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A PERSONALITY STUDY OF UNIVERSITY

STUDENTS BEGINNING TRANSCENDENTAL MEDITATION

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Submitted in partial fulfilment for the degree of

MASTER OF SOCIAL SCIENCES

in

PSYCHOLOGY

at

THE UNIVERSITY OF WAIKATO

Hamilton, New Zealand

February, 1972

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INTRODUCTION

Transcendental meditation (TM), as taught by Maharishi Mahesh Yogi, is now being practised by hundreds¹ of New Zealand University students. This meditation form, which is defined as "a simple, natural process which involves the progressive refinement of the nervous system through the regular alternation of deep rest and activity" (Katz 1968, p 2) is claimed to be easily taught and universally applicable.

From the research point of view it has a number of advantages:

- (1) Large numbers of subjects are being taught at the same time.
- (2) The effects are said to become apparent from the beginning of practice.
- (3) Practice starts at the beginning of a short (4 days) "training" period.
- (4) No concentration or effort of any kind is involved.
- (5) Subject can practice in any comparatively quiet environment for as little as 15 minutes twice a day.

These considerations allow the practice of transcendental meditation to be scientifically investigated with comparative ease. Physiological measurements on practitioners have already been carried out.

Wallace (1970) made a study of twenty-seven students who had been practising transcendental

¹ According to the National Transcendental Meditation Centre 2% of the total student population has been taught the practice of transcendental meditation.

meditation for between six months and three years. Each subject acted as his own control in a before-after design experiment. He found that oxygen consumption, measured by both open and closed circuit methods, fell in all subjects; the average fall being 45 ml. per minute. He also found that of the five pieces of research on oxygen consumption during sleep, four showed less of a decrease over a full night's sleep than which occurred during 30 minutes of transcendental meditation. These results are of interest because they point out that whatever processes cause the gradual decrease in O_2 consumption seen during sleep, whether it be due to prolonged rest, cyclic rhythms of metabolism or specific neurophysiological mechanisms, they seem to be different from the processes which cause the marked decrease in O_2 consumption after only 30 minutes of transcendental meditation.

There was a mean decrease in cardiac output of about 25% compared with 20% measured during sleep, and there was a decrease of arterial pH and a significant decrease of base excess indicating a change in the acid-base balance of the body. The decrease of loss during meditation indicates an increase of non-volatile acid and therefore a mild but definite metabolic acidosis.

In two of his subjects arterial lactate concentration decreased. Based on the hypothesis of Pitts (1969) stress in normals could cause an increased flow of epinephrine. Epinephrine is known to cause anxiety symptoms as well as increase lactate production which might further stimulate these symptoms. Wallace points

out that the decreased arterial lactate concentration during meditation might be caused by a decreased production of epinephrine. He says, "The fact that some subjects reported a decrease in anxiety symptoms during and after meditation would support this hypothesis." (p29). A second-order anxiety factor is thus of interest in this study.

There was a significant mean decrease in heart rate of 5 beats per minute. Wallace points out from a survey of the literature that during sleep the mean decrease varies with each investigator, ranging from one to two beats up to a dozen or more per minute depending on such factors as sex and age.

He found a significant decrease in blood pressure. However, the mean decrease during sleep is generally greater than during transcendental meditation.

Wallace also reported that the patterns of skin resistance changes during sleep are also different from those observed during meditation. He found that in those individuals where there is a maintained increase in skin resistance during sleep the magnitude and steepness of change is generally less than the changes which occurred during meditation.

He concludes that the changes in heart rate, blood pressure and skin resistance during transcendental meditation all suggests that there are specific changes within the functioning of the autonomic nervous system.

More weight is given to Wallace's work by a study carried out by Dr John Allison (1970). He used thermistors instead of a mark and flow meter (this

apparatus interfere with the subject's breathing and thus probably reduced the apparent magnitude of the changes), and found that respiratory rate fell as soon as meditation began and reverted to normal as soon as it ended. There was no compensatory over-breathing at any time, even though the rate fell to as little as four per minute.

Although in the present study we cannot add weight to these claims, we can (assuming Wallace's conclusion to be true) look for personality changes that occur over the first three months of practising meditation and theorize that the specific changes within the functioning of the autonomic nervous system allows these specific personality changes to come about by offering competing responses for normally aversive stimuli, e.g. the replacement of relaxation for anxiety in a social context. This is a counter-conditioning model or more generally a learning theory model of personality change (allowing for other learning methods).

The electroencephalogram showed some interesting features. Alpha rhythm (present in all subjects at rest) increased in regularity and amplitude. In some subjects the alpha activity occasionally stopped for two to five minutes and was replaced by low-voltage theta waves. Alpha blocking caused by repeated sound or light stimuli showed no habituation.

Wallace also showed that the EEG pattern seen in meditation is distinguishable from the sleep and dreaming pattern. There are no slow waves (delta), sleep-spindles or REM activity, but a predominance of alpha wave activity.

He found that during meditation there is an increase

in the intensity of slow alpha waves in the central and frontal regions and the occasional occurrence of theta wave trains in the frontal region. Kasamatsu and Hirai (1966) found similar results with Zen monks and classified these EEG changes into four stages: the appearance of alpha waves, an increase of alpha amplitude, a decrease of alpha frequency, and the appearance of rhythmical theta train. In a similar type of study, Anand, Chhina and Singh (1961) investigated four Yogis who practiced samadhi (meditation) and found similar results. Their EEG records showed persistent alpha activity with increased amplitude during samadhi. They also showed that the alpha activity could not be blocked by various memory stimuli during meditation. Kasamatsu and Hirai describe the state produced by Zen meditation as a "special stage of consciousness in which the cortical excitatory level becomes lower than in ordinary wakefulness, but is not lowered as in sleep and yet outer and inner stimuli are precisely perceived with steady responsiveness." (p 500)

Kasamatsu and Hirai suggest that the EEG changes are correlated with the reported decrease in O₂ consumption during Zen meditation (Akeshige 1968). Wallace reviewing the relevant literature concludes that although it is "probable that the change in brain waves seen during Zen meditation or transcendental meditation is a result of the brain consuming less oxygen, more likely the changes are due to the activation or the inhibition of specific neural centres". (p 29) If this is so then the findings are truly remarkable and if it

is confirmed that specific neural centres are activated or inhibited then this must have considerable influence on manifest personality characteristics.

The physiological states produced by hypnosis have been shown to be different from the state obtained by meditation. The results of studies by Jana (1967), Barber (1961) and Kleitman (1963) indicate that the physiological changes induced during hypnosis vary in the same way as in different emotional states observed during wakefulness. The state of hypnotic sleep where complete relaxation has been suggested produces no noticeable change in O_2 consumption (Barber 1961, Jana 1965, Kleitman 1963). The EEG patterns vary considerably, but most of them are identical to wakefulness patterns, and all were reported to be different from those observed during meditation (Kleitman 1963).

