Summary of Scientific Research on the Transcendental Meditation and TM-Sidhi Programme

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Introduction

Transcendental Meditation, as taught by Maharishi Mahesh Yogi, is a simple technique practised for 15-20 minutes twice daily, sitting comfortably with eyes closed. It can be learned easily by anyone regardless of age, educational background, or culture. The technique is effortless and requires no belief, nor any change in lifestyle or diet.

Over six million people have learned Transcendental Meditation (TM) around the world over the past 60 years. Instruction involves a standard seven-step course taught by qualified teachers who have undergone an extensive and systematic training programme, ensuring quality and consistency in instruction worldwide.

Scientific research on Transcendental Meditation comprises more than 600 studies conducted at over 250 independent universities and research institutions in 33 countries [1-50, 52-444]. These studies have demonstrated a wide range of benefits for mind, body, behaviour, and society (see Table 1, page 3), and have appeared in many leading, peer-reviewed journals (see Table 2, pages 4-5).

TABLE 1

Overview of Research Findings on the Transcendental Meditation Programme

- Reduced need for medical care and decreased health care costs [4-8, 399]
- 48% reduction in the rate of major clinical events (all-cause mortality, non-fatal myocardial infarction and stroke) in patients with coronary heart disease [9]
- Reduction of major risk factors for cardiovascular disease and improved cardiovascular health in both normal subjects and patients with heart disease [9-50, 52, 60, 62-64, 98, 316, 318, 320, 396, 408-409, 413-414, 425, 427, 429]
- Healthier ageing and increased longevity [4, 8, 12, 15-17, 95-102, 106-109]
- Improvements in common chronic disorders, including hypertension, coronary heart disease, heart failure, type 2 diabetes, asthma, post-traumatic stress disorder, insomnia, and ADHD [9-50, 52-59, 62, 65-94, 289, 396, 404, 409, 413-414, 418, 420-421, 425-426, 429]
- Improved quality of life and mental health in patients with breast cancer and other chronic disorders [53, 21, 59, 415]
- A unique state of deep rest during Transcendental Meditation [110-168, 416, 436, 438]
- Increased orderliness and integration of brain functioning [110-113, 115-119, 130, 151-188, 402-404, 407, 416, 436-438]
- Reduced physical and mental stress [9, 22-24, 35-38, 45-46, 49-50, 53, 56, 61-62, 66-67, 71, 84, 114, 116, 135-139, 141, 170, 178-179, 189-196, 200, 204, 212, 239-246, 281, 288-289, 316, 318-320, 343-361, 365, 401, 406, 410, 417-421, 423, 426, 428, 430-435]
- Growth of positive psychological health and enhanced cognitive development [201-238, 12, 31, 180-182, 187-188, 277, 279-282, 290, 401, 404, 416, 434-435, 437]
- Reduced anxiety, depression, hostility, and other forms of psychological distress [200, 9, 21-22, 31, 53, 56, 61, 67, 71, 211-212, 217, 240-246, 266-267, 269, 277, 288-291, 295, 316, 318-320, 343-344, 347-348, 351-352, 359, 401, 410, 417-421, 423, 426, 428, 430-435]
- Increased intelligence and creativity; improved memory, learning ability, and academic performance; higher graduation and college acceptance rates; lower school dropout [266-268, 270-280, 282-287, 290-292, 400, 404, 422]
- Improved perception, mind-body coordination, and athletic performance [266, 274-276, 296-315, 101, 179, 184-186, 397]
- Increased job satisfaction and performance; improved occupational health [61-62, 287, 316-334, 423]
- Improved relationships, including in marriage, families, at work, and in schools [56, 316-318, 335-339, 401]
- Decreased smoking, alcohol consumption and drug abuse [60, 56, 62-64, 246-265, 316, 318, 398]
- Effective rehabilitation of offenders [340-365, 403, 424, 430-432]
- Improved quality of life for society as a whole: reduced crime, violent crime, homicide, and murder; decreased accidents, accident fatalities, infant mortality, and drug-related deaths; increased economic prosperity; more effective leadership [366-395; 439-444]
- Reduced civil and international conflict; decreased deaths and injuries from war and terrorism; increased progress towards peace [385-395, 405, 444]

TABLE 2

Scientific and medical journals that have published original research or reviews on Transcendental Meditation

Medicine

American Journal of Cardiology
Archives of Internal Medicine
Circulation: Cardiovascular Quality and Outcomes
Stroke
Hypertension
American Journal of Hypertension
Journal of Human Hypertension
Current Hypertension Reports
Current Hypertension Reviews
Integrative Cancer Therapies
Respiration
Behavioral Medicine
Journal of Preventative Cardiology
Cardiology in Review
American Journal of Managed Care
Japanese Journal of Industrial Health
Japanese Journal of Public Health
American Journal of Health Promotion
Health and Quality of Life Outcomes
Journal of the Association of Physicians of India
AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV
The Permanente Journal
Psychosomatic Medicine
Lancet
Homeostasis
Journal of Behavioral Medicine
Ethnicity and Disease
Journal of the National Medical Association
Journal of Aging and Health
Socialstyrelsen (Swedish Health Board publication)
Acta Medica Okayama
Health Promotion
Harefuah, Journal of the Israel Medical Association
Canadian Medical Association Journal
Lakartidningen (Swedish Medical Assoc. Journal)
New Zealand Medical Journal
Australian Family Physician
New Zealand Family Physician
Le Médecin du Québec
Schweizerische Ärztezeitung
Est-Medicine
Journal of Human Stress
International Archives of Nursing and Health Care
British Journal of Nursing
Journal of Holistic Nursing
Ugeskrift for Læger
Biologische Medizin
Zeitschrift fur Allgemeinmedizin
Medizinische Klinik
Australian Dental Journal
Medical Hypotheses
Complementary Medicine International
Military Medicine
Cardiology Research and Practice
Health Promotion
Journal of the American Association of Nephrology Nurses and Technicians
Journal of the American Society of Psychosomatic Dentistry and Medicine
Evidence-Based Complementary and Alternative Medicine
Alternative Therapies in Clinical Practice
Focus on Alternative and Complementary Therapies
Journal of Alternative and Complementary Medicine
Alternative Therapies

Physiology and Neuroscience

Science
American Journal of Physiology
Scientific American
International Journal of Neuroscience
Annals of the New York Academy of Sciences
NeuroReport
Cognitive Processing
Experimental Neurology
Journal of Applied Physiology
Consciousness and Cognition
Neuroscience and Biobehavioral Reviews
Electroencephalography and Clinical Neurophysiology
Biological Psychology
Psychoneuroendocrinology
International Journal of Psychophysiology
Biomedical Research
Biofeedback
L'Encephale
Sleep
Dreaming
International Journal of Dream Research
Indian Journal of Physiology and Pharmacology
Journal of Neural Transmission
Signal Processing
Psychophysiology
Physiology and Behavior
Revista Internacional De Ciencias Del Deporte
Human Physiology (Fiziologiya Cheloveka)
Bulletin of Experimental Biology and Medicine (Byulleten' Eksperimental'noi Biologii i Meditsiny)
Zeitschrift für Elektroenzephalographie und Elektromyographie EEG-EMG
Proceedings of the San Diego Biomedical Symposium

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TABLE 2 (continued)

Scientific and medical journals that have published original research or reviews on Transcendental Meditation

Physiology and Neuroscience (continued)

Hormones and Behavior
Journal of Psychosomatic Research
Revue d'Electroencéphalographie et de Neurophysiologie Clinique
Progress in Brain Research
Experientia
Biofeedback and Self-Regulation
Psychopathometrie

Psychology and Psychiatry

Journal of Clinical Psychology
Journal of Psychology
British Journal of Psychology
American Psychologist
American Journal of Psychiatry
Journal of Clinical Psychiatry
Journal of Personality and Social Psychology
Journal of Social Behavior and Personality
Hospital and Community Psychiatry
Mind & Brain, The Journal of Psychiatry
Perceptual and Motor Skills
Memory and Cognition
Psychological Reports
Journal of Traumatic Stress
Journal of Counseling and Development
Journal of Personality and Individual Differences
Psychological Studies
Journal of Counseling Psychology
Journal of Humanistic Psychology
Journal of Personality Assessment
Journal of Indian Psychology
Zeitschrift für Klinische Psychologie
Gedrag: Tijdschrift voor Psychologie
Psychotherapie-Psychosomatik Medizinische Psychologie
Western Psychologist
Psychologia
Modern Psychological Studies

Education

British Journal of Educational Psychology
Intelligence
Education
Educational Technology
Contemporary School Psychology
Journal of Adult Development
Higher Education Research and Development
Journal of Creative Behavior
Journal of Indian Education
Journal of Moral Education
Journal of Instructional Psychology
Current Issues in Education
College Student Journal
Explore

Sociology and Rehabilitation

Journal of Conflict Resolution
Social Indicators Research
Journal of Mind and Behavior
Psychology Crime and Law
Journal of Crime and Justice
Criminal Justice and Behavior
Journal of Criminal Justice
SAGE Open
Journal of Health and Environmental Research
International Journal of Comparative and Applied Criminal Justice
Criminal Law Journal
Journal of Consciousness Studies
International Journal of Offender Therapy and Criminology
Caribbean Journal of Criminology and Social Psychology
Ratio Juris
Journal of Offender Rehabilitation
FBI Law Enforcement Bulletin
Social Science Perspectives Journal
Journal of Scientific Exploration
Proceedings of the American Statistical Association
Proceedings of the Midwest Management Society
Alcoholism Treatment Quarterly
International Journal of the Addictions
Bulletin of the Society of Psychologists in Addictive Behaviors
Addictive Behaviors
Bulletin on Narcotics
Drug Forum

Management

Journal of Business and Psychology
Academy of Management Journal
Human Resource Management
Journal of Transnational Management Development
Journal of Management Education
Career Development International
Journal of Organizational Change Management
Anxiety, Stress and Coping
Journal of Managerial Psychology
Management Decision
The Learning Organization: an International Journal
Leadership and Organization Development Journal
The TQM Magazine

Decreased Need for Medical Care – Reduced Hospital Admissions and Outpatient Consultations

A study of data from major US health insurer Blue Cross/Blue Shield examined medical care utilization over five consecutive years among 2,000 subscribers practising Transcendental Meditation, as compared to norms and control groups matched by age, gender, occupation, and health insurance terms (drawn from a total sample of 600,000). Both hospital admission and outpatient consultation rates were over 50% lower for subjects practising TM than norms or controls. In the over-40 age group, the reduction was over 70%. In contrast to controls, the TM group showed relatively little rise in health care needs with advancing age [4].

