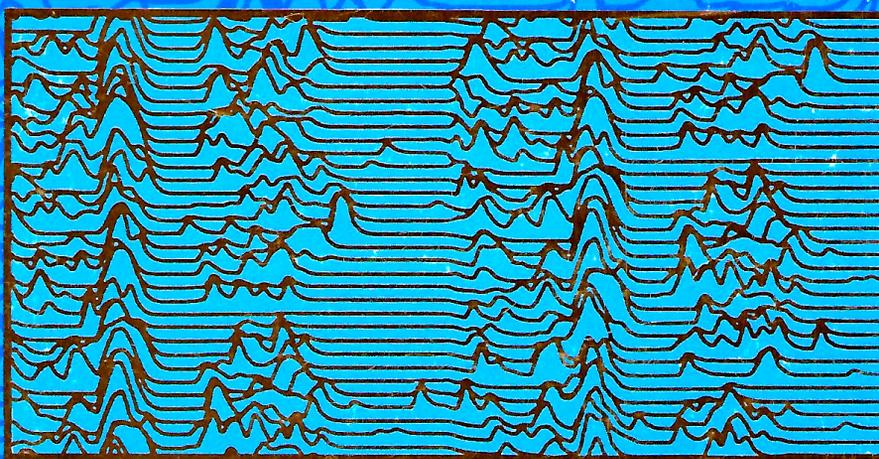


SCIENTIFIC RESEARCH
ON THE
TRANSCENDENTAL
MEDITATION PROGRAM

COLLECTED PAPERS, VOLUME I



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A LONGITUDINAL STUDY OF THE EFFECT OF THE TRANSCENDENTAL MEDITATION PROGRAM ON CHANGES IN PERSONALITY

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Evidence is presented that personality develops in stages as a result of the practice of the Transcendental Meditation technique; a reduction in neuroticism dominant in the first few weeks is followed by the growth of creativity and integration throughout the rest of the first year of the practice. — EDITORS

The Freiburger Personality Inventory was administered to a group of 37 subjects three times—before they learned the Transcendental Meditation technique, approximately seven weeks later, and approximately 55 weeks later. At the last testing, 12 subjects had discontinued meditation and were treated as a control group in the data analysis. Comparison of the mean pretest scores of the 25 meditating subjects with those of the 12 control subjects showed no significant differences. At the time of the third testing, approximately 55 weeks later, the 25 meditating subjects showed significantly better scores than the control group on the following five scales: Nervousness, Depression, Irritability, Inhibition, and Neuroticism. They also showed significantly greater improvements than controls on the following seven scales: Nervousness, Depression, Sociability, Inhibition, Extraversion, Neuroticism, and Masculinity (self-reliance). Compared to the norm, the meditating subjects showed significantly greater neuroticism at the time of learning TM. However, after approximately 55 weeks of regular practice of the TM technique, they showed significantly greater emotional stability (significantly less neuroticism) and significantly greater sociability than the norm. The changes in the various scales among the first, second, and third administrations suggest that regulative-compensatory processes producing a reduction in neuroticism dominate in the first few weeks of the practice of the TM technique, and that growth of individual creativity and integration continues throughout the rest of the first year.

INTRODUCTION

The Transcendental Meditation (TM) technique, as taught by Maharishi Mahesh Yogi, is a simple technique that does not involve concentration, contemplation, or any type of control. Individuals who practice the technique claim that they have a greater sense of physical and psychological well-being, feel greater joy, and experience greater meaningfulness in life. Closer investigation of the psychophysiological effects of the Transcendental Meditation technique has revealed that during the practice of the technique the nervous system achieves a deep state of rest, in which the metabolic rate is lower than during sleep, while the mind remains alert. This unique state of "restful alertness" may be the basis for the psychological changes reported by meditators. Because such changes seem to be a dominant theme in the reports of those who practice the Transcendental Meditation technique, we felt the need to study them in a more systematic manner. The Freiburger Personality Inventory (FPI) (1) was considered

to be an appropriate means to objectively measure attitudinal and behavioral changes in meditators.

An initial investigation of 49 people who practiced the Transcendental Meditation technique (2) suggested that significant psychological changes, as measured by the FPI, result from the practice of Transcendental Meditation. It was found that a subgroup of long-term meditators scored significantly lower than a norm group matched for sex and age on the FPI scales of Nervousness, Depression, Irritability, Domineering Tendency, Inhibition, and Neuroticism, and they scored higher than the norm on the scales of Sociability, Placidity (self-assuredness), and Masculinity (self-reliance).

