource.mil/health-wellness/mental-health/mental-health/does-receiving-psychological-health-care-affect-security-clearance>

16. R. Chalmers, Clements G., Schenkluhn H., Weinless M., eds. *Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers, Vols. 2-4*. Vlodrop, The Netherlands: Maharishi Vedic University Press, 1989.
17. M. C. Dillbeck, ed. *Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers, Vol. 6*. Vlodrop, The Netherlands: Maharishi Vedic University Press, 2011.
18. M. C. Dillbeck, Barnes V. A., Schneider R. H., et al., eds. *Scientific Research on the Transcendental Meditation and TM-Sidhi Program: Collected Papers, Vol. 7*. 7 vols. Vol. 7. Vlodrop, The Netherlands: Maharishi Vedic University Press, 2013.
19. D. W. Orme-Johnson, Farrow J. T., eds. *Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers, Vol. 1*. Livingston Manor, New York: Maharishi International University Press, 1977.
20. R. K. Wallace, Orme-Johnson D. W., Dillbeck M. C., eds. *Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers, Vol. 5*. Fairfield, Iowa: Maharishi International University Press, 1990.
21. F. T. Travis, Wallace R. K. "Autonomic patterns during respiration suspensions: Possible markers of Transcendental Consciousness." *Psychophysiology* 34 (1997): 39-46.
22. A. J. Arias, Steinberg K., Banga A., al. e. "Systematic review of the efficacy of meditation techniques as treatments for medical illness." *Journal of Alternative and Complementary Medicine* 12 (2006): 817-832.
23. M. B. Ospina, Bond K., Karkhaneh M., et al. "Clinical Trials of Meditation Practices in Health Care: Characteristics and Quality." *Journal of Alternative and Complementary Medicine* 14, no. 10 (2008): 1199-1213.
24. K. L. Heffner, Caine E. D., Crean H., et al. *Meditation for PTSD demonstration project: Final report to Mental Health Services, Department of Veteran Affairs*. Rochester, New York: Department of Psychiatry at the University of Rochester;2014.
25. R. Jevning, Wilson A. F., Davidson J. M. "Adrenocortical activity during meditation." *Hormones and Behavior* 10, no. 1 (1978): 54-60.
26. J. R. Infante, Torres-Avisbal M., Pinel P., et al. "Catecholamine levels in practitioners of the transcendental meditation technique." *Physiology & Behavior* 72, no. 1-2 (2001): 141-146.
27. C. R. K. MacLean, Walton K. G., Wenneberg S. R., et al. "Effects of the Transcendental Meditation program on adaptive mechanisms: Changes in hormone levels and responses to stress after 4 months of practice." *Psychoneuroendocrinology* 22, no. 4 (1997): 277-295.
28. M. C. Dillbeck, Orme-Johnson D. W. "Physiological differences between Transcendental Meditation and rest." *American Psychologist* 42 (1987): 879-881.
29. M. Bujatti, Riederer P. " Serotonin, noradrenaline, dopamine metabolites in Transcendental Meditation technique." *Journal of Neural Transmission* 39 (1976): 257-267.
30. V. A. Barnes, Orme-Johnson D. W. "Prevention and treatment of cardiovascular disease in adolescents and adults through the Transcendental Meditation program®: A research review update." *Current Hypertension Reviews* 8, no. 3 (2012): 227-242.

31. K. G. Walton, Pugh N., Gelderloos P., Macrae P. "Stress reduction and preventing hypertension: Preliminary support for a psychoneuroendocrine mechanism." *Journal of Alternative and Complementary Medicine* 1, no. 3 (1995): 263-283.
32. K. G. Walton, Schneider R. H., Nidich S. I., et al. "Psychosocial stress and cardiovascular disease 2: Effectiveness of the Transcendental Meditation technique in treatment and prevention." *Behavioral Medicine* 28, no. 3 (2002): 106-123.
33. R. S. Schneider, Mills P. M., Schramm W. "Serum dehydroepiandrosterone sulfate (DHEAS) levels in Transcendental Meditation practitioners." *Psychosomatic Medicine* 51 (1989): 256.
34. J. L. Glaser, Brind J. L., Vogelmann J. H., et al. "Elevated serum dehydroepiandrosterone sulfate levels in practitioners of Transcendental Meditation (TM) and TM-Sidhi programs." *Journal of Behavioral Medicine* 15, no. 4 (1992): 327-341.
35. Roth R. *Strength in Stillness: The Power of Transcendental Meditation*. New York: Simon and Schuster, 2018.
36. Clarke T, Barnes P, Black L, Stussman B, Nahin R. Use of Yoga, Meditation and Chiropractors Among U.S. Adults Aged 18 and Over. NCHS Data Brief, No. 325, November 2018.
37. Nidich S, Mills P, Rainforth M, Heppner P, Schneider R, Rosenthal N, Salerno J, Gaylord-King C, Rutledge T. A randomised controlled trial of non-trauma focused meditation compared to exposure therapy in veterans with PTSD. *Lancet Psychiatry* (2018) Vol. 5: 12. 975-986.
38. Tedeschi R, Moore B. Warrior PATHH 18-Month Report (January 2019)  
[https://static1.squarespace.com/static/54b6abd6e4b07b4a7d04efb5/t/5c572bccec212d2d5aa40c4d/1549216718611/Small\\_Digital\\_Vol+4\\_18+Month+Study+Interim+Report.pdf](https://static1.squarespace.com/static/54b6abd6e4b07b4a7d04efb5/t/5c572bccec212d2d5aa40c4d/1549216718611/Small_Digital_Vol+4_18+Month+Study+Interim+Report.pdf)
39. Barnes VA, Rigg JL, Williams JJ. (2013). A clinical case series: Treatment of PTSD with Transcendental Meditation in active duty military personnel. *Military Medicine*, 178, 836-840.
40. TM at Norwich University. Video. Can be found on homepage of the TM for Veterans website: <https://tmforveterans.org/>.
41. Bandy C.L., Fleming K., Meyer, M., & Dulmage J. Meditation training in Rook Cadets increases resilience (Norwich University) (manuscript being prepared for publication).
42. Brady KT (1997). Posttraumatic stress disorder and comorbidity: recognizing the many faces of PTSD. *Journal of Clinical Psychiatry*, 58 Suppl 9:12-5.
43. Brady KT, Killeen TK, Brewerton T, Lucerini S (2000). Comorbidity of psychiatric disorders and posttraumatic stress disorder. *Journal of Clinical Psychiatry*, 61 Suppl 7:22-32.
44. 2017 Wounded Warrior Project Survey: Report of Findings.  
<https://www.woundedwarriorproject.org/media/172072/2017-wwp-annual-warrior-survey.pdf>
45. Howard JT, Sosnov JA, Janak JC, Gundlapalli AV, Pettey WB, Walker LE, Stewart IJ (2018). Associations of Initial Injury Severity and Posttraumatic Stress disorder Diagnoses with Long-Term Hypertension Risk After Combat. *Hypertension* 71:824–832.
46. Jayadevappa R., et al. Effectiveness of Transcendental Meditation on Functional Capacity and Quality of Life of African Americans with Congestive Heart Failure: A Randomized Control Study. *Ethnicity and Disease*, 2007; 17(winter): 72-77.

47. Kondwani K, et al. Left ventricular mass regression with the Transcendental Meditation technique and a health education program in hypertensive African Americans. *Journal of Social Behavior and Personality* 2005;17(1):181-200.
48. Chhatre S, et al. Effects of behavioral stress reduction Transcendental Meditation intervention in persons with HIV. *AIDS Care* 2013; 25(10), 1291-1297.
49. Brooks JS & Scarano T. Transcendental Meditation and the treatment of post-Vietnam adjustment. *Journal of Counseling and Development* 1985; 64: 212-215.
50. Nidich S, et al. Reduced trauma symptoms and perceived stress in male prison inmates through the Transcendental Meditation program: A randomized controlled trial. *The Permanente Journal* 2016; 20(4):16-007.
51. Barnes, V.A., Treiber, F.A., and Davis, H., Impact of Transcendental Meditation on cardiovascular function at rest and during acute stress in adolescents with high normal blood pressure. *Journal of Psychosomatic Research*, 2001; 51(4):597-605.
52. Sheppard, W. D., Staggers, F., & Johns, L. The effects of a stress management program in a high security government agency. *Anxiety, Stress, and Coping* 1997; 10(4): 341-350.
53. Haratani T and Hemmi T. Effects of Transcendental Meditation on the mental health of industrial workers. *Japanese Journal of Industrial Health* 1990; 32: 656.
54. Wendt S, et al. Practicing Transcendental Meditation in high schools: Relationship to well-being and academic achievement among students. *Contemporary School Psychology* 2015, July 22.
55. Elder C, et al. Effect of Transcendental Meditation on employee stress, depression, and burnout: a randomized controlled study. *The Permanente Journal* 2014; 18:19-23.
56. Schneider RH, Grim CE, Rainforth MA, Kotchen TA, Nidich SI, Gaylord-King C, et al. Stress reduction in the secondary prevention of cardiovascular disease: Randomized controlled trial of Transcendental Meditation and health education in blacks. *Circulation: Cardiovascular Quality and Outcomes*, 2012;5(6):750-8.
57. Alexander, C.N., Robinson, P., and Rainforth, M., Treating alcohol, nicotine and drug abuse through Transcendental Meditation: A review and statistical meta-analysis. *Alcoholism Treatment Quarterly*, 1994; 11: 13-87.
58. Taub E, et al. Effectiveness of broad spectrum approaches to relapse in severe alcoholism: a long-term, randomized, controlled trial of Transcendental Meditation, EMG biofeedback and electronic neurotherapy. *Alcoholism Treatment Quarterly* 1994; 11(1/2):187-220.
59. Haaga DA, et al. Effects of the Transcendental Meditation Program on Substance Abuse among University Students. *Cardiology Review and Practice* 2011; 10 (doi: 10.4061).
60. Gryczynski J, et al. Integration of Transcendental Meditation into alcohol use disorder (AUD) treatment. *Journal of Substance Abuse Treatment* April 2018; 87:23-30.
61. Eppley, K., Abrams, A.I., and Shear, J., Differential effects of relaxation techniques on trait anxiety: A meta-analysis. *Journal of Clinical Psychology*, 1989; 45(6): 957–974.
62. Orme-Johnson, D. and Walton, K., All approaches to preventing or reversing effects of stress are not the same. *American Journal of Health Promotion*, 1998; 12(5): 297-299.
63. Barnes, V. and Orme-Johnson, D., Clinical and Pre-Clinical Applications of the Transcendental Meditation program in the prevention and treatment of essential hypertension and cardiovascular disease in youth and adults. *Current Hypertension Reviews*, 2006; 2: 207-218.

64. Sedlmeier P, et al. The psychological effects of meditation: A meta-analysis. *Psychological Bulletin* 2012; 138, 1139–1171.
65. Orme-Johnson, et al. Effects of the Transcendental Meditation technique on Trait Anxiety: A Meta-Analysis of Randomized Controlled Trials. *Journal of Alternative and Complementary Medicine* 2013; 20(5), 330-341.
66. Nidich S, et al. Stress reduction with the Transcendental Meditation program in caregivers: A pilot study. *International Archives of Nursing and Health Care Perspectives* 2015;1(011):1-4.
67. Abrams A and Siegel L. The Transcendental Meditation program and rehabilitation at Folsom State Prison: A cross-validation study. *Criminal Justice and Behaviour* 1978; 5:3-20.
68. Schneider, R.H., Staggers, F., Alexander, C., Sheppard, W., Rainforth, M., Kondwani, K., Smith, S., and King, C.G., A randomized controlled trial of stress reduction for hypertension in older African Americans. *Hypertension*, 1995; 26: 820-827.
69. Alexander, C.N., Schneider, R., Staggers, F., Sheppard, W., Clayborne, M., Rainforth, M., Salerno, J., Kondwani, K., Smith, S., Walton, K., and Egan, B., A trial of stress reduction for hypertension in older African Americans (Part II): Sex and risk factor subgroup analysis. *Hypertension*, 1996; 28(1):228-237.
70. Walton, K.G., Schneider, R.H., Nidich, S.I., Salerno, J.W., Nordstrom, C.K., and Bairey-Merz, C.N., Psychosocial stress and cardiovascular disease 2: Effectiveness of the Transcendental Meditation technique in treatment and prevention. *Behavioral Medicine*, 2002; 28(3):106-123.
71. 4. Walton, K., Schneider, R., and Nidich, S., Review of controlled research on the Transcendental Meditation Program and cardiovascular disease - Risk Factors, Morbidity and Mortality. *Cardiology in Review*, 2004; 12(5)262-266.
72. Anderson J.W., Liu C., and Kryscio R.J., Blood pressure response to transcendental meditation: A meta-analysis. *Am J Hypertens* 2008; 21:310-316.
73. Barnes, V. and Orme-Johnson, D., Clinical and Pre-Clinical Applications of the Transcendental Meditation program in the prevention and treatment of essential hypertension and cardiovascular disease in youth and adults. *Current Hypertension Reviews*, 2006; 2: 207-218.
74. Barnes, V.A., Treiber, F.A., and Davis, H., Impact of Transcendental Meditation on cardiovascular function at rest and during acute stress in adolescents with high normal blood pressure. *Journal of Psychosomatic Research*, 2001; 51(4):597-605.
75. Barnes, V.A., Treiber, F.A., and Johnson, M.H., Impact of stress reduction on ambulatory blood pressure in African American adolescents. *American Journal of Hypertension*, 2004; 17:366-369.
76. Rainforth M.V., Schneider R.H., Nidich S.I., Gaylord-King, C., Salerno J.W., and Anderson J.W., Stress Reduction Programs in Patients with Elevated Blood Pressure: A Systematic Review and Meta-analysis. *Current Hypertension Reports* 2007; 9:520–528.
77. Anderson JW, et al. Blood pressure response to Transcendental Meditation: a meta-analysis. *American Journal of Hypertension* 2008; 21:310-316
78. Bai Z, et al. Investigating the effect of transcendental meditation on blood pressure: a systematic review and meta-analysis. *Journal of Human Hypertension* 2015; 29:653-662



