Factor Analysis of Social Indicators in the Middle East: Effects of Cultural, Military, Political, and Climatic Events and Group Practice of the Transcendental Meditation and TM-Sidhi Program

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SUMMARY

Maharishi Mahesh Yogi has proposed a fundamentally new theory of society, which posits a field of collective consciousness as the causal level of social organization underlying all patterns of relationships between and among individuals and social groups. The purpose of the present study was to use factor analysis to examine the inter-correlation patterns among the dependent variables used in our previous research set in Israel. We wanted to reduce them to two composite factors for the purpose of seeing what these factors might tell us about collective consciousness and how it reacts to cultural, military, political, and climatic events in the country, as well as to a group practicing the Transcendental Meditation and TM-Sidhi program there.

First, we studied the effects of the various salient events in the country on the Overall quality of life index used in our previous research, which is the arithmetic mean of crime, auto accidents, fires, national mood,

the stock market, and the war intensity in Lebanon. Vacations (weekends and holidays in Israel) improved the Overall index (effect size $d = 1.25$, $p < .00001$). Summer heat and the resignation of Prime Minister Begin both decreased the index (d's = -.78 and -.89, respectively, $p < .004$). These findings validate that our quality of life index was sensitive to a variety of events, and therefore is a good reflection of the collective consciousness of the country.

The effect of the Transcendental Meditation and TM-Sidhi group (the "TM Group") on the Overall index was stronger than any of the cultural, military, political, or climatic events studied, effect size $d = 1.64$, $p < .00001$. Moreover, the effect of the TM Group on the index was robust under different conditions, during workdays as well as during vacations, during hot days as well as cool days, before as well as after the Israeli military withdrawal from Lebanon, and during the Begin resignation period as well as at other times (p's ranged from .003 to .0000001). These results support the theory that the Maharishi Effect operates on the fundamental level of the unified field of natural law, which is transcendental to the relative changing values in cultural, political, military, and climatic events.

The next phase in this study was to examine how the different social indicators might cluster into higher order factors and to study how the Maharishi Effect might differentially influence these factors. Factor analysis of the dependent variables yielded two factors that accounted for 57% of the variance. Factor 1 loaded on the Lebanon-war variables, the national mood, and stock prices. Factor 2 loaded on crime, fires, and auto accidents. The Begin resignation and the withdrawal of the Israeli army had a negative impact on Factor 1 (i.e., during that period war increased and stock prices and national mood declined, p's < .000002). Vacations and temperature changes had no significant effect on Factor 1. However, vacations, cool days, and the military withdrawal were associated with improvements in Factor 2 (fewer crimes, auto accidents, and fires (p's < .003 to .0000004). Only the TM Group had a significant and positive effect on both Factors 1 and 2, and its effect on Factor 1 was over twice as strong as that on Factor 2 ($d = 1.52$, $p < .0000004$ and $d = .67$, $p < .01$, respectively).

Factor 1 may be interpreted as a *collective-actor* dimension of social indicators, which reflects the motivations and actions of society as a whole, represented in this study by events pertaining to the nation's leader, war, and economic index. Factor 2 appears to represent *individual-actor* variables, which reflect individually motivated behaviours in society, as

indicated by criminal behaviour, driving skill, and domestic fires. This interpretation of the results suggests that the effect of the TM Group was stronger on society as a holistic entity than on the personal behaviour of individuals within society. This suggests new directions of study for this as well as for other areas of social indicators research.

INTRODUCTION

Maharishi Mahesh Yogi has proposed that different levels of social organization, such as family, city, national, and international have associated levels of collective consciousness—family consciousness, city consciousness, national consciousness, and world consciousness, which have a causal role in influencing behavioural interactions in society. In this view, collective consciousness and individual consciousness reciprocally influence each other.

> Just as the consciousness of an individual determines the quality of his thought and behaviour, so also there exists another type of consciousness for a society as a whole—a collective consciousness for each family, city, state, nation, and world—having its own reality and the possibility of growth. The quality of the collective consciousness of a society is a direct and sensitive reflection of the level of consciousness of its individual members.…The application of this knowledge to society is further illuminated by the new science of sociobiology, which tells us that the structure of a society is extremely sensitive to the behaviour of the individual; the society is, in effect, an amplifier of the properties of its individual members. (Maharishi, p. 91)[1]

A growing body of evidence over the last four decades suggests that consciousness is not merely a localized phenomenon isolated within individuals' brains, but also has field-like properties that directly interconnect individuals in society, consciously and even unconsciously. For example, an EEG study found that episodes of maximum EEG coherence during the Transcendental Meditation and TM-Sidhi practice of Yogic Flying led increases in broad-band EEG coherence in other subjects isolated in another room and performing a computer task.[2] Broad-band EEG coherence is a correlate of transcendental consciousness,[3] is a

distinguishing characteristic of high creativity,[4] of the most successful people in different fields such as management[5] and athletics,[6] and is a key indicator of cosmic consciousness.[7] Cosmic consciousness is the first stable state of enlightenment, the fifth state in Maharishi's taxonomy of Seven States of Consciousness, which is characterized by equanimity in "pleasure and pain, victory and defeat", 24-hour bliss, and spontaneous right action.[8,9] The study suggests that some degree of enlightenment is being created not only in the Yogic Flyer but in his or her environment as well.

Another study found that EEG coherence *between* three meditators isolated from each other in different rooms increased during group practice of the Transcendental Meditation and TM-Sidhi program in a large group at a 1000 mile distance from the EEG subjects.[10] Group practice of the Transcendental Meditation and the TM-Sidhi program has also been found to reduce psychoneuroendocrine stress markers in non-meditators living and working within a 20-mile radius of the group. In this study, a dynamic regression analysis of time-series observations over the 73-day experimental period found that increases in the group's size predicted an immediate subsequent reduction in cortisol, increase in urinary 5-HIAA (the main metabolite of serotonin), and an increase in the ratio of 5-HIAA/cortisol in non-meditators in the population.[11] High urinary 5-HIAA has been correlated with low scores on anxiety, anger, and depression.[12] These studies suggest that some of the benefits of Transcendental Meditation are transmitted to other people at a distance who are not meditating.

It is important to note that in these studies there is *no intention* involved. The meditators *do not intend* for any particular effect to happen to another person or to the general population. The effects of increased EEG coherence and serotonin metabolite in the surrounding population are the natural consequences of the meditator transcending to subtler levels of the mind, leaving behind all intention and other mental activity as they settle into transcendental consciousness, the state of least excitation of awareness, a process called automatic self-transcending.[13] In Maharishi's view, transcending is the direct experience by the individual of the unified field of natural law, the source of all order in the universe, and experiencing it creates coherence in the individual and consequently coherence throughout the various strata of collective consciousness.

