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Preventing Terrorism and International Conflict: Effects of Large Assemblies of Participants in the *Transcendental Meditation* and *TM-Sidhi* Programs

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ABSTRACT This study tested the hypothesis that group practice of the Transcendental Meditation (TM)[1] and TM-Sidhi[1] programs by approximately the square root of 1% of the world's population globally reduces terrorism and international conflict. For 3 periods during 1983-1985, ranging from 8 to 11 days, practitioners of these programs assembled in one place to practice in a group. Data on the numbers of casualties and fatalities due to terrorism were obtained from the Rand Corporation and grouped as five-day aggregates, forming a single time series spanning the 3 assemblies. Data on international conflict were generated from date-blind ratings of news events in the *New York Times* and *London Times* to give comparable blocks for time series analysis before, during, and after each of the assemblies. Time series intervention analyses used the Akaike information criterion to objectively define optimal noise models. The analyses found a 72% drop in terrorism ($p <$ .025) and an average drop of 32% in international conflict (p values from $<$ .005 to $<$ .025) during the assemblies. These results are consistent with similar effects of smaller such assemblies on local populations and suggest that long-term implementation of groups could have a major impact on terrorism and international conflict worldwide.

KEYWORDS Terrorism, international conflict, Transcendental Meditation, consciousness, crime prevention

Terrorism is defined as the unlawful use of force and violence against persons or property to coerce a government or civilian population for political or social objectives (see Title 22 of the United States Code, Section 2656f[d]; U.S. Department of State, 1998). When war is viewed separately from its social and political justifications, it also is fundamentally a type of crime, violating religious and civil codes of moral behavior. War is condoned by society in the furtherance of political, economic, or social objectives. Yet many in society regard this killing and destruction as criminal, particularly when they do not agree with the objectives intended to excuse it.

Strategies for preventing war have fallen into two broad categories: (a) create more weapons, i.e., deterrence theory or peace through strength; and (b) destroy weapons, i.e., disarmament theory or peace through cooperation (Davies & Alexander, in press). Neither approach has been successful. With regards to deterrence, historical studies show that increasing armaments are highly correlated with increased war proneness (Singer, 1986; Gochman, 1990). Significant disarmament in a world of heavily armed antagonists has never been achieved because of mutual mistrust and misperception. In reality, then, no nation today can truly defend itself against destruction; it can only counter-destroy.

Terrorism presents a similar situation: No individual or group can truly protect itself from terrorist attack. The United States (U.S.) counterterrorist policy includes making no concessions and striking no deals with terrorists, bringing terrorists to justice for their crimes, and isolating and applying pressure to states that sponsor and support terrorism to force them to change their behavior. Yet terrorism continues worldwide, with 304 terrorist acts in 1997. As former President William Clinton declared after the terrorist attack in Luxor, Egypt, "Once again, we are reminded of a painful truth: Terrorism is a global threat. No nation is immune. That is why all nations must redouble our commitment to fight this scourge together" (U.S. Department of State, 1998, p. 3).

The theoretical perspective informing the present research, the Maharishi Vedic Science[1] program, is unique in the history of conflict resolution, both in its theory and in the extensive research demonstrating its effectiveness (for reviews, see Orme-Johnson, 1994, in press; Orme-Johnson & Dillbeck, 1987). The theory holds that international conflicts and terrorism, as well as crime and other indices of societal conflict, are fundamentally consequences of stress in collective consciousness (Maharishi Mahesh Yogi, 1977a, 1986a, 1996).

Collective consciousness is defined as the holistic level of a society that arises from and defines the quality of life in the population. Just as the trillions of individual cells in the human body have a holistic level of functioning that is associated with the consciousness of the individual, so, too, the individual members of a society have a holistic level of interaction that may be termed the collective consciousness of society (Maharishi Mahesh Yogi, 1977a). From this perspective, there is a level of collective consciousness associated with each level of social organization, e.g., family consciousness, community consciousness, state consciousness, national consciousness, and world consciousness.

The quality of the collective consciousness of each of these levels arises from the quality of consciousness of its individual members. Reciprocally, collective consciousness influences each individual member. Stress in individual lives, for example, creates stress in collective consciousness, which permeates society and influences everyone's behavior. According to Maharishi Mahesh Yogi (hereafter referred to as Maharishi), when stress in collective consciousness is allowed to accumulate, it not only raises the rates of crime, sickness, and other social problems but also may break out in collective violence, such as wars and terrorism (1986a).

> The basis of terrorism can be understood in this: Whatever may seem to be the cause of the outbursts of terrorism, whatever little excuses there are, these excuses arise on the surface of the human race only from the stress in world consciousness, and stress is not seen until it bursts out. (pp. 83-84)

> I don't see any solution to terrorism except creating coherence in world consciousness. No power of the sword can possibly eliminate terrorism. Many governments are involved in promoting terrorism, but there is no direct political, economic, or social measure to stop terrorism in the world except to educate the people to think and act according to natural law and by creating coherence in world consciousness. (p. 162)

Maharishi defines *life in accord with natural law* as life with greater cooperation and mutual support for the diverse objectives of different factions in the population (Maharishi Mahesh Yogi, 1986a). The rationale for the hypothesis that the Transcendental Meditation and TM-Sidhi programs promote thought and action in accord with natural law and create coherence in collective consciousness is that these programs provide the direct experience of the underlying universal field of pure consciousness, the unified field of natural law, which is the source of natural law that structures order and harmony throughout the universe (Hagelin, 1987). Following the principle that the influence of coherent members of a system is proportional to their number squared, it was predicted that as few as the square root of 1% of a population contacting the unified field of natural law through the Transcendental Meditation and TM-Sidhi programs would create a measurable influence of coherence throughout society (Maharishi Mahesh Yogi, 1986a).