79. Brook RD, et al. Beyond medications and diet: alternative approaches to lowering blood pressure. A scientific statement from the American Heart Association. *Hypertension* 2013; 61:1360-1383.
80. Operation Warrior Wellness: Summary of Results, David Lynch Foundation Internal Evaluation Report
81. Travis F, Shear J. Focused attention, open monitoring and automatic self-transcending: categories to organize meditations from Vedic, Buddhist and Chinese traditions. *Consciousness and Cognition* 2010 19(4):1110-1118
82. Brain and Cognition. 2017;111:86-94.
83. Holzel BK, Ott U, Hempel H, Hackl A, Wolf K, Stark R, et al. Differential engagement of anterior cingulate and adjacent medial frontal cortex in adept meditators and non-meditators. *Neuroscience Letters*. 2007 Jun 21;421(1):16-21.
84. Mahone, M. C., Travis, F., Gevirtz, R., & Hubbard, D. (2018). fMRI during Transcendental Meditation practice. *Brain and Cognition*, Epub 2018 Mar 2.
85. Cahn BR, Polich J. Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bulletin*. 2006;132(2):180-211.
86. Cahn BR, Delorme A, Polich J. Occipital gamma activation during Vipassana meditation. *Cognitive Processes*. 2010;11:39-56.
87. Congressional Budget Office. The Veterans Health Administration's Treatment of PTSD and Traumatic Brain Injury Among Recent Combat Veterans. February 2012.
88. Orme-Johnson DW. Medical care utilization and the Transcendental Meditation program. *Psychosomatic Medicine* 1987; 49:493-507.
89. Zulman DM, Pal Chee C, Wagner TH, et al. Multimorbidity and healthcare utilization among high-cost patients in the US Veterans Affairs Health Care System. *BMJ Open* 2015; 5; e007771. Doi:10.1136/bmjopen-2015-007771.
90. Yoon J, Zulman DM, Scott JY, et al. Costs associated with multimorbidity among VA patients. *Medical Care* 2014; 52 Suppl 3: S31-36.
91. Cohen SB, Rohde F. *The Concentration in Health Expenditures over a Two Year Time Interval, Estimates for the US Population, 2005-2006*. Washington, DC: Agency for Healthcare Research and Quality; 2009.
92. Stanton MW, Rutherford MK. *The High Concentration of US Health Care Expenditures*. Rockville, MD: Agency for Healthcare Research and Quality; 2005.
93. Berk ML, Monheit AC. The concentration of health care expenditures, revisited. *Health Affairs*. 2001; 20: 9-18
94. Yoon J, Scott JY, Phibbs CS, Wagner TH. Recent trends in Veterans Affairs chronic condition spending. *Population Health Management* 2011; 14(6): 293-298.
95. Herron RE. Changes in physician costs among high-cost Transcendental Meditation practitioners compared with high cost non-practitioners over 5 years. *American Journal of Health Promotion* 2011; 26(1): 56-60.
96. Alexander, C.N., Robinson, P., and Rainforth, M., Treating alcohol, nicotine and drug abuse through Transcendental Meditation: A review and statistical meta-analysis. *Alcoholism Treatment Quarterly*, 1994; 11: 13-87.
97. Taub E, et al. Effectiveness of broad spectrum approaches to relapse in severe alcoholism: a long-term, randomized, controlled trial of Transcendental Meditation, EMG biofeedback and electronic neurotherapy. *Alcoholism Treatment Quarterly* 1994; 11(1/2):187-220.

98. Marmar CR, Schlenger W, Henn-Haase C, et al. Course of posttraumatic stress disorder 40 years after the Vietnam War: Findings from the national Vietnam veterans longitudinal study. *JAMA Psychiatry* 2015; 72(9): 875–881.
99. Herron RE, Cavanaugh K. Can the Transcendental Meditation program reduce medical expenditures of older people? A longitudinal medical cost minimization study in Canada. *Journal of Social Behavior and Personality* 2005; 17: 415–442.
100. Herron RE, Hillis SL. The impact of the Transcendental Meditation program on government payments to physicians in Quebec: An update. *American Journal of Health Promotion* 2000; 14:284–291.
101. Herron RE, Rees B. The Transcendental Meditation Program's Impact on the symptoms of Post-traumatic Stress Disorder of Veterans: An Uncontrolled Pilot Study. *Military Medicine* 2018, 183, pp. 144-150.
102. Kang SS, Erbes CR, Lamberty GJ, et al. Transcendental meditation for veterans with post-traumatic stress disorder. *Psychological Trauma* 2018; 10(6):675-680.
103. Rosenthal JZ, Grosswald S, Ross R, Rosenthal, N. Effects of Transcendental Meditation in veterans of Operation Enduring Freedom and Operation Iraqi Freedom with posttraumatic stress disorder: a pilot study. *Military Medicine* 2011, 176, 626-630.
104. Rees B., Travis F, Shapiro D, & Chant R. Reduction in post traumatic stress symptoms in Congolese refugees practicing Transcendental Meditation. *Journal of Traumatic Stress* 2013, 26, 295-298.
105. Rees B., Travis F, Shapiro D, & Chant R. Significant Reductions in Posttraumatic Stress Symptoms in Congolese Refugees after 10 days Transcendental Meditation Practice. *Journal of Traumatic Stress* 2014, 27(1), 112-115.
106. Nidich S, O'Connor T, Rutledge T, et al. "Reduced trauma symptoms and perceived stress in male prison inmates through the Transcendental Meditation program: A randomized controlled trial." *The Permanente Journal* 20, no. 4 (2016): 16-007.
107. Nidich S, Seng A, Compton B, et al. "Transcendental Meditation and Reduced Trauma Symptoms in Female Inmates: A Randomized Controlled Study." *Permanente Journal* 2017, 21.
108. Bandy C, Dillbeck M, Sezibera V, et al. Reduction of PTSD in South African University Students Using Transcendental Meditation Practice. *Psychological Reports*, On-line: February 2019.
109. Clayton M,S, Yeung N, CohenKadosh R. The roles of cortical oscillations in sustained attention. *Trends in Cognitive Sciences* 2015, 19, 188 –195.  
<http://dx.doi.org/10.1016/j.tics.2015.02.004>
110. Harmony T. The functional significance of delta oscillations in cognitive processing. *Frontiers in Integrative Neuropsychology* 2013, 83.
111. Chapin M. Program Evaluation Report: Implementing Transcendental Meditation Training as a Tool for PTSD Recovery. Annapolis Vet Center. May 17, 2016.
112. Bellehsen M, Stoycheva V, Cohen B, Nidich S. Submitted. Transcendental Meditation as an Adjunctive Treatment for PTSD in Veterans. The Unified Behavioral Health Center for Military Veterans and their Families: Northwell Health. Available on request.
113. Bremner JD, Mishra S, Campanella C, Shah M, Kasher N, Evans S., et al. A Pilot Study of the Effects of Mindfulness-Based Stress Reduction on Post-traumatic Stress Disorder Symptoms and Brain Response to Traumatic Reminders of Combat in

Operation Enduring Freedom/Operation Iraqi Freedom Combat Veterans with Post-traumatic Stress Disorder. *Frontiers in Psychiatry* 2017, August. 25.  
doi:org/10.3389/fpsy.2017.00157

114. Possemato K, Bergen-Cico D, Treatman S, Allen C, Wade M, Pigeon W. A randomized clinical trial of primary care brief mindfulness training for veterans with PTSD. *Journal of Clinical Psychology*, 2016, 72, 179–193.
115. Kearney DJ, McDermott K, Malte C, Martinez M, Simpson TL. Association of participation in a mindfulness program with measures of PTSD, depression and quality of life in a veteran sample. *Journal of Clinical Psychology*. 2012;68(1):1-16.
116. Kearney DJ, McDermott K, Malte C, Martinez M, Simpson TL. Effects of participation in a mindfulness program for veterans with posttraumatic stress disorder: A randomized controlled pilot study. *Journal of Clinical Psychology*. 2013;69(1):14-27.
117. Niles, BL., Klunk-Gillis J, Ryngala D, Silberbogen A, Paysnick A, Wolf E. Comparing mindfulness and psychoeducation treatments for combat-related PTSD using a telehealth approach. *Psychological Trauma: Theory, Research, Practice, and Policy*, 2012, 4(5), 538-547.
118. Polusny MA, Erbes C, Thuras P, Moran A, Lamberty G, Collins R, Rodman J, Lim K. Mindfulness-Based Stress Reduction for Posttraumatic Stress Disorder among veterans: A randomized clinical trial. *JAMA*, 2015, 314, 456–465. doi:10.1002/jclp.22241
119. Davis L, Whetsell C, Hamner M, Carmody J, Rothbaum B, Allen, R, Bremner, Douglas. A Multisite Randomized Controlled Trial of Mindfulness-Based Stress Reduction in the Treatment of Posttraumatic Stress Disorder. *Psychiatric Research and Clinical Practice in Advance*, 2018, 1-10. doi:0.1176/appi.prcp.20180002)
120. Orme-Johnson DW, Moore RM. First prison study using the Transcendental Meditation program: La Tuna Federal Penitentiary. *Journal of Offender Rehabilitation*. 2003;36:89-96.
121. Orme-Johnson DW. Autonomic stability and Transcendental Meditation. *Psychosomatic Medicine*. 1973;35:341-9.
122. Geisler M. Therapeutische Wirkungen der Transcendental Meditation auf Drogenkonsumenten. *Zeitschrift für Klinische Psychologie*. 1978;7(4):235-55.
123. Overbeck K-D. Auswirkungen der Technik der Transzendentalen Meditation (TM) auf die psychische und psychosomatische Befindlichkeit. *Psychotherapie-Psychosomatik Medizinische Psychologie*. 1982;32(6):188–92.
124. Alexander CN, Rainforth MV, Gelderloos P. Transcendental Meditation, Self-Actualization and Psychological Health: A Conceptual Overview and Statistical Meta-Analysis. *Journal of Social Behavior and Personality*. 1991;6(5):189-247.
125. MacLean CRK, Walton KG, Wenneberg SR, Levitsky DK, Mandarino JV, Waziri R, et al. Effects of the Transcendental Meditation program on adaptive mechanisms: Changes in hormone levels and responses to stress after 4 months of practice. *Psychoneuroendocrinology*. 1997;22(4):277-95.
126. Nidich S, Rainforth M, Haaga D, Hagelin J, Salerno J, Travis FT, et al. A randomized controlled trial on effects of the Transcendental Meditation program on blood pressure, psychological distress, and coping in young adults. *American Journal of Hypertension*. 2009;22:1326-31.
127. Alexander CN, Robinson P, Rainforth MV. Treating and preventing alcohol, nicotine, and drug abuse through Transcendental Meditation: a review and statistical meta-

- analysis. *Alcoholism Treatment Quarterly* 1994; 11(1/2):13–87
128. Candelent T, Candelent G. Teaching Transcendental Meditation in a psychiatric setting. *Hospital & Community Psychiatry* 1975; 26(3): 156–159.
  129. Ljunggren G. The influence of Transcendental Meditation on neuroticism, use of drugs and insomnia. *Lakartidningen* 1977; 74(47): 4212–4214.
  130. Barnes V, Monto A, Williams J, Rigg J. Impact of Transcendental Meditation on Psychotropic Medication Use Among Active Duty Military Service Members with Anxiety and PTSD. *Military Medicine* 2016; 181,1:56, 56-63.
  131. David Lynch Foundation. Veterans Lifeline: Summary of Results. David Lynch Foundation Internal Evaluation Report. February 2019.
  132. Rauch SA, Kim HM, Powell C, Tuerk PW, Simon NM, Acierno R, ... Hoge, CW. Efficacy of Prolonged Exposure therapy, sertraline hydrochloride, and their combination among combat veterans with posttraumatic stress disorder: A randomized clinical trial. *JAMA Psychiatry*, 2018. Advance online publication. PTSDpubs ID: 51290.
  133. Eppley K, Abrams A, Shear J. Differential effects of relaxation techniques on trait anxiety: a meta-analysis. *Journal of Clinical Psychology* 1989; 45(6):957–974.
  134. Wendt, S., Abrams, A., Grant, J., Nidich, S., Valosek, L. et al. (2015). Practicing Transcendental Meditation in High Schools: Relationship to Well-Being and Academic Achievement Among Students. *Contemporary School Psychology*, Published online, July 22, 2015.
  135. <https://chealth.canoe.com/drug/getdrug/sertraline>
  136. [https://www.theravive.com/therapedia/posttraumatic-stress-disorder-\(ptsd\)-dsm--5-309.81-\(f43.10\)](https://www.theravive.com/therapedia/posttraumatic-stress-disorder-(ptsd)-dsm--5-309.81-(f43.10))
  137. Rani NJ, Rao PVK. Effects of meditation on attention processes. *Journal of Indian Psychology*. 2000; 18: 52–60.
  138. Rani NJ, Rao PVK. Meditation and attention regulation. *Journal of Indian Psychology*. 1996; 14: 26–30.
  139. Hawkins M, Alexander CN, Travis FT, Camelia CR, Walton KG, Durchholz CF, Rainforth MW. Consciousness-based approach to rehabilitation of inmates in the Netherlands Antilles: psycho-social and cognitive changes. *Journal of Offender Rehabilitation* 2003; 36(1-4): 205–228.
  140. Abrams AI, and Siegel LM. The Transcendental Meditation program and rehabilitation at Folsom State Prison: A cross-validation study. *Criminal Justice and Behavior* 1978; 5(1): 3–20.
  141. Walton KG, Levitsky DK. Effects of the Transcendental Meditation program on neuroendocrine abnormalities associated with aggression and crime. *Journal of Offender Rehabilitation* 2003; 36: 67–87.
  142. Kam-Tim S, Orme-Johnson, DW. Three randomized experiments on the holistic longitudinal effects of the Transcendental Meditation technique on cognition. *Intelligence* 2001; 29(5), 419-440.
  143. Schnurr PP, Friedman MJ, Lavori PW, Hsieh FY. Design of Department of Veterans Affairs Cooperative Study no. 420: group treatment of posttraumatic stress disorder. *Control Clinical Trials* 2001. Feb;22(1): 74-88.