However, a large body of laboratory experiments has also shown that ordinary attention on other people, or intention to affect them in some way

at a distance, also has measurable effects.[14] For example, a meta-analyses of 36 remote intention experiments found that a person can influence physiological activity, such as electrodermal activity, heart rate, or EEG in a distant target person they are isolated from by intending to increase or decrease these parameters during randomly selected epochs. The effect size is small but statistically significant (Cohen's d = 0.106, p = .001). Similar effect sizes were found for studies showing that staring at a person can have a physiological effect on the person being stared at (d = 0.128, p = .013).[15] Remote healing, which is one of the most widely practiced modalities of alternative medicine, has similar effects (d = 0.114, p = .029). However, high quality studies do not support its efficacy, although some individuals apparently have impressive abilities to heal at a distance.[14,16] In the context of Maharishi's theory, one would predict that more highly evolved individuals would have greater abilities because they are more in tune with the underlying unified field of consciousness underlying everyone and everything. An interesting research program would be to see if people who score high on EEG parameters that distinguish cosmic consciousness[7] would produce more reliable non-local effects.

Significantly, negative emotions as well as positive ones appear to be transmitted between individuals. Nineteen studies have found that sending anxiety-provoking thoughts to a target person produces significant skin resistance stress reactions in that person, even though the target person is isolated from the transmitter person and not aware of his presence.[17] If experimental subjects under superficial laboratory conditions produce positive and negative physiological and psychological effects on other people at a distance with whom there is no known biophysical connection, imagine how prevalent these influences must be in the larger society, arising from powerful real-life expressions of love, anger, fear, and other emotions. The summation of all these influences, positive and negative, would define what Maharishi has described as *collective consciousness*.

In Maharishi's view, stress in collective consciousness is the root cause of crime, terrorism, war, and all other forms of civil discontent and stress-related problems.[1,18,19] This field-theoretic view of society provides a new way of interpreting social research data. For example, independent research has demonstrated that societal stress due to such factors as unemployment, bankruptcy, divorce, infant mortality, and new welfare cases are highly correlated with rates of violent crime, with correlations

ranging between .68 and .72.[20] Although some of these correlations have obvious behavioural interpretations, such as widespread unemployment motivating more robberies, it is not as easy to see why rates of infant mortality, for example, are correlated with rates of violent crime. A more parsimonious explanation is that individual stresses from all sources accumulating in collective consciousness influence everyone in the collective.

If the individual is the unit of collective consciousness, it follows that the most efficient means to produce global improvements in the quality of life in society is to reduce stress and increase coherence in the individual (Maharishi, pp. 80-84).[18] This is truly a grass-roots approach, based in the technologies by which individuals can access the unified field of consciousness at the basis of their minds through transcending. Studies on the individual indicate that the Transcendental Meditation technique produces a wakeful hypometabolic state of reduced autonomic and endocrine stress markers and increased EEG coherence, synchrony, and brain integration.[21-31] EEG coherence and synchrony have been shown to provide the exact timing of communication between distant but functionally related neural populations, which facilitates the exchange of information between whole-brain and local neuronal networks required for the sequential temporal activity of neural processes required for perception and cognition. [31-34] Randomized controlled trials have shown that Transcendental Meditation practice improves brain integration, habituation rate from stressors, wakefulness [29]and general cognitive ability.[35] Meta-analyses further operationalize the concept of increasing *coherence in the individual* through Transcendental Meditation practice, by showing that it reduces anxiety,[36] normalizes blood pressure,[37,38] decreases drug, alcohol, and cigarette use,[39] and increases self-actualization.[40]

Maharishi's theory further predicts that 1% of the population distributed throughout society practicing the Transcendental Meditation technique, or the $\sqrt{1\%}$ practicing the Transcendental Meditation and the TM-Sidhi program together in a group would generate sufficient coherence in collective consciousness to produce measurable improvements in the quality of life of society as a whole.[1,18,19,41] This relatively small requirement of practitioners can be explained by the general principle found throughout nature that the coherent elements of a system exert an influence that is proportional to their number squared, whereas the

incoherent elements have an influence proportional only to their number.[42]

The first empirical support for Maharishi's prediction was a study of crime in 11 US cities that reached 1% of their population practicing Transcendental Meditation in 1972. Crime rates decreased by 16% from 1972 to 1973 in these cities relative to control cities matched for population, college population, geographic region, and initial crime rate.[43] A subsequent study found a significant decrease in the slope of the crime rate trend over the six-year period in the experimental cities compared to controls, controlling for 10 demographics known to influence crime.[44] An expanded study of a random sample of 160 US cities using cross-lagged panel causal analysis found that an increasing percent of Transcendental Meditation program participants in the population led reductions in crime rate over a seven-year follow-up period (i.e., 1972-1978) controlling through partial correlation for other variables known to affect crime.[45] Similar results were found for a random sample of 80 US standard metropolitan statistical areas representing half of the metropolitan population of the US.[45]

Other studies have experimentally created groups of the $\sqrt{1}\%$ Transcendental Meditation and TM-Sidhi program participants in various populations such as India, Israel, Puerto Rico, Philippines, and the US, and have observed positive changes at the city, state, national, and international levels on specific social indicators predicted in advance to external project review boards.[41,46,47] These studies have found improvements in a variety of social indicators, including auto accidents, total crime, violent crime, homicides, suicides, fetal deaths, inflation, unemployment, stock prices, mortality, presidential ratings, bipartisan Congressional voting patterns, US-Soviet relations, international conflicts, and terrorism.[41,42,45,46,48-57] Most of these studies have employed time series analyses to control for seasonality, trends, drifts, and rival hypotheses, and to demonstrate temporal relationships among variables that support a causal model. In the tradition of naming scientific discoveries to honour their founders (e.g., the Meissner Effect, the Doppler Effect), this discovery has been named the Maharishi Effect.[43]

A study published in 2016 found that during the years 2007-2010, when the number of TM-Sidhi participants on the Invincible America Assembly (IAA) in Fairfield, Iowa was above or near $\sqrt{1}\%$ of the US population (approximately 1,725 participants), a rising trend of the

monthly US homicide rate during the baseline period 2002-2006 was reversed, and there was a highly significant shift to a decreasing trend (p = 2.7 x 10^{-16}). The homicide rate declined 21.2% (5.3% annually) relative to the baseline average rate. For the violent crime rate in a sample of 206 urban areas with populations over 100,000, there was a significant shift from a flat trend in 2002-2006 to a declining trend during 2007-2010 (p = 2.7 x 10^{-8}). The study indicates that 8,157 homicides and 186,774 violent crimes were prevented by this shift in crime rates. This change was predicted in advance, replicates previous studies, and cannot be explained by unemployment, increases in prison populations, percentage of youths 18-25 in the population, new surveillance technologies, or increases in social media communications.[58]

