EFFECT OF THE TRANSCENDENTAL MEDITATION AND TM-SIDHI PROGRAM ON REACTION TIME

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Subjects practising the Transcendental Meditation and TM-Sidhi programme showed a higher degree of mental alertness and psychophysiological integration, as indicated by faster reactions, than two control groups, one of which was interested in learning Transcendental Meditation, while the other was not. No significant difference in reaction time was found between the two control groups.—EDITORS

The following is the text of the original paper which was presented at the meeting of the American Psychological Association, Montreal, Canada, September 1980.

A cross-sectional study was undertaken to examine the hypothesis that, due to increased psychophysiological stability and integration, individuals practicing the Transcendental Meditation (TM) and TM-Sidhi program would show a faster reaction time when compared to individuals not engaged in this program. A second hypothesis that individuals interested in learning TM, but who had not yet been instructed, would not differ on rate of reaction time from individuals not predisposed to learning the TM program, was also tested.

Three groups of 19 subjects were selected for the study—one group who had been practicing the TM and TM-Sidhi program for between one and two years, one group with no previous experience of TM or any relaxation procedures, but who were interested in learning Transcendental Meditation, and a third group with no experience of meditation or relaxation procedures, who were not predisposed to learn TM. All subjects were administered a 100-trial reaction time test.
One-way analysis of variance showed a significant treatment effect upon reaction time \((p < .001)\). For each individual block of ten trials, the subjects practicing the Transcendental Meditation and TM-Sidhi program revealed a significantly faster reaction time than either of the two comparison groups \((p \text{ values ranged from } .1 \text{ to } .01)\).

These findings confirm the hypotheses that (1) individuals practicing the Transcendental Meditation and TM-Sidhi program would respond with shorter latency to reaction time stimuli than individuals not trained in this program, and (2) individuals about to learn the TM program are similar to individuals not choosing to learn the technique.

These findings, taken together with those of previous research, suggest that the enhanced ability to react to external stimuli demonstrated by practitioners of the TM and TM-Sidhi program may be attributed to a higher degree of mental alertness and psychophysiological integration.

The degree of alertness in a situation is often judged by the speed with which one responds to that situation. In research studies reaction time measures have been commonly used to assess the level of alertness of the individual. Research indicates that the practice of the TM technique produces a unique state of very low metabolism which is simultaneously experienced with heightened alertness and has been shown to produce a broad range of beneficial effects in daily life.

Measures of oxygen consumption, skin resistance, and biochemical changes taken during the practice of the TM technique have shown a substantial reduction in metabolic activity simultaneous with EEG recordings showing definite wakefulness \((\text{Banquet, 1972, 1973; Glueck and Stroebel, 1975; Jevning and Wilson, 1977; Krahne and Taneli, 1975; Treichel, Clinch, and Cran, 1973; Wallace et al., 1971})\). This subjective state has been described by physiologists as a unique state of consciousness, a "wakeful hypometabolic state" different from waking, deep sleep, or REM sleep \((\text{Wallace et al., 1971})\). Jevning, Wilson, VanderLaan, and Levine \((1975)\) found that experienced TM participants show a significant reduction in cortisol levels compared to resting controls indicating a reduction in physiological stress levels. Levine \((1975)\) and Orme-Johnson \((1977)\) found that a unique pattern of coherence in EEG recordings between cerebral hemispheres occurs during and to some extent following the TM practice. A recent study by Wallace et al. \((1979)\) suggests that the TM program reverses the biological aging process. These findings indicate that the technique has an integrating, ordering effect on the physiology, that is opposite to the entropic, disordering effects of stress.

In addition, studies by Appelle and Oswald \((1974)\), and Orme-Johnson, Kolb, and Hebert \((1976)\) and Shaw and Kolb \((1976)\) indicate that the practice of the TM technique increases reaction time.

This is the first study to measure the effects of the advanced TM and TM-Sidhi program on reaction time. This program is described as accelerating mind-body coordination and developing the ability to think and act from the state of least excitation of consciousness. The TM-Sidhi program is undertaken on the basis of the TM program as the techniques taught involve introducing a specific thought or mental technique while maintaining restful alertness, the state of least excitation of consciousness. The practice of the TM-Sidhi program, derived from the ancient formulas of Patanjali's *Yoga Sutras*, results in the performance of human abilities which have commonly been thought of as supernormal. Research on individuals practicing the TM-Sidhi program has found increased EEG coherence and creativity \((\text{Orme-Johnson et al., 1979})\), and increased neurological efficiency \((\text{Wallace et al., 1979})\).

It was hypothesized that due to the increased psychophysiological stability and integration resulting from the practice of the TM and TM-Sidhi program, individuals practicing this advanced program would show a faster rate of reaction time compared to individuals not engaged in this program. Secondly it was hypothesized that individuals who were interested in starting the TM program, but who had not yet been instructed, would not differ on rate of reaction time as compared to other individuals not predisposed to learning the TM program.