## Appendices

### Appendix 1: Veteran Experiences with the TM Technique

From Interviews Conducted by, or Letters Written to, the David Lynch Foundation

My girlfriend, despite every reason not to, stood by my side. It meant a lot to me, and I was determined to find help calming my mind. I was willing to try anything, even some crazy magic that she suggested, like meditation. When she suggested it to me, I said ‘of course I would try it,’ but, deep down, I didn’t feel like I would gain anything from it. After my first week of meditation, I was able to sleep. It’s like I was living in a fog of war, and TM cleared the fog, allowing me to see things clearly. My day-to-day functions became clearer. My depression has improved daily, and my aggression has vanished. TM has given the perspective to live with a peaceful mind. I find new improvements daily when I am consistent with my meditation.

\*

For me TM acted like an ice pack placed directly on the heated up and hyper-vigilant part of my brain that couldn’t calm down, that couldn’t think straight, that couldn’t hold a rational or coherent thought... Where everything else had failed, where other attempts and interventions had fallen short, where I had previously been baffled, TM literally cracked open my heart... The experience of TM almost defies description. It represents an experience I will never get over.

\*

In my short experience with TM, I have more energy, and I am getting out more. (Isolation is one of the most obvious symptoms of PTSD.) I sleep better, still experiencing dreams and flashbacks, but with less fear; I still get angry frequently, but I don’t often display it; I believe I laugh more; I feel calm after meditation but realize when it is time for the second of the day as my tension does increase again.

\*

TM was a concept I thought was BS. Nothing that easy would work on a person so high strung like myself. I was leery... until I tried it. IT WORKS!!! The ability to calm my mind and just exist with just me, for just me, and only for just me is amazing. It’s like my cobwebs are gone. I can begin my day on a clear note, and I end each day with the same clarity. I’m just amazed how this concept, as I thought of it at first, has transformed my life, and I have only been doing it for 3 days. I’m finally excited about things again because I know just how other vets with PTSD can benefit from TM like I have. The difference it will make can’t be bought or downloaded. It comes from within and that is a place I know I’ve missed, a place my PTSD took from me and TM has given it back.

\*

Death is so random in combat. I spent many years revisiting my near-death experiences and wondering why I had survived when a friend just a few feet away had not. That guilt, and the anger that accompanied it, haunted me for many years. TM has been the most effective tool I have found in dealing with this issue, especially the associated anger. My two-a-day TM sessions help me to prepare for the coming day, and at the end of the day, to deal with the frustrations I

was unable to avoid. The battle goes on daily, and I have become very much aware of how different my day goes when I am not able to start or end my day with TM. I believe that it would be a useful tool for veterans young and old in dealing with the reality of post combat life.

\*

Prior to TM, I was triggered frequently throughout my day. There would be several times a day where I would feel frightened, heart racing, and constantly alert. On starting TM, I immediately felt these symptoms decrease.

\*

The experience and opportunity of training and consistently meditating has been life-changing. Our household is calmer, quieter, happier, and we will always be grateful for the scholarship we were given to learn TM, which has become one of the best treatments we have ever found for PTSD.

\*

I was interested in TM, but I was skeptical at the same time. The power of the TM meditation... It was surprising to me. Having that inner peace after meditation really emboldened me to deal with things that I'd been just kind of stuffing away. To be able to have relief from agitation, have relief from anger, frustration, sleeplessness, alcoholism, drug addiction — that's huge.

\*

I would like to give you an update on how I am doing with TM. To date, I have not missed a meditation session... So far, my results from TM have been beyond anything I expected. I have gone from averaging 3 hours' sleep a night to roughly 5 or 6. While that may seem insufficient for most people, to a PTSD sufferer who battles insomnia, that is a huge step.

\*

Between the fourth and tenth day, I already experienced remarkable benefits from the daily practice which lasted throughout every day. Former anxiousness, agitation and worry were gone, and I actually got distinct experiences of feeling pleasant and happy, which I haven't felt authentically in I don't recall how long. I have a lasting calmness throughout each day, and can literally say that my stress has dropped by about 90%. It is like the mouse pulling the thorn out of the lion's paw.

A weight has been lifted, which has allowed me to have more energy to do things, and I've picked up my pace in cleaning things out in my life. I have felt more creative and expressive than usual, and began preparing new dishes in the kitchen, which I haven't done in a long time. My newfound energy has also allowed me to begin exercising again to lose the excess weight I've gained from inactivity. There's a self confidence, as well, that I once had, and I'm now aware of again. I have to state that I know this is not from any kind of self hypnosis or autosuggestion. It's too authentic and real for me to admit that. I actually know that I know that.

The biggest relief is that I am not dwelling in my thoughts throughout each day and worrying about everything when I'm alone in my house, or in my car going somewhere. I have also been commented on by family and friends, by phone and in person, that I seem calmer and more relaxed than usual, as well as being happy.

I cannot say that my PTSD is gone absolutely, because I have had a few triggers. However, I notice that they are few as compared to numerous. I feel that this is a huge breakthrough in my healthcare treatment, as nothing I've done or had done for my symptoms has worked before as this has."

\*

Sadness and blues have decreased. Spending money when I'm sad and blue has decreased significantly, and I'm able to control myself. I'm able to control somewhat, my panic, aggressive nature. I believe I can take things more in stride, and I think somewhat clearer—see things around me clearer. TM has definitely helped me. I just need to practice it more often.

\*

In the short period of time I have been meditating, there has been a near reformation of my life. What the doctors and medicines promised to “potentially” do over the course of years, I have gotten much closer to achieving in months. Some situations remain difficult, and so they will take longer to overcome and grow beyond. At times the troubling thoughts and nightmares come back, but, as a whole, the progress is palpable. I feel more in control of my life now, and I'm becoming hopeful about rebuilding and getting better, rather than lamenting the loss of who I was, and grimly marching the entire way through my decline. In addition to the calm I experience through meditation, I have also found it easier to manage my physical pain. I have been told that I look like an entirely different person from who I was coming back from country. I am vibrant, I smile, and I look much more grounded. The truth is you can't practice TM without it positively affecting you.

\*

Since learning TM, I have noticed that Stephen seems much more at ease, not as tightly-wound. He has more patience with our young children and is able to relate with them rather than just reacting with anger towards them. Stephen and I are able to communicate with each other without the fear of anger or hurt for the first time in several years. TM has given Stephen an inner peace and ability to find calm when before he only found anger, fear and resentment. TM has saved our marriage, brought our family closer, and given us hope that we can finish out this tour with the Marine Corps with peace and success!

\*

Through your assistance, we were able to learn TM and implement the technique in our daily lives. We have both experienced incredible improvements mentally and emotionally. I have noticed greater overall equanimity, a pervasive calmness, and a significant reduction in my own stress and anxiety. Prior to learning TM, I would fret about most everything in my life. I worried chronically, stressed about insignificant matters, critiqued myself and life harshly, and would get caught up in negative thought patterns that often ended in bouts of depression. Despite practicing yoga and Vipassana meditation, my mind would run wild, and I would be very easily overwhelmed. I can say with confidence that TM has given me a newfound sense of confidence and relief. I feel significantly less overwhelmed and happier! Coping with difficult situations has become much easier, enabling me to be a better and more supportive partner, friend, and individual. After half a year of TM, I am mentally stronger and better equipped to handle the ebb and flow of life.

\*

Physically, my blood pressure has improved, my headaches have diminished, and the anxiety attacks have gone. I have not had the chest pain I used to feel. Emotionally I have not had any feelings of rage or anger at insignificant trivialities.

\*

ALL of my physical issues either cleared up or became much less. These included: hypertension, headaches, high blood pressure, insomnia, anxiety, PTSD, readjustment syndrome, irritable bowel syndrome, alcoholism (2-3 fifths a week), restless leg syndrome, and insomnia due to back pain. I could cope with the problems much better, and my temperament has gotten better.



My wife saw a change in me from the first evening. Her stress compounded with my issues and my marriage was all downhill.

I can honestly say that, without any doubt, TM saved my life, my marriage, and now it has saved my wife's life also. My only wish is that I want to spread this and help as many vets as I can.

\*

I believe TM is assisting in response to A-Fib. I have had one episode since I started TM, and it resolved (cardioverted) spontaneously within 2 hours. With meds in an ER, it can take several hours or overnight; on my own, a less severe episode can take a day or more. Next, I feel my sleep has generally improved. I take prescribed sleeping medication, but I am sleeping longer in sections of sleep, can return to sleep more quickly, and generally feel it is improving.

\*

Reduced typical daily caffeine intake by half. Managed to avoid a complete nervous breakdown... which was definitely on the horizon before I started TM, so I count that as a huge benefit, even though I'm still working on achieving the transformative benefits that I expect to achieve soon.

#### From San Diego RCT

Shortly after my Navy career, I began to experience many difficulties in my well-being. It all began with an onset of paranoia and escalated to full blown PTSD. I would drink alcohol to excess to numb the pain of loneliness I felt from isolation. I was afraid to venture out of my house or drive or do anything that included interaction with people. Through TM I began to trust, blossom, and most of all, I began to heal. I began to come out of my nightmares and face the battle I had ahead. I began to attend the sessions faithfully, I began to drive, and I started community college. I got the courage to apply for a job in a hospital. This program has given me my life back. (female Navy veteran)

\*

I had problems going to sleep and staying asleep on a regular basis. My mind was clouded with regrets and uncertainties. On occasions I would think that I was better off dead so that I don't have to deal with it. I had tried individual counseling with multiple psychiatrists to address the problems I experienced. They also prescribed different types of medications at the same time ranging from anti-depression to sleeping aids. The medications and counseling sessions did nothing for me but wasted my time. The medications had terrible side effects which were worse than dealing with my original problems. The counseling sessions I attended were not helpful because I was not the type of person to easily express my feelings and problems. However, I was committed to get help because I was tired of living like that, and I was fortunate to be placed in the meditation program aiming at treating PTSD. I came in with an open mind and willing to try this new approach, which I think is the key for the success of this program. There were no side effects to meditation. I had nothing but good experiences with this method. One major benefit is that I'm able to sleep through the night, my mind is not as clouded as it was before. From the beginning, it (Transcendental Meditation) helped me feel less stress and more energized right after a meditation session. With consistent meditation, I'm able to manage myself and live a life that I enjoy. (male Marine veteran)

#### From Boulder Crest Retreat Center Participant Reports

I learned TM from trained professionals and experienced moments of true peace. The more we practiced throughout the week, the more moments I got to have. I left there thinking ‘Why would I ever NOT want to have this peace in my day?’ and I haven’t stopped in 18 months.

\*

While I was there, they taught me the power of meditation. Once I got it down, I began to wean off my medication for anxiety. I ended up stopping it and began to live by “Meditate not Medicate.” I didn’t need it any more. Instead of a pill, all I needed was twenty minutes twice a day, and I would accomplish way more than some pill I have to keep taking.

\*

Since leaving BCR in January 2018, I have felt a weight lifted off of my shoulders. Having the support system, weekly check ins, and TM has allowed me to continue to implement positive coping mechanisms and establish new patterns of behavior/practices.

- I have not relapsed with my eating disorder and do not obsessively track macros/restrict or binge food. I truly see food as fuel and am much more appreciative of what my body can do versus what it may look like.
- I fight with my husband significantly less. He still has his own struggles, and we are not perfect, but I do notice that on days I do not meditate, an argument ensues.

#### Veterans Lifeline Survey Responses about Benefits of the TM Technique

(from veterans who received David Lynch Foundation Scholarships to learn TM)

Physically, my blood pressure has improved, my headaches have diminished, and the anxiety attacks have gone. I have not had the chest pain I used to feel. Emotionally I have not had any feelings of rage, or anger at insignificant trivialities. My whole emotional feelings are good. I feel like I am back to the person I used to be. People comment (at work) that I am nice, and my family has noticed I am not on edge, anxious, or grumpy. I feel lighthearted and take things into perspective rather than letting life's negatives weigh me down.

\*

Mindfulness and increasing awareness, which allows a greater window of opportunity to catch myself reacting and make a choice not to react but to be more proactive.

\*

The clarity of mind, and the calming feeling it gives my mind, makes me think and react more accurately.

\*

Loss of compulsive anxious behavior. I don't hide in the back of a room any longer, and talking to strangers doesn't make me feel panicked. Less stress carried in the shoulders means less flare-ups of previous injuries.

\*

I no longer blame myself for things or call myself a "failure." My relationship with my wife and son have gotten significantly stronger. I have become extremely patient and no longer have angry outbursts.

\*

Less migraines monthly, less migraine medication needed, not as tired during the day, more productive

\*

My digestive system is balancing. My sleep is improving, more tolerant with noises and sounds during sleep. More tolerant with people around me. Easy to release stressor thoughts and even situations. Acceptance of events and changes.

\*

Easier time falling asleep without the help of medication. Generally calmer and easier to communicate with. Less angry outbursts. Being more level throughout the day.

\*

I feel as if I feel better about myself. I enjoy the time that I take twice a day. Before practicing, I cannot ever remember taking time to myself. After my morning session, I feel as if it sets me on the path to have a successful day. In the evening I find it gives me a burst of energy I need to have a productive rest of my day. Focused and energized.

\*

The experience and opportunity of training and consistently meditating has been life-changing. Our household is calmer, quieter, happier, and we will always be grateful for the scholarship we were given that has become one of the best treatments we have ever found for PTSD.

\*

The first thought I have upon waking is positive, and I'm excited to start my day. Before TM my first thought was negative and a feeling of dread.

\*

I have gotten fewer stress/tension headaches. I do typically feel more relaxed and happier or have a more positive outlook as well.

\*

As the spouse of a veteran who did not experience combat-related issues, this practice has been immensely helpful to the way my husband and I communicate. Often times we used strong words and loud voices to get our points across. Since starting TM, we have been able to really come together and increase our communication in a softer, supportive, and loving manner, even if it might be a negative subject. That said, my communication overall has become better as I am able to sit and take a moment to reflect before going into something.

\*

I have not had one nightmare since I started practicing. My mind is more clear, calm, and focused.

\*

Greater patience, less stress, lower blood pressure. Greater feeling of calm.