Autonomic functions and EEG patterns can also be altered by conditioning procedures (Katkin and Murray 1968, Kamiya 1968 and Schwartz et al 1970). A subject can increase his alpha wave activity through auditory and visual feed back (Kamiya 1968). Using instrumental learning techniques, animals can control their heart rate, blood pressure and some endocrine secretions (Miller 1969). Katkin and Murray showed that humans could alter their heart rate, GSR and blood pressure. More recently it has been shown that subjects can alter their heart rate and blood pressure independently (Schwartz et al 1970). However, these conditioning procedures are relatively complex and require sophisticated equipment whereas the above evidence

suggests that at least just as good results can be obtained from the application of transcendental meditation. One of the purposes of this study is to test for specific personality change occurring from transcendental meditation that could only come from this particular practice which is distinctly different from hypnosis (in effect) and conditioning (in its method of application).

The most obvious example of personality change occurring as a result of the practice of TM is in a study of the application of TM for alleviation of drug abuse. The study (Winquist 1969) was conducted on 484 students who had all been practising TM regularly for a minimum of three consecutive months. Three categories of drugs were evaluated: marijuana, hallucinogens (LSD, DMT, STP, hashish, peyote, psilocybin, morning glory seeds and woodrose seeds) and hard drugs (heroin, opium, methedrine and barbiturates). A subject was rated as a regular user if he (1) used marijuana twice per month for three consecutive months immediately prior to starting TM, and (2) used hard drugs once per month for three consecutive months immediately prior to starting TM. Out of the 484 subjects, 143 (30%) could be classified as regular users.

All of the 143 drug users were found to have used marijuana regularly, 78% (or 111) of the 143 drug users regularly used hallucinogenic drugs other than marijuana; and 29% (or 42) of the 143 drug users regularly used hard drugs. All of the subjects who used hard drugs also used hallucinogenics including marijuana and all the subjects

that used hallucinogenics other than marijuana also used marijuana. Of all the 143 subjects that used marijuana 48% stopped, 14.5% decreased, and 1.5% increased. Of the 111 subjects who regularly used hallucinogenics other than marijuana; 86% stopped and 14% decreased. Of the 42 subjects who regularly used hard drugs; 86% stopped and 24% decreased. Forty-nine per cent of the regular drug users stated that their use of drugs changed after TM because life became more fulfilling. Twenty-four per cent stated their use of drugs changed after TM because the drug experience became less pleasurable. Eight per cent stated that their use of drugs changed because the desire for drugs disappeared.

If Winquist's study is accurate this would mean that some sort of personality change must go on in order for individuals to change in their attitude toward drugs. Further support to this claim is made by Dr H. Benson (1969) who generalises that drug takers report that they no longer feel the need for drugs, and that if they do take drugs the sensations induced are very distasteful in comparison with those experienced during meditation. It must be remembered, however, that although expectancy change could account for the alleviation of drug abuse, if the above physiological changes occur the concurrent personality changes (if shown) *may be influenced by these* ~~physiological changes.~~

Another survey that suggests personality change may occur is evident from an analysis of questionnaires carried out by the Students International Meditation Society (SIMS 1968). The subjects had been practising

TM for at least three months and all attended group meetings thus ensuring regular practice. Out of the 394 subjects who answered the questionnaire 67% reported significant improvements in physical health and 84% reported significant improvement in mental health. 31% reported no significant changes in physical health and 16% reported no significant changes in mental health. This type of answer is to be expected since most of the subjects were students between the age of fourteen to twenty-five and generally in good health. 1% reported that since starting meditation some undesirable conditions had developed in their physical health. These could possibly be attributed to other influences such as a change in living conditions. No subjects reported that their mental health had become worse.

Finally, if there is an element of truth in the claims of the exponents of TM about its effects on the quality of every day life, there may be, at least, some sort of personality change. These claims have recently been summarised by Demetri Kanellakos (1970). They include: "increased energy and efficiency in performing any kind of work; increased tranquility of mind coupled with decreased physical and mental tension; partial or complete loss of desire for hallucinogenic drugs and alcohol; increased creativity, productivity, intuitiveness and so on; improvement in functional disorders such as poor body posture and insomnia; and better mobilisation of body resources to meet adverse circumstances such as accidents, and surgery".

It must also be emphasized that this may have even

greater applicability to "normal, healthy" individuals than those in need of psychotherapy. According to a SIMS publication (1969), "individuals who are regularly practicing the technique have reported (1) improved mental abilities with respect to educational and professional endeavours, (2) increased sensitivity and stability with respect to emotional and behavioral response and (3) an overall ability to enjoy life more." Again, if these claims are to any degree justified then there is a possibility that some sort of personality change will occur in individuals that are not in need of psychotherapy (c.f. Winquist 1969) and this change may be beneficial for the individual in many aspects of his life.

The result of these studies determined the present study to investigate general personality traits, a particular personality variable, and a particular (and general) personality change(s). It is investigated in light of a criticism of personality theory and a general theory of the effects of meditation (p 4 of the introduction).

Three personality tests were chosen: the Sixteen Personality Factor questionnaire (16 PF), the Sensation-Seeking Scale (SSS), and the Internal versus External scale (I-E scale). The 16 PF was chosen because it has been shown to sample a broad spectrum of traits in both the pathological and non-pathological domains (Hundleby and Connor 1968, Cattell and Bolten 1969). Split-half reliabilities for each of the 16 factor scales range from + .71 to + .93, averaging about + .83. Internal construct validities range from + .73 to + .96,

averaging approximately $\pm .88$ (IPAT handbook 1963). Generally speaking, as far as personality tests go, this test has proven itself fairly flexible and powerful in the prediction of various personality traits. Thus it seems to be fairly useful for the general purpose of this study (determining general personality characteristics and changes in TM beginners). The interpretation of the results (this applies for the other two tests as well), however, must be subject to a careful analysis of the theory behind the test (this is carried out in section B of the discussion).

The SSS was chosen to test a particular hypothesis based on the construct "optimal level of stimulation" proposed by Zuckerman's (1969) theory of sensory deprivation. Zuckerman, Kolin, Price and Zoob (1964) postulated that the need for change, variety and intensity of stimulation would manifest itself in many aspects of behavior, including sensory, social and thrill-seeking types of activity. If TM beginners consider TM a practice that offers an opportunity to satisfy thrill-seeking behavior ("a groovy scene" attitude), it would be expected that they would score high on the SSS.

The I-E scale was chosen to test another particular hypothesis based on Rotter's (1954) social learning theory, which views the probability of a behavior's occurrence as depending on a preference for certain reinforcements and an expectancy that these reinforcements can be obtained in the given situation. The I-E scale was developed by Rotter, Seeman and Liverant (1962) and purports to measure generalized expectancies of

internal control (belief in oneself) versus external control (belief in chance or fate) of reinforcement. Results from previous studies (reviewed by Lefcourt 1966b) have shown that tasks which imply that outcomes are personally controllable by the SSS evoke behavior which is more adaptive and success oriented than when the tasks are externally controlled. Thus if there is any basis to the claims of the exponents and researchers of TM (e.g. the claims made by Sims (1969) on page , and the claims made by Kanellakos (1970), on page 5) we would expect TM practitioners to become more internal in their locus of control of reinforcement after a certain length of time (a three month period may or may not be a sufficient period of time).