The present study is a reanalysis of the data from the International Peace Project in the Middle East.[41] A hotel was rented in Jerusalem during August and September 1983, and the Transcendental Meditation and TM-Sidhi practitioners in Israel and other countries were encouraged to participate in the twice daily group practice of Transcendental Meditation and TM-Sidhi program there. The predictions were posited in advance with an independent project review board. The research would test the hypothesis that increases in the group size would be associated with reduced stress and increased coherence in society, as measured by objective social indicators. Time-series impact assessment, transfer function, and cross correlation analyses indicated that the group had significant effects on war deaths and war intensity in Lebanon as well as Israeli crime, fires, auto accidents, stocks, and national mood. In a 13-day experiment within the experiment, the group size was experimentally increased by offering incentives to the meditators to come more often. The result was increased group size and improved quality of life (QOL) during the experimental period compared to the prior and subsequent 13-day periods. In addition, the time series analyses of the entire 61-day time series controlled for seasonal cycles, trends, major religious holidays, different specifications of the noise model, and different time series methodologies.[41,56]

One major finding was that the effect was stronger on an overall composite index than on the individual variables that comprised it. We interpreted this as signal averaging amplifying an effect common to all variables, and suggested that this general effect was transmitted on the level of an underlying unified field of consciousness.[24,41,42,45,47] We also

previously found that the major naturally occurring events at the time—cultural (weekends and holidays), military (Israeli withdrawal from Lebanon), political (resignation of Prime Minister Begin), and climatic (summer heat)—could not account for the Transcendental Meditation effect on the overall composite index.[59]

In the present paper, I used factor analysis to quantify how the possible correlations among the social indicators might cluster into principal components. Principal component analysis reveals the major independent dimensions of the internal structure in the data that best explains its variance. Factor analysis has a long history of application to QOL studies[60] and time series data.[61] This is an empirical approach to forming composite indices based on the inter-correlations in the data, rather than assigning all variables equal weights, pre-specified empirical weights, or creating composite variables according to *a priori* theoretical principles.

The goal of this study was to explore how the different naturally occurring events and the experimental intervention might influence the internal structure of the social indicators, to possibly reveal new insights into the dynamics of how these various events interact and impact society.

METHOD

Data

Independent Variables. The experiment was conducted over a two-month period, August and September 1983, on daily time series data.[41] The experimental variable, called the "TM Group", is the number of Transcendental Meditation and TM-Sidhi participants, which varied in size over the course of the experiment from 65 to 241 meditators. The TM Group size was represented in this analysis by the four different quartiles of size (Q1 [65–124 meditators], Q2 [125–157 meditators], Q3 [158–179 meditators], and Q4 [180–241 meditators]), which were coded as an indicator variable of 1, 2, 3, or 4, respectively. The days representing each quartile were essentially randomly distributed over the time course of the experiment.[41]

Naturalistic Events. The four naturalistic event variables were coded as binary indicator (dummy) variables. They were: Vacations = 26 days (all Fridays and Saturdays [the weekends in Israel] and religious holidays) vs.

Workdays = 35 days; Military Withdrawal = the 28 days (September 3- 30) from when the Israeli army withdrew from the Shouf mountains in Lebanon to their own border until the end of the study vs. the 33 previous days (August 1 to September 2); Temperature = median split on daily maximum temperature, indicating the 31 hottest days during the study vs. the 30 coolest days; Begin Resignation = the 19 days from when Prime Minister Begin announced he would resign until he finally resigned (August 28 to September 15) vs. the other 42 days.

These major military and political events were culled from the New York Times Index "Middle East", Israel and Lebanon, for August and September 1983.[62,63]

Dependent Variables. As in previous reports[41,59] a major dependent variable was the Overall index, the arithmetic mean of six standardized variables: Lebanon war intensity scale, automobile accidents and fires in Jerusalem, total Israeli crime, national mood derived from content analysis of the prominent front page picture story in the *Jerusalem Post*, and the stock market of freely traded Israeli stock. The Overall index was z-transformed (mean = 0, SD = 1), and the negative social indicators were inverted so that positive values of the index indicate improved quality of life, e.g., decreased crime, decreased war, increased national mood, etc.

Standard Box-Jenkins time series methodology was use to derive a pre-whitened version of the Overall index.[64] The result was Overall AR1, the residuals of the first order autoregressive term (AR1) model for the Overall index. This was the simplest adequate noise model, for which all time-dependent correlations among the data points had been removed, as evidenced by an absence of significant autocorrelations and partial autocorrelations.

This was the same model that was used in the original and subsequent papers.[41,59] The effects of the experimental and naturalistic events were studied on the Overall index, Overall AR1, individual social indicators, and factors derived from them.

Statistical Analysis

Factor Analysis. Principle component factor analysis was used to analyze the inter-correlational pattern among eight individual variables (war deaths, war intensity, stock prices, national mood, crime in Jerusalem, crime in the rest of Israel, auto accidents, and fires in Jerusalem) to reduce

them to two uncorrelated principle components. In this method, the first principle component accounts for as much variability in the data as possible, and each succeeding component accounts for as much of the remaining variance as possible.[65]

A varimax normalized rotation was used, which maximizes the sum of the variance of the squared factor loadings. Kaiser (1958) has shown that the normalized varimax solution coincides closely with the principle of simple structure,[66] producing two pure clusters of variables, called Factor 1 and Factor 2 in this experiment. The eight individual variables correlated strongly with one or the other of the factors, and the factors were uncorrelated with each other.

Standard time series methodology of identification, estimation, and diagnosis was used to identify the simplest adequate noise models for Factors 1 and 2, which were an AR1 for Factor 1 and an AR7 for Factor 2, called Fact1AR1, and Fact2AR7, respectively. As discussed below, because of their patterns of correlation with the individual variables, Factor 1 was also referred to as the *Collective Actor*, and Factor 2 as the *Individual Actor*.

Correlations and Effect Sizes. The strength of associations between the independent and dependent variables, including the Overall index, Overall AR1, Factors 1 and 2 and Fact1AR1 and Fact2AR7 were assessed by Pearson correlation coefficients, r, which was converted to the Cohen effect size d,[67] according to the standard formula: $d = 2r / \sqrt{(1-r^2)}$.

Since the direction of the effect was not predicted for most variables, a "minus" effect size denotes a decrease in the variable (e.g., decreased crime, decreased war deaths, decreased stock prices, etc.) and a plus indicated an increase (e.g., increased national mood, increased crime, etc.). For the composite indices (Overall index, Overall AR1, Factor 1, Factor 2, Fact1AR1, and Fact2AR7) a positive effect size indicates a global improvement in quality of life, and a negative effect size indicates a global decrease.