Rates of hospital admission for medical and surgical conditions were 60-70% lower in the Transcendental Meditation group, with reductions in all 17 disease categories studied. For example, admissions were 87% less for heart and blood vessel disorders, 55% less for tumours, 73% less for respiratory disorders, 87% less for neurological problems, and 30% less for infections [4].

These findings are corroborated by an eleven-year study of Blue Cross/Blue Shield data for individuals practising TM in conjunction with a comprehensive natural health programme—Maharishi's Vedic Approach to Health. Again, marked reductions in medical care utilization were found compared with normative data and matched control groups. Overall medical expenditure was 59% lower than norms and 57% lower than controls, with 80% fewer hospital admissions and 55% fewer outpatient visits to the doctor. TM subjects over 45 years spent 88% fewer days in hospital than controls. Hospital admission rates were 92% lower for immune, endocrine, and metabolic disorders; 92% lower for cardiovascular disease; 92% lower for mental health and substance abuse; and 94% lower for musculoskeletal disorders [5].

Reduced Health Care Costs

Reduced need for medical treatment as a result of Transcendental Meditation is also indicated by a 14-year controlled retrospective study of medical expenses for 2,836 people enrolled in the Quebec provincial health insurance scheme. Monthly data on payments to doctors were adjusted to account for age, inflation, and other influences using normative data provided by the Quebec government. Before beginning Transcendental Meditation, payments did not differ significantly between TM and control groups. After learning the technique, the TM group showed a progressive decline in payments to doctors compared to controls: the average annual difference was 13%, leading to a cumulative reduction of 55% after six years [6-7].

These results have been extended by analyses of Quebec health insurance data for two important subgroups: the highest-cost 10% of subjects; and individuals over 65 years. In most populations, the higher medical needs of these subgroups contribute very strongly to overall health care costs. For high-cost subjects, the TM group's payments decreased by 11% over one year, with a cumulative reduction of 28% after five years compared to controls [399]. For older individuals, the TM group showed a five-year cumulative cost reduction of 70% [8]. This finding is consistent with research indicating that TM counters deleterious effects of ageing and promotes longevity (see page 12) [12, 15-17, 95-102].

Reduction of Major Risk Factors for Disease

Transcendental Meditation simultaneously ameliorates many important risk factors for disease, including major risk factors for coronary heart disease, stroke, and cancer. Findings include reductions in: high blood pressure; insulin resistance; smoking; alcohol consumption; drug abuse; obesity; physical and mental stress; and various forms of psychological distress such as anxiety, depression, and hostility. TM also enhances protective factors including improved occupational health and job satisfaction; more harmonious relationships; and positive psychological health and well-being [see Table 1, page 3, for references].

Reduction of High Blood Pressure, Improved Cardiovascular Health, Reduced Cardiovascular Events, and Decreased Mortality

In recent years, a multi-centre medical research team in America has attracted grants totalling over $25 million, principally from the US National Institutes of Health for research on Transcendental Meditation and prevention of cardiovascular disease in older African-Americans (a high-risk group for vascular disease). These studies and other randomized controlled trials have shown:

- In a nine-year investigation of patients with coronary heart disease, TM led to a 48% reduction in the rate of major clinical events (all-cause mortality plus non-fatal myocardial infarction and stroke) compared to controls who received education on risk factor reduction. Regularity of TM was significantly associated with longer survival; subjects who practised the technique regularly showed a 66% risk reduction for major clinical events. TM also reduced blood pressure and psychosocial distress [9].
- TM produced clinically significant reductions in systolic and diastolic blood pressure, without adverse side-effects [9-18, 22-25, 32-45, 413-414].
- TM was more effective in reducing mild hypertension than either progressive muscular relaxation, a pseudo-meditation procedure (which attempted to imitate the TM technique),

or a 'usual care' programme of advice on weight loss, salt restriction, exercise, and alcohol intake [10-12, 32].

- TM was effective in lowering systolic and diastolic blood pressure for men and women in both high- and low-risk groups on six measures of hypertension risk: psychosocial stress, obesity, alcohol use, physical inactivity, dietary sodium-potassium ratio, and a composite measure of these factors [11].
- Over one year, subjects practising TM demonstrated reduced use of antihypertensive medication relative to control groups [13]. An analysis of cost-effectiveness indicated that TM could compare favourably with pharmacological treatment for hypertension [14].
- Pooled data from two randomized studies on older people with elevated blood pressure showed that TM was associated with a 23% reduction in all-cause mortality and a 30% decrease in cardiovascular deaths [15-17].
- In patients with stable coronary heart disease (CHD), TM decreased both blood pressure and insulin resistance—key components of the 'metabolic syndrome' associated with many major disorders of modern society, including CHD, type 2 diabetes, and hypertension. TM also increased stability of the cardiac autonomic nervous system [18].
- TM reduced carotid artery atherosclerosis compared to a control group who received health education [19-20, 427].
- TM improved functional capacity and quality of life in patients with chronic heart failure. TM subjects also showed reduced depression and had fewer hospitalizations [21].
- In university students, TM reduced blood pressure; decreased total psychological distress, anxiety, depression, and anger/hostility; and improved coping [22].
- In pre-hypertensive adolescents, TM decreased blood pressure at rest and during acute laboratory stress; and decreased ambulatory blood pressure during daily activity [23, 24].
- TM decreased left ventricular mass in pre-hypertensive adolescents compared to a control group receiving health education, indicating reduction of an early sign of left ventricular hypertrophy (the strongest predictor of cardiovascular mortality apart from age) [408].

Controlled research has also shown benefits from TM for patients with angina pectoris (cardiac pain on exercise) who had angiographically-proven coronary artery disease and positive exercise-stress tests. TM improved exercise tolerance and maximum workload achieved during a standard exercise test, and delayed the onset of electrocardiographic evidence of myocardial ischaemia (shortage of oxygen in the heart muscle) [26].

A British study found positive effects from Transcendental Meditation on exercise ECG testing and quality of life in patients with cardiac syndrome X (anginal chest pain, positive

response to exercise stress testing, and normal coronary angiogram). Despite a generally good prognosis, this distressing and disabling condition often necessitates expensive and invasive investigations, and recurrent hospital admissions; drug treatment is frequently unsatisfactory [27].

Other controlled studies on TM have shown: reduced cardiovascular risk factors and levels of the stress hormone cortisol in post-menopausal women [28]; reduced cholesterol levels independent of changes in diet, medication, or weight [29-30, 320]; and more effective weight reduction and improved psychological health in obese subjects on a weight reducing diet [31].

An Effective Non-Pharmacological Approach to High Blood Pressure

A systematic review and meta-analysis of randomized controlled trials from 107 published studies on stress reduction and high blood pressure found that TM reduced both systolic and diastolic blood pressure, while other methods of meditation and relaxation, biofeedback, and stress management did not produce significant effects [32]. Further meta-analyses by independent teams have confirmed that TM leads to clinically important reductions in blood pressure [33, 425, 429]. Authors conclude that sustained blood pressure changes of the magnitude produced by TM would be associated with substantially decreased risk of heart attack and stroke, the leading cause of mortality worldwide [33]. These findings are supported by other reviews on TM and cardiovascular health [34-50, 396, 409, 413-414].

Non-pharmacological measures, including diet, weight management and physical activity, have long been recognized as important aspects of therapy for hypertension [51, 445-446]. Research findings indicate that Transcendental Meditation can contribute to an optimal non-pharmacological treatment and preventive programme for high blood pressure because the technique:

- produces clinically significant blood pressure reductions in both hypertensive and pre-hypertensive subjects (with greater effects in subjects with higher initial blood pressure);
- is more effective than other meditation and relaxation procedures;
- is continued by a high proportion of subjects (in contrast to lower continuation rates for relaxation techniques);
- has documented acceptability and effectiveness in a wide range of populations;
- is effective in reducing high blood pressure when used as sole treatment or in concert with medication;
- reduces high blood pressure in ‘real-life’ environments outside the clinic;

- is free from harmful side-effects or adverse reactions;
- also reduces other cardiovascular risk factors and improves health in a general way;
- reduces rates of major clinical events (death, heart attack and stroke), and decreases mortality from both cardiovascular disease and all causes [9-24, 30-50, 52, 396, 408-409, 413-414, 429].

American Heart Association Scientific Statement

A scientific statement from the American Heart Association (AHA) published in 2013 concluded that the Transcendental Meditation technique lowers blood pressure and recommends that TM may be considered in clinical practice for the prevention and treatment of hypertension [413-414].

After considering meta-analyses and clinical trials, the report found that Transcendental Meditation is the only meditation practice that has been shown to lower blood pressure. Indeed, according to the AHA, 'Because of many negative studies or mixed results and a paucity of available trials, all other meditation techniques [including mindfulness] received a "Class III, no benefit, Level of Evidence C" recommendation. Thus, other meditation techniques are not recommended in clinical practice to lower BP at this time.' [413]

The AHA statement surveyed eleven randomized controlled trials (RCTs) on TM and blood pressure, with more than 1200 subjects, as well as two well-conducted meta-analyses. Most of the RCTs have been competitively reviewed and externally funded, rigorously conducted in collaboration with leading academic medical centres, blinded, independently monitored, published in peer-reviewed journals, and replicated. The beneficial effect of TM on blood pressure has been confirmed by numerous investigators, in multiple populations, and with ambulatory monitoring [414].

Prevention of major clinical events is the purpose of any anti-hypertensive therapy and the ultimate test of its effectiveness. The AHA report noted research on Transcendental Meditation demonstrating substantially reduced rates of major clinical events (death, heart attack and stroke) [9]; such hard event outcome trials are not available for other meditation and relaxation procedures. Moreover, in addition to reducing high blood pressure, TM improves multiple factors relevant to cardiovascular health, which likely contribute to the technique's observed preventive effects [34-50, 55, 409, 413-414]

The AHA Scientific Statement represents an important research landmark since it is the first time that Transcendental Meditation has been recognized and recommended for consideration

by a national medical organization that provides professional practice guidelines to physicians, health care payers, and policymakers [414].