Previous research on the city, state, and national levels has indicated that groups constituting the square root of 1% of the population practicing the Transcendental Meditation and TM-Sidhi programs together do reduce crime (Dillbeck, Banus, Polanzi, & Landrith, 1988; Dillbeck, Cavanaugh, Glenn, Orme-Johnson, & Mittlefehldt, 1987; Hagelin et al., 1999; Hatchard, Deans, Cavanaugh, & Orme-Johnson, 1996). These groups also have been found to improve quality of life (Assimakis & Dillbeck, 1995; Cavanaugh, 1987; Cavanaugh & King, 1988; Cavanaugh, King, & Ertuna, 1989; Dillbeck, 1990; Dillbeck & Rainforth, 1996; Orme-Johnson, Alexander, Davies, Chandler, & Larimore, 1988; Reeks, 1991). In addition, these groups reduce armed conflict (Orme-Johnson, Alexander, & Davies, 1990; Orme-Johnson et al., 1988) on the city, state, national, or international levels, depending on the size of the group.

The hypothesis of the present research is that participation in this program by the square root of 1% of the world's population (approximately 7,000 individuals at the time of the interventions) can create a field effect large enough to reduce tension and stress in the whole world population and, thereby, to create measurable reductions in terrorism and international conflict. This is the first research to test the ability of this technology to reduce social violence on a worldwide level.

METHOD

Independent Variable

The independent or intervention variable was the occurrence of large assemblies of participants in the Transcendental Meditation and TM-Sidhi programs. There have been three such large assemblies during which the number of participants approached or exceeded the threshold of participants predicted to produce an influence on a global scale: December 27, 1983, to January 6, 1984 (about 8,000 participants in Fairfield, Iowa); December 28, 1984, to January 6, 1985 (over 6,000 participants in The Hague, The Netherlands); and July 9-17, 1985 (about 5,500 participants in Washington, D.C.). Each assembly involved the twice-daily practice of the Transcendental Meditation and TM-Sidhi programs in large groups; other periods of the assembly were given to lectures and organizational activities. Each of these three assemblies constituted a planned experiment, with hypotheses regarding the predicted effects on conflict and terrorism made formally to scientists and journalists in advance.

Dependent Variables

International Conflict

For each of these assemblies, a separate daily time series was constructed from content analysis of one of the major newspapers that gives extensive coverage to international events–the *New York Times*, which has been widely used as the primary U.S. source for scoring international conflict and civil conflict (e.g., Taylor & Jodice, 1983, p. xvii) or the *London Times*, which has a somewhat broader coverage of European and African events. To meet the requirement of length for time series analysis, each time series covered at least a 2-month period, starting before the assembly began and ending sometime after its conclusion. For each assembly, articles were scored for international conflict using scales derived from Azar's (1980) conflict scale category. The dependent (endogenous) variable of international conflict was constructed from negative events only: The score for a given day was the sum of negative events for that day. For a negative event that involved different actions with various degrees of hostility, the most hostile action was scored. Ambiguity about the occurrence of an event or its duration was resolved by checking the Associated Press and United Press International archives.

Each article was scored by two raters blind to the date of the article. If the difference of the two scores between raters was no greater than one scale unit, the two scores were averaged. If there were larger differences between ratings (less than 1% of the cases), raters discussed the article with a third person until a consensus was reached. Interrater reliability was $r = .88$ for the Iowa assembly, $r = .97$ for the Holland assembly, and $r = .98$ for the Washington assembly. The slightly lower level of reliability for the Iowa assembly probably results from the fact that a different version of the rating scale was used, as described later in this article.

The collection of data on international conflict for the three assemblies was conducted initially in the context of three separate studies. Thus, there were slight variations in the length of the time period, in the method of selecting articles for scoring, and in the scales used. These small differences in methodology should provide a further test of the generalizability or robustness of results. For the Iowa and the Washington assemblies, articles were selected from the first three pages, the News Index, and the News Summary of the *New York Times*. For the Holland assembly, events were selected from the first six pages of the *London Times* or from the first two pages of the *London Sunday Times*. These differences in source, as well as differences in the length of the series for which content analysis was performed, were based on decisions made prior to examination of conflict events, as part of designing the three different intervention studies.

For the Iowa assembly, articles were selected in the following categories: (a) all articles reporting international conflicts in trouble-spot areas; (b) U.S.-Soviet relations pertaining to these conflict areas, to arms limitation talks, to the deployment of arms or missiles, or to any other indications of improved or worsened superpower relations; and (c) any politically motivated civil disturbance or terrorist act anywhere in the world. The scale used for the Iowa assembly was a simplified form of Azar's (1980) conflict scale, in which international and domestic conflicts were combined and in which the negative half of his 15-point scale was reduced to 4 negative scale points ranging from unchanged negative conditions (nonsignificant acts in an area currently undergoing conflict) to strong negativity (full-scale battles). The assessment of conflict was based on 206 articles (76.5% of a total of 269 articles, the remainder of which were judged to describe positive events). Analysis covered a 63-day period from November 26, 1983, to January 27, 1984, which constituted 31 days before, 11 during, and 21 after the assembly (a baseline period of at least 4 weeks before the intervention period was desired for modeling ongoing trends).

The scale used for rating conflict in the Holland and Washington assemblies was the negative half of a 15-point scale modeled on that of Azar. This 7-point scale, which ranged from mild verbal hostilities to full-scale war, combined Azar's International and Domestic Conflict Scale Categories (Azar, 1980) to permit scoring of both domestic and international political violence, since most conflicts include both.

For the Holland assembly, all articles concerning international relations or events in the specified pages of the *London Times* were selected for scoring. The dates of analysis were from November 30, 1984, to February 3, 1985. This comprised 66 days of which 28 days were before, 10 were during, and 28 were after the intervention. During this period, 318 articles were rated as negative events (69.6% of a total of 457 articles, with the remainder containing only events judged as positive).