The interactions of the TM Group with each of the four naturalistic events on the Overall index was studied using two-way analysis of variance, with planned comparisons to test the significance of the group's effects under each condition. All statistical analyses were conducted using the Statistica software modules for Basic Statistics, Analysis of Variance, Time Series Analysis, and Factor Analysis.[68]

RESULTS

Overall Index

Table 1 shows that the TM Group and Vacations both had significant positive effects on the Overall global index of QOL. This indicates QOL improved during weekends and religious holidays and during days when the TM Group size was large. During hot days the QOL fell compared to cool days, and was also lower during the 19-day period from when Prime Minister Begin announced his resignation until the day he resigned compared to other days.

Table 1: Correlations (*r*) of the TM Group and various naturally occurring events with the Overall composite index and the pre-whitened Overall index (Overall AR1); *p* = probability values of the correlations, and *d* = effect sizes.*

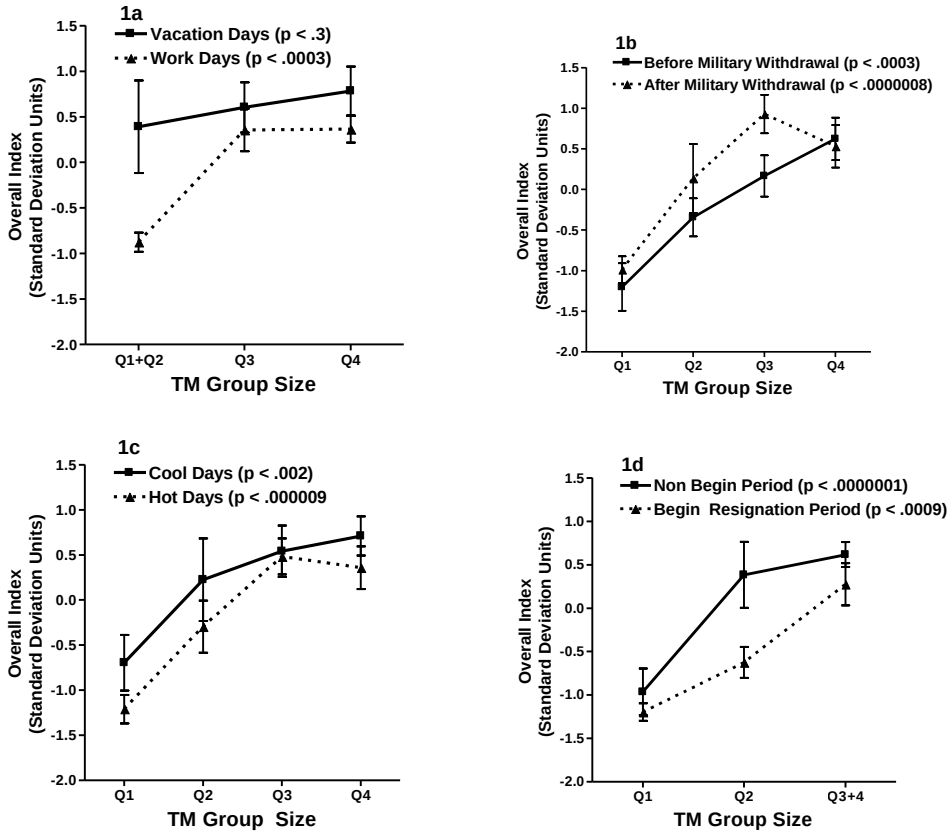
	Statistics	TM Group	Vacations	Military Withdrawal	Temperature	Begin Resignation
Overall Index	*r*	0.633	0.529	0.027	-0.362	-0.406
	p	0.000004	0.00001	0.837	.004	.001
	d	1.64	1.25	0.05	-0.78	-0.89
Overall AR1	*r*	0.476	0.562	0.041	-0.230	-0.308
	p	0.0001	0.000002	0.754	0.075	0.016
	d	1.08	1.36	0.08	-0.47	-0.65

* *d* = Cohen effect size.[67] Number of days N = 61.

The Military Withdrawal of the Israeli Army from Lebanon did not have an effect on the Overall index or its pre-whitened variant. The TM Group had a larger magnitude of effect size than the other variables on the Overall index (*d* = 1.64). Vacations had the strongest effect on Overall AR1 (*d* = 1.36 compared to 1.08 for the TM Group).

Figures 1a-1d show the interactions between the TM Group and the four naturalistic events. The only interaction that approached significance was TM Group X Vacations ($p < .097$), indicating that the effect of the TM Group may have been different during vacation days compared to during workdays. Planned comparisons showed that the TM Group was not significant during vacation days only ($p < .3$), but was significant during

work days only (p < .0003). Inspection of Figure 1a illustrates that the Overall index tended to be high during all vacation days independently of the size of the TM Group. There were significantly more meditators in the TM Group during vacations than during workday (mean of 177 vs. 145, p < .0005), and Figure 1a shows that the combination of large TM Group and vacations produced the greatest improvement in quality of life.



Figures 1a-d: Overall index standard deviation units for work days (1a), military withdrawal (1b), hot days (1c), and Begin resignation (1d) in relation to TM Group size.

Planned comparisons also indicated that the TM Group had a significant effect in the predicted direction on the Overall index under all other conditions. It was significant both before and after the military withdrawal (Figure 1b), during both hot days as well as cool days (Figure 1c) and

during the period of the Begin resignation as well as during all other days (Figure 1d).

Figures 1a to 1d. The interactions of the experimental variable (Transcendental Meditation Group Size), with the four naturalistic events, Vacations (1a), Military Withdrawal (1b), Temperature (1c), and Begin Resignation (1d) on the Overall index of global quality of life. The *p*-values are for the planned comparisons of the TM Group's effects on the Overall index during each sub-period. The error bars are standard errors of the means. Note that for Vacations (1a), quartiles Q1 and Q2 were collapsed to have enough subjects in all cells to compute the interaction. Likewise, for the Begin Resignation (1d), Q3 and Q4 had to be collapsed.

Individual Variables

Table 2 shows the correlations *r*, *p*-values, and the effect sizes *d* for each of the independent variables with each of the different events. The TM Group had significant effects in the predicted direction for all individual variables except for auto accidents, which was marginally significant, $p < .10$). Vacations were significantly associated with fewer fires, crimes, and auto accidents and elevated national mood, but were not associated with war deaths. There were no data for stocks because the market was closed during vacations. Hot days were significantly associated with more fires, crimes, and auto accidents, but not with the war variables, national mood, or stock prices.