Improved Quality of Life and Mental Health for Patients with Breast Cancer and Other Chronic Disorders

Breast cancer is the commonest malignancy in women in Britain and USA, affecting 11% of UK women, especially after age 50. Impairment of quality of life and psychological health affect both newly diagnosed and long-term survivors. Psychosocial stress has been implicated as contributing to the onset, progression, and mortality from this disease. A pioneering trial examined effects of TM on quality of life and mental well-being in 130 women with breast cancer (stages II to IV, average age 63.8 years) [53]. Funding for the study included grants from the US National Institutes of Health (NIH) National Center for Complementary and Alternative Medicine.

Patients were randomly assigned to learn TM or act as controls, following stratification to ensure that groups were well matched for age, stage of cancer, and timing of metastases in stage IV patients (spread of cancer to distant sites). All patients received standard medical care. Well-documented measures were administered six-monthly over an average 18-month intervention period. Compared to controls, subjects practising TM showed improvements in overall quality of life, emotional well-being, social well-being, and mental health [53].

Other long-term health problems also impair quality of life and psychological well-being, which in turn can adversely affect physical health. National guidelines for UK doctors emphasize screening for depression in patients with chronic disorders, including heart disease. A randomized trial of patients with chronic heart failure found that TM improved quality of life and reduced depression, as well as improving functional capacity and reducing hospitalizations [21]. Two further randomized studies have found reduced symptoms of depression as a result of TM in patients at increased risk of cardiovascular disease (see ‘Improved Mental Health and Well-Being’, page 19) [242].

Stress has also been implicated in the pathogenesis and progression of HIV [415]. In a community-based randomized controlled trial of people with HIV, subjects who practised TM for 6 months showed improvements in both general and HIV-specific health-related quality of life compared to control subjects who received education on healthy eating. The TM group exhibited improved total and general health scores on Functional Assessment of

HIV Infection compared to controls. Increased vitality and physical well-being were also observed in TM subjects, but not in controls [415].

Family and professional caregivers (carers) often experience high levels of stress, to the detriment of their mental health and wellbeing. In a recent pilot study, caregivers who practised TM over a two-month period showed reductions in perceived stress and mood disturbance—including decreased anxiety, depression, anger, confusion and fatigue— and an increase in spiritual well-being (faith in the future and purposefulness) [433].

Benefits for Common Health Problems

Transcendental Meditation has been recommended by doctors in many countries for its contribution to prevention of disease, management of common disorders, and promotion of positive health [www.DoctorsonTM.org].

Research and/or clinical experience have identified benefits of Transcendental Meditation in the management of a range of common clinical problems, including hypertension, coronary heart disease, and heart failure [9-50, 413-414, 425, 429]; asthma [54]; post-traumatic stress disorder [56, 401, 418-421], type 2 diabetes [55]; migraine [57]; ADHD [289, 404]; sleep disturbance [56, 62, 67-68, 343-344, 404]; occupational stress [61-62, 316, 318, 320, 423]; anxiety, depression, and substance misuse [see Table 1, page 3, for references]; as well as in improving quality of life and mental health in patients with chronic disorders, including breast cancer, coronary heart disease, heart failure, HIV, and chronic renal failure [53, 9, 21, 59; 65-94; 415]. In some original studies and reviews, TM has been investigated in conjunction with other aspects of a comprehensive natural health programme—Maharishi's Vedic Approach to Health [5, 20, 55, 89-94].

Healthier Ageing and Increased Longevity

It has been observed that many effects of Transcendental Meditation are opposite to deteriorations usually seen with ageing (see Table 3, page 13). Other findings indicate a strengthening of factors known to favour longevity, such as cardiovascular health, work satisfaction, positive health habits, good mental health, happiness, and intelligence (see Table 1, page 3; and Table 3, page 13).

TABLE 3

Effects of the Transcendental Meditation Programme Opposite to Detrimental Effects of the Ageing Process

PHYSIOLOGY

Increase **with ageing;** ***Decrease*** **with TM**

Blood pressure – systolic [9-13, 15-18, 22-24, 29, 32-34, 40, 52, 96-98, 320, 413-414]
Blood pressure – diastolic [9-11, 13, 15-18, 22-24, 29, 32-34, 40, 52, 320, 413-414]
Atherosclerosis [19-20]
Heart failure [21]
Major cardiovascular events (death, myocardial infarction, stroke) [9]
Visual evoked potentials – P300 latency [102]
Reflex latency (monosynaptic reflex) [197]
Reflex recovery time (paired H-reflex) [198]
Muscular contraction time (fast and mixed muscles) [197]
Susceptibility to stress [22-23, 28, 114, 170, 178-179, 189-192, 194-195, 316, 365]
Erythrocyte sedimentation rate [100]
Insomnia (time to fall asleep) [343-344, 67-68, see also 56, 62]
Sleep disturbance (awakenings per night) [343-344, 67-68; see also 56, 62]
Daytime sleep [68; see also 178]

Decrease **with ageing;** ***Increase*** **with TM**

Cardiovascular efficiency [21, 23, 26, 314-315]
Vital capacity [314-315]
Cerebral blood flow [124, 127, 166]
EEG alpha power [110-113, 115-119, 151-160, 162, 169, 402, 416]
Temperature homeostasis [103]
Neuromuscular co-ordination [314-315]
Periodontal health [75]
Physical health and well-being in later life [9-13, 21, 28, 53]
Longevity [12, 15-17]

BIOCHEMISTRY

Increase **with ageing;** ***Decrease*** **with TM**

Serum cholesterol [29-30, 318]
Insulin resistance [18]

Decrease **with ageing;** ***Increase*** **with TM**

DHEAS (dehydroepiandrosterone sulphate) [99]
Efficiency of endocrine control (pituitary-thyroid axis) [193]
Glucose tolerance [104-105]

TABLE 3 (continued)

Effects of the Transcendental Meditation Programme Opposite to Detrimental Effects of the Ageing Process

PERCEPTION AND MIND-BODY CO-ORDINATION

***Decrease* with ageing; *Increase* with TM**

Visual perception [12, 184, 276, 308]
Dichotic listening [306]
Field independence [274-276, 298-299, 397]
Perceptual flexibility [12, 184, 276, 307, 309]
Perceptual-motor performance [101, 297, 309-311]
Complex sensory-motor performance [310-311]

***Increase* with ageing; *Decrease* with TM**

Auditory threshold [96-97, see also 1-2]
Behavioural rigidity [12, 309]
Reaction time – simple [101, 296, 314-315]
Reaction time – complex [297, 184]

PSYCHOLOGY

***Decrease* with ageing; *Increase* with TM**

Fluid intelligence [266-267, 270, 275, 101]
Creativity [266, 277-278, 283]
Learning ability [12, 279, 284]
Memory – verbal [284]
Memory – visual [101]
Organization of memory [285]
Cognitive flexibility [12, 266, 276, 184-185]
Self-evaluation of health and well-being [12, 61, 71]
Mental health and well-being in later life [12, 9, 21, 53, 109, 242]

***Increase* with ageing; *Decrease* with TM**

Depression [21, 56, 61, 211-212, 242, 319, 401, 423]

REQUIREMENTS FOR HEALTH CARE

***Increase* with ageing; *Decrease* with TM**

Patient days in hospital (medical and surgical) [4-5; see also 21]
Outpatient visits (medical and surgical) [4-5]
Health care costs [6-8, 399]
Rise in health care needs with advancing age [4]
Rise in health care costs with advancing age [8]

In keeping with these observations, a study employing a standardized ageing index found that the biological age of middle-aged individuals practising Transcendental Meditation was significantly younger than both their chronological age and the biological age of non-meditating controls. The longer subjects had been practising TM, the greater the degree to which biological age was younger than chronological age [95]. A British study subsequently found similar results in a younger population [96-97].

A meticulously controlled, randomized study from Harvard University found that elderly individuals who learned Transcendental Meditation showed greater improvements in cognitive and behavioural flexibility, learning ability, self-assessment of well-being and ageing, systolic blood pressure, and staff assessment of mental health than subjects taught either a relaxation procedure or 'mindfulness' training, or who acted as a no-treatment control group. Those who learned the relaxation procedure (which attempted to imitate TM) showed no improvement on any measure. A clear majority of TM subjects rated their technique as personally useful and easy to practise, in contrast to lower ratings for the other methods [12].

Strikingly, after three years, all those who had learned Transcendental Meditation were still living in contrast to lower survival rates for the other three groups and for the remaining inhabitants of the institutions where the study was conducted [12]. Moreover, significantly greater longevity in the TM group was subsequently maintained over a 15-year follow-up period. Average survival times were 2.2 years (18%) longer for cardiovascular mortality and 1.73 years (19%) longer for all-cause mortality in the TM group, compared to the other three groups combined [17].

These findings are supported by an eight-year randomized controlled study showing reduced cardiovascular and all-cause mortality in elderly African Americans with mild high blood pressure [16]. A third analysis combined data from these two studies, totalling 202 subjects. Mortality rates were significantly reduced among TM subjects compared to controls: 23% lower for all-cause mortality, and 30% lower for cardiovascular mortality [15].

Increased health care needs and costs are among the most important correlates of ageing. As discussed above, a 14-year study of medical expenses among people over 65 years in Quebec showed that individuals practising TM had markedly reduced annual change in payments to doctors compared to matched controls, with a cumulative difference of 70% after five years [8]. An earlier American study of health insurance data also found relatively little increase in

health care needs with advancing age among individuals practising Transcendental Meditation, in contrast to a marked increase seen in a normative control group [4].

Middle-aged and older individuals practising TM have been found to maintain higher levels of the hormone *dehydroepiandrosterone sulphate* (DHEAS) than controls. DHEAS usually declines steadily throughout adult life; low levels have been linked to a variety of diseases and to increased mortality. On average, DHEAS levels in individuals practising TM were comparable to levels of non-meditators who were 5-10 years younger—a difference that could not be explained by variations in diet, weight, or exercise [99].