\*

Less agitation, more relaxed, focus my thoughts better, work through obstacles blocking my goal to be in NYC's 2016 Marathon with my handcycle.

\*

Self discipline, sense of internal and external quiet, and just a non-specific sense of well-being.....trending in a positive direction.

\*

Am calmer; more motivated; off medications entirely now for mood/anxiety and sleep reasons.

\*

I feel more relaxed during the day. I'm able to let frustrations go a little easier. I'm also very hopeful about the future. After the TM workshop, I began leaving the house more often and I was able to get a job. :) I'm still coping with depression, but I feel much better.

\*

I enjoy the feeling of releasing the stresses of the day and life. I feel free again.

## Appendix 2: The Effect of the *TM* Technique on DSM Criteria

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on <i>TM</i> Technique
1	Repeated, disturbing, and unwanted memories of the stressful experience	<p>Increased Freedom from Habitual Patterns of Perception</p> <p>Improved Mental Health, Decreased Stress Reactivity, Increased EEG Coherence</p> <p>Improved Psychological Health</p> <p>Decreased Anxiety</p> <p>Improved Mental Health; Increased Self-Actualization through Transcendental Meditation in Contrast to Other Procedures as Demonstrated by Meta-Analysis</p>	<p>Dillbeck MC. Meditation and flexibility of visual perception and verbal problem-solving. <i>Memory and Cognition</i> 1982; 10(3): 207–215.</p> <p>Gaylord-King C, Orme-Johnson DW, Travis FT. The effects of the Transcendental Meditation technique and progressive muscle relaxation on EEG coherence, stress reactivity, and mental health in black adults. <i>International Journal of Neuroscience</i> 1989; 46(1-2): 77–86.</p> <p>Hjelle JA. Transcendental Meditation and psychological health. <i>Perceptual and Motor Skills</i> 1974; 39(5):623–628.</p> <p>Penner WJ, Zingle HW, Dyck R, Truch S. Does an in-depth Transcendental Meditation course effect change in the personalities of the participants? <i>Western Psychologist</i> 1974; 4:104–111.</p> <p>Ferguson PC, Gowan JC. Psychological findings on Transcendental Meditation. <i>Journal of Humanistic Psychology</i> 1976; 16(3):51–60.</p> <p>Orme-Johnson DW, Barnes VA. Effects of the Transcendental Meditation technique on trait anxiety: A meta-analysis of randomized controlled trials. <i>Journal of Alternative and Complementary Medicine</i>. 2014;20(5):330-341.</p> <p>Eppley K et al. Differential effects of relaxation techniques on trait anxiety: A meta-analysis. <i>Journal of Clinical Psychology</i> 1989; 45 957–974.</p> <p>Dillbeck MC. The effect of the Transcendental Meditation technique on anxiety level. <i>Journal of Clinical Psychology</i> 1977; 33(4): 1076–107.</p> <p>Alexander CN, Rainforth MV, Gelderloos P. Transcendental Meditation, self-actualization, and psychological health: A conceptual overview and statistical meta-analysis. <i>Journal of Social Behavior and Personality</i> 1991; 6: 189–248.</p>
2	Repeated, disturbing dreams of the stressful experience	Better Quality of Sleep with Development of Higher States of Consciousness	Mason LI, Orme-Johnson DW. Transcendental consciousness wakes up in dreaming and deep sleep. <i>International Journal of Dream Research</i>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		<p>Enhanced Sleep Patterns (Decreased Time to Fall Asleep, Decreased Awakenings per Night, Improved Quality of Sleep)</p> <p>Improved Sleep; Decreased Time to Fall Asleep, Reduced Waking During the Night</p> <p>Decreased Anxiety</p>	<p>2010; 3(1):28–32.</p> <p>Mason LI, Alexander CN, Travis FT, Marsh G, Orme-Johnson DW, Gackenbach J, Mason DC, Rainforth M, Walton KG. Electrophysiological correlates of higher states of consciousness during sleep in long-term practitioners of the Transcendental Meditation program. <i>Sleep</i> 1997; 20(2):102–110.</p> <p>Travis FT. The junction point model: a field model of waking, sleeping, and dreaming relating dream witnessing, the waking/sleeping transition, and Transcendental Meditation in terms of a common psychophysiology state. <i>Dreaming</i> 1994; 4:91–104.</p> <p>Candelent T, Candelent G. Teaching Transcendental Meditation in a psychiatric setting. <i>Hospital and Community Psychiatry</i> 1975; 26(3):156–159.</p> <p>Abrams AI, Siegel L M. The Transcendental Meditation program and rehabilitation at Folsom State Prison: A cross-validation study. <i>Criminal Justice and Behavior</i> 1978; 5 (1): 3–20.</p> <p>Haratani T, Henmi T. Effects of Transcendental Meditation on health behavior of industrial workers. <i>Japanese Journal of Public Health</i> 1990; 37:729.</p> <p>Eppley K et al. Differential effects of relaxation techniques on trait anxiety: a meta-analysis. <i>Journal of Clinical Psychology</i> 1989; 45 957–974.</p> <p>Dillbeck MC. The effect of the Transcendental Meditation technique on anxiety level. <i>Journal of Clinical Psychology</i> 1977; 33(4): 1076–107.</p>
3	<b>Suddenly feeling or acting as if the stressful experience were actually happening again (e.g., flashbacks)</b>	<p>Increased Ability to Live More Fully in the Present, Ability to Connect Past and Present Meaningfully</p> <p>Increased Emotional Stability and Psychological Balance</p>	<p>Hjelle LA. Transcendental Meditation and psychological health. <i>Perceptual and Motor Skills</i> 1974; 39: 623–628.</p> <p>Nidich SI, Seeman W, Dreskin T. Influence of Transcendental Meditation on self-actualization: A replication. <i>Journal of Counseling Psychology</i> 1973; 20(6):565–566.</p> <p>Alexander CN, Rainforth MV, Gelderloos P. Transcendental Meditation, self-actualization and psychological health: A conceptual overview and statistical meta-analysis. <i>Journal</i></p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on <i>TM</i> Technique
		<p>Increased Brain Coherence and Expansion of Consciousness</p> <p>Increased Brain Coherence and Expansion of Consciousness</p>	<p><i>of Social Behavior and Personality</i> 1991; 6(5), 189–247.</p> <p>Overbeck K-D. Auswirkungen der Technik der Transzendentalen Meditation (TM) auf die psychische und psychosomatische Befindlichkeit. <i>Psychotherapie-Psychosomatik Medizinische Psychologie</i> 1982; 32(6):188–192.</p> <p>Travis FT, Tecce JJ. Effects of distracting stimuli on CNV amplitude and reaction time. <i>International Journal of Psychophysiology</i> 1998; 31(1):45–50.</p> <p>Travis FT, Tecce J, Arenander A, Wallace RK. Patterns of EEG coherence, power and contingent negative variation characterize the integration of transcendental and waking states. <i>Biological Psychology</i> 2002; 61(3):293–319.</p> <p>Travis FT, Tecce JJ, Guttman J. Cortical plasticity, contingent negative variation, and transcendent experiences during practice of the Transcendental Meditation technique. <i>Biological Psychology</i> 2000; 55(1):41–55.</p> <p>Travis FT, Wallace RK. Autonomic patterns during respiratory suspensions: possible markers of Transcendental Consciousness. <i>Psychophysiology</i> 1997; 34(1):39-46.</p> <p>Travis FT, Wallace RK. Autonomic and EEG patterns during eyes-closed rest and Transcendental Meditation (TM) practice: a basis for a neural model of TM practice. <i>Consciousness and Cognition</i> 1999; 8(3):302–318.</p>
4	<b>Intense or prolonged distress after exposure to traumatic reminders</b>	Increased Field Independence: Less Influenced by External Cues, Stimuli, or Reminders	<p>So KT, Orme-Johnson, DW. Three randomized experiments on the holistic longitudinal effects of the Transcendental Meditation technique on cognition. <i>Intelligence</i> 2001; 29(5), 419–440.</p> <p>Gelderloos P, Lockie RJ, Chuttoorgoon S. Field independence of students at Maharishi School of the Age of Enlightenment and a Montessori school. <i>Perceptual and Motor Skills</i> 1987; 65(6),</p>