For the Washington assembly, articles selected from the specified *New York Times* pages were those that met the same criteria listed above for the Iowa assembly. There were 129 days in this series–100 before, 8 during, and 21 after the intervention–covering the period from April 1 to August 7, 1985. Analysis of international conflict is based on 638 negatively scored articles (68.8% of the total of 927 articles, of which the remainder were positive events). Further details on the scales and scoring procedures are available from the authors.

International Terrorism

To increase reliability of the data on international terrorism, because the separate intervention periods were short, the combined influence of all three assemblies was estimated relative to a 2-year control period. A database of all international terrorist events worldwide, the Chronology of International Terrorism (Extract), was obtained from the Rand Corporation (1987). This data included the date of the event, a description of the event, and the number of fatalities and injuries resulting from it. The measure of terrorism used here was the sum of fatalities and injuries. The Rand Corporation data bank was derived from public domain sources by monitoring approximately 100 newspapers, journals, and periodicals. The definition of terrorism used in compiling the database was "violence, or the threat of violence, calculated to create an atmosphere of fear and alarm" (Rand Corporation, 1987, p. 1). All events were international in scope, excluding indigenous (domestic) incidents irrespective of their motivation. Incidents of separatist groups were included only when they took place outside of the country or when aimed at a foreign target within the country. Incidents that occurred in the midst of a war were not included in the data bank. Acts of kidnapping, attacks against installations, hijackings, barricade and hostage events, assassination, and incidents involving significant threats or conspiracies were all included. Hoaxes, arrests or discoveries of terrorists' caches, smuggling, bank robberies, or unsubstantiated threats were not included (Rand Corporation, 1987, pp. 1-2).

To be amenable for time series analysis, the terrorism data required aggregation. This aggregation was necessary because events occurred sporadically rather than continuously. Fatalities and injuries were, therefore, added together into one total, and data were aggregated into 219 five-day periods covering from January 2, 1983, to December 31, 1985. The 5-day interval was chosen to provide the best nonoverlapping fit with the intervention periods. Thus, a time period was not used as an intervention point if it had more than one day outside the dates of the assemblies. There were five intervention points, each of 5-day duration–two for each of the first two assemblies and one for the third.

Data Analysis

The effect of the independent variable on each dependent variable was assessed by time series intervention analysis using the autoregressive integrated moving averages (ARIMA) methodology of Box and Jenkins (1976). This approach allows intervention effects to be accurately estimated while controlling for any serial dependence, trends, or seasonality in the data over time (McCleary & Hay, 1980). In the intervention analysis, the independent variable takes the value of 0 when there is no intervention and the value of 1 during assemblies.

In intervention analysis, the serial dependence of the data is explicitly modeled in a noise model, which serves essentially as the null hypothesis for intervention effects. The finding of a significant intervention effect indicates that a new influence was present at the time of the intervention that could not be predicted from the previous history of the series. It should be noted that this is a very conservative analytical approach. It rigorously controls not only for the past history of the series but also effectively controls, through the noise model, for the influence of unmeasured continuous variables that might be determining the pattern of the series.

The noise model N_t has a form $N_t = [\varphi(B)]^{-1}\theta(B)a_t$, where $\varphi(B)$ and $\theta(B)$ specify autoregressive and moving average parameters, respectively, at various time lags, and where a_t is a series of independent and normally distributed random disturbances. In effect, the noise model removes the serial dependence of the data by modeling it, and the residuals to the noise model (a_t) form independent data points for which usual parametric statistical models are appropriate.

The simplest intervention model is an immediate and continuous effect during the period of the intervention. This is the zero-order transfer function $Y_t = C + \omega_n I_t + N_t$, where Y_t is the endogenous series (dependent variable), C is a possible constant, I_t is the binary intervention series, ω_n is the intervention effect to be estimated at time lag n, and N_t is the stochastic noise model for the endogenous series (McCleary & Hay, 1980, p. 145). In addition to the immediate and continuous effect, it is also possible to model interventions that have either a permanent effect with a gradual onset or an abrupt but temporary effect. These effects are modeled by the first-order transfer function $Y_t = C + f(I_t) + N_t$, where all terms are as previously defined except $f(I_t)$. For the gradual permanent intervention, this term is defined as $f(I_t) = (1 - \delta_1 B)^{-1}\omega_n I_t$, where ω_n is the intervention effect at lag n, and where δ_1 is the rate at which the intervention effect grows; for the abrupt temporary intervention, this term is $f(I_t) = (1 - \delta_1 B)^{-1}\omega_n(1-B)I_t$ (McCleary & Hay, 1980, p. 169). In assessing the three possible forms of intervention–abrupt permanent (zero-order function above), gradual permanent (first-order function above), or abrupt temporary (first-order function above)–the strategy recommended by McCleary and Hay (1980, pp. 168-171) was employed.

To systematize the choice of a noise model, an objective criterion of model diagnosis, the Akaike information criterion (AIC), was utilized (Akaike, 1973). The AIC is a criterion of optimal model choice within a framework of predictive inference for choosing the model most likely to describe another sample of the same process (Larimore, 1983). In this context, the AIC provides the best balance between the opposing goals of parsimony and model fit when evaluating model order and model structure (Larimore & Mehra, 1985), based on the fundamental statistical principles of repeated sampling, sufficiency, and an asymptotic version of the likelihood principle (Cox & Hinkley, 1973). The AIC is defined as $AIC = -2 \ln(\text{maximum likelihood}) + 2m$, where ln is the natural logarithm and m is the number of model parameters (Larimore & Mehra, 1985). A lower value of the AIC indicates a better model. The maximum-likelihood term of the AIC can be interpreted as an indicator of fit, while the parameter term can be understood as a penalty for overmodeling.