The relationship between the Transcendental Meditation technique and specific processes of personality development, suggested by the above study, was further examined in the present longitudinal study. During this study, which was carried out during 1972 and 1973, the subjects were tested three times—before learning TM,

approximately seven weeks later, and again approximately 55 weeks later.

The following three questions were of special interest:

1. What changes do meditating subjects exhibit compared to subjects who learn TM but do not practice it?
2. Do subjects who learn TM differ from the norm (a) before learning TM? (b) One year later?
3. Are there stages in the development of meditators during the first year of their practicing TM?

The intention of the first question was to isolate those changes that were brought about not by simply learning the TM technique (which might be accounted for by factors such as suggestion), but only by regularly practicing the technique. All of the subjects participating in the study had begun TM on their own. We could expect, therefore, that the group was homogeneous with respect to both the variables measured by the FPI and the variable of motivation to learn TM. We compared the scores of those meditating regularly for a long period (experimental group) to the scores of the subjects who discontinued the regular practice of TM (control group). Experience showed that by using this method we could expect a control group smaller than the experimental group.

In investigating into the second question, we hoped to reveal any personality differences that existed between subjects who practiced TM and the general population at two times: before learning TM and after approximately one year of practice. For this purpose the scores of the meditating subjects on the pretest and on the final posttest were compared to the corresponding scores of a normative group.

The third question inquired into different stages of development within the first year after subjects learned the TM technique. We know from developmental psychology that developmental processes (e.g., childhood and puberty) proceed in stages. To see whether our material contained indications that TM brings about specific developmental stages, we compared the changes on each FPI scale within the first seven weeks of meditation to the changes in the remaining 48 weeks.

METHODS

A description of the scales of the Freiburger Personality Inventory appears in table 1. The study was carried out in several cities in Germany (mainly in southern and western Germany). Subjects were asked to participate on a voluntary basis. To guarantee complete anonymity, the answer sheets were marked by code numbers so that the results for each subject on the first, second, and third test administration could be identified. Of the 62 subjects who

TABLE 1

DESCRIPTION OF SCALES OF THE FREIBURGER PERSONALITY INVENTORY

SCALE	SCALE RANGE
1. Nervousness	psychosomatically disturbed—not disturbed
2. Aggressiveness	spontaneously aggressive, emotionally immature—not aggressive, self-controlled
3. Depression	bad-tempered, self-doubtful—contented, self-confident
4. Irritability	irritable, easily frustrated—calm, tranquil
5. Sociability	sociable, lively, friendly—unsociable, uncommunicative, reserved
6. Placidity	self-assured, good-humored—irritable, procrastinating
7. Domineering Tendency	reactive-aggressive, overbearing—able to yield, moderate, flexible, tolerant of frustration
8. Inhibition	restrained, tense—spontaneous, communicative
9. Openness	self-critical—reserved, uncritical
Ext. Extraversion	more open to interpersonal relationships, friendly, spontaneous and lively—introverted, withdrawn, reticent
Neu. Neuroticism	emotionally unstable—emotionally stable
Mas. Masculinity	self-reliant, self-confident, tough-minded, vigorous, balanced mood—depressed, timid, worried, general psychosomatic complaints

NOTE: First part of scale range description corresponds to a high score and second part corresponds to a low score on each scale.

took the pretest, 52 were available for the second testing seven weeks later and 37 were available for the third testing 55 weeks after the pretest.

Of the 37 subjects at the third test, 25 were still practicing the TM technique and 12 had discontinued the technique within the first months after starting. The subjects thus fell into two subgroups: an experimental group of meditators ($N = 25$) and a control group of subjects who had discontinued practice of the TM technique ($N = 12$).

The experimental group included 13 male and 12 female subjects, with a mean age at the beginning of the study of 24.3 years. The control group included six male and six female subjects, with a mean age of 28.9 years. There was no significant difference in age between the two groups. Most of the subjects in both groups were students.