	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		<p>Increased Strength and Integration of Psychological Health</p> <p>Decreased Anxiety and Distress</p>	<p>613–614.</p> <p>Dillbeck MC, Assimakis PD, Raimondi D, Orme-Johnson DW, Rowe R. Longitudinal effects of the Transcendental Meditation and TM-Sidhi program on cognitive ability and cognitive style. <i>Perceptual and Motor Skills</i> 1986; 62: 731–738.</p> <p>Jedrczak A, Clements G. The TM-Sidhi programme and field independence. <i>Perceptual and Motor Skills</i> 1984; 59, 999–1000.</p> <p>Pelletier KR. Influence of Transcendental Meditation upon autokinetic perception. <i>Perceptual and Motor Skills</i> 1974; 39: 1031–1034.</p> <p>Alexander CN, Rainforth MV, Gelderloos P. Transcendental Meditation, self-actualization, and psychological health: A conceptual overview and statistical meta-analysis. <i>Journal of Social Behavior and Personality</i> 1991; 6: 189–248.</p> <p>Orme-Johnson DW, Barnes VA. Effects of the Transcendental Meditation Technique on trait anxiety: a meta-analysis of randomized controlled trials. <i>Journal of Alternative and Complementary Medicine</i> 2013; 19:1–12.</p> <p>Dillbeck MC. The effect of the Transcendental Meditation technique on anxiety level. <i>Journal of Clinical Psychology</i> 1977; 33(4):1076–1078.</p> <p>Eppley K, Abrams A, Shear J. Differential effects of relaxation techniques on trait anxiety: a meta-analysis. <i>Journal of Clinical Psychology</i> 1989; 45(6):957–974.</p> <p>Nidich SI, Rainforth MV, Haaga DAF, Hagelin J, et al. A randomized controlled trial of effects of the Transcendental Meditation program on blood pressure, psychological distress, and coping in young adults. <i>American Journal of Hypertension</i> 2009; 22(12): 1326–1331.</p>
5	Having strong physical reactions when reminded of the stressful experience	Reduced Stress: Lower Excretion of Cortisol, Lower Anxiety, Less Mood Disturbance	Walton KG, Pugh NDC, Gelderloos P, Macrae P. Stress reduction and preventing hypertension: Preliminary support for a psychoneuro-endocrine mechanism. <i>Journal of Alternative</i>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
	(for example, heart pounding, trouble breathing, sweating)	<p>Meta-Analysis: Higher Basal Skin Resistance, Lower Respiration Rate, Lower Plasma Lactate, Lower Baseline Levels of Spontaneous Skin Resistance Responses, Respiration Rate, Heart Rate, and Plasma Lactate</p> <p>Reduced Anxiety and Stress</p> <p>Improved Resistance to Stress and Greater Autonomic Stability: Faster Habituation of Skin Resistance Response to Stressful Stimuli, Fewer Multiple Responses, Fewer Spontaneous Skin Resistance Responses</p> <p>Unique State of Deep Rest for Mind and Body</p> <p>Experience of Pure Consciousness Associated with: Periodic Breath Suspension, Marked Reductions in Metabolic Rate (Oxygen Consumption and Carbon Dioxide Elimination)</p> <p>Deep Rest with Wakeful, Ordered State of Brain Functioning: Decreased Metabolic Rate (Decreased Oxygen Consumption and Unchanged Respiratory Quotient), Decreased Heart Rate, Increased Basal Skin Resistance</p> <p>Reduced Stress Hormones and Improved Adaptive Response to Stress</p>	<p>and <i>Complementary Medicine</i> 1995; 1: 263–283.</p> <p>Dillbeck MC, Orme-Johnson DW. Physiological differences between Transcendental Meditation and rest. <i>American Psychologist</i> 1987; 42: 879–881.</p> <p>Orme-Johnson DW, Walton KG. All approaches to preventing and reversing the effects of stress are not the same. <i>American Journal of Health Promotion</i> 1998; 12(5):297–299</p> <p>Orme-Johnson DW. Autonomic stability and Transcendental Meditation. <i>Psychosomatic Medicine</i> 1973; 35: 341–349.</p> <p>Jevning R, Wallace RK, Beidebach M. The physiology of meditation: a review. A wakeful hypometabolic integrated response. <i>Neuroscience and Biobehavioral Reviews</i> 1992; 16(3):415–424.</p> <p>Farrow JT, Hebert JR. Breath suspension during the Transcendental Meditation technique. <i>Psychosomatic Medicine</i> 1982; 44(2):133–153.</p> <p>Wallace, RK, et al. The physiology of meditation. <i>Scientific American</i> 1972; 226: 84–90.</p> <p>Wallace RK, et al. A wakeful hypometabolic physiologic state. <i>American Journal of Physiology</i> 1971; 221: 795–799.</p> <p>Wallace RK. Physiological effects of Transcendental Meditation. <i>Science</i> 1970; 167: 1751–1754.</p> <p>MacLean CR, Walton KG, Wenneberg SR, Levitsky DK, Mandarino JV, Waziri R, Hillis SL, Schneider RH. Effects of the Transcendental</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		More Calm, Relaxed Style of Brain Functioning	<p>Meditation program on adaptive mechanisms: Changes in hormone levels and responses to stress after four months of practice. <i>Psychoneuroendocrinology</i> 1997; 22(4):277–295.</p> <p>Infante JR, Peran F, Martinez M, Roldan A, Poyatos R, Ruiz C, Samaniego F, Garrido F. ACTH and beta-endorphin in Transcendental Meditation. <i>Physiology and Behavior</i> 1998; 64(3):311–315.</p> <p>Infante JR, Torres-Avisbal M, Pinel P, Vallejo JA, Peran F, Gonzalez F, Contreras P, Pacheco C, Roldan A, Latre JM. Catecholamine levels in practitioners of the Transcendental Meditation technique. <i>Physiology and Behavior</i> 2001; 72(2):141–146.</p> <p>Travis FT, Wallace RK. Autonomic and EEG patterns during eyes-closed rest and Transcendental Meditation (TM) practice: a basis for a neural model of TM practice. <i>Consciousness and Cognition</i> 1999 8(3):302-18</p>
6	<b>Persistent effortful avoidance of distressing trauma-related stimuli after the event: trauma-related thoughts or feelings</b>	<p>Reduced Stress, Anxiety, and Depression</p> <p>Improved Psychological Health</p> <p>Reduced Psychological Distress, Anxiety, and Depression, Improved Coping Ability</p>	<p>Elder C, Nidich S, Moriarty F, Nidich R. Effect of Transcendental Meditation on employee stress, depression, and burnout: A randomized controlled study. <i>Permanente Journal</i> 2014; 18(1): 19–23.</p> <p>Sheppard WD, Staggers FJ, John L. The effect of a stress management program in a high security government agency. <i>Anxiety, Stress, and Coping</i> 1997; 10: 341–350.</p> <p>Alexander CN, Rainforth MV, Gelderloos P. Transcendental Meditation, self-actualization, and psychological health: A conceptual overview and statistical meta-analysis. <i>Journal of Social Behavior and Personality</i> 1991; 6: 189–248.</p> <p>Nidich SI, Rainforth MV, Haaga DAF, Hagelin J, et al. A randomized controlled trial of effects of the Transcendental Meditation program on blood pressure, psychological distress, and coping in young adults. <i>American Journal of Hypertension</i> 2009; 22(12): 1326–1331.</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
7	<b>Avoidance of external reminders of the stressful experience (for example: people, places, conversations, activities, objects, or situations)</b>	Increased Field Independence: Less Influenced by External Cues, Stimuli, or Reminders	<p>Kam-Tim S, Orme-Johnson, D. W. (2001). Three randomized experiments on the holistic longitudinal effects of the Transcendental Meditation technique on cognition. <i>Intelligence</i> 2001; 29(5), 419-440.</p> <p>Gelderloos P, Lockie RJ, Chuttoorgoon S. Field independence of students at Maharishi School of the Age of Enlightenment and a Montessori school. <i>Perceptual and Motor Skills</i> 1987; 65(6), 613–614.</p> <p>Dillbeck MC, Assimakis PD, Raimondi D, Orme-Johnson DW, ROWE R. Longitudinal effects of the Transcendental Meditation and TM-Sidhi program on cognitive ability and cognitive style. <i>Perceptual and Motor Skills</i> 1986; 62: 731–738.</p> <p>Jedrczak A., Clements G. The TM-Sidhi programme and field independence. <i>Perceptual and Motor Skills</i> 1984; 59, 999–1000.</p> <p>Pelletier KR. Influence of Transcendental Meditation upon autokinetic perception. <i>Perceptual and Motor Skills</i> 1974; 39: 1031–1034.</p> <p>Fergusson LC. Field independence, Transcendental Meditation, and achievement in college art: a re-examination. <i>Perceptual and Motor Skills</i> 1993; 77:1104-1106.</p>
8	<b>Inability to recall key features of the traumatic event (usually dissociative amnesia; not due to head injury, alcohol, or drugs)</b>	<p>Reduced Cognitive Distortion and Improvement in Intelligence-Related Measures</p> <p>Improved Psychological Health</p>	<p>Hawkins M, Alexander CN, Travis FT, Camelia CR, Walton KG, Durchholz CF, Rainforth MW. Consciousness-based approach to rehabilitation of inmates in the Netherlands Antilles: psycho-social and cognitive changes. <i>Journal of Offender Rehabilitation</i> 2003; 36(1-4): 205–228.</p> <p>Hjelle JA. Transcendental Meditation and psychological health. <i>Perceptual and Motor Skills</i> 1974; 39(5):623–628.</p> <p>Penner WJ, Zingle HW, Dyck R, Truch S. Does an in-depth Transcendental Meditation course effect change in the personalities of the</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		Greater Adaptability of Brain Functioning	<p>participants? <i>Western Psychologist</i> 1974; 4:104–111.</p> <p>Ferguson PC, Gowan JC. Psychological findings on Transcendental Meditation. <i>Journal of Humanistic Psychology</i> 1976; 16(3):51–60.</p> <p>Gaylord-King C, Orme-Johnson DW, Travis FT. The effects of the Transcendental Meditation technique and progressive muscle relaxation on EEG coherence, stress reactivity, and mental health in black adults. <i>International Journal of Neuroscience</i> 1989; 46(1-2): 77–86.</p> <p>Dillbeck MC. The effect of the Transcendental Meditation technique on anxiety level. <i>Journal of Clinical Psychology</i> 1977; 33(4):1076–1078.</p> <p>Candelent T, Candelent G. Teaching Transcendental Meditation in a psychiatric setting. <i>Hospital and Community Psychiatry</i> 1975; 26(3):156–159.</p> <p>Bennett JE, Trinder J. Hemispheric laterality and cognitive style associated with Transcendental Meditation. <i>Psychophysiology</i> 1977; 14(3):293–296.</p>
9	<b>Persistent (and often distorted) negative beliefs and expectations about oneself or the world (e.g., "I am bad." "The world is completely dangerous.")</b>	<p>Increased Self-Actualization: Enhanced Self-Regard, Increased Inner-Directedness (Independence, Self-Supportiveness), Increased Spontaneity</p> <p>Increases in Self-Regard, Spontaneity, Greater Inner Locus of Control, Less Anxiety</p> <p>Enhanced Self-Concept: Less Likely to Qualify Self-Description, Fewer Personality Defects, Greater Self-Esteem, Better Opinion of Oneself, Greater Self-Satisfaction, Greater Sense of Personal Worth</p> <p>Improved Perception of Positive Self-Identity</p>	<p>Seeman W, Nidich S, Banta T. Influence of Transcendental Meditation on a measure of self-actualization. <i>Journal of Counseling Psychology</i> 1972; 19: 184–187.</p> <p>Hjelle LA. Transcendental Meditation and psychological health. <i>Perceptual and Motor Skills</i> 1974; 39: 623–628.</p> <p>Nystul MS, Garde M. Comparison of self-concepts of Transcendental Meditators and nonmeditators. <i>Psychological Reports</i> 1977; 41: 303–306.</p> <p>Turnbull M, Norris H. Effects of Transcendental Meditation on self-identity indices and personality. <i>British Journal of Psychology</i> 1982; 73:57–69.</p> <p>Gelderloos P, Goddard III PH, Ahlström HH,</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		<p>Development of More Positive Values</p> <p>Enhanced Psychological Development and Reduced Psychopathology</p> <p>Increased Quieting of Brain and Enhanced Perception</p>	<p>Jacoby R. Cognitive orientation towards positive values in advanced participants of the TM and TM-Sidhi program. <i>Perceptual and Motor Skills</i> 1987; 64(3):1003–1012.</p> <p>Alexander CN, Walton KG, Goodman R. Walpole study of the Transcendental Meditation program in maximum security prisoners I: cross-sectional differences in development and psychopathology. <i>Journal of Offender Rehabilitation</i> 2003; 36(1-4): 97–126 .</p> <p>Lyubimov NN. Changes in electro-encephalogram and evoked potentials during application of a special form of psycho-logical training (meditation). <i>Human Physiology (Fiziologiya Cheloveka)</i> 1999; 25:171–180</p>
10	<b>Persistent distorted blame of self or others for causing the traumatic event or for resulting consequences</b>	<p>Enhanced Self-Concept: Less Likely to Qualify Self-Description, Fewer Personality Defects, Greater Self-Esteem, Better Opinion of Oneself, Greater Sense of Personal Worth, Greater Satisfaction with One's Moral Worth</p> <p>Reduced Cognitive Distortion and Improvement in Intelligence-Related Measures</p> <p>Increased Freedom from Habitual Patterns of Perception</p> <p>Enhanced positive perception of self</p> <p>Decreased Depression (Increased Contentment, Increased Self-Confidence), Increased Sociability (Increased Friendliness, Increased Liveliness), Increased Placidity (Increased Self-Assuredness, Increased Good Humor, Decreased Tendency to Procrastinate), Decreased Inhibition (Increases in: Naturalness, Spontaneity, Self-Sufficiency), Increased Extraversion</p>	<p>Nystul MS, Garde M. Comparison of self-concepts of Transcendental Meditators and nonmeditators. <i>Psychological Reports</i> 1977; 41: 303–306.</p> <p>Hawkins M, Alexander CN, Travis FT, Camelia CR, Walton KG, Durchholz CF, Rainforth MW. Consciousness-based approach to rehabilitation of inmates in the Netherlands Antilles: psychosocial and cognitive changes. <i>Journal of Offender Rehabilitation</i> 2003; 36(1-4): 205–228.</p> <p>Dillbeck MC. Meditation and flexibility of visual perception and verbal problem-solving. <i>Memory and Cognition</i> 1982; 10(3): 207–215.</p> <p>Turnbull M, Norris H. Effects of Transcendental Meditation on self-identity indices and personality. <i>British Journal of Psychology</i> 1982; 73:57–69.</p> <p>Geisler M. Therapeutische Wirkungen der Transzendentalen Meditation auf Drogenkonsumenten. <i>Zeitschrift für Klinische Psychologie</i> 1978; 7(4):235–255.</p> <p>Abrams AI, Siegel LM. The Transcendental Meditation program and rehabilitation at Folsom State Prison: a cross-validation study. <i>Criminal Justice and Behavior</i> 1978; 5(1):3–20.</p> <p>Tjoa A. Increased intelligence and reduced neuroticism through the Transcendental</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		<p>(Increased Capacity for Warm Interpersonal Relationships),</p> <p>Decreased Neuroticism (Increased Emotional Stability, Decreased Tension), Increased Self-Reliance (Increased Effectiveness, More Balanced Mood, Increased Vigor)</p>	<p>Meditation program. <i>Gedrag: Tijdschrift voor Psychologie</i> (Behavior: Journal of Psychology) 1975; 3:167–182.</p> <p>Alexander CN, Walton KG, Goodman R. Walpole study of the Transcendental Meditation program in maximum security prisoners I: cross-sectional differences in development and psychopathology. <i>Journal of Offender Rehabilitation</i> 2003; 36(1-4): 97–126.</p>
11	<b>Persistent negative trauma-related emotions (e.g., fear, horror, anger, guilt, or shame)</b>	<p>Decreased Anxiety, Decreased Neuroticism, Decreased Resentment, Decreased Negativism, Decreased Irritability, Decreased Hostility, Improved Behavior</p> <p>Enhanced Positive Cognitive Style and Lower Anxiety</p> <p>Orientation Toward Positive Values, More Positive Appraisal of Others</p> <p>More Positive Conception of Human Nature, More Positive Self-Image, Higher Levels of Tolerance, Greater Sociability, Less Pronounced Feelings of Social Inadequacy</p>	<p>Abrams AI, and Siegel LM. The Transcendental Meditation program and rehabilitation at Folsom State Prison: A cross-validation study. <i>Criminal Justice and Behavior</i> 1978; 5(1): 3–20.</p> <p>Yosuke Sakairi. What Does Meditation Change? Measurement of Cognitive Styles. In <i>The Embodiment of Mind: Eastern and Western Perspectives</i>, M.M. Del Monte &amp; Y. Haruki (Eds.); Delft: Eburon Publishers, 1998: 57–66.</p> <p>Gelderloos P, Goddard III PH, Ahlström HH, Jacoby R. Cognitive orientation towards positive values in advanced participants of the TM and TM-Sidhi program. <i>Perceptual and Motor Skills</i> 1987; 64(3): 1003–1012.</p> <p>Hanley CP, Spates JL. Transcendental Meditation and social psychological attitudes. <i>Journal of Psychology</i> 1978 99: 121–127.</p>
12	<b>Markedly decreased interest in (pre-traumatic) significant activities</b>	<p>Greater Interest in Academic Activities, Greater Intellectual Orientation, Greater Aestheticism, Greater Adaptability of Mental Orientation, Greater Autonomy, Greater Social Extraversion, Less Impulsiveness</p> <p>Greater Openness to Experience, Greater Emotional Stability, Greater Extroversion &amp; Agreeableness,</p>	<p>Penner WJ, Zingle HW, Dyck R, Truch S. Does an in-depth Transcendental Meditation course effect change in the personalities of the participants? <i>Western Psychologist</i> 1974; 4: 104–111.</p> <p>Travis FT, Arenander A, DuBois D. Psychological and physiological characteristics of a proposed object-referral/self-referral continuum of self-awareness. <i>Consciousness</i></p>