The purpose of this study is stated formally as follows:

Hypothesis I: there are personality differences between students who intend to start the practice of transcendental meditation and those who do not intend to start the practice.

Hypothesis II: there are personality changes in students who have been practising transcendental meditation for three months.

Hypothesis III: that students who intend to start the practice of transcendental meditation have a higher optimal level of stimulation than students who do not intend to start the practice.

Hypothesis IV: that students who have been practising transcendental meditation for three months become more internal in their locus of control of reinforcement.

METHODA. Subjects and Procedure

The subjects consisted of twenty "normal" (no mental or physical disabilities) undergraduate students. Ten were subjects who were about to receive instructions on how to meditate by a teacher in an organisation specializing in teaching transcendental meditation as taught by Maharishi Mahesh Yogi; they were designated as Group I (experimental). The other 10 subjects were randomly chosen from students sitting in the university cafeteria and were designated as Group II (control). The average age of Group I was 20.2 years (range 18 to 23) and the average age of Group II was 19.4 (range 17 to 21). There were seven males (Ss 1,3,4,5,7,8, and 10) and three females (Ss 2,6, and 9) in Group I and five males (Ss 1,3,4,7, and 9) and five females (Ss 2,5, 6,8, and 10) in Group II.

In order that determination could be made of any personality difference between the experimental group and the control group, they were given the following personality tests, the Sixteen personality Factor Inventory (16 PF), the Internal versus External Scale (I-E scale) and the Sensation-Seeking scale (SSS). Both groups were required to complete the tests in their own time, Group I subjects before they commenced meditation and Group II subjects not later than one week after Group I subjects. Explicit instructions were given to each subject verbally (they were also written down) before they attempted the tests¹. A thorough

¹ See appendix III for details on these instructions.

questioning was given when the tests were returned to ensure that they had carried out the test within the required time and to the exact specifications of the instructions.

The ten experimental subjects then received instructions in how to meditate and then were left to practice¹. The ten control subjects received no such instructions and all indicated in initial questioning that they had no desire to start. Three months later the same three tests were handed out with the same instructions to all twenty subjects. All ten control subjects returned their tests within an adequate period of time (one week) and completed the tests as correctly as possible (assessed by questioning). Eight of the experimental subjects returned their tests to the above criterion, however, two subjects indicated verbally that they had stopped meditating completely and did not complete the tests. Of the eight Group I returns four were still meditating twice a day for at least fifteen minutes, whereas the other four were only meditating an average of about six times (with a range of about four to ten) a week.

B. Description of the tests used

The Sixteen Personality Factor Questionnaire (16 PF) is a test devised by Cattell (1957) to give "the most complete coverage of personality possible in a brief time".² This test evolved out of a long series of

1 See Appendix I for information on the philosophy and technique of TM.

2 from the shortened IPAT manual, p 3.

researches. Starting with behavior ratings, Cattell identified 131 clusters of ratings, which were then reduced to 50 "nuclear clusters". These 50, in turn, were arranged to identify 20 "sectors of the personality sphere". In a later study Cattell attempted to develop questionnaire items which would measure these 20 aspects by self-description. Using factor analysis, he succeeded in locating 16 groups of items which could be paired moderately well with the earlier data.

The questionnaire comes in two forms, A and B, consisting of 10 to 13 items for each of the 16 factors. Form A was used in the initial testing situation and form B was used in the retest situation.

The Sensation-Seeking Scale (SSS) was developed by Zuckerman, Kolin, Price and Zoob (1964) as a measure of individual differences in the need for stimulus variability. It is based on the concept of an optimal level of stimulation which is a substitute for the unsatisfactory concept of drive reduction. This concept assumes that the common goal of all primary motivation is to reduce stimulation to a minimum. Zuckerman et al (1964) points out that research has shown too little stimulation, as in perceptual isolation, leads the organism to increase stimulation, while too much stimulation, as in sensory overloading or high drive states, leads to behavior directed at stimulation reduction. That is, their theoretical basis is reliant on the concept of an "optimal" level of stimulation and they are interested in the personality implications of this concept. In fact, the development of this scale

was carried out with the express purpose of "measuring a trait" (Zuckerman et al 1964, p 477). Although they did concede that it is possible that sensation seeking (SS) is specific to the various types of sensations, they did hypothesize that a general factor would emerge from responses to diverse items.

In this study Form II of the SSS was used. It consisted of 34 forced-choice items, of which only the 22 items in the General M-F subscale were used as the subjects consisted mainly of males.

The Internal-External (I-E) control scale developed by Rotter, Seeman, and Leverant (1962) attempts to provide a distribution along a dimension specifying the degree to which an individual believes he possesses or lacks the power necessary to control what happens to himself, that is, the degree to which he attributes the things that happen to him as a function of his own control, skill, or behavior, versus attributing these events to luck, chance, fate, or power beyond his control.

The version used in this study consists of a 29-item, forced-choice test including six filler items intended to make the purpose of the test somewhat more ambiguous. The score is the total number of external choices.

RESULTS

Nonparametric statistical tests were used throughout this study as one of the conditions for the use of parametric tests was not met; subjects used in this study do not seem to be drawn from a normally distributed population.

Thus the Mann-Whitney U test was used for analysis between the groups and the Wilcoxon matched-pairs signed-ranks test for the test-retest results. Therefore we will have a fairly conservative estimate of personality differences and changes (thus a relatively insensitive reliability measure).

However, these tests are comparable to parametric tests. If both nonparametric tests are applied to data which might properly be analyzed by the most powerful parametric test, the t test, its power efficiency approaches $3/\pi = 95.5\%$ as N increases (Mood, 1954). For the Mann-Whitney U test it is close to 95% for sample sizes of 9 to 20, and for the Wilcoxon matched-pairs signed-ranks test it is close to 95% for samples as small as six. They are, therefore, considered excellent alternatives to the t test.

It was decided to include all eight subjects in an overall analysis of the effects of meditation. This decision was based on the fact that the physiological effects arise from the individual meditation sessions (Wallace 1969) and the effects are said to be cumulative regardless of interference between sessions (Maharishi 1963). Thus with our overall analysis we simply have a range of practice intensity.

It is assumed in this study that all the ten participators in the experimental group were genuinely interested in learning the practice of transcendental meditation. This must be borne out to some extent by the fact that they all paid fifteen dollars and learnt the technique, devoting four one-hour sessions to this.

However, the fact that two "dropped out" and four only partially practiced raises an interesting query. On Questioning, it was found that they all intend to start again (or start regular practice) sometime in the near future, and all indicated that they considered it a "worth-while thing". Thus we are still assuming that they are all genuine, at least in intent. Therefore, to see if personality differences between subjects who practiced regularly and those who practiced irregularly show up we broke Group I down for further analysis into a group of four (regular practitioners, RP) and a group of six (irregular practitioners, IP), and a Mann-Whitney U test was applied between the groups. Test-retest differences could not be analysed as N (the smallest group) was too small for any available statistical test to be applied. The subjects in the RP group are Ss 3,6,7 and 8; the Ss in the IP group are Ss 1,2,4,5,9 and 10.