RESULTS

To see whether experimental and control groups were comparable before learning TM with regard to the 12 variables measured by the FPI, mean scores for both groups were compared using two-tailed *t*-tests for independent samples. The results are presented in table 2. No

TABLE 2

COMPARISON OF MEAN SCORES AND VARIANCES OF EXPERIMENTAL AND CONTROL GROUPS AT PRETEST

SCALE	MEAN SCORES			VARIANCE		
	Experimental	Control	<i>p</i>	Experimental	Control	<i>p</i>
1. Nervousness	14.80	15.75	NS*	45.41	59.12	NS
2. Aggressiveness	9.20	9.67	NS	20.08	24.97	NS
3. Depression	16.36	15.75	NS	32.16	43.30	NS
4. Irritability	9.88	11.42	NS	24.69	25.90	NS
5. Sociability	13.84	16.25	NS	24.06	39.11	NS
6. Placidity	8.68	9.17	NS	17.06	23.24	NS
7. Domineering Tendency	5.20	6.67	NS	6.50	7.51	NS
8. Inhibition	11.88	10.42	NS	13.61	22.27	NS
9. Openness	10.48	10.58	NS	4.18	6.27	NS
Ext. Extraversion	11.32	14.08	<0.10	21.81	16.27	NS
Neu. Neuroticism	14.92	14.42	NS	19.83	23.90	NS
Mas. Masculinity	9.92	10.00	NS	16.74	15.82	NS

*NS = not significant.

TABLE 3

COMPARISON OF MEAN SCORES AND VARIANCES OF EXPERIMENTAL AND CONTROL GROUPS 55 WEEKS AFTER INSTRUCTION IN TM

SCALE	MEAN SCORES			VARIANCE		
	Experimental	Control	<i>p</i>	Experimental	Control	<i>p</i>
1. Nervousness	6.88	12.33	<0.01	18.11	34.79	NS*
2. Aggressiveness	7.52	8.42	NS	12.43	22.99	NS
3. Depression	9.48	14.00	<0.05	32.26	60.00	NS
4. Irritability	6.64	9.75	<0.05	23.24	24.38	NS
5. Sociability	18.16	16.33	NS	33.48	53.70	NS
6. Placidity	11.60	9.92	NS	24.58	27.18	NS
7. Domineering Tendency	3.60	5.08	0.06	9.17	8.44	NS
8. Inhibition	7.48	10.08	<0.05	15.51	26.45	NS
9. Openness	9.48	9.58	NS	4.59	5.18	NS
Ext. Extraversion	13.24	13.33	NS	19.69	23.70	NS
Neu. Neuroticism	9.00	12.75	<0.05	28.58	24.93	NS
Mas. Masculinity	14.40	12.00	NS	19.75	24.18	NS

*NS = not significant.

significant differences between the scores of the experimental group and the scores of the control group were found on any of the scales at pretest, although the difference between the two groups on the Extraversion scale approached significance ($p < .10$). Therefore, the groups at pretest can be considered equivalent with respect to the variables measured by the FPI, with the possible exception of Extraversion.

To determine any characteristic changes in personality that might have been attributable to the regular practice of TM, the scores of the experimental group and the control group obtained about 55 weeks after subjects started TM were compared using two-tailed *t*-tests. Results are presented in table 3. The experimental group scored significantly lower than the control group on the Nervousness, Depression, Irritability, Inhibition, and Neuroticism scales. The difference between the experimental and

control groups on the Domineering Tendency scale approached significance ($p = .06$).

Therefore, compared to the nonmeditating subjects, the meditating subjects were more emotionally stable, calm, self-confident, contented, and spontaneous. They also tended to be more flexible and tolerant of frustration.

For a more exact determination of the changes over the relatively long period of 55 weeks, the mean differences for both the experimental and control groups were computed from the differences between pre- and posttest scores for each subject and were then compared using *t*-tests for two independent means (table 4).

With regard to question one (How do changes among regularly meditating subjects compare with changes among subjects who discontinued the practice?), it was found that the subjects who regularly practiced the TM

TABLE 4
COMPARISON OF MEAN DIFFERENCES AND VARIANCES OF EXPERIMENTAL AND CONTROL GROUPS
BETWEEN PRETEST AND POSTTEST 55 WEEKS LATER

SCALE	MEAN DIFFERENCE SCORES			VARIANCE		
	Experimental	Control	<i>p</i>	Experimental	Control	<i>p</i>
1. Nervousness	-7.92	-3.42	<0.01	40.83	9.90	<0.05
2. Aggressiveness	-1.68	-1.25	NS*	9.73	5.48	NS
3. Depression	-6.88	-1.75	<0.01	26.44	27.30	NS
4. Irritability	-3.24	-1.67	NS	16.61	17.15	NS
5. Sociability	4.32	0.08	<0.01	19.06	14.81	NS
6. Placidity	2.92	0.75	NS	13.74	16.39	NS
7. Domineering Tendency	-1.60	-1.58	NS	3.33	8.08	NS
8. Inhibition	-4.40	-0.33	<0.01	16.42	7.33	NS
9. Openness	-1.00	-1.00	NS	4.50	4.18	NS
Ext. Extraversion	1.92	-0.75	<0.05	14.91	10.57	NS
Neu. Neuroticism	-5.92	-1.67	<0.01	23.41	14.97	NS
Mas. Masculinity	4.48	2.00	<0.05	24.68	5.09	<0.01

*NS = not significant.