	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		<p>Lower Anxiety, Higher Moral Reasoning</p> <p>Increased Intelligence, Decreased Neuroticism, Decreased Neurotic Instability</p> <p>Increased Inner and Outer Awareness; Ability to Live in the Present, Ability to Connect Past, Present, and Future Meaningfully; Increased Spontaneity and Flexibility</p>	<p><i>and Cognition</i> 2004; 13(2):401–420.</p> <p>Tjoa A. Increased intelligence and reduced neuroticism through the Transcendental Meditation program. <i>Gedrag: Tijdschrift voor Psychologie</i> (Behavior: Journal of Psychology) 1975; 3:167–182.</p> <p>Alexander CN, Rainforth MV, Gelderloos P. Transcendental Meditation, self-actualization, and psychological health: a conceptual overview and statistical meta-analysis. <i>Journal of Social Behavior and Personality</i> 1991; 6(5):189–247.</p>
13	<b>Feeling alienated from others (e.g., detachment or estrangement)</b>	<p>Decreased Social Alienation and Emotional Disturbance</p> <p>Increased Capacity for Warm Interpersonal Relationships), Less Anxiety</p> <p>Increased Sociability, Improved Psychological Health, Increased Intelligence, Increased Social Maturity</p> <p>Improved Ability to Work with Others, Increased Job Satisfaction, Improved Personal and Work Relationships, Reduced Job Worry and Tension, Reduced Trait Anxiety, Improved Health, Greater Calm (Lower Skin Conductance) During Task Performance</p> <p>Increased Ability to Be Sympathetic, Compassionate, and Understanding; Improved Personal Relationships, Improved Harmony with Others; Warm Marital &amp;</p>	<p>Penner WJ, Zingle HW, Dyck R, Truch S. Does an in-depth Transcendental Meditation course effect change in the personalities of the participants? <i>Western Psychologist</i> 1974; 4: 104–111.</p> <p>Hjelle LA. Transcendental Meditation and psychological health. <i>Perceptual and Motor Skills</i> 1974; 39: 623–628.</p> <p>Aron A, Orme-Johnson D, Brubaker P. The Transcendental Meditation program in the college curriculum: A four-year longitudinal study of effects on cognitive and affective functioning. <i>College Student Journal</i> 1981; 15(2):140–146.</p> <p>Alexander CN, Swanson GC, Rainforth MV, et al. The effects of the Transcendental Meditation program on stress reduction, health, and employee development: A prospective study in two occupational settings. <i>Anxiety, Stress, and Coping</i> 1993; 6: 245–262.</p> <p>Aron EN, Aron A. Transcendental Meditation and marital adjustment. <i>Psychological Reports</i> 1982 51(7):887-890</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		Family Relationships; Greater Connectedness	
14	<b>Persistent inability to experience positive emotions (for example, being unable to feel happiness or have loving feelings)</b>	<p>Orientation toward Positive Values; More Positive Appraisal of Others</p> <p>Adaptability of Mental Orientation; Greater Autonomy; Greater Social Extraversion; Greater Personal Integration; Lower Anxiety Level; Greater Altruism</p> <p>Increased Contentment, Increased Self-Confidence; Increased Sociability; Increased Friendliness; Increased Good Humor, Decreased Inhibition; Increased Extraversion (Increased Capacity for Warm Interpersonal Relationships); Decreased Neuroticism (Increased Emotional Stability, Decreased Tension)</p> <p>Improved Capacity for Warm Interpersonal Relationships; Greater Inner Locus of Control; Less Anxiety</p> <p>Increased Ability to Be Sympathetic, Compassionate, and Understanding; Improved Personal Relationships, Improved Harmony with Others; Warm Marital &amp; Family Relationships; Greater Connectedness</p>	<p>Gelderloos P, Goddard III PH, Ahlström HH, Jacoby R. Cognitive orientation towards positive values in advanced participants of the TM and TM-Sidhi program. <i>Perceptual and Motor Skills</i> 1987; 64(3):1003–1012.</p> <p>Penner WJ, Zingle HW, Dyck R, Truch S. Does an in-depth Transcendental Meditation course effect change in the personalities of the participants? <i>Western Psychologist</i> 1974; 4: 104–111.</p> <p>Geisler, M. Therapeutische Wirkungen der Transzendentalen Meditation auf Drogenkonsumenten. <i>Zeitschrift für klinische Psychologie</i> 1978; 7(4): 235–255.</p> <p>Hjelle JA. Transcendental Meditation and psychological health. <i>Perceptual and Motor Skills</i> 1974; 39(5):623–628.</p> <p>Aron EN, Aron A. Transcendental Meditation and marital adjustment. <i>Psychological Reports</i> 1982; 51(7):887–890</p>
15	<b>Irritable or aggressive behavior</b>	<p>Reduction of Neuroendocrine Abnormalities Associated with Aggressive and Irritable Behavior</p> <p>Decreased Anxiety; Decreased Hostility; Decreased Neuroticism,</p>	<p>Walton KG, Levitsky DK. Effects of the Transcendental Meditation program on neuroendocrine abnormalities associated with aggression and crime. <i>Journal of Offender Rehabilitation</i> 2003; 36: 67–87.</p> <p>Abrams AI, and Siegel LM. The Transcendental Meditation program and rehabilitation at Folsom</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		<p>Decreased Resentment; Decreased Negativism; Decreased Irritability</p> <p>Decreased Overactive or Impulsive Behavior; Decreased Anxiety and Tension</p> <p>Enhanced Psychological Development and Reduced Psychopathology</p> <p>Improvements in Mental Well-Being; Decreased Impulsive Tendency; Reduced Emotional Instability; Decreased Neurotic Tendency; Decreased Anxiety</p>	<p>State Prison: A cross-validation study. <i>Criminal Justice and Behavior</i> 1978; 5(1): 3–20.</p> <p>Abrams AI. Transcendental Meditation and rehabilitation at Folsom Prison: response to a critique. <i>Criminal Justice and Behavior</i> 1979; 6:13–21.</p> <p>Candelent T, Candelent G. Teaching Transcendental Meditation in a psychiatric setting. <i>Hospital &amp; Community Psychiatry</i> 1975; 26(3): 156–159.</p> <p>Alexander CN, Walton KG, Goodman R. Walpole study of the Transcendental Meditation program in maximum security prisoners I: cross-sectional differences in development and psychopathology. <i>Journal of Offender Rehabilitation</i> 2003; 36(1-4): 97–126 .</p>
16	Self-destructive or reckless behavior	<p>Reduction in Use of Illegal Drugs, Alcohol, and Cigarettes; Abstinence from Illegal Drugs, Alcohol, and Cigarettes Maintained or Increased over Long Term; Improved Psychological Health (Reduced Negative Qualities, Reduced Anxiety, Improved Positive Qualities)</p> <p>Decreased Negative Behaviors</p> <p>Improvements in Mental Well-Being; Decreased Impulsive Tendency; Reduced Emotional Instability; Decreased Neurotic Tendency; Decreased Anxiety</p> <p>Increased Capacity for Moral Reasoning and Good Judgement</p>	<p>Alexander CN, Robinson P, Rainforth MV. Treating and preventing alcohol, nicotine, and drug abuse through Transcendental Meditation: a review and statistical meta-analysis. <i>Alcoholism Treatment Quarterly</i> 1994; 11(1/2):13–87</p> <p>Barnes VA, Bauza LB, Treiber FA. Impact of stress reduction on negative school behavior in adolescents. <i>Health and Quality of Life Outcomes</i> 2003; 1(1):10.</p> <p>Haratani T, Henmi T. Effects of Transcendental Meditation on mental health of industrial workers. <i>Japanese Journal of Industrial Health</i> 1990 32:656.</p> <p>Nidich SI, Nidich RJ, Alexander CN. Moral development and higher states of consciousness. <i>Journal of Adult Development</i> 2000; 7(4):217–225.</p> <p>Nidich SI, Ryncarz RA, Abrams AI, Orme-Johnson DW, Wallace RK. Kohlbergian moral perspective responses, EEG coherence, and the Transcendental Meditation and TM-Sidhi</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		<p>Increased Intelligence to Facilitate Better Decisions</p> <p>Decreased Drug Abuse; Decreased Use of Cigarettes; Decreased Use of Alcohol; Decreased Use of Caffeine; Decreased Need for Tranquillizers and Other Prescribed Drugs</p> <p>Increased Brain Coherence</p> <p>Increased Cognitive Ability</p>	<p>program. <i>Journal of Moral Education</i> 1983; 12(3):166–173.</p> <p>Cranson RW, Orme-Johnson DW, Dillbeck MC, Jones CH, Alexander CN, Gackenbach J. Transcendental Meditation and improved performance on intelligence-related measures: a longitudinal study. <i>Journal of Personality and Individual Differences</i> 1991; 12(10):1105–1116.</p> <p>Monahan RJ. Secondary prevention of drug dependence through the Transcendental Meditation program in metropolitan Philadelphia. <i>The International Journal of the Addictions</i> 12(6): 729–754, 1977.</p> <p>Travis FT, Tecce J, Arenander A, Wallace RK. Patterns of EEG coherence, power and contingent negative variation characterize the integration of transcendental and waking states. <i>Biological Psychology</i> 2002; 61(3):293–319.</p> <p>Kam-Tim S, Orme-Johnson, D. W. (2001). Three randomized experiments on the holistic longitudinal effects of the Transcendental Meditation technique on cognition. <i>Intelligence</i> 2001; 29(5), 419-440.</p>
17	<b>Hypervigilance</b>	<p>More Relaxed Style of Functioning; Increased Stability of Nervous System; Reduced Hypervigilance</p> <p>Increased Inner Calmness and Decreased Hypervigilance</p> <p>More Relaxed Style of Functioning; Increased Stability of Nervous System; Increased Inner Calmness and Decreased Hypervigilance</p>	<p>Alexander CN, Rainforth MV, Gelderloos P. Transcendental Meditation, self-actualization, and psychological health: A conceptual overview and statistical meta-analysis. <i>Journal of Social Behavior and Personality</i> 1991; 6: 189–248.</p> <p>Orme-Johnson DW, Moore RM. First prison study using the Transcendental Meditation program: La Tuna Federal Penitentiary, 1971. <i>Journal of Offender Rehabilitation</i> 2003; 36: 89–95.</p> <p>Jevning R, Wallace RK, Beidebach M. The physiology of meditation: a review. A wakeful hypometabolic integrated response. <i>Neuroscience and Biobehavioral Reviews</i> 1992; 16(3):415–424.</p> <p>Lang R, Dehof K, Meurer KA, Kaufmann W. Sympathetic activity and Transcendental Meditation. <i>Journal of Neural Transmission</i> 1979 44(1/2):117–135.</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on <i>TM</i> Technique
			<p>Orme-Johnson DW. (1973). Autonomic stability and Transcendental Meditation. <i>Psychosomatic Medicine</i>, 1973; 35(4): 341–349.</p> <p>Wallace, RK, et al. The physiology of meditation. <i>Scientific American</i> 1972; 226: 84–90.</p> <p>Wallace RK, et al. A wakeful hypometabolic physiologic state. <i>American Journal of Physiology</i> 1971; 221: 795–799.</p> <p>MacLean CR, Walton KG, Wenneberg SR, Levitsky DK, Mandarino JV, Waziri R, Hillis SL, Schneider RH. Effects of the Transcendental Meditation program on adaptive mechanisms: Changes in hormone levels and responses to stress after four months of practice. <i>Psychoneuroendocrinology</i> 1997; 22(4):277–295.</p> <p>Infante JR, Peran F, Martinez M, Roldan A, Poyatos R, Ruiz C, Samaniego F, Garrido F. ACTH and beta-endorphin in Transcendental Meditation. <i>Physiology and Behavior</i> 1998; 64(3):311–315.</p> <p>Infante JR, Torres-Avisbal M, Pinel P, Vallejo JA, Peran F, Gonzalez F, Contreras P, Pacheco C, Roldan A, Latre JM. Catecholamine levels in practitioners of the Transcendental Meditation technique. <i>Physiology and Behavior</i> 2001; 72(2):141–146.</p>
18	<b>Exaggerated startle response</b>	<p>More Relaxed Style of Functioning; Increased Stability of Nervous System; Reduced Startle Response</p> <p>Improved Calm, Settled Style of Functioning</p>	<p>Jevning R, Wallace RK, Beidebach M. The physiology of meditation: a review. A wakeful hypometabolic integrated response. <i>Neuroscience and Biobehavioral Reviews</i> 1992; 16(3):415–424.</p> <p>Lang R, Dehof K, Meurer KA, Kaufmann W. Sympathetic activity and Transcendental Meditation. <i>Journal of Neural Transmission</i> 1979 44(1/2):117–135.</p> <p>Orme-Johnson DW. (1973). Autonomic stability and Transcendental Meditation. <i>Psychosomatic Medicine</i>, 1973; 35(4): 341–349.</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on TM Technique
		<p>Development of High States of Consciousness and Coherent Brain Functioning</p> <p>More Stable and Balanced Hormonal System</p>	<p>Wallace, RK, et al. The physiology of meditation. <i>Scientific American</i> 1972; 226: 84–90.</p> <p>Wallace RK, et al. A wakeful hypometabolic physiologic state. <i>American Journal of Physiology</i> 1971; 221: 795–799.</p> <p>Wallace RK. Physiological effects of Transcendental Meditation. <i>Science</i> 1970; 167: 1751–1754.</p> <p>Travis FT, Wallace RK. Autonomic patterns during respiratory suspensions: possible markers of Transcendental Consciousness. <i>Psychophysiology</i> 1997; 34(1):39-46.</p> <p>MacLean CR, Walton KG, Wenneberg SR, Levitsky DK, Mandarino JV, Waziri R, Hillis SL, Schneider RH. Effects of the Transcendental Meditation program on adaptive mechanisms: Changes in hormone levels and responses to stress after four months of practice. <i>Psychoneuroendocrinology</i> 1997; 22(4):277–295.</p> <p>Infante JR, Peran F, Martinez M, Roldan A, Poyatos R, Ruiz C, Samaniego F, Garrido F. ACTH and beta-endorphin in Transcendental Meditation. <i>Physiology and Behavior</i> 1998; 64(3):311–315.</p> <p>Infante JR, Torres-Avisbal M, Pinel P, Vallejo JA, Peran F, Gonzalez F, Contreras P, Pacheco C, Roldan A, Latre JM. Catecholamine levels in practitioners of the Transcendental Meditation technique. <i>Physiology and Behavior</i> 2001; 72(2):141–146.</p>
19	Problems in concentration	<p>Improved Ability to Focus Attention</p> <p>Improved Ability to Focus Attention</p>	<p>Rani NJ, Rao PVK. Effects of meditation on attention processes. <i>Journal of Indian Psychology</i>. 2000; 18: 52–60.</p> <p>Rani NJ, Rao PVK. Meditation and attention regulation. <i>Journal of Indian Psychology</i>. 1996; 14: 26–30.</p> <p>Banquet JP, Lesèvre N. Event-related potentials in altered states of consciousness. <i>Progress in Brain Research</i> 1980; 54:447–453.</p>