In order to objectively identify the optimal model as defined by the AIC, the following procedure was used. Scale transformations (to make the data more normally distributed) and differencing transformations (to induce stationarity) were performed if necessary. Initial noise modeling was then carried out, assessing the major seasonal trends of the data and modeling possible intervention effects. On this basis, the intervention model was specified. The intervention and noise models were jointly estimated. Then the noise model was diagnosed using the AIC criterion, with the addition of new parameters guided, in the standard manner, by the autocorrelation and partial autocorrelation functions. At each step of addition, the criterion for which parameter to add, from the set of potential parameters suggested by diagnostic indicators, was the parameter that resulted in lowest AIC over the same set of effective observations (because the AIC is dependent upon sample size, and autoregressive parameters consume larger numbers of observations in estimating these models). The optimal model was then reestimated on the full data set available for that model. From this model, in a stepwise fashion, a set of further additional noise parameters was explored, leading to a set of sequentially nested noise models. This approach provided a reasonable and effective heuristic for searching the set of possible models while minimizing the AIC. Larimore (1983), as noted above, suggests absolute minimization of the AIC as the optimal model criterion. However, small differences in the AIC may correspond to the addition of nonsignificant parameters in the noise model. Therefore, at the point at which the best additional noise parameter led to a parameter estimate that did not reach statistical significance, the difference in AIC between the two models was subjected to a significance test (Larimore, 1986). The difference in AIC for two nested models can be tested by use of a generalized likelihood ratio test, which follows a chi-square distributed with degrees of freedom equal to the difference in the number of parameters in the two models (Larimore, 1986). If the probability value for the test was less than or equal to .05 after rounding to 2 decimal places, the additional parameter was added to the noise model.

Although minimization of the AIC was found to lead to complex noise models, the AIC has the virtue of being an objective indicator of model adequacy and of having a solid statistical foundation, as noted previously. In the case of more complex noise models, the inclusion of parameters in the noise model controls for additional seasonal cycles, thus providing for a more rigorous test of the hypothesis of interest, the effect of the intervention.

Reported *p* values for parameter estimates are based upon two-tailed tests for all noise model parameters and constants, and on one-tailed tests for intervention parameters, because the direction of effect is clearly predicted. Data were analyzed on a VAX 11/780 minicomputer using the BMDP 2T time series program. Two of the assemblies occurred at the end of the year. Therefore, after the major analysis for each variable, a secondary analysis is reported from data of previous years to assess the possibility that the observed results are due to seasonal, year-end effects.

RESULTS

International Conflict

Iowa Assembly

The international conflict series for the Iowa assembly, already in the form of a series of independently distributed random disturbances, required no ARIMA parameters in the noise model. The model for this series was $Y_t = C + \omega_0 I_t + a_t$, where C is a constant (the mean of the series), I_t is the exogenous intervention series, ω_0 is the immediate intervention effect, and a_t is a series of independent and randomly distributed disturbances. This form of the intervention function (zero-order transfer function) indicates an immediate, permanent effect during the assembly period. Both of the parameters were statistically significant, with the series mean C = 7.148 ($t(61) = 13.58$, $p < .0001$, two-tailed) and the intervention effect $\omega_0 = -2.603$ ($t(61) = -2.07$, $p < .025$, one-tailed).

Diagnostic tests indicated the model to be adequate. No autocorrelations or partial autocorrelations were significant at the .05 level from lags 1 to 36. The Ljung-Box test for the joint significance of the observed residual autocorrelations (Ljung & Box, 1978) was Q = 12 for lags 1-24 and Q = 22 for lags 1-36, $\chi^2(22) = 12$, $p > .95$, and $\chi^2(34) = 22$, $p > .90$, respectively, supporting the null hypothesis that random noise disturbances are responsible for the observed autocorrelation function of the residuals (i.e., that all cycles in the data were effectively modeled). The AIC for the overall model had a value of 350.839. The mean decline of 2.603 scale units during the intervention period, from a daily mean sum of scores of negative events of 7.148 during the nonintervention periods, represents a decline of 36.4% in international conflict during the intervention period.

Holland Assembly

The intervention effect for the international conflict time series during the assembly in Holland was specified by a gradual or cumulative permanent effect during the intervention period. The intervention model was thus $Y_t = C + (1 - \delta_1 B)^{-1}\omega_0 I_t + N_t$, where Y_t is the endogenous series, C is a constant, $\delta_1$is a parameter indicating the rate of growth of the intervention effect, B is a backwards shift operator, ω_0 is the amount of growth at each observation in the intervention period, I_t is the intervention series, and N_t is the noise model. For the present series, the noise model was specified by $N_t = C + (1 - \theta_3 B^3)(1 - \theta_6 B^6 - \theta_8 B^8 - \theta_9 B^9 - \theta_{11} B^{11})a_t$, where θ_i are seasonal moving average parameters, $B^n a_t = a_{t-n}$ (a backwards shift operator), and other terms are as previously defined. All parameters were statistically significant, as listed in Table 1. The noise model was appropriate, as indicated by diagnostic tests. No autocorrelations or partial autocorrelations were statistically significant at lags 1-36. The Ljung-Box test for the joint significance of residual autocorrelations was Q = 12 at lags 1-24 and Q = 19 at lags 1-36, $\chi^2(16) = 12$, $p > .70$, and $\chi^2(28) = 19$, $p > .85$, respectively. This supports the hypothesis of random noise disturbances, indicating that all cycles and trends in the data were adequately modeled.