The military withdrawal of the Israeli Army from Lebanon was associated with an increase in the war variables and a decrease in stock market prices, as well as with decreases in fires and crime. However, it had no association with auto accidents or national mood. Since the period after the withdrawal of the Israeli troops was basically the month of September (September 3-30), it seemed likely that the reduction in fires and crimes during that period might be due to cooler September weather. It was cooler in September than August (28.2 degrees C compared to 26.6, $p < .005$), and ANCOVA using temperature as a covariate showed that fires were no longer significant when temperature was used as a covariate ($p < .13$).

Table 2: Correlations (*r*) of the TM Group and various events with the individual social indicators; *p* = probability values of the correlations, and *d* = effect sizes*.

	Statistics	TM Group	Vacations	Military Withdrawal	Temperature	Begin Resignation
War Intensity	*r*	-0.479	-0.083	0.542	0.009	0.559
	p	0.00001	0.5	0.00001	0.9	0.000003
	d	-1.09	-0.17	1.29	0.02	1.35
War Deaths	*r*	-0.446	-0.060	0.641	-0.114	0.462
	p	0.0003	0.6	0.0000005	0.4	0.0002
	d	-1.00	-0.12	1.67	-0.23	1.04
Fires	*r*	-0.252	-0.289	-0.308	0.392	-0.010
	p	0.05	0.02	0.02	0.002	0.9
	d	-0.52	-0.60	-0.65	0.85	-0.02
Crimes	*r*	-0.25	-0.58	-0.53	0.36	0.11
	p	0.05	0.000001	0.00001	0.004	0.4
	d	-0.51	-1.43	-1.25	0.78	0.23
Auto Accidents	*r*	-0.188	-0.259	-0.090	0.259	0.034
	p	0.1	0.04	0.5	0.04	0.8
	d	-0.38	-0.54	-0.18	0.54	0.07
National Mood	*r*	0.490	0.338	-0.075	-0.182	-0.410
	p	0.0005	0.02	0.6	0.2	0.004
	d	1.12	0.72	-0.15	-0.37	-0.90
Stock Prices	*r*	0.673	No data**	-0.686	0.136	-0.413
	p	0.00001		0.0000006	0.4	0.01
	d	1.82		-1.88	0.27	-0.91

* *d* = Cohen (1988) effect size. Since the direction of the effect was not predicted for most variables, a "minus" denotes a decrease in the variable and a plus indicated an increase. The number of days N = 61, except for National Mood (N = 47) and Stocks (N = 35); ** The stock market was closed during vacations.

Crimes, however, remained significant ($p < .0002$) with a temperature covariate. The Begin resignation was correlated with an increase in fighting in Lebanon, and with a decrease in the national mood and stock prices, but not with fires, crimes, and auto accidents.

Table 3: Factor loadings and correlations of the eight social indicators with the factors.

	Factor Loadings		**Correlations**	
Variable	*Factor 1: Collective Actor*	*Factor 2: Individual Actor*	*Factor 1: Collective Actor*	*Factor 2: Individual Actor*
War Death	0.85	-0.23	-0.89	0.40
War Intensity	0.84	-0.07	-0.82	0.33
Stock Prices	0.68	-0.04	0.75	-0.15
National Mood	0.63	0.25	0.69	0.14
Crime Israel	0.05	0.90	0.19	-0.63
Crime Jerusalem	0.01	0.82	-0.06	-0.59
Auto Accidents	0.02	0.55	0.22	-0.57
Fires	-0.25	0.49	0.44	-0.50
Variance Explained	31%	26%	31%	26%

Factor Analysis of Eight Social Indicators

Table 3 shows that Factor 1 loaded on war deaths, war intensity, stock prices and national mood, whereas Factor 2 loaded on crime in Jerusalem, crime in the rest of Israel, auto accidents, and fires. Table 3 also shows correlations of the individual variables with the factors, indicating that an increase in Factor 1 denotes a reduction in war and increases in the national mood and the stock market. An increase in Factor 2 indicates decreases in crime, auto accidents and fires. Factor 1 explained 31% of the variance, and Factor 2 accounted for 26%.

Table 4 shows the correlations, *p*-values, and effect sizes *d* for Factors 1 and 2 with the TM Group and the four naturally occurring events. The TM Group had a significant effect on both Factor 1 and Factor 2 as well as on their pre-whitened variants, Fact1AR1 and Fact2AR7. Its effect on Factor 1 was over twice as strong (d = 1.52) as on Factor 2 (d = .67), although its effects on the pre-whitened versions were somewhat higher for Fact2AR7 (d = .84 compared to .71 for Fact1AR1).

Table 4: Correlations (*r*), probability values (*p*), and effect sizes (*d*) for Factor 1, Factor 2, Fact1AR1, and Fact2AR7 with the TM Group size and the cultural, military, climatic, and political events (N = 61).

	Statistics	TM Group	Vacations	Military Withdrawal	Temperature	Begin Resignation
Factor 1: Collective Actor	*r*	0.604	0.158	-0.562	0.026	-0.566
	p	.0000004	.222	.000002	.837	.000002
	d	1.52	0.32	-1.36	0.05	-1.37
Factor 2: Individual Actor	*r*	0.318	0.5979	0.5258	-0.3798	-0.0677
	p	.012	.0000004	.00001	.003	.604
	d	0.67	1.49	1.24	-0.82	-0.14
Factor 1: Collective Actor	*r*	0.3335	0.2009	-0.2187	0.0054	-0.3297
	p	.009	.121	.090	.967	.009
	d	0.71	0.41	-0.45	0.01	-0.70
Factor 2: Individual Actor	*r*	0.3856	0.5497	0.2374	-0.2809	-0.0872
	p	.002	.000004	.065	.028	.504
	d	0.84	1.32	0.49	-0.58	-0.17

During vacations Factor 2 variables improved compared to workdays (i.e., fewer crimes, auto accidents, and fires during vacations) but vacations did not have a significant effect on Factor 1. The Military Withdrawal was associated with a decrease in Factor 1 but an increase in Factor 2. Temperature had no significant association with Factor 1, but a significant inverse association with Factor 2, that is, more crimes, fires and auto accidents during hot days. The Begin resignation was associated with a reduction in Factor 1 but no change in Factor 2. Figure 2 graphically summarizes these results.