	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on <i>TM</i> Technique
		<p>Quieting of the Brain and Enhanced Perception</p> <p>Improved Brain Functioning and Increased Ability to Focus</p>	<p>Cranson RW, Orme-Johnson DW, Dillbeck MC, Jones CH, Alexander CN, Gackenbach J. Transcendental Meditation and improved performance on intelligence-related measures: A longitudinal study. <i>Journal of Personality and Individual Differences</i> 1991; 12(10):1105–1116.</p> <p>Kam-Tim S, Orme-Johnson, D. W. (2001). Three randomized experiments on the holistic longitudinal effects of the Transcendental Meditation technique on cognition. <i>Intelligence</i> 2001; 29(5), 419-440.</p> <p>Dillbeck MC. Meditation and flexibility of visual perception and verbal problem solving. <i>Memory and Cognition</i> 1982; 10(3):207–215.</p> <p>Alexander CN, Swanson GC, Rainforth MV, et al. The effects of the Transcendental Meditation program on stress reduction, health, and employee development: A prospective study in two occupational settings. <i>Anxiety, Stress, and Coping</i> 1993; 6: 245–262.</p> <p>Lyubimov NN. Changes in electroencephalogram and evoked potentials during application of a special form of psychological training (meditation). <i>Human Physiology (Fiziologiya Cheloveka)</i> 1999; 25:171–180.</p> <p>Travis FT, Tecce JJ. Effects of distracting stimuli on CNV amplitude and reaction time. <i>International Journal of Psychophysiology</i> 1998; 31(1): 45–50.</p> <p>Travis FT, Tecce J, Arenander A, Wallace RK. Patterns of EEG coherence, power and contingent negative variation characterize the integration of transcendental and waking states. <i>Biological Psychology</i> 2002; 61(3):293–319.</p> <p>Travis FT, Tecce JJ, Guttman J. Cortical plasticity, contingent negative variation, and transcendent experiences during practice of the Transcendental Meditation technique. <i>Biological Psychology</i> 2000; 55(1):41–55.</p>
20	Sleep disturbance	Improved Quality of Sleep with Comprehensive Neurophysiological	Mason LI, Orme-Johnson DW. Transcendental consciousness wakes up in dreaming and deep



	DSM-5 Criteria for PTSD	Mediating Variables	Scientific Research on <i>TM</i> Technique
		<p>Integration</p> <p>Improved Sleep Patterns (Decreased Awakenings per Night, Improved Quality of Sleep); Decreased Anxiety and Tension; Decreased Overactive or Impulsive Behavior</p> <p>Improved Sleep Patterns (Decreased Time to Fall Asleep, Decreased Awakenings per Night, Improved Quality of Sleep)</p>	<p>sleep. <i>International Journal of Dream Research</i> 2010; 3(1):28–32.</p> <p>Mason LI, Alexander CN, Travis FT, Marsh G, Orme-Johnson DW, Gackenbach J, Mason DC, Rainforth M, Walton KG. Electrophysiological correlates of higher states of consciousness during sleep in long-term practitioners of the Transcendental Meditation program. <i>Sleep</i> 1997; 20(2):102–110.</p> <p>Travis FT. The junction point model: a field model of waking, sleeping, and dreaming relating dream witnessing, the waking/sleeping transition, and Transcendental Meditation in terms of a common psychophysiologic state. <i>Dreaming</i> 1994 4:91–104.</p> <p>Candelent T, Candelent G. Teaching Transcendental Meditation in a psychiatric setting. <i>Hospital &amp; Community Psychiatry</i> 1975; 26(3): 156–159.</p> <p>Ljunggren G. The influence of Transcendental Meditation on neuroticism, use of drugs and insomnia. <i>Lakartidningen</i> 1977; 74(47): 4212–4214.</p>

## Appendix 3: Selected Research on the Transcendental Meditation Program

### Selected Physical Health Research

#### Selected Cardiovascular Disease and Risk Factor Research

- Alexander CN, Robinson P, Orme-Johnson D, Schneider RH, Walton K. Effects of Transcendental Meditation compared to other methods of relaxation and meditation in reducing risk factors, morbidity, and mortality. *Homeostasis*, 35 (4-5): 243-264, 1994.
- MacLean CRK, Walton KG, Wenneberg S, Levitsky DK, Mandarin JV, Waziri R, Schneider RH. Altered responses of Cortisol, GH, TSH and testosterone to acute stress after four months practice of Transcendental Meditation (TM). *Annals of the New York Academy of Sciences*, 746:381-384, 1994.
- Schneider RH, Staggers F, Alexander CN, Sheppard W, Rainforth M, Kondwani K, Smith S, King C. A randomized controlled trial of stress reduction for hypertension in older African Americans. *Hypertension*, 26:820-827, 1995
- Alexander CN, Schneider RH, Claybourne M, Sheppard W, Staggers F, Rainforth M, Salerno J, Kondwani K, Smith S, Walton KG, Egan B. A trial of stress reduction for hypertension in older African Americans II. Sex and risk subgroup analysis. *Hypertension*, 28(2): 228-237, 1996.
- Wenneberg SR, Schneider RH, Walton KG, MacLean C, Levitsky DK, Mandarin JV, Waziri R., Wallace RK. Anger expression correlates with platelet aggregation. *Behavioral Medicine*, 22:174-177, 1997.
- Wenneberg SR, Schneider RH, Walton KG, MacLean C, Levitsky D., Mandarin JV, Rainforth MV, Salerno JW, Waziri R, Wallace RK. A controlled study of the effects of the Transcendental Meditation program on ambulatory blood pressure and cardiovascular reactivity. *International Journal of Neuroscience*, 89:15-28, 1997.
- Barnes VA, Schneider RH, Alexander CN. Stress, stress reduction and hypertension in African Americans: An updated review. *Journal of the National Medical Association*, 89(7):464-476, 1997.
- MacLean CRK, Walton KG, Wenneberg SR, Levitsky DK, Mandarin JV, Waziri R, Hillis SL, Schneider RH. Effects of the Transcendental Meditation program adaptive mechanisms: Altered endocrine responses to stress after four months of practice. *Psychoneuroendocrinology*, 22(4):277-295, 1997.
- Schneider RS., Nidich SI, Salerno JW, Sharma HM, Robinson CE, Nidich RJ, Alexander CN. Lower lipid peroxide levels in practitioners of the Transcendental Meditation Program. *Psychosomatic Medicine*, 60:38-41, 1998.
- Calderon R, Schneider RH, Alexander CN, Meyers H. Stress, stress reduction and hypercholesterolemia in African Americans. *Ethnicity and Disease*, 9:451-462, 1999.
- Castillo-Richmond A, Schneider RH, Alexander CN, Cook R, Meyers HS, Haney C, Rainforth M, Salerno J. Effects of stress reduction and carotid atherosclerosis in hypertensive African Americans. *Stroke*, 31:568-573, 2000.
- Schneider RH, Castillo-Richmond A, Alexander CN, Meyers H, Kaushik V, Aranguri C, Norris K, Haney C, Rainforth M, Calderon R, Nidich S. Behavioral treatment of hypertensive heart disease in African Americans: Rationale and design of a randomized controlled trial. *Behavioral Medicine*, 27:83-95, 2001.
- Fields JZ, Walton KG, Schneider RH, Nidich S, Pomerantz R, Suchdev P, Castillo-Richmond A, Payne K, Clark ET, Rainforth M. Effect of a multimodality natural medicine program on carotid atherosclerosis in older subjects: A pilot trial of Maharishi Vedic Medicine. *American Journal of Cardiology*, 89:952-958, 2002.

- Bairey Merz CN, Dwyer J, Nordstrom C, Walton KG, Salerno JW, Schneider RH. Psychosocial stress and cardiovascular disease, Part I: Pathophysiological links. *Behavioral Medicine*, 27:141-146, 2002.
- Walton KG, Schneider RH, Nidich SI, Salerno JW, Nordstrom CK, Bairey Merz CN. Psychosocial stress and cardiovascular disease 2: Effectiveness of the Transcendental Meditation program in treatment and prevention. *Behavioral Medicine*, 28:106-123, 2002.
- Nidich RJ, Nidich SI, Schneider RH. The Transcendental Meditation program and quality of life in breast cancer patients: A feasibility study. *Journal of Psychosomatic Research*, 55:153, 2003.
- Nidich SI, Schneider RH, Fields JZ, Rainforth M. Effects of the Transcendental Meditation program on emotional well-being in elderly breast cancer patients: Preliminary results from a randomized controlled study. *Journal of Psychosomatic Research*, 55:153-154, 2003.
- Nidich SI, Grandinetti A, Schneider RH, Chang H, Ricketts L, Toomey M. The Transcendental Meditation program and cardiovascular disease in Native Hawaiians. *Journal of Psychosomatic Research*, 55:144-145, 2003.
- Walton KG, Fields JZ, Levitsky DK, Harris DA, Pugh ND, Schneider RH. Lowering cortisol and CVD risk in postmenopausal women: A pilot study using the Transcendental Meditation Program. *Annals of the New York Academy of Sciences*, 1032:211-5, 2004.
- Walton KG, Schneider RH, Nidich S. Review of controlled clinical research on the Transcendental Meditation program and cardiovascular disease: Risk factors, morbidity, and mortality. *Cardiology in Review*, 12(5):262-266, 2004.
- Walton KG, Schneider RH, Salerno JW, Nidich SI. Psychosocial stress and cardiovascular disease 3: Clinical and policy implications of research on the Transcendental Meditation program. *Behavioral Medicine*, 30(4):173-83, 2005. \
- Schneider RH, Alexander CN, Staggars F, Rainforth M, Salerno JW, Hartz A, Arndt S, Barnes VA, Nidich SI. Long-term effects of stress reduction on mortality in persons  $\geq 55$  years of age with systemic hypertension: *American Journal of Cardiology*, 95:1060-1064, 2005.
- Barnes VA, Schneider RH, Alexander CN, Rainforth M, Salerno J, Kondwani K, Staggars F. Impact of the Transcendental Meditation program on mortality in older African Americans with hypertension—Eight-year follow up. *Journal of Social Behavior and Personality*, 17:201-216, 2005.
- Schneider RH, Alexander CN, Staggars F, Orme-Johnson DW, Rainforth M, Salerno JW, Sheppard W, Castillo-Richmond A, Barnes VA, Nidich SI. A randomized controlled trial of stress reduction in African Americans treated for hypertension over one year. *American Journal of Hypertension*, 18:88-98, 2005.
- Schneider RH, Alexander CN, Salerno J, Rainforth M, Nidich S. Stress reduction in the prevention and treatment of cardiovascular disease in high risk underserved populations: A review of controlled research on the Transcendental Meditation program. *Journal of Social Behavior and Personality*, 17:159-180, 2005.
- Kondwani KA, Schneider RH, Alexander CN, Sledge C, Staggars F, Clayborne BM, Sheppard W, Rainforth M, Krouse L, Orme-Johnson DW. Left ventricular mass regression with the Transcendental Meditation technique and a health education program in hypertensive African Americans. *Journal of Social Behavior and Personality*, 17:181-200, 2005.
- Paul-Labrador M, Polk D, Dwyer JH, Velasquez I, Nidich SI, Rainforth M, Schneider RH, Bairey Merz CN. Effects of randomized controlled trial of Transcendental Meditation on components of the metabolic syndrome in subjects with coronary heart disease. *Archives of Internal Medicine*, 166:1218-1224, 2006.
- Jayadevappa R, Johnson J, Bloom B, Nidich S, Desa, S, Chhatre S, Razian, D, Schneider RH, Effectiveness of Transcendental Meditation on functional capacity and quality of life of African

Americans with congestive heart failure: a randomized control study. *Ethnicity and Disease*, 17:72-77, 2007.

- Schneider RH, Grim CE, Rainforth MV, Kotchen T, Nidich SI, Gaylord-King C, Salerno JW, Kotchen JM, Alexander CN. Stress reduction in the secondary prevention of cardiovascular disease: randomized, controlled trial of transcendental meditation and health education in Blacks. *Circ. Cardiovasc Qual Outcomes*. 2012; (6):750-8. PMID: 23149426

#### Breast Cancer Research

- Nidich, S, Field, J, Rainforth, M, Pomerantz, R, Cella, D, Kristeller, J, Salerno, J, & Schneider, R. (2009). A randomized controlled trial of the effects of Transcendental Meditation on quality of life in older breast cancer patients. *Integrative Cancer Therapies*, 8(3), 228-234.

#### AIDS Research

- Chhatre S, Metzger DS, Frank I, Boyer J, Thompson E, Nidich S, Montaner LJ, Jayadevappa R. Effects of behavioral stress reduction Transcendental Meditation intervention in persons with HIV. *AIDS Care*. 2013; 25(10):1291-7.
- Nidich, S., Roth, T., Chhatre, S., Jayadeevappa, R. Effect of the Transcendental Meditation Program on quality of life in AIDS patients: San Francisco AIDS Foundation study (to be submitted for publication).

#### **Other Noted Health Studies**

- Orme-Johnson DW. Medical care utilization and the Transcendental Meditation program. *Psycho-somatic Medicine* 1987 49(1):493-507.
- D. W. Orme-Johnson, Herron R. E. "An innovative approach to reducing medical care utilization and expenditures." *The American Journal of Managed Care* 3, no. 1 (1997): 135-144.
- Herron RE, Schneider RH, Mandarino JV, Alexander CN, Walton KG. Cost-effective hypertension management: Comparison of drug therapies with an alternative program. *Journal of Managed Care*, 2(4):427-437, 1996.
- Schneider RH, Cavanaugh W, Boncheff S. Cost reductions through better health: Transcendental Meditation program cuts costs in half. *Business and Health*, 4(1):39-42, 1986.
- Rainforth MV, Schneider RH, Nidich SI, King CG, Salerno JW, Anderson JW. Stress reduction programs in patients with elevated blood pressure: a systematic review and meta-analysis. *Current Hypertension Reports*, 9(6):520-8, 2007.
- Brook RD, Appel LJ, Rubenfire M, Ogedegbe G, Bisognano JD, Elliott WJ, Fuchs F, Hughes JW, Lackland DT, Staffileno BA, Townsend RR, Rajagopalan S. Beyond medications and diet: alternative approaches to lowering blood pressure. A scientific statement from the American Heart Association. *Hypertension* 2013 61(6):1360-1383.
- Barnes VA, Orme-Johnson DW. Prevention and treatment of cardiovascular disease in adolescents and adults through the Transcendental Meditation Program: a research review update. *Current Hypertension Reviews* 2012 8(3):227-242.

#### **Selected Brain Imaging Research**

- Travis, Valosek, L., Konrad, A., Link, J., Salerno, J., Scheller, R., Nidich, S. Effect of meditation on psychological distress and brain functioning: A randomized controlled study. *Brain and Cognition*, 2018, 125, 100-105.