The Sixteen PF Questionnaire

The results show that Group I - Ss intending to start TM - differed significantly (refer to Table I) on four personality domains (c - , more affected by feelings; H + , more venturesome; I + , more tenderminded; Q₁ + , more experimenting) and one second-order factor (more extraverted) from Group II - Ss not intending to start TM.

The results also show that Group II differed significantly on one personality domain (L + , more suspicious) from Group I.

The test-retest results show that Group I change significantly (Table I) in two personality domains; C and Q₄, that is, They are significantly less affected by feelings and less tense. There were no significant personality changes for Group II. Therefore, it can be concluded that these changes are due to TM alone, although it must be remembered that if a t test was used some changes may have shown up.

The results show that the IP group was significantly (Table I) more affected by feelings (C -), more suspicious (L +) and more tense (Q₄ +) than the RP group, whereas the RP group was more experimenting (Q₁ +) than the IP group.

TABLE I

The between groups and test-retest results of the Sixteen PF Questionnaire

Factor	Group I and Group II difference scores		Test-retest scores for Group I		Test-retest scores for Group II		RP and PI difference scores	
	The U values for the Mann-Whitney U test	The significance level for a one-tailed test	The T values for the Wilcoxon matched-pairs signed-ranks test	The significance level for a one-tailed test	The T values for the Wilcoxon matched-pairs signed-ranks test	The significance level for a one-tailed test	The U values for the Mann-Whitney U test	Probabilities associated with values as small as deserved of U
A Outgoing	35.5	NS	3, N=7	NS	11, N=7	NS	4	.057, NS
B Intelligent	51	NS	11, N=6	NS	25, N=9	NS	11.5	.501, NS
C Emotionally stable	24	.05	2, N=8	.02	5, N=7	NS	2	.019, sig.
E Assertive	34	NS	6, N=7	NS	17, N=8	NS	7	.176, NS
F Carefree	40	NS	6, N=8	NS	11, N=9	NS	8	.238, NS
G Conscientious	44.5	NS	5, N=5	NS	18.5, N=8	NS	8.5	.271, NS
H Venturesome	18	.01	14.5, N=8	NS	24.5, N=10	NS	7.5	.202, NS
I Tender-minded	13	.01	12, N=8	NS	15, N=7	NS	10	.381, NS
L Suspicious	24	.05	1, N=5	NS	17, N=7	NS	2.5	.026, sig.
M Imaginative	42	NS	3.5, N=6	NS	13, N=10	NS	10.5	.412, NS
N Shrewd	38	NS	2, N=6	NS	14, N=7	NS	8.5	.271, NS
O Apprehensive	35	NS	15, N=7	NS	10, N=9	NS	6	.129, NS
Q ₁ Experimenting	23	.025	1, N=6	NS	20, N=7	NS	1	.010, sig.
Q ₂ Self-sufficient	33	NS	15, N=8	NS	18.5, N=10	NS	11	.457, NS
Q ₃ Controlled	53	NS	10, N=6	NS	21.5, N=9	NS	9	.305, NS
Q ₄ Tense	32.5	NS	1, N=7	.05	12.5, N=8	NS	1.5	.015, sig.
Second-order factors								
I Anxiety	42	NS	9, N=8	NS	8.5, N=8	NS	5	.086, NS
II Extroversion	26.5	.05	7, N=8	NS	11, N=8	NS	8	.238, NS
III Alert poise	35.5	NS	13, N=8	NS	16.5, N=8	NS	11.5	.501, NS
IV Independence	48	NS	15, N=8	NS	14, N=7	NS	9.5	.343, NS

N = the number of matched pairs minus the number of pairs whose d = 0

NS = not significant

TABLE II

The Sensation-Seeking Scale Raw Scores

Subject	Control Group		Experimental Group	
	Initial Test Score	Retest Score	Initial Test Score	Retest Score
1	12	13	16	15
2	14	14	17	16
3	10	12	16	16
4	17	14	17	19
5	12	15	18	-
6	16	18	15	17
7	16	16	16	18
8	13	13	19	16
9	16	17	15	17
10	11	10	17	-
	13.7	14.2	16.6	15.0

The Sensation-Seeking Scale

Group I was significantly ($U = 20$, $X = .025$, one-tailed test) more sensation-seeking than Group II. For both Group I and Group II the test-retest results were non-significant ($T = 9.5$, $N = 7$ and $T = 11.5$, $N = 7$ respectively).

Thus it can safely be said that there was no detected change in the sensation-seeking variable over a period of three months for TM beginners, but there was a personality difference (assuming S-S to be a personality variable) between subjects who intended to start TM and subjects who did not intend to start TM.

The IP group was not significantly ($U = 9.5$, $P = .343$) more sensation-seeking than the RP group.

TABLE III

The Internal versus External General M-F SubscaleRaw Scores

Subject	Control Group		Experimental Group	
	Initial Test Score	Retest Score	Initial Test Score	Retest Score
1	14	10	13	12
2	13	15	12	14
3	9	9	12	10
4	7	12	14	14
5	16	13	18	-
6	6	7	15	16
7	13	10	16	14
8	10	13	9	11
9	13	10	14	16
10	15	17	13	-
	11.1	11.4	13.6	13.4

The Internal-External Scale

Group I was not significantly ($U = 44$) more external than Group II. For both group I and II the test-retest results were non-significant ($T = 24.5$, $N = 9$ and $T = 9.5$, $N = 7$ respectively).

Thus it can safely be said that over a period of three months there was no tendency for TM beginners to become more internal in their locus of control of reinforcement, nor were they different in their locus of control, compared to non-practitioners, before they actually start the practice.

The IP group was not significantly ($U = 10.5$, $P = .412$) more externally controlled than the RP group.

A. DISCUSSION ON THE THREE TESTS

1 The Sixteen PF Questionnaire The first hypothesis is confirmed, that is, there are personality differences between students who want to start the practice of transcendental meditation and those who don't. In detail our results show that our sample of University students who intend to start TM differed significantly on four primary personality domains (c- more affected by feelings; H+, more venturesome; I+, more tenderminded; Q₁+, more experimental) and one second-order factor (more extraverted) from a random selection of University students who have had no such intentions. However, when we compare them with norms based on 384 New Zealand University students we can see that our results show more differences; they are more imaginative (M+) and more forthright (N-). These are the factors that have an average sten value of +1.5 from the norm (a sten value of +1.5 is "very significant and substantially above the general population average")¹.

Group II also had M+ and N- showing up (according to the IPAT criterion), and it also had the L (suspicious) factor showing up as significantly more suspicious than Group I suggesting that our control group was biased

1 According to the IPAT information bulletin, 1963, page 2. A statistical analysis could not be performed as data from the present study was suitable for non-parametric analysis only.

in these respects (M+, N-, L+). This may be a reflection of our sample selection method or simply a chance occurrence commonly associated with small samples. It can also be said that the M+ and N- factors (at least) may be showing colloquial features of Waikato University students, but these features of our results do not detract from the general conclusion that our sample of meditators can be characterized as more affected by feelings (c-), more venturesome (H+), more tenderminded (I+), more experimental (Q1+), more imaginative (M+), more forthright (N-) and more extroverted. It is important to realise, of course, that with a large sample, not only including meditators from other Universities but also meditators from other walks-of-life, these personality factors may be substantially different. However, as a nonparametric statistical test was used in analysing these personality differences, the factors that showed up as significant would be considered to be a conservative estimate of personality differences for our sample.