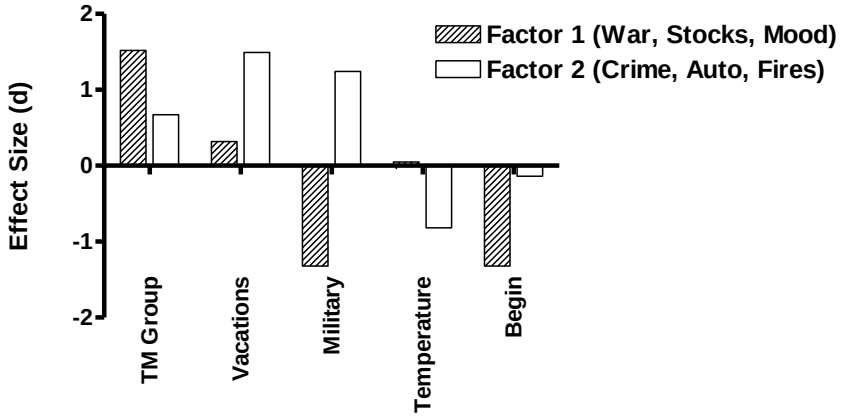


Figure 2: Effect sizes for the TM Group, vacations, military withdrawal, temperature and the Begin resignation for Factors 1 and 2. A positive effect size indicates improvements in QOL (less war, increases in stock prices and national mood, and decreases in crimes, auto accidents, and fires).

DISCUSSION

Overall Index of Quality of Life

The various events studied had different effects on the Overall index. The TM Group and vacations were correlated with increases in the index, whereas temperature and the Begin resignation were correlated with decreases. The military withdrawal, on the other hand, was uncorrelated with it. The effect sizes of these major naturally occurring events provide a gauge against which the TM Group's effect can be compared.

The magnitude of the effect sizes *d* for the naturally occurring events ranged from .05 to 1.25, compared to 1.64 for the TM Group, which was 24% to 53% larger than the other events that had a significant effect. An effect size of .8 is considered large in the social sciences,[67] indicating that

the effect sizes for the TM Group, vacations, temperature, and the Begin resignation were all large by this standard[1].[i]

The finding that the Overall index (and Overall AR1) was sensitive to major cultural, military, political, and climatic events provides construct validity for the index. It shows that it successfully operationalized the theoretical construct *quality of life*, and perhaps *collective consciousnes*s, in a way that was sensitive to naturally occurring events.

In addition, the direction of change associated with the various events provides face validity for the index, because the results are intuitively easy to interpret by ordinary behavioural mechanisms. For example, one would expect vacations to be associated with a rise in the quality of life and the resignation of a very popular prime minister to be correlated with a decline, or that summer heat would be associated with a decline.

The robustness of the TM Group's effect on the Overall index over a wide variety of conditions—before and after the military withdrawal, during cool days and during hot days, during the Begin period and the non-Begin period, and during workdays— indicates that the effect was independent of these events.

Vacations were potentially a confounding factor, because more meditators participated in the experiment during vacations than during workdays. However, vacations could not explain the TM Group effect because it was strong during workdays when vacations were completely eliminated from the data set ($p < .0003$).

[1] For Overall AR1, vacations had the largest effect size, 1.36 compared to 1.08 for the Transcendental Meditation Group. The pre-whitened version of the Overall index has the statistical advantage of rendering the time-series datum points independent of each other with regard to temporal dependencies, meeting a basic requirement of inferential statistics for interpreting p-values. The disadvantage of pre-whitening is that it transforms the original series into a version that does not carry all the information of the original. Thus, the Overall index more accurately represents what actually occurred in the experiment than its pre-whitened variant, and the correlations of it with the different events faithfully represent the strength of association between them, even though the p-values for the correlations are not interpretable. Arguably, the most valid measures of strength of effect are the correlations r and effect sizes d on the un-pre-whitened Overall index. However, the most valid p-values come for the result of the pre-whitened Overall AR1 index.

Individual Social Indicators

Vacations. The results for individual social indicators also have face validity. It makes intuitive sense that weekends and other religious holidays in Israel would be correlated with reductions in domestic variables such as fires, crimes, and auto accidents and increases in the national mood. Possibly during vacations fewer people are driving and cooking (cooking is not allowed on some Jewish holidays), hence fewer auto accidents and fires. Criminals may feel inhibited about committing crimes on holy days, or they may themselves take a vacation, or perhaps fewer police staff are on duty resulting in fewer crimes being recorded. In addition, people may be better rested on vacations, and consequently make fewer bad decisions and mistakes, which could impact accidents, fires, and crime. It also makes sense that the editors of the *Jerusalem Post* may routinely plan more positive front page picture stories for holidays, resulting in the elevation of the national mood scale, which was based on the front-page picture stories[2].

The finding that Israeli vacations are not correlated with the multinational war in Lebanon is also not surprising, given that the various ethnic factions involved in that war have different holidays. Six separate armies were involved in the war.[69] Moreover, traditionally wars are not halted for holidays and may even present opportunities for attack, as in George Washington's crossing the Delaware at Christmas to attack Hessian troops in 1776, or the Yom Kippur Arab-Israeli war of 1973.

Temperature. Studies have found that elevated ambient temperature is associated with higher crime rates, riots, and aggression.[70] We have also previously found that temperature is a significant predictor of violent crime.[47,58] In the present study, hot days were associated not only with higher incidents of crimes, but also with more fires and auto accidents. This may be explained by research showing that thermal stress has profound

[2] In addition to these behavioural explanations, other possible explanations are suggested by Maharishi's theory of collective consciousness. In this scenario, the elevated mood of people during vacations and perhaps even the direct effects of religious services themselves would create a positive influence in collective consciousness, which would translate into general improvements in the quality of life in society. Whether vacations and religious services create non-local effect that change the national mood scale and other variables would be an interesting area of future research.

effects on the physiology and behaviour, including narrowing of attention, degrading of sensory-motor performance, and slowing of decision reaction time. In addition, according to members of the Jerusalem fire department interviewed at the time, many fires spontaneously erupt in the desert on hot summer days.

The lack of correlation between war deaths and war intensity with ambient temperatures indicates that the military event was independent of temperature. Historically, however, weather variables often play a key role in military decisions and engagements, but in this instance they were not. The stock market prices were also independent of temperature. It appears that in this experiment the consequences of national military and personal financial decisions were too great to let ambient temperature influence them. The national mood scale was also independent of temperature, which could be interpreted as greater stability in a variable that reflects society as a whole compared to variables that reflects individuals' more isolated behaviours, such as those involved in auto accidents, crime, and fires.

Military Withdrawal and Begin Resignation. The increased fighting in Lebanon after the withdrawal of the Israeli troops was due to various military factions competing to capture the strategic Israeli position in the Shouf mountains after they evacuated.[63] Moreover, according to military sources interviewed at the time, the withdrawal of Israel was tied to the resignation of Prime Minister Begin. Begin announced that he would resign on August 28,[62] and six days later on September 3 the Israeli army pulled out to a more defensive position along its own border to protect the country during a potentially vulnerable time when it was reorganizing its government.[63] Began did not actually resign until September 15 (*New York Times*, September 16, 1983), almost two weeks after the military redeployment. Thus, the military withdrawal was motivated by the Begin resignation and the correlation of the Begin period with increased fighting in Lebanon was an artefact of the withdrawal.