In another study, individuals practising Transcendental Meditation were found to have lower average erythrocyte sedimentation rate (ESR) and a higher frequency of zero ESR compared to controls. Increased ESR is correlated with ageing and is a well-established marker of inflammation [100].

Ageing research has focused extensively on the role of *free radicals*—small, highly reactive molecules or molecular fragments which can powerfully oxidize and damage vital bio-molecules, injuring tissues and disrupting physiological repair mechanisms. Free radicals are thought to be involved in key aspects of ageing and are also implicated in many major diseases, including coronary heart disease, cancer, Alzheimer's disease, diabetes, and inflammatory disorders such as rheumatoid arthritis [94]. A recent study examined free radical activity, as measured by ultraweak photon emissions, at 12 anatomical locations in 60 middle-aged male subjects practising either TM or other forms of meditation, or acting as non-meditating controls. Subjects who practised TM showed significantly lower free radical activity than both controls (at all 12 anatomical sites) and practitioners of other types of meditation (at 11 out of 12 sites). Compared to non-meditating controls, free radical activity was 27% lower among TM subjects, compared to 17% lower in practitioners of other techniques [106-107].

An earlier study found lower blood levels of lipid peroxides (another index of free radical activity) in elderly people who practised Transcendental Meditation compared to non-meditating peers [108]. Lower lipid peroxide levels in older long-term participants in TM have been found to correlate with better performance on tests of fluid reasoning, verbal intelligence, long-term memory, and speed of processing, suggesting a link between free radical activity and cognitive functioning in later life [109].

Physiological Changes during TM: a Unique State of Restful Alertness

Extensive physiological research over 40 years has shown that Transcendental Meditation gives rise to a unique physiological state characterized by deep rest [110-134]; increased orderliness and integration of brain functioning [110-113, 115-119, 130, 151-175, 416, 436-438]; increased blood flow to the brain [124, 127, 166]; decreased peripheral vascular resistance [128]; features directly opposite to the physiological and biochemical effects of stress (including high and stable galvanic skin resistance [110-112, 114, 121, 131, 314], decreased plasma cortisol [135-136], reduced arterial blood lactate [110-112, 114, 122, 124, 126], and deep muscle relaxation [150, 158]); and other distinctive neuroendocrine changes [137-149].

Taken together, these studies clearly distinguish the physiology of TM from sleep, drowsiness, or ordinary relaxation. Researchers have concluded that TM gives rise to a fourth major state of consciousness—Transcendental Consciousness—which is both experientially and physiologically distinct from waking, sleeping, and dreaming. Like these three states, Transcendental Consciousness has its own unique correlates, aptly described as a state of 'restful alertness' in mind and body [111, 115-119, 129-130, 151, 155-156, 161-162, 416, 436-438].

EEG ('brain wave') studies show that while the level of excitation in the nervous system is reduced during TM, wakefulness increases [110-113, 115-119, 130, 151-164, 167-168, 407, 416, 436, 438]. At the same time, integration between different areas of the brain is enhanced [115-119, 151-164, 402-404, 416, 436, 438], with high EEG coherence[1] between front and back of the brain and between right and left cerebral hemispheres [115, 119, 130, 151, 154-156, 159-160, 162, 170, 403-404, 416].

A comprehensive review of different forms of meditation identified characteristics of practice and EEG patterns that clearly distinguish TM from other methods. Specifically during TM, high power and coherence in the alpha-1 frequency band spread globally over the cerebral cortex, indicating that the technique brings the whole brain to a state of restful alertness [119]. Other forms of meditation show different EEG patterns, for example prominent gamma frequencies for methods employing focused attention [119, 438].

[1]**EEG coherence** measures the correlation between brain waves from different areas of the cerebral cortex, providing an index of orderliness and integration in brain functioning [159-160].

TM is further characterized by high levels of activation of the brain's Default Mode Network (DMN), a network of brain areas that show higher activity during rest and self-referential mental activity, and lesser activation with goal-directed thinking and behaviour. High DMN activation during TM strongly indicates that the technique does not involve focused attention or cognitive control, and is consistent with the effortless nature of the practice. By contrast, all other forms of meditation—including methods using focused attention or open monitoring, and mindfulness meditation—show DMN de-activation, consistent with active cognitive processing [438, 151].

In addition, TM is the only technique for which EEG correlates have been documented in randomized controlled trials, and also the only practice for which specific physiological correlates (including characteristic EEG patterns), have been identified both for experiences of Transcendental Consciousness during meditation, and for experiences of higher states of consciousness developed through regular practice of the technique [119, 151, 162, 178, 402, 404, 416, 437, 180-182].

High EEG coherence during TM has been found to correlate with higher scores on measures of creativity, intelligence, concept learning, academic performance, mathematical skills, moral reasoning, emotional stability, neuromuscular efficiency, self-development, self-awareness, and experiences of higher states of consciousness; and with lower anxiety and neuroticism [115, 117, 119, 130, 155-156, 170, 172-175, 180, 187-188, 205].

Highly integrated EEG patterns characteristic of the advanced TM-Sidhi programme have also been identified, and correlated with classical descriptions of this practice from the ancient Vedic Literature, as brought to light by Maharishi Mahesh Yogi [402, 169, 171].

Sophisticated neurophysiological and neuroimaging techniques are shedding further light on TM's integrative effects on the brain [153, 166, 179]. A magneto-encephalographic study identified the prefrontal cortex and anterior cingulate brain regions as the source of the widespread EEG alpha wave activity observed during TM [153]. Positron emission tomography also highlighted the role of the prefrontal cortex (the highest level of regulation in the brain), showing increased blood flow to this region [166], consistent with the findings of earlier cardiovascular research [124, 127].

Regular practice of TM is associated with sustained increases in brain integration, including during challenging cognitive tasks (see page 27) [178-188, 438], and with reductions in physiological and biochemical correlates of stress [189-196, 359, 365], reduced sleepiness

[178], and increased neurological efficiency [197-199]. Research on the brain's response to pain, using functional magnetic resonance imaging, indicates that regular practice of TM reduces distress associated with painful stimuli, without impairing sensory acuity [179].

Based on neurophysiological and psychological studies on TM, the experience of transcending has been proposed as a key driver of higher brain and cognitive development in adult life [416, 437].

Improved Mental Health and Well-Being

A large body of research has demonstrated that Transcendental Meditation produces comprehensive improvements in mental health, enhancing positive aspects of psychological and social functioning, reducing various forms of distress, and developing a more stable, balanced, and resilient personality. Findings include:

- Increased self-actualization and enhanced self development [201, 203-238]
- Improved self-concept and increased self-esteem [220, 319, 58, 211, 215-216, 218, 225, 229, 280, 290]
- Increased autonomy and independence [217, 277]
- Decreased anxiety, tension and depression [200, 417, 21-22, 56, 61, 71, 211-212, 225, 242, 244, 246, 269, 277, 289, 290, 316, 319, 343-344, 347-348, 351-352, 401, 423, 430, 433-434]
- Reduced anger, aggression and hostility [9, 22, 31, 343-344, 347-348, 433]
- Decreased irritability and impulsiveness [61, 217, 241, 289, 338, 343-344]
- Increased emotional well-being, stability, and maturity [22, 31, 53, 61, 67, 201, 212, 244, 246, 267, 281-282, 338, 343-344]
- Decreased behavioural rigidity [12, 309, 359]
- Increased sociability, friendliness, tolerance, and good humour [31, 215, 217, 223, 225, 246, 359]
- Less sensitivity to criticism and greater trust [211]
- Increased ability to be objective, fair-minded, and reasonable [338]
- Increased social maturity [223]
- Increased tolerance and appreciation of others [215, 217, 277, 336]
- Enhanced capacity for warm interpersonal relationships [31, 211, 219, 225, 246, 338]
- Improved personal, family, and work relationships [56, 226, 316-318, 335-339, 401]
- Increased marital harmony and adjustment [335, 338-339]
- Reduced perceived stress and occupational burnout [423]

- Decreased perceived stress and mood disturbance, and increased spiritual well-being (faith in the future and purposefulness) for caregivers (carers) [433]
- Improvements in post-traumatic stress disorder (PTSD) [56, 401, 418-421, 430-432]
- Improvements in attention deficit hyperactivity disorder (ADHD) [289, 404]

Increased Self-Actualization – Enhanced Personal Development

In a meta-analysis of 42 independent research results, Transcendental Meditation proved three times as effective as other meditation and relaxation procedures in increasing self-actualization, an overall measure of positive mental health and personal development. Further analysis revealed that the technique is exceptionally effective in developing three independent components of this dimension: emotional maturity, a resilient sense of self, and a positive, integrated perspective of self and the world [201, 203-238].

Decreased Anxiety

A systematic review and meta-analysis of 146 independent outcomes found that Transcendental Meditation was more than twice as effective in reducing trait anxiety[2] as other techniques (including progressive muscular relaxation, methods claimed to induce a 'relaxation response', and other forms of meditation). Only TM showed a positive correlation between duration of regular practice and reduction of anxiety. The greater effectiveness of Transcendental Meditation remained highly significant when only the strongest and most rigorous studies were included in the analysis. This result remained robust even when analyses were limited to randomized controlled trials by researchers known to be neutral or sceptical towards TM, and when other potentially confounding factors were controlled [200].

These findings are supported and extended by a more recent systematic review and meta-analysis of randomized controlled trials, which confirmed that TM was effective in reducing trait anxiety, with greater effects seen in subjects with high anxiety levels before starting the technique [417, 434]. Studies using repeated measures showed substantial reductions in anxiety within two weeks of learning TM, and sustained improvements after one and three years. No other alternative active treatment was more effective than TM. Moreover, TM had a greater effect in decreasing anxiety than was observed with mindfulness in a previous meta-analysis [417].

[2] ***Trait anxiety*** denotes anxiety that is (or has become) a persisting feature of a person's psychological make-up and response to situations and events.