The intervention parameters of $\omega_0 = -.9853$ (level) and $\delta_1 = .9887$ (rate of growth) indicate that the intervention effect was −.9853 the first day, −.9853(.9887) the second day, $-.9853(.9887)^2$ the third day, and so on, with the power of the rate parameter increasing by 1 each day. The fact that the rate parameter was close to the upper bound of stability (+1) indicates that the intervention effect increased by almost a constant amount (i.e., increased almost linearly) each day. McCleary and Hay (1980, p. 159) note that this situation may indicate that the intervention period is too short to encompass the equilibrium state of the process (i.e., that the value of δ_1 is, in fact, less than 1). They point out that this explanation is most likely with social science data. Given the short period of the intervention (10 days) the explanation seems most plausible, that the cumulative effect of the intervention grew slowly and had not reached an asymptotic value by the end of the intervention period. To estimate the practical magnitude of the intervention effect in a scale comparable to the intervention parameter in the Iowa assembly (an abrupt constant effect), the average daily effect over the 10 days was calculated. This resulted in a de-

Table 1: International Conflict Holland Assembly Parameter Estimates

Parameter		Variable	Value	*t*(58)
1	ω_0	I_t	−.9853	−2.78[a]
2	δ_1	I_t	.9887	51.24[b]
3	C	Y_t	21.79	160.87[b]
4	θ_3	Y_t	.3472	2.71[c]
5	θ_6	Y_t	.4235	6.06[b]
6	θ_8	Y_t	.4771	5.93[b]
7	θ_9	Y_t	.4994	5.89[b]
8	θ_{11}	Y_t	.5828	7.92[b]

Note: One-tailed: [a]$p < .005$ Two-tailed: [b]$p < .0001$ [c]$p < .01$
AIC = 467.816

crease of 5.24 scale scores, where the scale is the total score of all negative events per day. This represents an average decrease of 24.05% from the trend-adjusted, nonintervention mean (21.79).

Washington Assembly

The intervention model for the third time series of international conflict was $Y_t = C + \omega_2 I_t + N_t$, where terms are as previously defined. This indicates an abrupt permanent effect 2 days after the beginning of the intervention period. The noise model was specified by $N_t = (1 - \varphi_3 B^3 - \varphi_6 B^6 - \varphi_{33} B^{33})^{-1}(1 - \theta_{11} B^{11})(1 - \theta_{22} B^{22})(1 - \theta_{29} B^{29})a_t$, where φ_i is a seasonal autoregressive parameter for lag i, and other terms are as defined earlier. Parameter estimates and significance values are given in Table 2. The noise model was appropriate, as indicated by the diagnostic tests. The Ljung-Box test for joint significance of residual autocorrelations was Q = 7.5 at lags 1-24 and Q = 17 at lags 1-36, $\chi^2(16) = 7.5$, $p > .95$, and $\chi^2(28) = 17$, $p > .90$, respectively, indicating that the hypothesis of random disturbances was tenable. There were no significant autocorrelations or partial autocorrelations at lags 1-36. The statistically significant intervention effect of −6.60 represents a 34.9% decrease in international conflict during

Table 2: International Conflict Washington Assembly Parameter Estimates

Parameter	Variable	Value	*t*(86)
1 ω_2	I_t	−6.600	−2.50[a]
2 C	Y_t	18.93	41.67[b]
3 ϕ_3	Y_t	.2985	3.18[c]
4 ϕ_6	Y_t	−.2586	−2.77[c]
5 ϕ_{33}	Y_t	−.2807	−3.17[c]
6 θ_{11}	Y_t	.2244	1.97[d]
7 θ_{22}	Y_t	.3014	2.52[d]
8 θ_{29}	Y_t	−.2774	−2.39[d]

Note: One-tailed: [a] $p < .01$ Two-tailed: [b] $p < .0001$ [c] $p < .01$ [d] $p \leq .05$
AIC = 630.541

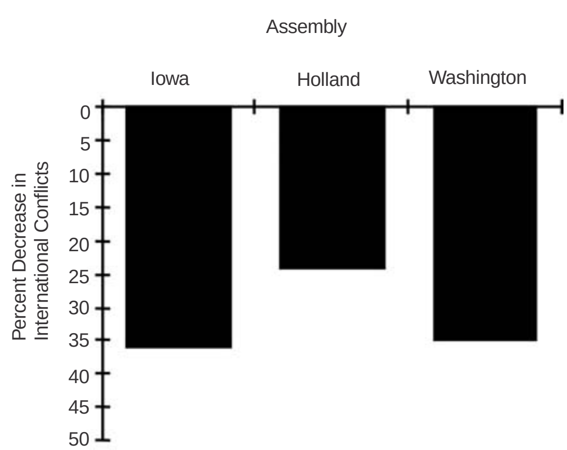
the intervention period, in comparison to the seasonally adjusted nonintervention mean of 18.93, where the scale is the sum of all scores of negative events each day.

Figure 1 displays the estimated percentage reduction in international conflict associated with each of the three assemblies.

Control Analyses for International Conflict

Two control analyses were performed to assess whether the observed reduced international conflict at the year-end time of the Iowa and Holland assemblies would be found in previous years. The first control analysis used the data on international and domestic conflict in the most recent 5 years of the Conflict and Peace Data Bank (COPDAB), i.e., 1973-1978 (Azar, 1980). To make Azar's 15-point international and domestic scales most comparable to the one used here, only the negative items were used (scale scores 9-15), and the constant 8.0 was subtracted from each scale score to make the scale range from 1-7 in severity of conflict. To use a series of days identical to that of the Iowa assembly analysis and similar to that in the Holland assembly analysis,

☐ ***Figure 1: Percentage Decrease in International Conflict During Each of the Three Assemblies, as Assessed by Time Series Intervention Analysis of Content-Analyzed News Reports***



the precise dates used were November 26, 1973, to January 27, 1974, with the same dates used again for 1974-1975, 1975-1976, 1976-1977, and 1977-1978. For each day of the 9-week time series (e.g., all January 1 items of the five time intervals), the scale scores of all items were added together, as was done in the primary analyses reported earlier, to obtain an overall intensity of conflict score for that day of the year totaled across all 5 years. Time series analysis was performed on the series of these overall intensity of conflict scores, constituting 63 observations from November 26 to January 27. Within these dates were 3,493 international and domestic items from the COPDAB file, an average of 55.4 items per day. A mock intervention was constructed with the same dates as the Iowa assembly, December 27 to January 6; these dates were nearly identical to those of the Holland assembly, December 28 to January 6 (one year later).