It has been suggested that, as the exponents and researchers of transcendental meditation emphasize the psychological and physiological benefits of it (e.g. Maharishi 1966, Jackson 1967, Wallace 1970), it may attract psychologically disturbed people (Winqvist 1969). Considering the general 16 PF pattern (c-, H+, I+, M+, N- Q1+) it does not match up very closely to any of the clinical profiles referred to in the IPAT information bulletin (1963). In fact, of the "basic" clinical-normal discriminators (O+, Q4+, C-, and F-)

referred to only the C- discriminator is present in our sample, and this seems to be rather a dubious discriminator anyway; information in the IPAT tables shows that psychotics scored higher than neurotics, and university professors scored below average near the psychotics. Thus there appears to be no real psychological problems or pathology present at all.

The above primary factors (except N-) actually fit into the factor pattern (A-, H+, M+, Q₁+, Q₄-) associated with the self-actualization measure of the Personal Orientation Inventory (POI) that Grossack, Armstrong and Lussiev (1966) found in their study of personality correlates of self-actualization. The assumption underlying the POI is that it is an empirical measure of self-actualization based on the theories of Maslow and Ellis. Grossack et al concluded that the POI is a useful instrument for its intended purposes simply by obtaining a personality pattern of A-, H+, M+, Q₁+, Q₄-, from the 16 PF and three correlates (autonomy, positive; heterosexuality, positive; abasement and order, negative) from the Edwards PPS. Now, although this is rather a curious way of validating a particularly elusive concept such as self-actualization, we may be able to consider these factors (H+, Q₁+, M+) healthy or positive personality characteristics. However, the other factors, C- and I+, are in the Type I profile of the general neurosis pattern (IPAT information bulletin, 1963), therefore, these traits may be considered to be "negative". Thus the factor pattern really does not furnish many clues as to the "essential nature" of TM

beginners.

The significant second order factor (extroversion) is an interesting result. It indicates (according to the 1962 IPAT Manual) a "socially outgoing uninhibited person, good at making contacts". This is not an unexpected result as the nature of the attraction of TM may be in its social associations (prestige) which is tied up with "following a cult". This, however, is only a hypothesis subject to further research as the connection between extroversion and cult following is tenuous, to say the least, without scientific validation.

None of the other second-order factors were significant, and none of these factors after the test-retest period. The lack of significant change for the anxiety second-order factor is rather surprising in light of the significant reduction in the Q_4 (tense) factor. However, as they are supposed to be measuring different things - Q_4 measures more particular tendencies, such as tension when doing something or excitability during something, while Anxiety measures a more general tendency referring to some sort of maladjustment, ie, according to the 1962 Manual, "they are not dissatisfied with the degree to which they are able to meet the demands of life and to achieve what they desire". (p 12). Thus there is no conflict with Wallace's (1969) thesis that TM decreases metabolism if the following is correct: the reduction in the Q_4 factor indicates a general decrease in metabolism but does not mean that a general tendency not to react in certain anxious ways is changed at this stage of TM.

The results show that the IP group is more affected by feelings (C-), more suspicious (L+), and more tense (Q₄+) than the RP group, whereas the RP group is more experimental (Q₁+) than the IP group.

Thus it seems that the IP group accounts for the one neurotic tendency, C-, present in the overall group and the RP group seems to account for the one "positive" factor, Q₁+. The other factors in the overall group pattern seem to be evenly distributed over both groups. Now, as the IP group also shows a further clinical-normal discriminator, Q₄+, it appears that they are distinctly more neurotic than the RP group, and this may be related to why they partially gave up or, as it now seems, why they found it difficult in maintaining regular practice. It may be that because they are more tense and more affected by feelings, they cannot easily get into a routine (which is necessary for regular practice) let alone last for at least 15 minutes twice a day under any circumstances - all internal and external stimuli (e.g. thoughts, noise, etc) are supposed to be allowed to simply flow into consciousness and out again without any effort to stop them entering or forcing them to disappear. (Maharishi 1963, Jackson 1967). Thus there is no evidence to suggest that they are not genuine in their intention to practice meditation, but it is tempting to say that they seem to be unsuitable, however transcendental meditation is supposed to be of value to individuals with psychological disturbances (Winqvist 1969). Unfortunately, we cannot make a test-retest analysis to clarify

(n_1 , the smallest group is too small for the available tests) whether there are any original benefits from partial practice, but there seems to be here an interesting hypothesis for further research.

Hypothesis II is also confirmed, that is, there are personality changes in students who have been practising transcendental meditation for three months. The results show that there were two factors significantly reduced on the affected by feelings (c) factor and the tense (Q_4) factor. The Q_4 factor score is of particular interest as it was originally fairly similar to the control group and the New Zealand University norm. This means that TM is affecting the meditators to the extent that they become more relaxed (compare 4.4 to 5.8, the university population)¹ not just less anxious. The increase in the C score indicates a normal score on the emotionally stable-less stable continuum. Perhaps with continued practice a positively emotionally stable score will eventuate. As a reliability measure Group II was retested, but there were no significant results. Therefore, the Group I significant results must be attributed to a personality change arising from the practice of TM. Thus there seems to be some support for the benefits the exponents of transcendental meditation put forward if, for example, words like "peace of mind" can be interpreted as relaxful and gives some support to rigorous scientific work such as

1 mean PF values on Table II of the appendix.

Wallace (1969).

11 The Sensation-Seeking Scale Hypothesis III was confirmed; students who intend to start TM do have a significantly higher optimal level of stimulation or arousal than students who do not intend to start the practice. That is, it is confirmed if we can prove that the scale measures what it purports to measure; and the further generalization that TM beginners use TM to satisfy their need for thrill-seeking behaviour is reliant on this proof as well.

First of all the question of construct validity of the scale remains open. Although this test has moderate reliability (r 's = .68 and .74 for male and female respectively) it may have poor validity because its structure is built upon response set or other sources of specific test variance. Zuckerman, et al (1964) has demonstrated a significant positive relationship ($r = .54$, $P < .01$) between SS tendency and field independence and a significant negative relationship ($r = .32$, $P < .05$) with anxiety, which is encouraging if further weight can be given to the following hypothesis that some of their results support; SS tendency is not a measure of impulsivity but a measure of sensitivity to internal sensation. However, Zuckerman et al (1964) also correlated the Stimulus Seeking Maze Test, developed by Howard (1961) with the SSS. It utilizes series of pencil and paper mazes. In form A the mazes consist of alternate paths to the same goal. A series of identical mazes is given, ostensibly as a time filler, between a learning and

recall task. The measure of change in paths from maze to maze constitute the stimulus-seeking score. Since the need for variation constituted one of the types of items in the SSS, Zuckerman expected a positive correlation between the SSS and Howard's SS test. However, there was no such correlation and since neither test had undergone much validation, a failure to find a correlation between them does not indicate a failure of concurrent validity for either test, but would indicate a failure in construct validity for one or both tests.