TM was also exceptional in the breadth and depth of beneficial effects associated with anxiety reduction, including decreases in depression, post-traumatic stress disorder, neuroticism, autonomic stress reactivity, sleep disturbance, anger, hostility, and drug misuse; and improvements in blood pressure, cardiovascular health, brain integration, intelligence, creativity, and perceptual ability [417]. The analysis found no evidence that author affiliation influenced outcomes: effect sizes of studies conducted by researchers from Maharishi University of Management were not greater than those of studies from independent universities, consistent with previous findings [417, 200].

These results are corroborated by an earlier meta-analysis which examined 51 studies of the effects of different meditation techniques on measures of psychological health and well-being, comprising more than 9700 research subjects and 400 outcome findings. TM was found to be markedly more effective than other techniques in improving psychological variables; this result was maintained when only studies of highest validity and strongest experimental design were included [202].

Decreased Depression

Depression, like anxiety, is a massive worldwide problem with far-reaching consequences for health, society, and the economy. Depression is an important risk factor for development and progression of cardiovascular disease and other chronic disorders. Two randomized controlled trials investigated depression levels in subjects aged over 55 who were at increased cardiovascular risk: respectively, Native Hawaiians with at least one other major cardiovascular risk factor; and African Americans with ultrasound evidence of carotid artery atherosclerosis. TM decreased depressive symptoms over a 9-12 month period compared to controls who received health education. The largest improvements were found in those with indications of clinically significant depression, with an average 48% reduction in depressive symptoms [242]. In a third randomized trial, TM reduced depression in patients with chronic heart failure, as well as improving functional capacity and quality of life, and reducing hospitalizations [21].

Depression and anxiety have a major impact on occupational health and performance. A random-assignment study of employees at a high-security government agency found that Transcendental Meditation reduced depression and anxiety, and improved self-concept, over a three-year period in comparison to controls who participated in an educational corporate stress-management programme [319]. In another randomized controlled trial, conducted on

secondary schoolteachers and support staff at a residential therapeutic school for children with severe behavioural problems, TM was effective in reducing depression, perceived stress, and overall teacher burnout [423]. Transcendental Meditation has also been found to reduce depression and anxiety in people with post-traumatic stress disorder [56], as described below, and in caregivers (carers) [433].

Improvements in Post-Traumatic Stress Disorder

The comprehensive nature of Transcendental Meditation's benefits for mental health is illustrated in a randomized study of Vietnam War veterans suffering from post-traumatic stress disorder (PTSD). Over a three-month period, patients practising TM showed clear-cut improvements in all aspects of the syndrome studied, with significant decreases in depression, anxiety, insomnia, and alcohol consumption; improvement in family problems; reduced severity of delayed stress syndrome; decreased emotional numbness; and reduced difficulty in obtaining employment. In contrast, the control group who received standard treatment with psychotherapy showed no significant change on any measure [56].

These findings are corroborated by a study of US veterans with PTSD following exposure to moderate or heavy-moderate combat in the Iraq and Afghanistan wars. After eight weeks' practice of Transcendental Meditation, subjects showed a 50% reduction in symptoms of PTSD, including decreased stress and depression, and marked improvements in relationships and overall quality of life [401]. In another study, American active duty military service members with PTSD or anxiety who practised TM showed reduced medication usage and an overall decrease in the severity of psychological symptoms compared to controls [426].

Case studies have also indicated the feasibility of providing TM training to active duty soldiers with PTSD in defence department medical facilities, including those with traumatic brain injury, depression, or substance abuse. Practice of TM was associated with reduction in PTSD symptoms and distress, and improvement in social role performance [418]. These findings are supported by a survey of potential approaches to improving soldier resilience which concluded that Transcendental Meditation had the most supporting evidence across five domains of resilience: physical, emotional, spiritual, social, and family life [419].

Recent studies have also examined effects of Transcendental Meditation on PTSD in civilian refugees of the devastating Congo war. Marked reductions in severe post-traumatic stress symptoms were found after 30 days practice of TM, with sustained improvements after 135 days. In contrast, symptom scores for control subjects matched for age, sex, and baseline

symptoms showed an upward trend [420]. A second study of Congolese war refugees found that striking reductions in PTSD symptoms were evident within ten days of learning TM, with further reductions after 30 days [421].

A study from Japan found a reduction in mental and physical stress symptoms after instruction in TM among 171 residents of two cities (Sendai and Ishinomaki) directly affected by the 2011 earthquake and tsunami disaster, as compared to control subjects [428].

Trauma experiences among incarcerated men and women are more prevalent than in the general population, and are associated with increased recidivism and other mental and physical health problems. In two four-month randomized controlled trials conducted in Oregon, TM decreased trauma symptoms and psychological distress in both male and female prison inmates compared to control subjects (for further details, see 'Effective Rehabilitation of Offenders', page 32) [430-432].

Reduced Smoking, Alcohol Consumption, and Drug Abuse

Transcendental Meditation has consistently been found to reduce the use of tobacco, alcohol, and non-prescribed drugs in a wide variety of settings and populations [60, 56, 62-64, 246-265, 316, 318, 398]. A systematic review and meta-analysis of 198 studies (including 19 on TM) found that Transcendental Meditation produced marked, sustained, and highly significant reductions in smoking, alcohol consumption, and illicit drug use, with larger effects than other treatments including standard therapies, other forms of meditation, relaxation training, educational programmes, anxiety management, counselling to counteract peer pressure, biofeedback, hypnosis, acupuncture and sensory deprivation [60].

Over an 18-24 month period, abstinence ranged from 51% to 89% for people practising Transcendental Meditation, compared to 21% for good conventional substance abuse programmes. In contrast to high early relapse rates with standard programmes, reductions in smoking and alcohol consumption with TM increased gradually over time, while initial marked reductions in illicit drug use were sustained [60]. Overall, research in this area indicates that the longer individuals practise Transcendental Meditation, the more likely it is that they will stop or markedly reduce smoking, alcohol consumption, or drug abuse [60, 64]. These results are remarkable given that TM does not involve advice on lifestyle change or substance use. Instead, the marked reductions observed with TM appear to be internally motivated, based on the comprehensive benefits of the technique for physical and mental health and well-being [253-255].

Research on Transcendental Meditation in comparison to other types of meditation and relaxation

Transcendental Meditation is unique in the range and depth of research into its effects: no other method of meditation or relaxation has been shown to reproduce the physiological changes observed during TM, or to replicate its wide-ranging benefits for mind, body, behaviour, and society [189, 119].

Randomized controlled trials have shown that, compared to various forms of relaxation and meditation, TM is more effective in reducing high blood pressure [10-13]; decreasing atherosclerosis [19]; decreasing cardiovascular and all-cause mortality in subjects with mild hypertension [15-17]; increasing cognitive flexibility, well-being, and longevity in the elderly [12, 17]; increasing general intelligence, practical intelligence, creativity and speed of cognitive processing [266]; improving perceptual awareness (increased field independence) [266, 299]; and decreasing anxiety [266]. In other randomized studies, TM was more effective than psychotherapy in decreasing multiple features of post-traumatic stress disorder [56], and superior to an educational corporate stress management programme in reducing anxiety and depression and improving self-concept [319].

Systematic reviews and meta-analyses, integrating data from multiple studies, have shown that TM is more effective than other methods of meditation and relaxation in reducing high blood pressure [32], enhancing overall psychological health (self-actualization) [201], decreasing anxiety [200], and improving psychological outcomes in general [202]. An updated meta-analysis of randomized controlled trials found that TM was more effective in reducing anxiety than treatment as usual. Moreover, no alternative active treatment was more effective than TM, or produced the same wide range of associated beneficial effects. TM had a stronger effect in reducing anxiety than was observed with mindfulness-based therapy in a previous meta-analysis [417].

Meta-analyses have also shown that TM promotes deeper rest and decreases physiological indicators of stress more effectively than ordinary relaxation [114], and is strikingly more successful in combating smoking, alcohol consumption, and drug abuse than conventional substance abuse programmes or other forms of meditation or relaxation [60].

An **American Heart Association (AHA) Scientific Statement** from 2013 found that TM is the only type of meditation that has been shown to lower blood pressure, and recommended that TM may be considered in clinical practice for prevention and treatment of hypertension. The AHA report concluded that there is not enough scientific evidence to recommend other meditation or relaxation techniques [413-414].

A review of EEG research on different forms of meditation identified characteristic patterns of integrated brain functioning that clearly distinguish TM from other methods [119, 438]. In addition, TM is the only technique for which EEG correlates have been documented in randomized controlled trials [119, 151, 162, 178, 402, 404], and also the only practice for which specific physiological correlates have been identified both for experiences of Transcendental Consciousness during meditation, and for experiences of higher states of consciousness developed through regular practice of TM [117, 155, 180-182, 416, 436-438].

Comprehensive Benefits for Education

Transcendental Meditation is being increasingly employed in education as a technology to facilitate optimal cognitive, intellectual, social and emotional development. Research findings include:

- Increased intelligence and creativity [266-268, 223, 270, 275, 277-280, 283, 101]
- Improved memory, learning ability, and cognitive flexibility [266, 12, 174-175, 279, 284-285]
- Improved academic achievement in school, university, and postgraduate students [271-273, 282, 397, 400]
- Higher graduation and college acceptance rates; and lower school dropout [422]
- Enhanced cognitive and self development [201, 203, 222, 224, 226, 231-238, 280, 287, 290, 334]
- Improved attention, perception, and mind-body co-ordination [266, 101, 179, 184-185, 270, 274-275, 289, 296-315, 397]
- Increased orderliness and integration of brain functioning [178, 110-113, 115-119, 130, 151-177, 179-188, 402-404]
- Improvement on both verbal-analytical and visual-spatial tasks (indicating improved functioning of both left and right cerebral hemispheres) [101, 185, 266-268, 274-279, 283-284, 305, 397, 404]
- Improved athletic performance [313-315]
- Increased field independence (indicating greater ability to maintain broad comprehension while focusing sharply) [266, 274-275, 298-300, 397]
- Comprehensive benefits for mental health and well-being [12, 22, 56, 61, 67, 71, 200-246, 266-267, 269, 280-282, 289-293, 316-321, 334-339, 347-348, 359, 435]
- Greater moral maturity and higher moral reasoning [227-228, 235, 279, 173]
- Increased orientation towards positive values [226]
- Increased social maturity in college students [223]
- Decreased sleepiness in college students [178]
- Decreases in total psychological distress, anxiety, depression, anger/hostility, and blood pressure, and improved coping, in university students [22]
- Reduced anxiety and greater resilience in ninth-grade students [435]
- Decreased general psychological distress and reduced anxiety in racial and ethnic minority secondary school students [410]
- Reduced blood pressure in pre-hypertensive adolescents and young adults [22-24, 34]
- Reduced alcohol consumption, drug abuse, and smoking [60, 62-64, 246-265, 316, 318, 398]
- Reduced perceived stress, depression, and burnout in secondary schoolteachers and support staff [423]