The COPDAB control series had to be differenced at a lag of one day to achieve stationarity. The AIC-identified noise model for the differenced series was $N_t = (1 - \theta_1 B^1)a_t$, where terms are as previously defined. The intervention model $Y_t = \omega_n I_t + N_t$ was tested for lags n = 0-3 days. At lags zero and one days, the addition of the intervention parameter changed the AIC-identified noise model somewhat, requiring additional noise parameters. For the interventions at lags 2 and 3 days, the noise model remained unchanged. For the lag zero intervention, the noise model was $N_t = (1 - \theta_1 B)(1 - \theta_{21} B^{21} - \theta_{23} B^{23})a_t$, and for the lag one intervention, the noise model was $N_t = (1 - \theta_1 B)(1 - \theta_{18} B^{18})(1 - \theta_{21} B^{21})(1 - \theta_{23} B^{23})(1 - \theta_{36} B^{36})a_t$. Diagnostic criteria were acceptable for all four intervention analyses (lags 0-3). No autocorrelations or partial autocorrelations of residuals were significant in any analysis, and the Ljung-Box test for the joint significance of residual autocorrelations was consistent in each case with the null hypothesis of random noise disturbances, indicating that seasonality and trends were adequately modeled. All noise model parameters were significant at the .05 level, except the parameter θ_{23} in the intervention analysis at a lag of one day, which was significant at the .10 level. (Further details of noise parameter estimates and significance test values are omitted for the sake of space.) The mock-intervention effects did not reach statistical significance, $\omega_0 = 22.70$, $t(58) = 1.19$; $\omega_1 = 29.73$, $t(55) = 1.84$; $\omega_2 = 22.31$, $t(58) = 1.08$; $\omega_3 = 13.81$, $t(57) = 0.67$, where the required two-tailed critical t value is $\pm$ 2.0 for $p = .05$. In fact, the mock interventions indicated that during the years 1973-1978 there was a nonsignificant increase in conflict at the time of the Iowa and Holland assemblies in relation to earlier and subsequent days, rather than a decrease.

Because the COPDAB file does not extend beyond 1978, a second year-end control analysis was performed to assess trends in the year immediately prior to the first (Iowa) assembly. This analysis used a time series based on the *New York Times* during the period November 11, 1982, to January 28, 1983, one year before the first (Iowa) assembly. There were 160 items scored during this period. Scoring was performed in the same way as for the Iowa assembly. The optimal noise model using the AIC criterion was $N_t = C + (1 - \varphi_1 B)^{-1}(1 - \theta_2 B^2 - \theta_7 B^7 - \theta_{25} B^{25})a_t$. Diagnostic criteria indicated that the model was acceptable; the Ljung-Box test was not significant and there were no significant autocorrelations or partial autocorrelations at lags 1-36. The mock intervention was tested at lags zero to three days (as defined above for the COPDAB control analysis). There was an increase in international conflict at each of these lags, which reached significance at lags of 1 and 2 days, $\omega_0 = 2.88$, $t(60) = 1.88$; $\omega_1 = 3.93$, $t(60) = 2.87$; $\omega_2 = 4.13$, $t(59) = 2.83$; $\omega_3 = 2.03$, $t(57) = 1.52$, where the critical two-tailed t value is $\pm$ 2.0 for $p = .05$. The θ_2 parameter of the noise model became nonsignificant for lags one and two and by the AIC criterion the model was better without it, so it was deleted; however, the significance of the mock intervention was similar with or without this parameter. Thus, there is no evidence from either the *New York Times* analysis or the COPDAB file that international conflicts decline during the year-end periods of the assemblies in comparison with surrounding dates. In fact, there appears to be an increase during previous years.

International Terrorism

The time series for terrorism required a natural logarithm transformation for the data to be more normally distributed. This was necessary because several terrorist events resulted in large numbers of casualties and injuries, forming a high upper bound, while the lower bound for the totals of fatalities and injuries was zero. The constant 1 was added to each score prior to log transformation so that the zero values would continue to be defined as zero. Because two of the assemblies occurred at year-end, and a third at midyear, the noise model was diagnosed based upon the autocorrelation function defined at lags 1-84 (420 days or 60 weeks) to look for indications of annual or semiannual seasonality and control for these seasonal influences by including them in the noise model. The intervention model was $Y^*_t = C + \omega_1 I_t + N_t$, where Y^*_t is the log-transformed data series and where other terms are as previously defined. This models a sudden permanent effect at a lag of one, or 5 days (1 data point due to 5-day aggregation) after the onset of the intervention periods. The noise model was $N_t = (1 - \theta_{13} B^{13} - \theta_{22} B^{22} - \theta_{32} B^{32})(1 - \theta_{54} B^{54} - \theta_{55} B^{55})(1 - \theta_{62} B^{62})(1 - \theta_{84} B^{84})a_t$, indicating seasonality at approximately 2, 4, 6, 9, 10, and 14 months (recall that each data point is a 5-day period). The noise model appears adequate. There were no autocorrelations or partial autocorrelations significant at lags 1-84. The Ljung-Box test of joint significance of residual autocorrelations was $Q = 19$ at lags 1-36 and $Q = 44$ at lags 1-84, $\chi^2(27) = 19$, $p > .85$, and $\chi^2(75) = 44$, $p > .95$, respectively, consistent with the null hypothesis of random noise disturbances.

