REACTION TIME FOLLOWING THE
TRANSCENDENTAL MEDITATION TECHNIQUE

ROBERT SHAW, B.A., and DAVID KOLB, B.A.
Graduate Department of Psychology, University of Texas, Austin, Texas
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Subjects practicing the Transcendental Meditation technique had faster reactions than those not practicing the technique on a reaction time test and improved their performance after a session of the technique. — EDITORS

INTRODUCTION

The Transcendental Meditation (TM) technique is described as an easily learned mental practice that allows mental activity to become more refined (2). Its proponents state that during the practice of the TM technique the physiological activity of the body decreases and a state of deep relaxation is experienced, yet the mind remains alert.

Wallace (1, 2) reports data on physiological measurements taken on meditators during and immediately after a session of meditation. His results verify the proponents' claims. Several parameters of physiological rest were found during the practice: decreases in cardiac output, oxygen consumption (indicating lowered metabolism), and lactic acid concentration in the blood, along with a marked increase in skin resistance. These indicators of decreased physiological activity were observed concurrently with increased amplitude and regularity of alpha waves as measured by EEG. Wallace concluded that the practice of TM produces a state of "restful alertness" in which the body gains deep rest while the mind remains alert. This "unique state of mental and physical functioning" was so different from the waking, dreaming, and sleep states that he postulated it as a fourth major state of consciousness.

Proponents assert that the physiological rest gained during the practice of TM makes one more alert and responsive one becomes.

Research has centered on physiological correlates of TM, and at present there is no published research on the possible behavioral benefits of meditation. The purpose of this preliminary study was to test the claim that the practice of TM results in improved behavior out of the meditative state. It was thought best in such a study to use a very simple measure of behavioral efficiency. The measure of reaction time was selected to satisfy this criterion of simplicity. Reaction time also has the advantage of fairly wide applicability to everyday life situations.

To test the immediate benefits of the practice of TM, we hypothesized that reaction time of meditators would be lower immediately after meditation than before. Also, we predicted that this postmeditation reaction time would be lower than the reaction time of nonmeditators measured after a comparable period of rest with eyes closed.

Long-term cumulative benefits were evaluated by testing the prediction that the reaction times of meditators measured midway between morning and evening meditation (at least four hours after meditation) would be lower than those of nonmeditators measured after a comparable period of time after rest or sleep.

METHOD

Two groups of 25 students at the University of Texas at Austin were each tested for simple reaction time. Group I was composed of meditators who had been practicing the
Transcendental Meditation technique from three to 24 months, with a mean time of eight months. Subjects of Group II were a comparable group of students, matched for age and sex, who had not been instructed in TM. None of the subjects had meditated or slept within four hours of the beginning of the test sessions.

Reaction time to a light stimulus directly in front of the subject was measured. Each subject was seated comfortably in front of the reaction time device with the middle finger of his dominant hand resting on a spot eight inches from an "off" button. He was cautioned not to talk during the testing session so that he would be ready at all times to turn off the light as quickly as possible. Subjects were given three warm-up trials before beginning. Each subject was asked if he was ready for the first trial, but was instructed to be ready for the next 99 trials without prompting. The mean intertrial interval was five seconds, but was randomly varied from three to seven seconds.

The entire testing session consisted of the following:
1. Three warm-up trials
2. A block of 100 trials with the reaction time device
3. A 20-minute interval in which subjects in Group I meditated and subjects in Group II rested with eyes closed
4. A five-minute transition period with eyes open
5. Another block of 100 reaction time trials

The experimental manipulation was carried out in the following manner for both groups: Each subject was seated alone in a quiet room in a comfortable chair. Subjects from the meditation group were instructed to meditate for about 20 minutes, after which time they would be asked to stop meditating. Subjects from the nonmeditation group were instructed to sit comfortably and relax with their eyes closed (without opening them) for about 20 minutes, until asked to stop.

RESULTS

To assure that subjects had completely habituated to the task, the first ten of each set of 100 trials were not included in the analysis. The mean of the remaining 90 trials for Group I (meditators) was 0.349 second before meditation and 0.296 second after meditation. For Group II (nonmeditators) the mean reaction time was 0.468 second before rest and 0.534 second after 20 minutes with eyes closed (fig. 1).

The mean reaction time of meditators was lower after meditation than before, a result that contrasts markedly with that for the nonmeditators. The mean reaction time for nonmeditators was higher after a period of rest with eyes closed than before. Also, a comparison of reaction times for the two groups before the experimental manipulation shows that meditators were faster than nonmeditators.

DISCUSSION

The mean differences reported above are substantial in relation to the small individual variability commonly associated with simple reaction time. These data strongly suggest that behavioral improvement is an immediate re-
sult of the practice of the TM technique. This conclusion is strengthened when the increase in performance by meditators after meditation is compared with the decrease in performance by controls after simply resting with eyes closed.

In the state of consciousness brought about by TM, the level of physiological arousal is lowered, yet the subject remains alert (2); thus, cognitive arousal remains high. During rest, however, both physiological arousal and cognitive arousal are lowered. Fourteen of the 25 “rest” subjects showed signs of sleep (head dropping onto chest or heavy breathing) when asked to open their eyes, whereas one meditator showed signs of sleep. It is likely that this difference in cognitive arousal was a significant factor in producing a difference in mean reaction time between the TM and rest groups.

The new state of awareness gained during the practice of the TM technique, as defined physiologically by Wallace et al. (1, 2, 3), seems to produce an improved reaction to one’s environment. Formerly it was thought that high physiological arousal was necessary for high performance levels. The results of this study, however, even though tentative, suggest that in order to be alert and responsive to the environment, one need not maintain high emotional and physiological arousal—anxiety, fear, tension, stress. High arousal states are consistently found to narrow the range of cue utilization (ability to effectively utilize environmental cues) and to increase task-irrelevant responses (behavior not directed toward goal accomplishment).

The practice of TM may offer a means to increase performance levels by allowing one to expend less energy yet maintain alertness and a broad range of cue utilization resulting in fewer irrelevant responses to the environment. This possibility is especially promising since the results of this study suggest that the effects of TM are cumulative.

Further research is needed in order to investigate more fully the behavioral and physiological correlates of the Transcendental Meditation technique. Studies are needed to test directly how well practitioners of TM utilize environmental cues. Closer observation of meditators performing complex reaction time and other behavioral tasks is needed to investigate whether the number of responses irrelevant to task accomplishment is different for meditators and nonmeditators. Measurement of time necessary for meditators to learn complex hand-eye coordination tasks as compared to nonmeditators is another way to test the parameters of behavioral improvement as a result of the practice of the TM technique.

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REFERENCES