Other correlational studies have been performed that suggest closely related personality characteristics of a high optimum level of stimulation. Farley and Farley (1967) have found a positive correlation between SS and extroversion and Zuckerman and Link (1968) have found positive correlations with *n* autonomy, *n* change, and *n* exhibitionism scales of both the Edward's PPS and the Zuckerman Adjective Checklist, and negative correlations with measures of *n* affiliation, *n* orderliness, *n* nurturance, and *n* deference.

However, a study by Farley (1967) suggested that the general SSS might include more than one simple factor. Zuckerman and Link (1968) rotated the factors obtained in the factor analysis of the sample. The results suggested that additional factors labelled Thrill Seeking, Social Sensation Seeking, Visual Sensation Seeking and Antisocial Sensation Seeking might be identifiable in males. Only the first two factors were definable in females

Thus the question of just what the SSS is measuring

is a very confused one indeed, in fact, because of this, we cannot say just how the personality of TM beginners differs from non-meditators from this particular questionnaire scale. However, to see if we can make some sense of our results, let us accept that the SSS measures something and let us see if the results of recent work using the SSS has anything to offer in interpreting our results. Blackburn (1969) and Zuckerman and Link (1968) have shown that the SSS positively correlates with the MMPI F, Pd, Mg, and Im scales and negatively with the MMPI K, L and R scales. Blackburn suggested that the SSS might be a measure of psychopathic symptomatology. This has important consequences for beginners or TM if these claims can be substantiated as it has been suggested that meditation is helpful in alleviation of drug abuse and improvement of mental health (Winqvist, 1969. Benson 1969, SIMS Survey 1968). However, the MMPI has been shown to be of little prognostic value: Marks, Stauffacher and Lyle (1963), in a study attempting to predict outcomes for schizophrenic patients on the MMPI found that simple self-respect attitude scales, like the California F scale, yielded better predictions than "factorially pure scales" (p 126). Thus it is unlikely that the SSS can predict psychopathic personality.

To further support this claim the SSS has been shown to correlate positively with measures that are essentially independent of pathology, such as the studies cited above, namely: Zuckerman, et al (1964), Zuckerman and Link (1968), Farley and Farley (1967) as well as a

study by Bone and Montgomery (1970) which did not find a significant correlation between SSS and N (Eysenck's measure of neuroticism) and concludes that sensation seeking is independent of self-admitted pathology.

Thus these studies on other possible constructs underlying the scale do not clarify or make sensible our results at all: in fact, they only seem to refute the possibility that the SSS measures psychopathology. That is to say, we cannot say that individuals beginning the practice of TM seek greater stimulus variability than individuals not interested in starting, nor can we say more than it is only possible that this scale may reveal other relevant personality constructs, and it certainly cannot be suggested that beginners see TM as a novel way of satisfying a need for stimulation variation.

The lack of construct validation has implication for the lack of test-retest change as well. Remembering the state of confusion of the validity studies we are in no position to say just what personality variable is not effected by TM after three months.

111 The Internal vs External Scale Hypothesis IV was not confirmed; there was only a very small, non-significant, reduction in the internal direction, that is, students who have been practising transcendental meditation for three months do not change their view to generally believing that reinforcement is contingent on their own skill and abilities rather than feeling that what happens is a result of chance or forces outside their control. It is true that nonparametric test results, as used in this study, give less sensitive results for ~~the~~

test-retest change than parametric tests, but, as the mean test-retest difference (0.2) was so small, this makes no difference. Thus it can also be said, at this stage, there is no evidence that with further practice a tendency will develop in the internal direction.

The I-E group differences show that Group I were not significantly more external than Group II. However, the combined results of both groups were very high (11.8, i.e., tending in the external direction) suggesting that it may be a colloquial characteristic of Waikato students to score in the external direction. (Male and female Ohio State elementary psychology students, had means of 8.15 (SD = 3.88) and 8.42 (SD = 4.06) respectively, Rotter 1966. No large sample studies have been published in New Zealand).

There are several reasons why the scores in this study are spuriously high (this may effect one group more than the other, either reducing the significance or increasing it). First of all, the conditions of administration were different from normal conditions. The Ss were allowed to take the tests home and do them in their own time. Thus, although they were given full and explicit instructions, the conditions were obviously very casual and, as all Ss (including the control) knew that they were doing the tests for a research project on TM, they had no reason to feel obliged to "achieve" in any sense.

There seems to be some evidence to suggest that, if the administration conditions are casual and without much purpose (this attitude may prevail: "no personal gains in doing this test - only doing it to help out a research project"), the scores may be spuriously inflated. Rotter (1966) pointed out just how important testing conditions are. He found that Ohio Federal prisoners scored lower than College students although one might naturally expect them to be more external than the college student population. He pointed out that these prisoners were tested shortly after entering the reformatory in the administration building during the same period of time when they were receiving other classification tests. They seemed to believe that the test was given for administrative rather than experimental purposes and that the test scores would become part of their permanent record, although they were told the converse. This is supported by an unusually high correlation (found in no other study) between the Marlowe - Crowne Social Desirability Scale and the I - E scores.

Previous research has shown that tasks which imply that outcomes are personally controllable by the Ss evoke behaviour which is more adaptive and success oriented than when the tasks are externally controlled (detailed reviews by Lefcourt 1966a, 1966b and Rotter 1966). Lefcourt (1966a, 1966b) has commented on analogous findings in the breakdown of social norms when decreased

opportunity for personal control exists. Passivity and irresponsibility are often the products of restricted fields of alternatives where little chance for personal control is perceived. Gore and Rotter (1963) has shown that Ss who take part in civil rights actions are less externally controlled than their inactive peers; blacks and American Indians score in the external direction; lower class persons also score higher in external control than middle class individuals. Other groups which also score higher in the external control direction are retardates and schizophrenics (Cromwell, Rosenthal, Shakow and Hahn 1961, Lefcourt 1966b). Rotter (1966) and Lefcourt (1966a, and 1966b) also review some studies on tuberculosis patients and delinquents. It was found that those who were higher on external control were characterized as being highly alienated and as gaining less objective information about their condition or about parole information than the internally controlled individuals.

Results from these studies seem to indicate that individuals who believe that they control their own reinforcements will exercise more control in directing their own lives than their externally oriented peers. Individuals with an internal control orientation are likely to learn and believe in ways which continue to facilitate personal control, thus leading to more adaptive behaviour, while individuals with external control expectancies are more likely to engage in dysfunctional behaviour.

In this study although the scores for Group I are

in the external direction they are not significant and thus it cannot be said that TM beginners are anymore dysfunctional in their behaviour than a control sample. Even if it could be said that Group I has characteristics normally associated with psychopathic functioning there is little evidence in this study to suggest that this possible tendency is reduced: the I - E and SSS test-retest scores are not significantly reduced and only the C and Q₄ factors are reduced in the 16 PF test. However, Butterfield (1964) and Watson (1967) have found a positive relation between anxiety and external control. Perhaps with a greater test-retest period a significant change in the internal direction will be achieved. This would mean that with a sufficient period of TM-practice self-control will increase which has obvious implications for psychotherapy.