- Benefits in special and remedial education:
  - Improved academic achievement in at-risk urban middle school students [400]
  - Increased intelligence and improved self-concept among children from low income families [280]
  - Reduced behaviour problems in school—decreased absenteeism, rule infractions, and suspension days [288]
  - Improvements in children with attention deficit hyperactivity disorder (ADHD): improved EEG ('brain wave') patterns, cognitive performance, and behaviour [404]; reduced stress and anxiety; and improvements in ADHD symptoms and executive function [289]
  - Increased independence and self-supportiveness, improved self-regard, and decreased dropout rate from school in economically-deprived adolescents with learning problems [290]
  - Decreased anxiety, examination anxiety, and school dislike in children with learning problems [291]
  - Benefits for learning disabled subjects: improvements in social behaviour, cognitive functioning, intelligence, physical health; and normalization of neuroendocrine measures [292, 87]
  - Improvement in autism: decreased echolalic behavior [293]
  - Decreased stuttering [294]
  - Improved social behaviour, increased self-regard, and decreased anxiety among juvenile offenders [351-352]

Holistic Cognitive Development and Increased Intelligence

Three randomized controlled trials (RCTs) on high school students in Taiwan found that Transcendental Meditation produced greater improvements in speed of cognitive processing, cognitive flexibility, creativity, general intelligence, practical intelligence, and field independence, and also reduced anxiety, compared to a traditional Chinese meditation technique or napping [266]. The authors note that, as in earlier research on TM and intelligence, the technique produced unexpected improvements in basic cognitive abilities that do not usually develop beyond early adolescence [266-267, 270, 275].

In another RCT, Canadian secondary school students who practised TM over a 14-week period showed improvements in intellectual performance (problem-solving ability), creativity, tolerance, self-esteem, autonomy and independence, innovation, energy levels, and ability to deal with abstract and complex situations, as well as decreased anxiety, compared to control students [277].

In a ten-year longitudinal study, American university students practising the Transcendental Meditation and TM-Sidhi programme increased significantly on a measure of self development (Loevinger's ego-development scale), in comparison to control students at three other universities [203]. Another study found that American university students practising TM rated important people in their lives (parents and spouse) significantly more positively than did control students [226].

In Cambodian students taking a one-year preparatory course before university, TM led to increased intelligence and self-esteem, improved physical health, and decreased depression and anxiety, compared to control students [268-269]

Improved Academic Performance and Higher Graduation Rates

In a randomized controlled trial, British master's degree engineering students who learned Transcendental Meditation showed improved performance on standard examinations after six months, compared with controls [271].

Another investigation examined academic achievement in Californian middle school students who were below proficiency level in English and mathematics. All subjects were from the same school and continued with the standard curriculum and instruction; 97% of subjects were from ethnic minorities. Over a three-month period, students who learned Transcendental Meditation showed improved scores on both English and mathematics scales of the California Standard Tests, in contrast to non-meditating control subjects [400].

A study conducted at a US East Coast urban high school showed a 15% higher graduation rate among students practising TM compared to non-meditating controls, after taking into account student grade point average. When only students with low academic performance were compared, graduation rate was 25% higher for TM subjects than controls. Students practising TM were also less likely to drop out of school, or enter prison, and were more likely to be accepted at post-secondary educational institutions [422]. Consistent with these results, a four-month randomized trial found that adolescent African American children who learned Transcendental Meditation showed reductions in absenteeism, school rule infractions, and suspension days compared to a control group who participated in health education [288].

Increased Brain Integration in College Students

By incorporating TM into the daily curriculum, Consciousness-Based Education progressively develops integration in brain functioning—the essential foundation for more

effective learning, enhanced personal growth, and greater success in any field of life (see 'Physiological Changes during TM', page 17). A recent randomized controlled trial found that college students who practised TM over a three-month period showed increased scores on an electroencephalographic (EEG) index of brain integration compared to non-meditating control students. The TM group also showed reduced sleepiness and had no increase in physiological stress levels (measured by skin resistance responses) despite impending final examinations, in contrast to the expected increase seen in controls [178].

Improved Health and Reduced Stress for Students and Teachers

A randomized controlled study of American university students found that TM reduced blood pressure; decreased total psychological distress, anxiety, depression, and anger/hostility; and improved coping [22]. Previous randomized trials on pre-hypertensive adolescents found that TM reduced blood pressure both at rest and during acute laboratory stress, and decreased ambulatory blood pressure during normal daily activity [23, 24].

Workplace stress and burnout are pervasive problems among teachers and staff in schools, with major deleterious impacts on mental and physical health, and on both individual and institutional performance. In a four-month randomized controlled study of 40 secondary schoolteachers and support staff at a residential therapeutic school for children with severe behavioural problems, Transcendental Meditation was effective in reducing perceived stress, depression, and overall teacher burnout [423].

Improvements in ADHD

A random-assignment trial investigated effects of Transcendental Meditation in 18 students, aged 11-14 years, with attention deficit hyperactivity disorder (ADHD). After three-months, children practising TM showed improvements in brain integration, cognitive functioning, and behaviour compared to controls, as measured by: improvement in EEG ('brain wave') abnormalities associated with ADHD (decreased theta/beta ratios); increased EEG coherence, indicating increased integration between different areas of the brain; increased Letter Fluency; and positive changes in cognitive and behavioural functioning reported by parents in five areas—ability to focus on schoolwork, organizational abilities, ability to work independently, happiness, and quality of sleep [404]. These findings are corroborated by an earlier study on children with ADHD which found that TM reduced stress and anxiety, and improved ADHD symptoms and executive function [289].

Consciousness-Based Education in Practice

The Transcendental Meditation programme is currently being implemented in over 700 educational institutions around the world with more than 360,000 students, encompassing projects in diverse social and economic environments in over 60 countries, including:

Latin America and the Caribbean*:* Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Curaçao, Dominican Republic, Ecuador, El Salvador, French Guyana (Fr.), Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Puerto Rico (USA), Suriname, Trinidad and Tobago, Uruguay, Venezuela.

North America*:* Canada, Mexico, USA.

Africa*:* Angola, Cape Verde, Ghana, Guinea, Guinea Bissau, Kenya, Mali, Mozambique, Sao Tome and Principe, South Africa, Tanzania, Togo, Uganda, Zambia.

Asia: India, Indonesia, Israel, Kyrgyzstan, Japan, Lebanon, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Thailand.

Europe*:* Bosnia-Herzegovina, Denmark, Georgia, Greece, Ireland , Italy, Netherlands, Portugal, Romania, Spain, UK, Ukraine.

Australia and the Pacific: Australia, Solomon Islands. [www.consciousnessbasededucation.org]

The longest established educational institutions employing Consciousness-Based Education —Maharishi University of Management (founded in 1972) and Maharishi School, both in Fairfield, Iowa, USA—have consistently delivered outstanding educational outcomes, and their students have repeatedly won regional, national, and international awards in many fields, including science, mathematics, creative thinking, literature, and sport [www.maharishischooliowa.org, and www.mum.edu].

Maharishi School in Iowa has had 95% of graduates accepted at four-year colleges, including Harvard, MIT, Stanford, Johns Hopkins, Wellesley, and University of California at Berkeley, with senior students consistently scoring in the nation's top 1% on standardized tests of educational development. The school has had 17 National Merit Scholars (the highest academic honour for the top 1% of national entrants), twice the national average over the past 30 years, as well as over 100 Finalists, Semifinalists, and Commended Scholars.

Maharishi School students have won over 100 international, national, and state competitions for science, engineering, mathematics, sports, arts, poetry, and extracurricular activities. For example, in Destination ImagiNation, an international creative problem-solving competition, Maharishi School students have won the Global Finals three times, achieved 34 other top ten awards, and been state champions 50 times. Maharishi School has also achieved first place in

the American High School Math Exam on four occasions, and ranked first in Iowa according to the Mathematical Association of America [www.maharishischooliowa.org].

Improved Occupational Health and Job Performance

Studies conducted in occupational settings have shown that TM improves health and performance in the workplace [61-62, 287, 316-334]. Findings include:

- Improved job performance [317-318]
- Increased job satisfaction [316-317]
- Improved relationships at work [316-318]
- Increased productivity [317]
- Increased employee effectiveness [316]
- Increased contribution of managers to the organization [318]
- Improved leadership [321]
- Enhanced management development [287, 322-334]
- Improved health and well-being (physical and mental) [61-62, 316, 318-320, 423]
- Improved health-related behaviour in employees and managers [62, 316, 318]
- Reduced stress in employees and managers [61, 316, 318, 320, 423]
- Reduced job tension, anxiety, depression, and insomnia [61, 316, 319, 423]
- Increased energy and decreased fatigue [316, 318]
- Reduced perceived stress, depression, and burnout in secondary schoolteachers and support staff [423]
- Reduced difficulty in obtaining employment for people with post-traumatic stress disorder [56]

In a five-month study conducted by researchers from Japan's National Institute of Industrial Health (a branch of the Japanese Ministry of Labour), industrial employees practising Transcendental Meditation showed increased emotional stability and reductions in anxiety, tendency to neurosis, impulsiveness, physical complaints, insomnia and smoking compared to controls. Depression also decreased in the TM group, despite lower initial levels [61-62]. Overall, employees practising Transcendental Meditation improved significantly on 10 out of 14 dimensions, whereas controls improved on only one [61].

Another study examined stress, health, and employee development in two settings in the automotive industry: a large manufacturing plant of a Fortune 100 corporation and a small sales distribution company. Employees who learned Transcendental Meditation showed greater improvement than matched control subjects on a wide variety of measures, including improved general health and reductions in physiological arousal, anxiety, job tension,

insomnia, fatigue, and consumption of cigarettes and hard liquor [316]. Practice of Transcendental Meditation also led to increased job satisfaction, improved employee effectiveness, and better work and personal relationships, confirming the findings of an earlier study [316-317].