- Newberg AB, Travis F, Wintering N, Nidich S, Schneider R. Cerebral glucose metabolic changes associated with a meditation based relaxation technique. *Journal of Nuclear Medicine*, 2006; 47: 314.
- Orme-Johnson DW, Schneider R, Son YD, Nidich S, Cho Z. Neuroimaging of meditation's effect on brain reactivity to pain. *NeuroReport*, 17(12):1359-63, 2006.
- Travis F, Shear J. Focused attention, open monitoring and automatic self-transcending: categories to organize meditations from Vedic, Buddhist and Chinese traditions. *Consciousness and Cognition* 2010 19(4):1110-1118.
- Travis F, Haaga A, Hagelin J, Tanner M, Arenander A, Nidich S, Gaylord-King C, Grosswald S, Rainforth M, Schneider R. A self-referential default brain state: patterns of coherence, power, and eLORETA sources during eyes-closed rest and Transcendental Meditation practice. *Cognitive Processing*, 11:21–30, 2010.
- Travis F, Haaga DH, Hagelin J, Tanner M, Nidich S, Gaylord-King C, Grosswald S, Rainforth M, & Schneider RH. Effects of Transcendental Meditation Practice on Brain Functioning and Stress Reactivity in College Students. *International Journal of Psychophysiology*, 71(2):170-6, 2009.
- Travis F. Transcendental experiences during meditation practice. *Annals of the New York Academy of Sciences* 2014 1307:1-8.

### **Selected Mental Health Publications**

#### Research in Veterans, Active-Military, Cadets, Inmates

- Nidich, S., Rutledge, T., Rainforth, M., Mills, P., Heppner, P., Salerno, J. Gaylord-King, C., & Schneider, R. (2018). Non-trauma-focused meditation versus exposure therapy in veterans with post-traumatic stress disorder:: a randomised controlled trial. *Lancet Psychiatry*, 5: 975-86.
- Brooks JS, Scarano T. (1985). Transcendental Meditation in the treatment of post-Vietnam adjustment. *Journal of Counseling and Development*, 64, 212-215.
- Rosenthal JZ, Grosswald S, Ross R, Rosenthal, N. (2011). Effects of Transcendental Meditation in veterans of Operation Enduring Freedom and Operation Iraqi Freedom with posttraumatic stress disorder: a pilot study. *Military Medicine*, 176, 626-630.
- Herron, R. & Rees, B (2018). The Transcendental Meditation Program's Impact on the symptoms of Post-traumatic Stress Disorder of Veterans: An Uncontrolled Pilot Study. *Military Medicine*, 183, pp. 144-150.
- Barnes VA, Rigg JL, Williams JJ. (2013). A clinical case series: Treatment of PTSD with Transcendental Meditation in active duty military personnel. *Military Medicine*, 178, 836-840.
- Barnes VA, Monto A, Williams JJ, et al. (2016). The impact of Transcendental Meditation on psychotropic medication use among active duty military service members with anxiety and PTSD. *Military Medicine*.
- Bandy, C.L., Fleming, K., Meyer, M., & Dulmage, J. Meditation training in Rook Cadets increases resilience (Norwich University) (manuscript being prepared for publication).

#### Other Trauma Research

- Rees, B., Travis, F., Shapiro, D., & Chant, R. (2013). Reduction in post traumatic stress symptoms in Congolese refugees practicing Transcendental Meditation. *Journal of Traumatic Stress*, 26, 295-298.
- Rees, B., Travis, F., Shapiro, D., & Chant, R. (2014). Significant Reductions in Posttraumatic Stress Symptoms in Congolese Refugees after 10 days Transcendental Meditation Practice. *Journal of Traumatic Stress*, 27(1), 112-115.
- S. Nidich, O'Connor T., Rutledge T., et al. "Reduced trauma symptoms and perceived stress in male prison Inmates through the Transcendental Meditation program: A randomized controlled trial." *The Permanente Journal* 20, no. 4 (2016): 16-007.

- S. Nidich, Seng A., Compton B., et al. "Transcendental Meditation and Reduced Trauma Symptoms in Female Inmates: A Randomized Controlled Study." Perm J 21 (2017).
- Bandy C, Dillbeck M, Sezibera V, et al. Reduction of PTSD in South African University Students Using Transcendental Meditation Practice. *Psychological Reports*, On-line: February 2019.

## **Selected Education Publications**

### School Research

- Valosek L, Nidich S, Wendt S, Grant J, Nidich R. (2019) Effect of Meditation on Social-Emotional Learning in Middle School Students. *Education*, Volume 139, Number 3, 111-119.
- Barnes VA, Bauza LB, Treiber FA. (2003). Impact of stress reduction on negative school behavior in adolescents. *Health and Quality of Life Outcomes*, 1(1).
- Barnes VA, Treiber FA, Johnson MH. (2004). Impact of stress reduction on ambulatory blood pressure in African American adolescents. *American Journal of Hypertension*, 17(4), 366-369.
- Barnes VA, Kapuku GK, Treiber FA. (2012). Impact of Transcendental Meditation on left ventricular mass in African American adolescents. *Evidence-Based Complementary and Alternative Medicine*.
- Colbert RD, Nidich S. (2013). Effect of the Transcendental Meditation Program on graduation, college acceptance and dropout rates for students attending an urban public high school. *Education*, 133(4), 495-501.
- Elder C, Nidich S, Colbert R, Hagelin J, Grayshield L, Oviedo-Lim D, Nidich R, Rainforth M, Jones C, Gerace D. (2011). Reduced psychological distress in racial and ethnic minority students practicing the Transcendental Meditation Program. *Journal of Instructional Psychology*, 38(2), 109-116.
- Nidich S, Mjasiri S, Nidich R, Rainforth M, Grant J, Valosek L, Chang W, Zigler RL. (2011). Academic achievement and Transcendental Meditation: a study with at-risk urban middle school students. *Education*, 131(3), 556-564.
- Rosaen C, Benn R. (2006). The experience of Transcendental Meditation in middle school students: a qualitative report. *Explore*, 2, 422-425.
- Wendt, S., Abrams, A., Grant, J., Nidich, S., Valosek, L. et al. (2015). Practicing Transcendental Meditation in High Schools: Relationship to Well-Being and Academic Achievement Among Students. *Contemporary School Psychology*, Published online, July 22, 2015.

### ADHD Research

- Grosswald, S. J., Stixrud, W. R., Travis, F., & Bateh, M. A. . (2008). Use of the Transcendental Meditation technique to reduce symptoms of Attention Deficit Hyperactivity Disorder (ADHD) by reducing stress and anxiety: An exploratory study. *Current Issues in Education [On-line]*, 10(2).
- Travis, F. T., Grosswald, Sarina, & Stixrud, W. (2011). ADHD, Brain Functioning, and Transcendental Meditation Practice. *Mind & Brain, the Journal of Psychiatry*, 2(1), 73-81.

## **Teacher and Administrator Research**

- Valosek, L., Link, J., Mills, P. et al. (2018). Effect of Meditation on Emotional Intelligence and Perceived Stress: A Randomized Controlled Study. *The Permanente Journal*, 22: 17-172.
- Elder C., Nidich S., Moriarty F., Nidich R. (2014). Effect of Transcendental Meditation on employee stress, depression, and burnout: a randomized controlled study. *The Permanente Journal*, 18(1), 19-23.
- Wendt, S., Nidich, S., Abrams, A., Hipps, J., Grant, J., Link, J., Valosek, L. Effects of Transcendental Meditation on School Staff Burnout, Resilience, and Perceived Stress: A Randomized Controlled Study (submitted for publication).

### College Research

- Bandy, C, Dillbeck, M., Sezibera, V., Taljaard, L., de Reuck, J., Wilks, M., Shapiro, D., Peycke, R. (*Psychological Reports*. on-line: February, 2019) Reduction of PTSD in South African University Students Using Transcendental Meditation Practice.
- Bandy, C.L., Fleming, K., Meyer, M., & Dulmage, J. Meditation training in Rook Cadets increases resilience (Norwich University) (manuscript being prepared for publication).
- Nidich S, Rainforth M, Haaga D, Hagelin J, Salerno J, Travis F, Tanner M, Gaylord-King C, Grosswald S, Schneider R. (2009). A randomized controlled trial on effects of the Transcendental Meditation program on blood pressure, psychological distress, and coping in young adults. *American Journal of Hypertension*, 22(12):1326-1331.
- Haaga DAF, Grosswald S, Gaylord-King C, Rainforth M, Tanner M, Travis F, Nidich S, Schneider RH. (2011). Effects of the Transcendental Meditation program on substance use among university students. *Cardiology Research and Practice* 2011 – published online at Cardiology Research Practice, 537101.
- Burns et al. (2011). The effect of meditation on self-reported measures of stress, anxiety, depression, and perfectionism in a college population. *Journal of College Student Psychotherapy*, 25, 132-144.

### Selected Cognitive Research

- Nidich SI, Ryncarz RA, Abrams AI, Orme-Johnson DW, Wallace RK. Moral development, EEG coherence, and the Transcendental Meditation program. *Journal of Moral Education* 1983 12(3):166-173.
- Alexander CN, Langer EJ, Newman RI, Chandler HM, Davies JL. Transcendental Meditation, mindfulness, and longevity: an experimental study with the elderly. *Journal of Personality and Social Psychology* 1989 57(6):950-964.
- Alexander CN, Langer EJ (eds). *Higher Stages of Human Development: Perspectives on Adult Growth*. New York: Oxford University Press, 1990
- Nidich SI, Schneider RH, Nidich RJ, Foster G, Sharma H, Salerno J, Goodman R, Alexander CN. Effect of the Transcendental Meditation program on intellectual development in community-dwelling older adults. *Journal of Social Behavior and Personality*, 17:217-226, 2005.
- Alexander CN, Kurth SC, Travis F, Alexander VK. Effect of practice of the children's Transcendental Meditation technique on cognitive stage development: acquisition and consolidation of conservation. *Journal of Social Behavior and Personality* 2005 17(1):21-46.
- So KT, Orme-Johnson DW. "Three randomized experiments on the holistic longitudinal effects of the Transcendental Meditation technique on cognition." *Intelligence* 2001 29(no. 5): 419-440.
- Cranson RW, Orme-Johnson DW, Gackenbach J, et al. Transcendental Meditation and improved performance on intelligence-related measures: a longitudinal study. *Personality and Individual Differences* 1991 12: 1105-1116.
- Dillbeck MC, Meditation and flexibility of visual perception and verbal problem solving. *Memory and Cognition* 10 (1982): 207-215.

### Selected Business and Government Publications

- Elder C., Nidich S., Moriarty F., Nidich R. (2014). Effect of Transcendental Meditation on employee stress, depression, and burnout: a randomized controlled study. *The Permanente Journal*, 18(1), 19-23.
- Sheppard WD, Staggers F, Johns L. (1997) The effects of a stress management program in a high security government agency. *Anxiety, Stress, and Coping*. 10(4):341-50.

- Alexander CN, Swanson GC, Rainforth MV, Carlisle TW, Todd CC, Oates RM. (1993) Effects of the Transcendental Meditation program on stress reduction, health, and employee development: a prospective study in two occupational settings. *Anxiety, Stress, and Coping* 6:245-262.
- Haratani T, Hemmi T. (1990) Effects of Transcendental Meditation on the mental health of industrial workers. *Japanese Journal of Industrial Health*. 32:656.
- McCollum B. Leadership development and self development: an empirical study. *Career Development International*. 1999;4(3):149-54.
- Frew D. Transcendental Meditation and productivity. (1974) *Academy of Management Journal* 17: 362-368.

### **Selected Meta-Analysis Studies**

- Alexander CN, Robinson P, Rainforth MV. Treating and preventing alcohol, nicotine, and drug abuse through Transcendental Meditation: a review and statistical meta-analysis. *Alcoholism Treatment Quarterly* 1994 11(1/2):13-87
- Orme-Johnson, D. W., & Barnes, V. A. (2013). Effects of the Transcendental Meditation technique on Trait Anxiety: A Meta-Analysis of Randomized Controlled Trials. *Journal of Alternative and Complementary Medicine*, 20(5), 330-341.
- Orme-Johnson, D.W. & Dillbeck, M.C. Michael C. (2014). Methodological concerns for meta-analyses of meditation: Comment on Sedlmeier et al. (2012). *Psychological Bulletin*, 140, (2), 610–616.
- K. Eppley, Abrams A. I., Shear J. "Differential effects of relaxation techniques on trait anxiety: A meta-analysis." *Journal of Clinical Psychology* 45, no. 6 (1989): 957–974.
- M. C. Dillbeck, Orme-Johnson D. W. "Physiological differences between Transcendental Meditation and rest." *American Psychologist* 42 (1987): 879–881.

### **Selected Corrections Research**

- Abrams AI, Siegel LM. The Transcendental Meditation program and rehabilitation at Folsom State Prison: a cross-validation study. *Criminal Justice and Behavior* 1978 5(1):3-20.
- Alexander CN, Orme-Johnson DW. Walpole study of the Transcendental Meditation program in maximum security prisoners II: longitudinal study of development and psychopathology. *Journal of Offender Rehabilitation* 2003 36(1-4):127-160
- Alexander CN, Rainforth MV, Frank PR, Grant JD, Von Stade C. Walpole study of the Transcendental Meditation program in maximum security prisoners III: reduced recidivism. *Journal of Offender Rehabilitation* 2003 36(1-4):161-180.
- Nidich, S., O'Connell, T, & Compton, B. Reduced trauma symptoms in inmates through the Transcendental Meditation program: Oregon Corrections Project *Permanente Journal* 2016 Fall; 20(4):16-007.
- Nidich, S., Seng, Compton, B, O'Connor T, Salerno, J, Nidich, R. Transcendental Meditation and Reduced Trauma Symptoms in Female Inmates: A Randomized Controlled Study. *Permanente Journal* 2017;21:16-008.
- M. Hawkins. "Effectiveness of the Transcendental Meditation program in criminal rehabilitation and substance abuse recovery: A review of the research." *Journal of Offender Rehabilitation* 36, no. 1-4 (2003): 47-65.
- M. A. Hawkins, Orme-Johnson D. W., Durchholz C. F. "Fulfilling the rehabilitative ideal through the Transcendental Meditation and TM-Sidhi Programs: primary, secondary, and tertiary prevention." *Journal of Social Behavior and Personality* 17, no. 1 (2005): 443-488.