All parameters were statistically significant (see Table 3 and Figure 2). McCleary and Hay (1980, p. 174) gave a formula through which the intervention parameter of −1.272 in the natural log metric can be converted directly into a percentage change in the expected value (mean) of the process associated with the intervention. This yields a 72.0% decrease in terrorism 5 days after the onset of the three assemblies.

Control Analysis for International Terrorism

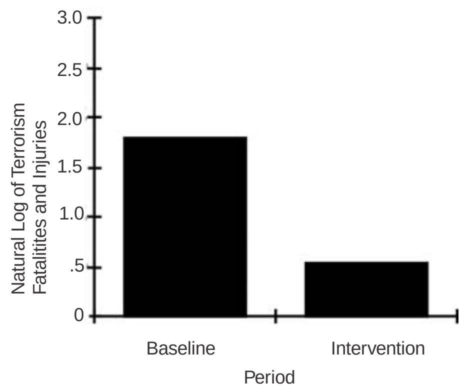
A secondary analysis to assess year-end trends was performed on international terrorism data for the 5-year period beginning March 1978. Daily data on fatalities and injuries were aggregated into 5-day periods and transformed in the natural log metric in a manner identical to the primary analysis. The aggregation began with March 2, 1978, so that the first year-end period came after some baseline, and so that mock-intervention periods were comparable to the year-end assemblies (December 27-31 and January 1-5 of each year). March 1, 1983, was the last day of the final 5-day interval. February 29, 1980, was omitted from the aggregation so that all years had an identical number of days; there were no fatalities or injuries on this day. There were, thus, 365 five-day observations for time series analysis. The noise model, identified for the series by modeling up to lag 36, was $N_t = C + (1 - \varphi_2 B^2)^{-1}(1 - \varphi_8 B^8)^{-1}(1 -$

Table 3: World Terrorism Intervention Analysis Parameter Estimates

Parameter		Variable	Value	*t*(209)
1	ω_0	I_t	−1.272	−2.10[a]
2	C	Y_t	1.802	21.59[b]
3	θ_{13}	Y_t	−.1802	−2.57[d]
4	θ_{22}	Y_t	.1479	2.05[d]
5	θ_{32}	Y_t	−.1618	−2.23[d]
6	θ_{54}	Y_t	.2577	3.29[c]
7	θ_{55}	Y_t	−.1613	−2.07[d]
8	θ_{62}	Y_t	.1987	2.49[d]
9	θ_{84}	Y_t	.1726	2.00[d]

Note: One-tailed: [a]$p < .025$; Two-tailed: [b]$p < .0001$ [c]$p < .01$ [d]$p < .05$
AIC = 785.934

☐ ***Figure 2: Mean Fatalities and Injuries Due to International Terrorism in Five-Day Aggregates During the Baseline and Intervention (Assembly) Periods***



$\varphi_{35}B^{35})^{-1}(1 - \theta_{11}B^{11})(1 - \theta_{36}B^{36})a_t$, where terms are as previously defined. The noise model, although complex, was optimal by the AIC criterion and was adequate in terms of diagnostic tests. There were no significant autocorrelations or partial autocorrelations at lags 1-36. The Ljung-Box test for the joint significance of observed autocorrelations was Q = 19 at lag 24, $\chi^2(18) = 19$, $p > .35$, and at lag 36, Q = 28, $\chi^2(30) = 28$, $p > .55$. This is consistent with the hypothesis of random noise disturbances. All parameters were statistically significant at the .05 alpha level, C = 1.496, $t = 12.08$; $\varphi_2 = .2063$, $t = 3.72$; $\varphi_8 = .1159$, $t = 2.03$; $\varphi_{35} = .1748$, $t = 3.13$; $\theta_{11} = -.1335$, $t = -2.33$; and $\theta_{36} = .1216$, $t = 2.02$, where all *t*-values have 314 degrees of freedom. The model was reestimated adding the mock intervention at either lag zero or one; neither intervention was statistically significant. For lag zero, $\omega_0 = -.0655$, $t(313) = -0.17$; and for lag one, $\omega_1 = -.4440$, $t(312) = -1.15$, where the critical two-tailed t value is $\pm$ 1.96 for $p = .05$. The noise models were still adequate in both cases (details are omitted for space considerations). All noise model parameters were still significant, except that in the case of the analysis at lag one, the φ_8 parameter was $t(312) = 1.92$, $p = .056$. The results of the control analysis, based on the behavior of the variable in previous years, thus indicated that the decrease in international terrorism found during the assembly periods in the primary analysis could not have been expected due to a year-end seasonal effect.

DISCUSSION

As predicted, a statistically significant effect of the large assemblies was observed on both indicators of global conflict. Content analysis of the world news indicated decreases in international conflict associated with the three assemblies of 36%, 24%, and 35%, respectively. A decrease of 72% in casualties and injuries due to world terrorism was found after the onset of the assemblies.

Several of the intervention results may be clarified by discussion. First, unlike the sudden permanent effect on international conflict during the Iowa and Washington assemblies, the form of the intervention effect for the Holland assembly was a gradual permanent one. One possible reason for this is that the Holland assembly used a different source and manner of article selection for content analysis. The *London Times*, the source for this assembly, has a somewhat different coverage of international events than the *New York Times*, which was the source for the other two assemblies. Also, the method of selecting events for the Holland assembly (more from Europe and Africa) did not restrict articles only to recognized areas of international conflict but accepted all articles of international scope. As a result, the data series was less focused on specific international conflict areas and, therefore, may have been less sensitive to immediate changes in these areas. Nevertheless, a positive intervention effect was still found, indicating that the effect is generalizable rather than restricted to a single source or method of sampling. Another possible cause for the gradual intervention effect could be that conflict was quite intense immediately before the beginning of the Holland assembly, particularly in southeast Asia and in Afghanistan-Pakistan. Before the two other assemblies, the level of conflict was not as high.