Further analysis identified three factors underlying this wide range of improvements through TM: 'occupational coherence', 'physiological settledness', and 'job and life satisfaction'. The effect size of TM in reducing physiological arousal, anxiety, and alcohol/cigarette use, and in enhancing personal development, was substantially larger than for other forms of meditation and relaxation reported in four previous meta-analyses [316].

A three-month prospective study at a medical equipment company compared managers who learned Transcendental Meditation to matched controls who were similar in age, education level, ethnicity, marital status, hours worked per week, job type and level of responsibility in the organization. Managers who practised TM made an increased 'organizational contribution' compared to controls, as measured by a combined index of productivity, leadership practices, work relationships, vitality, mental health, job satisfaction, and anger. TM also led to reduced alcohol consumption; healthier habits of exercise, diet, and sleep; decreased serum cholesterol; increased energy and less fatigue; improved mental health; reduced stress-related physical symptoms; and reduction in perceived stress (the degree to which situations were perceived as overloading, uncontrollable or unpredictable) [318].

In a randomized study of employees at a high-security government agency, subjects who learned Transcendental Meditation showed reductions in anxiety and depression after 12 weeks, in comparison to controls who participated in an educational corporate stress-management programme. When retested after three years, the TM group showed not only sustained reductions in anxiety and depression, but also improved self-concept compared to controls [319].

Consistent with these findings, a controlled prospective study of employees at a South African firm found that TM was effective in reducing psychological stress and decreasing both systolic and diastolic blood pressure over a five-month period [320]. In another study, employees at a food sales company who learned TM showed greater improvement on a composite measure of leadership behaviour over an eight-month period than non-meditating controls [321].

Work-related stress and occupational burnout are major problems in education. In a four-month randomized controlled study of secondary schoolteachers and support staff at a residential therapeutic school for children with severe behavioural problems, Transcendental Meditation was effective in reducing perceived stress, depression, and overall teacher burnout [423].

Effective Rehabilitation of Offenders

Research spanning more than 40 years demonstrates that Transcendental Meditation is effective in correcting and preventing criminal behaviour. These studies have used some of the most sophisticated and widely validated measures of mental health and developmental maturity available in the social sciences [340-365, 424].

A study conducted at Harvard University on maximum security inmates in Massachusetts showed that the criminal mindset can be altered by Transcendental Meditation. Prisoners who learned the technique significantly improved on measures of psychopathology, including decreased aggression, anxiety, and schizophrenic symptoms. Furthermore, Transcendental Meditation increased their self development by more than one level on Loevinger's ego (self) development scale—from the dependent, exploitative orientation that is commonly found in criminals to the more responsible, self-monitoring, self-respecting, and communicative orientation of law-abiding citizens. Such holistic effects on development in adults are remarkable, especially among people previously thought to be most resistant to change [347-348].

In another maximum security prison study, inmates who learned Transcendental Meditation showed reductions in anxiety, resentment, negativism, suspicion, verbal hostility, neuroticism, and tendency to assault, as well as decreased insomnia and improved quality of sleep compared to controls [343-344].

Trauma experiences among incarcerated men and women are more prevalent than in the general population, and are associated with increased recidivism and other mental and physical health problems. In two four-month randomized controlled trials conducted in Oregon, TM decreased trauma symptoms and psychological distress in both male and female prison inmates compared to control subjects. In the first study, on male prisoners, TM reduced total trauma symptoms, anxiety, depression, dissociation, sleep disturbance and perceived stress. Subgroup analysis on subjects with high trauma levels showed a greater magnitude of effect from TM on all outcomes [430]. In the second investigation, which

employed different measures with female inmates, TM reduced total trauma, intrusive thoughts, and hyperarousal [431]. A companion editorial examines these studies in light of previous research and advocates TM as an evidence-based mind-body approach to prevention and promotion of health and well-being [432]. These studies complement research showing improvements in post-traumatic stress disorder in war refugees and veterans as a result of TM [56, 401, 418-421].

Transcendental Meditation can also facilitate rehabilitation of juvenile offenders: young people referred to juvenile court for a legal offence showed improved social behaviour and increased self-regard after learning TM. Anxiety levels were also reduced, a result corroborated by a later study [351-352].

Other studies also strongly supports these findings [340-342, 345-346, 349-350, 353-365]. A narrative and quantitative review of the application of TM in eight correctional settings involving almost 1500 inmates found that the technique leads to positive changes in health, psychological development, and behaviour [341]. Another review examining changes in brain chemistry of criminals found that stress-related neuroendocrine abnormalities known to be associated with aggression and crime were alleviated by Transcendental Meditation [360; see also 403].

The ultimate test for any rehabilitation programme is whether it reduces the frequency with which former offenders commit new crimes and return to prison (recidivism). Two studies, one with a 15-year follow-up period after release, found that TM markedly decreased recidivism rates, with up to 47% reduction compared to controls participating in other treatment programmes [340, 342, 349]. In keeping with these results, a large scale study of 11,000 prisoners and 900 prison officers in Senegal found that Transcendental Meditation reduced recidivism rates to only 8%, as well as markedly decreasing prison violence and health problems [345].

In a pioneering, community-based rehabilitation programme, six Missouri judges sentenced over 100 probationers, whose offences range from drunken driving to manslaughter, to learn TM. The programme achieved remarkable success, with extremely low rates of re-offending based on promotion of more balanced, successful, and law-abiding lives for participants [346].

Improved Quality of Life for Society as a Whole – the Maharishi Effect

Every individual continuously contributes to, and is influenced by, the quality of life in society. In Maharishi's analysis, the quality of life in any social group, from a family to the whole world, is governed by the *collective consciousness* of all the members of that group. Just as the thinking and behaviour of individuals is determined by their level of consciousness, so the functioning of society is governed by the degree of integration in its collective consciousness [447].

When collective consciousness is coherent and free from stress, a powerful influence of positivity and harmony permeates all areas of society, benefitting everyone. On the other hand, when stress builds up in collective consciousness, its negative and discordant effects pervade the whole community. If not relieved, accumulation of stress in collective consciousness leads inevitably to disorders of collective health, such as crime, violence, social turbulence, and economic failures, eventually threatening the very integrity of the nation.

According to Maharishi, the influence of Transcendental Meditation on society does not depend on social interaction on the surface level of life through speech or behaviour, but results primarily from enlivenment of a universal source of coherence and harmony which is fundamental to both individual consciousness and the collective consciousness of society as a whole. Thus, when an individual experiences the most settled state of mind—pure consciousness—during Transcendental Meditation, a coherent and life-supporting influence is generated not only at all levels of individual life, but also in the collective functioning of the entire society [447].

Based on this principle, Maharishi predicted in 1960 that if even a small fraction of the population were to practise Transcendental Meditation, positive changes would be observed not only in their own lives but also throughout the community. This prediction was first investigated in 1974 in a number of American cities where 1% of the population had learned Transcendental Meditation. When the 1% threshold was reached, a substantial reduction in crime rate was observed, in contrast to previous crime trends in these cities and to the continuing rise of crime in matched control cities with far fewer meditators [366].

This result has been confirmed and extended by larger and increasingly more rigorous investigations, which have demonstrated that the percentage of the population practising Transcendental Meditation is a reliable predictor of decreases in crime, suicides, and

accidents even after controlling for demographic factors that are known to influence these parameters. For example, scientists found that the observed improvements in quality of life could not be explained by changes in population size and density, residential stability, college population, ethnic distribution, unemployment rate, average income, percentage of the population living below the poverty level, age distribution, average level of education, police coverage, or previous crime trends. Further research found evidence of a direct causal relationship between numbers practising Transcendental Meditation and reduction of crime rate in two separate random samples, one of 160 cities and the other of 80 metropolitan areas in the United States [367, 372].

This phenomenon, representing a transition to a more coherent and harmonious state in society, was named the *Maharishi Effect* in recognition of Maharishi Mahesh Yogi, who had both predicted it and made possible its practical implementation. More than 50 separate studies have now been conducted on this effect (see Table 4, page 37) [366-395, 439-444].

Research on Groups Practising the Transcendental Meditation and TM-Sidhi Programme

Scientific interest in this field grew sharply when it was observed that the level of coherence in society was greatly intensified when Transcendental Meditation and the advanced TM-Sidhi programme, including Yogic Flying, are practised together in a group. As a result, the number needed to generate the Maharishi Effect was found to be greatly reduced, to as little as the *square root of one percent of the population*. This figure is a very small fraction of any large social system: approximately 800 for the United Kingdom, 1,800 for the United States, and 8,700 for the world as a whole. These relatively small numbers have made it practically possible to test this formula repeatedly in cities, provinces, states, whole nations, and even the entire world [367-395; 439-442, 444, 448].

The rise in coherence and harmony in society created by groups utilizing this technology has been repeatedly verified through increasingly well-controlled studies, including prospective projects, employing the most rigorous experimental designs and statistical methods available in the social sciences. Many have appeared in leading journals, including *Journal of Conflict Resolution; Social Indicators Research; Psychology, Crime and Law; The Journal of Mind and Behavior; Psychological Reports; Journal of Social Behavior and Personality; SAGE Open; Journal of Offender Rehabilitation; Social Science Perspectives Journal; Journal of Consciousness Studies;* and *Journal of Health and Environmental Research.*

The results of these investigations, summarized in Table 4, reach exceptionally high levels of statistical significance: taken together, they establish the Maharishi Effect on a level of proof unprecedented in sociological research. A fascinating feature of these studies is that diverse and apparently unrelated social parameters are found to improve simultaneously, consistent with the understanding that this technology enlivens a source of orderliness and integration that is common to all aspects of life [376, 385-386, 390, 439-442].