The military withdrawal was also inversely correlated with fires and crime. For fires, this correlation appears to be an artefact of temperature, because when temperature was co-varied, fires were no longer significant. Crime, however, remained significantly lower after the military withdrawal even with a temperature covariate. Perhaps the population of Israel, including the criminals, was feeling more conservative and on its best behaviour during a period of national crisis. It is not surprising that

both the military withdrawal and the Begin resignation were associated with a decline in the stock market. Political events often impact stock markets.[71] On the other hand, one would not necessarily expect the resignation of the head of state to impact the personal behaviours associated with fires, crimes, and auto accidents, as was observed.

Transcendental Meditation Group. Of all the events, only the TM Group had a completely generalized positive effect on all the individual social indicators and composite indices. Whereas the naturally occurring events had limited effects, most of which can be easily explained by well-known behavioural mechanisms, the effect of the TM Group cannot. The generality of the Maharishi Effect and its action at a distance supports the hypothesis that it operates from a fundamental level of natural law, the unified field.[1,42]

Factor Analysis. The two factors resulting from the present analysis fell into two distinct clusters[3]. Factor 1's loading on war deaths, war intensity, the stock market, and national mood, suggests that it reflects the concerns of the broader society acting as a collective unit. Wars are in the service of fulfilling collective missions. Stock market behaviour, although motivated by individual's hopes for personal gain, is a leading economic indicator signifying how well the national economy is doing and how well it will do in the future.[72]

The association of stock market prices with the war variables in Factor 1 appears to be because market behaviour, unlike the other personal behaviours involved in crime, auto accidents, and fires, is influenced by national political events.[71] Therefore, stock prices, like the war variables, appear to reflect the status of the collective as a whole. The fact that the national mood scale, which was derived from the most

[3] In the present study, the factors were constructed on the basis of zero-order, simultaneous correlations, and did not take into account any possible lagged-covariance structure that might exist between the variables. Previously, we reported that cross correlations and transfer function analyses showed that variation in the daily size of the TM group either had an immediate, same day effect (zero lag for the individual and composite war variables) or led change by one day for crime, the Israel composite, and Overall composite, supporting a causal interpretation. However, in the present re-analysis, there was no clear theoretical motivation for studying the lagged relations between crime, auto accidents, fires, etc., although this could be done by future analyses by using more complex dynamic factor models. Also, since the naturally occurring events were coded as on-off indicator variables, they cannot be pre-whitened and lagged covariance between them and dependent variables is difficult to interpret.

prominent front-page story in a major newspaper, associated with the war and stock variables in Factor 1 suggests that it, too, successfully mirrored the national mood and not just the caprice of an editor.

Factor 2 variables—crimes, auto accidents, and fires—appear to reflect more isolated individual behaviours, which are less sensitive to the status of the collective as a whole (although, of course, not completely so). Criminal acts, for example, are in the service of the individual's self-interests, whereas very similar kinds of behaviours during war serve national interests. Rates of accidents, fires and similar personal behaviours that are less sensitive to events on the national scale seem to reflect the status of individual lives within the collective (Factor 2, Individual Actor) as contrasted to the status of the collective as an entity in itself (Factor 1, Collective Actor). A medical analogy might be that indicators of the overall health status of the body, such as temperature, blood pressure, and weight, which are routinely measured each time we go to the doctor, are like Factor 1, whereas measures of the health of specific tissues in the eyes, nose, lungs, etc. are like Factor 2.

Emile Durkheim, a pioneer of modern sociology, pointed out that suicide rates, which would fall into the Factor 2 type of highly personal behaviours, do provide important information about society as a whole,[73] as do rates of crime, auto accidents, etc.[20] However, the suggestion here is that whereas rates of variables reflecting the quality of life of individuals living within society provide one kind of information about the quality of life, measures of society as a collective entity—its wars, political actions, leading economic indicators, etc. provide another kind or level of information.

This interpretation is congruent with the finding that vacations and temperature, which impact individually motivated behaviour, are correlated with Factor 2: Individual Actor, but are not correlated with Factor 1: Collective Actor. On the other hand, the collectively relevant behaviour of the military withdrawal and the Begin resignation are correlated with Factor 1: Collective Actor but not Factor 2: Individual Actor. It should be noted that the Begin resignation is an example in which the behaviour of a single individual in a key governing position impacts the collective as a whole.

A comparison of the results for Factors 1 and 2 with those of the Overall index of quality of life illustrate an apparent limitation of the equally-weighted Overall composite index. The military withdrawal was

not significantly correlated with the Overall index, but was significantly correlated with both Factors 1 and 2, *but in the opposite direction*—negatively with Factor 1 (increased fighting in Lebanon, declining stock market prices and national mood) and positively with Factor 2 (decreased crime and fires). This illustrates that factor scores are superior to omnibus QOL indices, because they carry information about the principal components of the internal structure of the social indicators that may respond differently to important socio-political events.

Cause vs. Effect Variables. A related interpretation of Factors 1 and 2 is based on the distinction between "effect indicators", which reflect the underlying QOL, and "causal indicators", which have a causal role in influencing QOL.[60] It could be argued that events in the war in Lebanon, the resignation of the prime minister, and the national mood portrayed on the front page of a major newspaper may *cause* changes in QOL rather than reflecting them. On the other hand, crime, auto accidents, and fires may be considered *effect* variables that are affected by the cause variables. The effect variables (Factor 2) are often considered the more proper indicators of QOL.[60] Related to the idea of causal variables is what other researchers have identified as *period effects that involve historical events*, such as war and economic depression, which impinge on all social actors in society and influence their behaviour, as reflected, for example, in suicide rates.[74]

In the present study, however, we found that changes in the war, stock market, and national mood were themselves influenced by political and military events (the resignation of the prime minister and redeployment of military forces) as well as by the TM Group. Hence, there appear to be levels in the chain of causality in QOL variables. One plausible scenario, for example, is that the resignation of the prime minister resulted in the military redeployment which resulted in changes in the intensity of the Lebanon war, which caused reductions in the stock market and national mood.