B. GENERAL DISCUSSION

The results of the three personality tests used have shown that subjects wanting to practice TM are different from subjects not wanting to practice in the following factors; c-, H+, I+, Q₁₊ and Factor II on the 16 PF and greater S-S on the SSS. These characteristics are subject to the difficulties arising out of a "straight" (accepting the theory behind the tests) interpretation in light of relevant research, and also subject to the more general criticism to follow in the last part of this section.

There was also a significant reduction on the C and Q₄ factors, and, as the test-retest scores on all tests for the control group are not significant, it can

be said that these changes are attributable to TM practice alone. Therefore, there is some evidence here for the theory put forward in the introduction, namely: physiological effects of TM (Wallace 1969, Benson 1969) allow for personality change. This theory arises from the assertion that personality is not a mystical tendency that has its own laws, therefore, accepting this (a discussion on "the nature of personality" is necessary and is covered later on), it is plausible to look for physiological conditions of personality change. Just what role the physiological effects have may be explained as follows: if a person is constantly functioning at a lower metabolic rate he must eventually learn different cognitive and behavioural associations that only become possible with this different metabolic state, and as well, he will unlearn behaviours that were once associated with particularly high metabolic activity (this is not necessarily anxiety as it may only be a motivational state). That is, he is learning different responses to different conditions (that are possible only because of TM) that may show up as different personality characteristics.

A cognitive-expectancy model may account for personality change as an alternative way of interpreting the effects of TM. The observed personality changes could be attributed mainly to changes in Ss expectations concerning the effects of TM rather than to the learning of new behaviours associated physiological change. From this point of view Ss already have a knowledge of what sort of personality change should occur (see Kanellakos, 1970

and Sims, 1969, pp 5 and 8 of the introduction). They then go through a four day training period that is concluded each day with tape-recorded "talks" by Maharishi which emphasize "immediate benefits". As they become to accept (simply by starting and paying 15 dollars is an immense personal investment), they may alter their personality consistent with their newly acquired expectancies. Hence TM has been effective as a function of cognitive change rather than any kind of direct influence.

The 16 PF questionnaire, the SSS, and the I-E scale are based on one basic assumption: that there is a stable, consistent, generalized personality structure that can be revealed by factor analytic methods. We will first of all have a look at the factor analytic method and then see how it is applied and what is achieved. We will also raise the question of the relations between personality test results and personality.

Factor analysis was originally devised to uncover underlying personality traits. It has been claimed that "primary dimensions" (the basis for the 16 PF) or "real characteristics" have been discovered by factor analysis (e.g. Barlow and Burt (1954); Cattell and Sullivan (1962)). In spite of these claims however, factor analysis does not by itself seem to be a sufficient procedure to infer the determinants of test responses.

Overall (1964) has shown by factor analysis of the physical dimensions of books that there is no necessary correspondence between the factors obtained and the primary conceptual dimensions of the object. Overall

devised twelve equations, each of which defined a complex measure as a linear function of the three conceptually primary dimensions of a book: height, width and thickness. Included in the twelve variables thus defined were three pure marker variables that represented each of the three primary dimensions. He then measured one hundred books. The resulting intercorrelations of the twelve variables were subjected to a principle-axis factor analysis that yielded three factors. The factors obtained were very complex with regard to the primary dimensions. These factors represented something like size, obesity and squareness.

As Overall points out a single contrary demonstration like this is enough to call into question the basic assumption that stable, consistent, generalized personality structure exist. He says "the important thing to consider is that if factor analysis results sometimes fail to correspond to primary dimensions of the objects being measured such a failure may occur when we attempt to use it as a method for discovering the 'real structure of nature' in areas where the structure is unknown" (p 270).

Overall goes on to say that "when we do not know beforehand what the primary dimensions are, it is difficult to justify the belief that factor analysis will somehow magically point them out to us" (p 272).

Thus factor analysis is a very useful tool for reducing a large set of correlated measures to fewer unrelated dimensions, but there is no reason to assume

that this statistical procedure does more. Even so-called primary dimensions are human abstractions about objects or events rather than absolute intrinsic characteristics of nature. Factor analysis reveals descriptive categories rather than underlying entities.

Now, as all three tests used in this study used factor analysis to reveal their hypothetical constructs, in light of the above criticism there seems to be no possible way of showing that in fact these particular constructs were revealed.

Thus the method for arriving at a particular personality dimension is dubious to say the least. Now, accepting that the developers of these tasks have a particular theory of personality, what was really derived? The basic assumption in their personality theory seemed to be that there is a universal taxonomy of traits. The 16 PF was an attempt to derive certain primary dimensions; the I-E scale was an attempt to derive a personality variable; and the SSS attempted to formalize and quantify the "optimal level of stimulation" theory (which assumes that individuals arrive at particular states of activation). They all use factor analysis to the extent where it is not only useless but also misleading (the SSS actually may be measuring something completely unrelated to the original theory - Howard 1961, Farley and Farley 1967, Blagburn 1969).

As our results are based on personality tests that are derived from a trait theory (the 16 PF test and the I-E scale) and a state theory (the SSS), we cannot

interpret our results beyond these theories, but just how adequate these theories are and just how far we can interpret our results in light of these kinds of theories is an extremely important question.

W. Mischell (1968) points out that trait and state theories of man are excessively crude, using gross units to encompass the extraordinary complex and subtle behaviour of man. These theories look for stable response predispositions in individuals as the generalized and enduring causes of their behaviour. All three tests used in this study have theories that depend on cross-situational consistencies in behaviour, whereas although behaviour patterns often may be stable, they usually are not highly generalized across situations (Mischel 1968, ch. 2 and 4). The findings on consistency over time (Mischel, ch. 2) like the data on the cross-situational specificity of social behaviours, fit the view that behaviours depend on highly specific events but remain stable when the consequences to which they lead and the evoking conditions remain similar (Mischel, ch. 6). Thus the three tests used in this study seem to have a naive view of human behaviour. The SSS theory assumes that individuals have a general tendency to seek an optimal level of stimulation where, in fact, the level of stimulation motivation must depend at least on situational conditions. The I-E scale has actually been shown that it depends on the situation as to whether they are more internal or more external. Rotter (1966) has shown

that Peace Corps trainees, who were given an assessment battery of tests, including the I-E scale and knew that these tests would in part determine whether or not they would be judged to be acceptable for appointment as Peace Corps volunteers and sent overseas on assignment, were not significantly more internal than young male prisoners. This was considered to be a very surprising result, that may be explained by expectancy conditions that they were placed in. They were in a situation that warranted more controlled behaviour as it might affect their parole chances. The 16 PF, as pointed out above, is based on the result of a long series of researchers that finally comes up with 16 stable, generalized personality factors. A series of extensive and sophisticated factor analytic studies, extending on from Cattell's (1957) work, investigated the degree of factor similarity obtained for diverse samples of subjects rated by their peers on scales drawn from Cattell's "standard reduced personality sphere". Consistently the same set of five relatively independent factors appeared, and led to the conclusion that a "highly stable structure of personal characteristics has been identified" (Norman, 1965, p 581). This belief hinged on the basic assumption that the structure obtained reflected true characteristics of the rates. Passini and Norman (1966) showed that this assumption was in fact not justified. When complete strangers were rated the factor structure that emerged was highly similar to the five-factor structure from ratings of subjects that raters know well. Therefore, not only is

there no basis for assuming a stable, consistent pattern of personality factors, there is no reason to assume that the 16 PF test measures anything more than the subjects response-bias at the time of testing.