TABLE 4

(see page 37)

TABLE 4

Research Findings on the Maharishi Effect – Large Scale Sociological Effects of the Transcendental Meditation and TM-Sidhi Programme

- Decreased crime (research on: Merseyside, UK 1988-1991; Netherlands 1979, 1981; Washington DC, USA 1981-83, 1993; Puerto Rico, USA 1984; Metro Manila, Philippines 1984; Union Territory of Delhi, India 1980-81; Israel 1983; Jerusalem, Israel 1983; USA 2007-2010) [367-372, 375, 385-386; 439, 442]
- Decreased violent crime (Washington DC 1993; USA 2007-2010) [369, 439, 442]
- Decreased homicide and murder (USA 2007-2010) [439, 442]
- Decreased violent fatalities (homicide, suicide, and motor vehicle accidents) (USA 1982-1985) [371]
- Decreased motor vehicle and/or aircraft accidents and fatalities (Netherlands 1979, 1981; USA 1979; Jerusalem, Israel 1983; Worldwide 1983-84) [375-376, 385-387]
- Decreased motor vehicle and other accidental fatalities (USA 2007-2010) [440]
- Decreased infant mortality (USA 2007-2010) [441]
- Decreased drug-related deaths (USA 2007-2010) [441]
- Reduction of notifiable infectious diseases (USA and Australia 1983-84) [387]
- Increased economic prosperity and confidence:
  - Increased national economic strength and competitiveness (New Zealand and Norway 1994-1998) [443]
  - decrease in an index of unemployment and inflation (USA 1979-1988; Canada 1979-1988) [378-381]
  - increases in stock market indices (USA 1979; UK 1982-83; Israel 1983; Worldwide 1983-84) [376, 382, 385-387]
  - increased patent applications (indicating increased creativity) (USA, UK, South Africa and Australia 1983-84) [387]
- Improvements in overall quality of state and national life (as measured by composite indices including data on crime, suicides, accidents, fetal deaths, infant mortality, infectious diseases, pollution, alcohol and cigarette consumption, gross national product, days lost through strikes, patent applications, higher educational attainment, and divorce rates) (USA 1976-1983; Canada 1972-1986; Israel 1983; Philippines 1979-81; Metro Manila, Philippines 1984-85; Rhode Island, USA 1978; Iowa, USA 1979-1986) [370, 373-374, 376-377, 383, 385-386, 444]
- Reduced conflict and increased progress towards peace in major world trouble-spots:
  - decreased war deaths, war injuries, and intensity of conflict (Lebanon 1983-85) [385-386, 388]
  - decreased international conflict (Worldwide 1983-84 and 1978) [387, 389, 448]
  - increased progress towards peaceful resolution of conflict (Lebanon 1983-1985) [388]
- Reduced casualties and injuries from international terrorism (Worldwide 1983-85) [389]
- More positive interactions between the superpowers (USA and Soviet Union 1979-86) and increased friendliness in statements of US Head of State (USA and Soviet Union 1985-1987) [390-391]
- Increased harmony in international affairs (Worldwide 1983-84 and 1978) [387, 389, 448]

Recent Advances in Research on the Maharishi Effect – Sustained Reductions in Homicide, Violent Crime, Murder, Accidental Fatalities, Infant Mortality, and Drug-Related Deaths

Six recent papers confirm and extend previous research on the Maharishi Effect, demonstrating sustained improvements in multiple social measures and further strengthening the validity of statistical analysis through a battery of diagnostic tests [439-444]. Four of these studies examined effects of a large assembly practising the Transcendental Meditation and TM-Sidhi programme in Iowa from 2007-2010, when group size consistently exceeded (or was near to) the critical threshold predicted to generate the Maharishi Effect for the United States as a whole [439-442].

Compared to trends in the 50-month pre-intervention period (when group size was well below the critical threshold), the 48-month intervention period showed cumulative reductions in US national mortality rates from: homicide (21.2% decrease); motor vehicle accident fatalities (13.5% decrease); other accidental fatalities (20.5% decrease); drug-related deaths (20.5% decrease); and infant mortality (12.5% decrease) [439-441]. Reductions were also found for rates of violent crime (18.4% decrease) and murder (28.4% decrease), measured in a sample of 206 urban areas (total population 60 million in 2010) [439, 442].

These findings are of major practical significance, translating into expected reductions over the four-year intervention period of: 8,157 fewer homicides; 19,435 fewer fatalities from motor vehicle accidents; 16,759 fewer fatalities from other accidents; 26,425 fewer drug-related deaths; and 992 fewer infant deaths [439-441]. There were also 186,774 fewer violent crimes and 4,136 fewer murders than expected in the 206 urban areas studied [439, 442]. Interestingly, although these urban areas initially had higher murder rates than the country as a whole, they experienced a greater decrease during the experimental period [439, 442].

The authors examine other possible explanations for these results, but none was found to account for the findings. Notably, in contrast to all previous major economic downturns since World War 2, violent crime failed to rise during the severe recession that followed the global financial crisis of 2008 [439, 442].

These findings are corroborated by more than 30 previous studies showing reduced crime and violence through the Maharishi Effect since 1974 [366-372, 375, 385-386]. For example, in a notable prospective test, 4000 participants in the TM-Sidhi programme gathered in Washington, DC for a six-week demonstration project in 1993. Predictions were lodged in

advance with a 27-member independent review panel and advertised in the Washington Post. Results showed a 15.6% reduction in total violent crime during the project period, as well as increased approval ratings for President Clinton; reductions in accidents, emergency psychiatric calls, and hospital trauma cases; decreased complaints against police; and improvement in a quality of life index [369].

Reductions in crime rate were also observed when assemblies of experts in the TM-Sidhi programme exceeded the square root of one percent of the population of the Union Territory of Delhi, India; Metro Manila, Philippines; Puerto Rico, USA [370]; and Metropolitan Merseyside, UK [368]. The latter study documented sustained crime reductions when the coherence-creating group was maintained over a number of years: during this period, Merseyside crime rate declined from the third highest among the eleven largest UK metropolitan areas to the lowest [368]. Sustained improvements in multiple indicators of quality of life were also found in a US study, including reduced fatalities due to homicide, suicide, and motor vehicle accidents, and improvement in economic indicators, when a stable coherence-creating group in Iowa exceeded the size predicted to influence the USA, or both the USA and Canada [373, 377-381].

Increased Economic Prosperity and National Competitiveness

A recent analysis examined the economic fortunes of the two countries with the highest per capita participation in Transcendental Meditation—New Zealand and Norway—both of which passed the predicted coherence threshold of 1% of the population instructed in TM in 1993. Scores on the Institute for Management Development (IMD) *Index of National Competitive Advantage* increased significantly for both countries when they passed the 1% threshold, in comparison to 44 other developed nations over a 7-year period. Subsidiary analysis and Organisation for Economic Co-operation and Development (OECD) data confirmed that the economic improvements were unusually broad-based, sustained, and balanced in nature, with five years of high growth, low unemployment, and low inflation [443]. For New Zealand, a cost-benefit analysis of coherence creation through Transcendental Meditation conservatively estimated the gain to the nation at $320 for every $1 invested in implementing the programme [443].

These results complement previous findings of improvement in economic indicators at national and international levels as a result of the Maharishi Effect, including decreases in an index of unemployment and inflation (USA and Canada) [378-381], increased stock market

indices (USA,UK, Israel, and Worldwide) [376, 382, 385-387], and increased patent applications (USA, UK, South Africa and Australia) [387].

Decreased Conflict and Increased Progress Towards Peace

The Maharishi Effect has been repeatedly shown to calm even the most extreme forms of societal stress and disorder, as evidenced by reduced war intensity and international conflict, decreased deaths and injuries from war and international terrorism, increased progress toward peaceful resolution of conflict, reduced international tension, and increased harmony in international affairs [385-391, 395, 444, 448].

For example, war intensity in the Lebanese conflict was reduced on days when a group practising the TM-Sidhi programme in Jerusalem over a 2-month period reached sufficient size to generate the Maharishi Effect for the region. Improvements were also found in composite indices of quality of life (including data on crime, motor vehicle accidents, fires, national mood, and the stock market) for both Jerusalem and Israel as a whole when the group was large enough to predict effects at the city or national levels [385-386, 395].

In a recent factor analysis of these results, the quality of life index proved reliably sensitive to important factors influencing collective consciousness, such as major political and climatic events. However, the effect of the group practising the Transcendental Meditation and TM-Sidhi programme on the quality of life index was substantially greater than any of the cultural, military, political, or climatic events studied, and generated improvements both in parameters that are predominantly collectively motivated (decreased war intensity, increased stock prices, improved national mood) and in parameters that are predominantly individually motivated (decreased crime, accidents, and fires), with the strongest impact seen on the collectively-motivated measures [444].

The finding of reduced war in Lebanon was subsequently replicated for all seven assemblies of TM-Sidhi experts of sufficient size to predict the Maharishi Effect for the region during the peak of the conflict between 1983 and 1985, including groups located in or close to Lebanon and larger assemblies further afield [388]. Statistical analysis controlled for temperature, holidays, and weekends, and results were found to be independent of alternative explanations. Multiple indicators of reduced conflict also replicated the findings when combining intervention periods, including: 71% reduction in war-related fatalities; 68% decrease in war-related injuries; and 48% reduction in level of conflict [388].

Other investigations have documented calming of conflict on a wider international scale, including: decreased hostilities in major world trouble-spots when groups practising the TM-Sidhi programme assembled in the affected areas [448]; and reduced international conflict and increased harmony in worldwide affairs when a group achieved the size predicted to generate the Maharishi Effect for the entire world [387]. A subsequent study examining the effect on world events of three such large assemblies found a 72% reduction in international terrorism, a 33% decrease in international conflict, and increased world stocks [389].

World Peace – an Achievable Goal through the Maharishi Effect

With the discovery of the Maharishi Effect, world peace and prosperity become, for the first time, achievable and sustainable goals. Permanent maintenance of several groups of 8,700 individuals collectively practising the Transcendental Meditation and TM-Sidhi programme—more than enough to generate a continuous powerful influence of coherence and positivity for the entire world—would cost no more than a few advanced military aircraft [392-393, 405]. Moreover, based on research findings on the Maharishi Effect, it can be anticipated that investment in establishing and maintaining coherence-creating groups will be readily recouped through the massive fiscal benefits consequent upon reduced conflict, increased international peace and cooperation, reduction of major social problems (such as crime, accidents, and unemployment), and improved economic performance.

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