Could the TM Group be at the head of this causal chain by influencing the actions of the head of state? According to Maharishi's theory of society, the activity of every national government is governed by the collective consciousness of its people.[19] Menachem Begin became prime minister of Israel in 1977, and was widely respected for the strength of his leadership. In November 1982, his wife died and since that time Prime Minister Begin (age 70) was reported to have become increasingly ill, depressed, and withdrawn from critical military and political decisions,[62] creating

considerable confusion about who was running the government (*New York Times*, September 16, 1983). The period when the TM Group size was largest and therefore coherence in national consciousness was predicted to be the highest was from August 14-28.[41]

According to Maharishi's theory of society "Every decision of government is the expression of national consciousness" and the actions of the head of state are the "innocent mirror" of national consciousness.[19] It was on this day of maximum predicted coherence for Israel, August 28, 1983, ten months after his wife died, that Prime Minister Begin announced to his Cabinet that he intended to resign.[62] Begin's decision to remove himself from leadership can be seen as being in the national interest because, according to his and all other accounts, he was so grief stricken that he could no longer rule effectively. His resignation, although a sad day for the people of Israel, allowed the nation to form a new stronger leadership.

Given his physical and mental condition over the preceding year, Begin would undoubtedly have stepped down sooner or later. But the fact that he did step down exactly after the two-week period during which the meditator group in Israel was largest lends support to the theory that successful resolutions of national problems are aided by coherence in national consciousness. It is not that the TM Group, individually or collectively, had any intention whatsoever for Begin to resign or that Begin was aware of their existence. There is no intention for any particular outcome during Transcendental Meditation practice, for either the individual or society. Transcendental Meditation practice simply involves innocently allowing the mind and body to settle into their quiet, most coherent state, which apparently radiates a generalized influence of coherence in collective consciousness.[1,18,19]

In any case, of all the events in society at the time, only the TM Group had an influence on both Factors 1 and 2. The finding that the effect on Factor 1: Collective Actor was over twice as strong (d = .604) as the effect on Factor 2: Individual Actor (d = .318), suggest a new hypothesis to test, which is that the Maharishi Effect influences society as a collective entity more strongly than it affects private individuals within the collective.

It would appear that other social indicators that reflect governance and actions of the collective as a whole, such as presidential statements, media approval of the president, Congressional voting patterns, East-West relations, international trade and cultural exchanges, national policies, and

national economic indices (e.g., unemployment and inflation) would fall into the Factor 1 class of social indicators.[51,52,54,55] Other examples of Factor 2 variables might include suicides, patent applications, various indices of crime, emergency psychiatric calls, accidental deaths, trauma cases, complaints against the police, and hospitalization rates.[45,50,53,75]. The hypothesis that the Maharishi Effect is stronger on Factor 1 than Factor 2 variables could be tested by a meta-analysis on the 51 studies on it by comparing the effect sizes for Factor 1 and Factor 2 variables, controlling for other potentially relevant variables, such as the predicted strength of effect (formula 1^{41}) type of intervention (grouped or distributed meditators), proximity of the meditators to the measured population, type of social indicator variables (individual or composite), etc.

Factors 1 and 2 and the Right-Left Hemispheric Functions. Recent studies indicate that the differential functions of the right and left hemispheres found in humans occur in many species and apparently have evolved over the last 500 million years.[76-78] A wide range of evidence indicates that the right hemisphere functions are global, taking in the whole scene to monitor danger, unusual circumstances, emotional process, and the social behaviour of the group. Throughout evolution, the right hemisphere has taken primary control in potentially dangerous situations that require rapid reaction from the species. In humans, the right prefrontal cortex is more active during negative emotions and avoidance of aversion.[79-81] In this study in the Middle East, in which Israel was surrounded by enemies, Factor 1 is perhaps the collective analogue to the right hemisphere, which specializes in global monitoring for danger, survival and opportunity for the group as a whole.

Throughout evolutionary history, left hemisphere functions are local, attending to specific limited features of the scene of special interest to the individual animal's *routine* normal maintenance and behaviour, such as feeding, communication, and classifying.[76] In humans, the left prefrontal cortex and left amygdala are associated with positive emotions and approach towards reward.[79-81] Factor 2 appears to be a left hemisphere analogue of social indicators, because it reflects localized individual routine behaviours involved in crime, auto accidents, and fires. Of course, any complex human behaviour will involve the coordinated activities of right and left functions. Right and left functions working together in parallel give the species an adaptive advantage because global monitoring of the environment (right brain) detects unusual events that might present

a potential danger or opportunity, while discrimination and control of routine functions (left brain) sustains day to day life.[76]

If, as Maharishi has proposed, the individual is the unit of collective consciousness,[1] and if, as research has shown, the right-left hemisphere functional divisions are fundamental to the evolution of our species, then it would follow that the collective consciousness, which arises from individuals in the population, would have analogues to right and left brain functions. How the left and right aspects of collective consciousness, should they exist, function in parallel to give society an adaptive advantage is an interesting area for future research.

CONCLUSION

The application of factor analysis to define composite indices of social indicators seems to have uncovered two broad classes of variables. Factor 1 (war variables, national mood, and the stock market) is interpreted as reflecting a *collective actor* or political entity whose actions reflect the status of the collective as a whole, and Factor 2 (crime, auto accidents, and fires) is interpreted as indexing the *individual actor* within the collective that arises from routine behaviours of the individuals acting on their own behalf. These variables are speculated to be the collective analogue of right and left hemisphere functions, respectively, and may provide different kinds of information about society.

Factor 2 variables indicate how individuals in the collective are behaving and prospering in their individual lives, whereas the collective-actor variables reflect the actions and well-being of the collective as a whole. As suggested by Maharishi's theory that "government is the innocent mirror of collective consciousness", which more holistically reflects collective consciousness than the individual,[18,19] the strongest effect of the coherence creating group of meditators was on the index of the collective actor.

The effects of socio-political, cultural, and climatic events in this study on social indicators can all be plausibly explained by ordinary mundane behavioural mechanisms operating on the classical level of physics. The known psychophysiological effects of summer heat as well as the changes in behavioural routines during vacations would be expected to impact private individual behaviours involved in crime, driving, or how fire is handled. On the other hand, major events in the life of a head of state

or by the military would be expected to impact variables that reflect the status and well-being of the collective as a whole, such as the stock market, national mood, and war.

However, the effects of the TM Group are *not* easily explained on the classical level of cause and effect. The group members were isolated from the populations they were affecting, especially from the combatants in the war in Lebanon who were in another country. The finding that the effect was evident during different naturally occurring cultural, climatic, political, and military conditions suggests that it was operating at a level of causation that is transcendental to the classical causal mechanisms associated with these conditions. This and the findings that the TM Group had a global influence, affecting all individual social indicators, the Overall index, and both Factors 1 and 2, supports the hypothesis that the Maharishi Effect functions from the quantum-mechanical level of the unified field that is fundamental to all other levels collective consciousness and natural law.[41,45-47,59]

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