A second point in the analysis of international conflict concerns the distinctions in the abrupt, permanent intervention effects displayed by both the Iowa and Washington assemblies. The effect of the Washington assembly was found at lag 2 days after the beginning of the assembly, while the effect of the Iowa assembly was immediate. This immediate effect could be related to the fact that the Iowa assembly was, by far, the largest.

A final point deals with international terrorism analysis. The intervention effect for international terrorism was found at lag 5 days (one observation with 5-day aggregation) rather than immediately with the onset of the assemblies. In this analysis, the joint effect of all three assemblies was assessed. Because only the Iowa assembly showed a lag-zero effect on international conflict, some delay in effect for international terrorism might be expected. Also, because the data were aggregated in 5-day periods, even a short time delay in the effect would appear as a 5-day (one observation) lag.

The fact that all of these variables displayed a near-simultaneous improvement indicates that there was a worldwide and holistic influence of reduced tension during the intervention periods. A viable alternative hypothesis for the results of the present study would have to predict both the holistic nature of the changes (a worldwide effect across both conflict variables) and their temporal specificity. The most likely such alternate hypothesis is that because two of the assemblies occurred at the end of the year, the results could be due to some holiday-related effect at that time. This alternative hypothesis appears unlikely for several reasons. The first is that one of the assemblies occurred in midsummer rather than at year-end. Results for this assembly were replicated for international conflict, and this assembly was part of the intervention parameter estimation for terrorism. In addition, the time series analysis for terrorism modeled seasonal cycles up to 84 lags (60 weeks) to explicitly take yearly cycles into account and to ensure that the intervention effects reported would not be due to annual cycles present in the series. Finally, as a direct control, a secondary time series analysis was performed for each variable assessing its year-end behavior in at least 5 previous years. For each of the variables–international conflict and international terrorism–these analyses demonstrated that the magnitude of change found in the present study could clearly not have been expected from the behavior of the variable in previous years. These findings indicate that a general year-end effect is not a viable alternative hypothesis. Indeed, in the case of international conflict, the trend was in the opposite direction.

It is difficult to identify other alternative hypotheses that might account for changes in these variables worldwide during the specific assembly periods. A tenable alternative hypothesis must account for a simultaneous influence on what would ordinarily be considered independent conflicts in different areas (e.g., Latin America, the Middle East, Southeast Asia). Although ad hoc and complex explanations might be attempted, the hypothesis of the present study, while novel, is more parsimonious.

In contrast to the year-end alternative hypothesis and other possible post hoc explanations that do not easily account for the scope or timing of the results, the hypothesis of a rapid onset of the Maharishi Effect on a global scale was predicted, in advance of each assembly, for the variables used in this study. The global reduction in international conflict and terrorism corresponding to or immediately following the onset of the large assemblies of participants in the TM and TM-Sidhi programs strongly supports the theory that generated this research. Furthermore, it extends previous research on this effect to the world scale. The individuals participating in these assemblies were clearly not engaged in behavioral interaction or direct communication with those involved in armed conflict or terrorist acts occurring at multiple locations thousands of miles away. Thus, it appears that the only tenable explanation for an immediate global influence of group practice of the subjective techniques is that this influence is propagated through an underlying field characterized by or capable of interacting with consciousness. On the metropolitan, national, and international levels, this effect has been replicated many times using other conflict variables closely related to terrorism, such as war deaths, war intensity, and crime rates (e.g., Davies & Alexander, in press; Dillbeck, 1990;

Dillbeck et al., 1987, 1988; Hagelin et al., 1999; Hatchard et al., 1996; Orme-Johnson et al., 1988, 1990).

On a practical level, the small number of people required for the effects found here raises the possibility of a global influence of reduced violence through an approach that requires no intrusion in other nations, can be adopted by any country regardless of its governmental system, and involves an insignificant fraction of the defense spending of any major nation. If the principle tested in this research is true, then its continued application on a global level should lead to a significant reduction of conflict around the world. Proposing a growing influence of coherence in the collective consciousness of the world through the cumulative effect of large assemblies such as those studied here as well as the influence of stable groups practicing the Transcendental Meditation and TM-Sidhi programs on several continents, Maharishi Mahesh Yogi predicted in January of 1987 an imminent transition to a more peaceful world, specifying criteria for its achievement that included the ending of international conflicts such as the Iran-Iraq war and a major reversal in U.S.-Soviet relations (*Invitation to Action*, 1987). The outbreak of peace that began to occur in mid-1988–associated with these specific dimensions of international relations–represents a striking transition in world affairs that, despite all commentary, was clearly unanticipated by world leaders and policy makers. An analysis of U.S.-Soviet relations during the period just prior to this transformation (1979-1986), however, indicated that major groups of participants in the Transcendental Meditation and TM-Sidhi programs had a positive influence on relations between the superpowers (Gelderloos, Cavanaugh, & Davies, 1990). In light of the strong findings of the present investigation and consistent results of previous research, we recommend as a next step in researching this phenomenon that a permanent group of approximately 8,000 participants in these programs be established and its effects on international relations and global quality of life be measured.

NOTE

1. Transcendental Meditation, TM, and TM-Sidhi are service marks registered in the U.S. Patent and Trademark Office, licensed to Maharishi Vedic Education Development Corporation and used under sublicense.

AUTHORS' NOTE

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