**METHOD**

Three groups of 19 subjects each were selected for the study: 14 males and 5 females, who had been
practicing the TM and TM-Sidhi program for one to two years (Sidhas); 10 males and 9 females, who had no previous experience with TM or any other relaxation technique, but were desirous of starting the TM program (pre-meditators); and 11 males and 8 females, who had no experience with any relaxation technique and were not predisposed to starting the TM program (controls).

The mean age of group one was 29.0 years, 21.8 years for group two, and 19.6 years for group three. Group one subjects were all semi-professionals with groups two and three consisting of college undergraduates.

All 57 subjects were read the following instructions prior to being tested:

This is a test of mental alertness. Today we are going to measure reaction time. In front of you, you will notice a box with two lights and two levers. Each lever corresponds to the light above it. One of these two lights will flash on. You are to lift your hand up and quickly place it on the respective lever—which will shut the light off. The object of the test is to see which of the two lights is on and to shut it off as quickly as possible.

Are there any questions?

All subjects were individually administered a 100-trial reaction time test whereby each subject responded to a randomized right or left light stimulus by manually depressing the appropriate lever. The latency of hand-to-lever response was recorded in hundredths of a second.

**RESULTS**

A one-way analysis of variance with comparison among treatment means revealed a significant treatment effect upon reaction time at the .001 level (see table 1). Subjects practicing the TM and TM-Sidhi program exhibited a faster reaction time, with a mean of .32 sec, than either the pre-meditators (.36 sec) or the control group (.36 sec).

As can be seen in figure 1, subjects practicing the TM and TM-Sidhi program initially exhibited a faster reaction time during the first block of ten trials than either of the other groups and maintained their quicker response throughout the remaining nine blocks of ten trials each. For each individual block of ten trials, the subjects practicing the TM and TM-Sidhi program revealed a significantly faster react-
tion time than either the pre-meditators or the control group ($p$ values ranged from .1 to .01). It should also be noted that the pre-mediator and control groups exhibited no real difference in their reaction time latency during any of the ten blocks of ten trials. These findings confirm the hypotheses that (1) individuals practicing the TM and TM-Sidhi program would respond with shorter latency to reaction time stimuli than individuals not trained in this special program, and (2) individuals first entering the TM program are similar to individuals not choosing to learn this technique.

An observation of the pattern of reaction time latencies for the three groups reveals a similarity of the three curves. Each group began this unfamiliar task with slower reaction times which diminished at the end of the fourth block of ten trials. All three groups showed a significant reduction in reaction time latency from Trial Block 1 to Trial Block 4 at the .001 level of significance as revealed by $t$-tests for related samples ($t$ scores of 4.90, 6.21, and 4.32 were yielded for control, pre-meditators, and Sidhas).

From Trial Blocks 4 through 6, each group showed an increase in reaction time as the fatigue and monotony of the task emerged ($t$ scores of .729, 4.48, and 2.11 were obtained for control, pre-meditator, and Sidha groups).

From Trial Blocks 6 through 8, each group exhibited a decreased latency. A $t$-test for related samples on a comparison of Trial Blocks 6 and 8 revealed that both the control group and the Sidhas improved significantly with $t$ values of 2.83 and 4.18. The pre-meditators exhibited only a tendency toward reduction in reaction time with a $t$ of 1.61.

This improvement in latency was short-lived and reversed for all three groups as each subject completed the set of 100 trials. Both the control group and the Sidhas showed a significant increase in their reaction time latencies from Trial Block 8 to Trial Block 10 with $t$ values of 1.93 and 2.26. Only the pre-meditators failed to exhibit a significant reduction in their reaction time efficiency.

The similarity in patterns of performance between the three groups indicates a similar process operating for all subjects regardless of particular training or self-selection. Although the process for each group appears similar, individuals who practice the TM-Sidhi program exhibited a shorter reaction time latency throughout the entire experiment.

**DISCUSSION**

Based upon the findings of previous research on the TM and TM-Sidhi program, it is suggested that the Sidhas' enhanced ability to react to external stimuli may be attributed to a higher degree of mental alertness and psychophysiological integration.

An alternative explanation that might account for the results involves the employment of an unequal sex distribution of subjects within each group. Specifically, only five of the Sidhas were females while the other two groups contained eight and nine female subjects. In order to assess the relationship between sex and reaction time latency a $t$-test of means within each group was performed. These $t$-tests revealed no significant difference in reaction time between males and females within any of the three groups.

Since the Sidhas are older than subjects in either of the other two groups, a product moment correlation was performed on each of the groups to assess the relationship between reaction time latency and age. No significant correlations were revealed for either the Sidhas, pre-meditators, or the control group—indicating that age and reaction time latency were independent for our samples.

Within the scope of this study, it was found that the practice of the TM-Sidhi program increases one's alertness to the degree that it is possible to react to stimuli in less time than it would take an individual from other given populations. Researchers are encouraged to continue to investigate the TM and TM-Sidhi program as a viable means for developing other aspects of the human potential.

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