At best these results are a very crude estimate of very transient characteristics, and the personality change measured, although not the result of other influences (according to our reliability check), may be measuring something totally unrelated to the subtle changes occurring as a result of a technique that is very hard, to say the least, to pin-point exactly what is going on - the terms and concepts used are mainly mystical and totally undefinable (see Appendix I).

That is, the instruments used in this study may be far too crude to measure such changes, if in fact something is happening in what appears to be a very subtle process. The effects of meditation seem to be far better accommodated by existing theories put forward for instance by Maslow (1968), who says, "No theory of psychology will ever be complete that does not centrally incorporate the concept that man has his future within him, dynamically active at this present moment" (p 28). That is to say at the very core of the individual there is some central organising tendency that cannot be ignored, especially when the subtleties of human behaviour are particularly relevant. However, this approach leads away from a scientific inquiry and into a debate about the experimentalist and the existentialist which is beyond the scope of this study.

SUMMARY AND CONCLUSIONS

This study attempted to show personality differences between two samples of university students; a sample of students intending to start TM practice and a sample with no such intentions. A test-retest analysis was made with each group after a period of three months.

There were also two particular hypothesis adopted for this study; (1) a reduction in external control of reinforcement was predicted, and (2) a difference between the groups in sensation-seeking behaviour was predicted.

The results gave Group I (TM beginners) a C-, L+, H+, Q1+ factor pattern on the 16 PF, a greater sensation-seeking behaviour score, and no change in the external control score.

The interpretation of these results were discussed in terms of two possible approaches; (1) a learning theory model, and (2) a cognitive-expectancy model.

A thorough analysis of the theory behind the personality tests used and the implications for the personality of TM beginners is discussed.

It is concluded that not enough is known about the effective ingredients of TM to explain exactly what is happening, and a trait/state approach can not adequately accommodate personality differences and changes.

RECOMMENDATIONS FOR FURTHER RESEARCH

Further research is needed using controlled, large sample research designs to sort out the effective ingredient and possible therapeutic value of transcendental meditation. Perhaps a technique embodying the expectancy-manipulation features (e.g., some sort of pseudomeditation technique) of TM, but without the technical elements of the practice (i.e., without the mantra and with eyes open) could be one approach.

APPENDIX IThe Philosophy And Technique Of Transcendental Meditation

The philosophy used to explain the technique of transcendental meditation is based on the concept that a thought exists on several levels. It arises at the subtlest level of awareness and rises, or develops, through progressively coarser strata until it arrives at the top, which is the gross level of relative existence, where the conscious mind becomes aware of it and appreciates it as a thought. The process is somewhat like the rise of a tiny air bubble which originates at the bottom of the ocean and rises gradually, becoming bigger and bigger as the water's pressure lessens, until it arrives, finally, at the surface where it is seen and recognized as a bubble for the first time by those whose scope of observation is limited to the water's surface.

Maharishi Mahesh Yogi, the present exponent of transcendental meditation, teaches that this process can be reversed. His system starts with the experience of a thought at the conscious level and follows it inward, reducing and refining it step by step as it proceeds, until the point of origin is attained and transcended. The attention then regains the conscious level by coupling itself to a new thought at its point of origin and riding upward with it, back to the surface of the gross level once more.

In the course of this process, the conscious mind absorbs and retains something of the nature of the transcendental field through which it has passed.

Maharishi explains that this process expands the conscious mind and at the same time brings it in full contact with a reservoir of energy and creative intelligence.

An important distinction from traditional meditation techniques lies in the interpretation of "withdrawal". The Vedas and the Upanishads and Bhagavad Gita (the source of Maharishi's teachings) speak of the necessity for withdrawal. This has been interpreted generally to mean that true attainment requires the individual to renounce the world and withdraw permanently into seclusion and to have no contact with worldly functions or responsibilities. In other words, the only true path is the path of the ascetic or renunciate. Actually, says Maharishi, the withdrawal mentioned by the scriptures is only that which is necessary during meditation, in order to release the attention so that it may attain the transcendental field. To meditate successfully, it is necessary that the mind "withdraw" in the course of meditation, but to this extent only.

Maharishi further holds that the tendency of the mind is not to wander aimlessly but to move naturally in the direction of experiences which bring greater happiness and enjoyment. He states that the technique involves no suggestion, belief, mental control or physical manipulation. Thus the philosophy of transcendental meditation teaches that the experience of increasingly finer aspects of thought is both natural and enjoyable.

APPENDIX IIMean 16 PF Scores

Factor	Control Group		Experimental Group	
	Original Mean Scores	Retest Mean Scores	Original Mean Scores	Retest Mean Scores
A	5.5	6.2	5.7	6.5
B	6.2	6.5	6.4	6.6
C	5.4	6.1	3.3	5.3
E	4.2	5.4	4.8	4.5
F	6.0	5.9	6.3	5.5
G	4.8	4.4	4.3	5.5
H	5.2	5.7	7.0	6.9
I	4.5	5.0	7.7	6.3
L	7.1	6.8	5.8	4.4
M	7.4	7.6	7.4	8.2
N	4.3	4.7	4.7	4.9
O	5.4	5.6	6.4	5.9
Q1	6.2	6.0	7.6	6.8
Q2	5.9	6.3	3.7	4.5
Q3	5.8	5.6	5.3	5.5
Q4	6.1	6.0	6.6	4.4

APPENDIX IIIInstructions For The Three Tests

Each subject received the following instructions verbally. In the case of the SSS and the I-E scale, these were the written instructions as well; in the case of the 16 PF an example and more detailed instructions were on the cover of the 1961 edition of the 16 PF booklet.

The Sixteen PF Questionnaire

Inside this booklet are some questions to see what attitudes and interests you have. There are no "right" and "wrong" answers because everyone has the right to his views. To be able to get the best results could you please answer them exactly and truly.

Could you answer the four sample questions on the cover of the booklet immediately please (explain how to do this).

Are there any questions?

When you answer, keep these points in mind:

1. Give the first, natural answer as it comes to you.
2. Try not to fall back on the middle, "uncertain" answers.
3. Answer every question, somehow.
4. Answer as honestly as possible what is true of you.

Start in your own time after reading through the instructions. When I collect it could you please tell me how long it took you and if you were interrupted very much.

The I-E Scale

Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief: obviously there are no "right" or "wrong" answers.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also try to respond to each item independently when making your choice; do not be influenced by your previous choices.

Could you please note how long it takes you and how many times you were interrupted?

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