TABLE 5
COMPARISON OF MEAN SCORES AND VARIANCES OF EXPERIMENTAL GROUP (AT PRETEST) AND NORMATIVE CONTROL GROUP

SCALE	MEAN SCORES			VARIANCE		
	Experimental	Control	<i>p</i>	Experimental	Control	<i>p</i>
1. Nervousness	14.80	11.63	<0.05	45.42	39.43	NS*
2. Aggressiveness	9.20	8.68	NS	20.08	23.02	NS
3. Depression	16.36	12.92	<0.05	32.16	42.00	NS
4. Irritability	9.88	9.66	NS	24.69	24.42	NS
5. Sociability	13.84	14.42	NS	24.06	29.43	NS
6. Placidity	8.68	10.29	NS	17.06	16.42	NS
7. Domineering Tendency	5.20	7.78	<0.01	6.50	16.12	<0.05
8. Inhibition	11.88	9.88	<0.05	13.60	17.45	NS
9. Openness	10.48	10.12	NS	4.18	6.77	NS
Ext. Extraversion	11.32	11.81	NS	21.81	20.80	NS
Neu. Neuroticism	14.92	12.24	<0.05	19.83	28.31	NS
Mas. Masculinity	9.92	12.46	<0.05	16.75	14.62	NS

*NS = not significant.

technique differed from the subjects who had discontinued TM. On the following scales the regular meditators showed:

1. Greater reduction in Nervousness (reduced psychosomatic disturbance)
3. Greater decrease in Depression (increased contentment and self-confidence)
5. Greater increase in Sociability (increased friendliness and liveliness)
8. Greater decrease in Inhibition (increased spontaneity)
- Ext. Greater change in the direction of Extraversion (decreased reticence)
- Neu. Greater reduction in Neuroticism (increased emotional stability)
- Mas. Greater increase in Masculinity (increased self-reliance and vigor and more balanced mood)

The mean scores for the experimental group at the pretest were also compared to the mean scores of a normative group. A comparable norm group was formed using the norm tables in the FPI test manual (1); the parameters for a corresponding "symbolic" control group matched for sex and age were computed using the formula for weighted mean scores and variances. Therefore, the means and variances of the normative control group are those of a random sample matched to the experimental group for age and sex. Table 5 presents the means and variances of the experimental and normative groups along with the results of *t*-tests comparing the means and *F*-tests comparing the variances.

Before learning TM the subjects of the experimental group were on the average more nervous (scale 1), more depressed (scale 3), more tense (scale 8), more emotionally unstable (Neuroticism scale), and more timid, worried, and psychosomatically disturbed (Masculinity

TABLE 6

COMPARISON OF MEAN SCORES AND VARIANCES OF EXPERIMENTAL GROUP
(AFTER 55 WEEKS OF PRACTICING TM) AND NORMATIVE CONTROL GROUP

SCALE	MEAN SCORES			VARIANCE		
	Experimental	Control	<i>p</i>	Experimental	Control	<i>p</i>
1. Nervousness	6.88	11.63	<0.01	18.12	39.34	<0.05
2. Aggressiveness	7.52	8.68	NS*	12.43	23.02	NS
3. Depression	9.48	12.92	<0.05	32.26	42.00	NS
4. Irritability	6.64	9.66	<0.05	23.24	24.42	NS
5. Sociability	18.16	14.42	<0.05	33.47	29.43	NS
6. Placidity	11.60	10.29	NS	24.58	16.42	NS
7. Domineering Tendency	3.60	7.78	<0.05	9.17	16.12	NS
8. Inhibition	7.48	9.88	<0.05	15.50	17.45	NS
9. Openness	9.48	10.12	NS	4.59	6.77	NS
Ext. Extraversion	13.24	11.81	NS	19.68	20.80	NS
Neu. Neuroticism	9.00	12.24	<0.05	28.59	28.31	NS
Mas. Masculinity	14.40	12.46	NS	19.75	14.62	NS

*NS = not significant.

scale) than the normative group. Since scales 1, 3, and 8 (and Neu and Mas, which are mathematically dependent on 1, 3, and 8) taken together measure primarily the dimension of "Emotional Instability-Emotional Stability" (Neuroticism) (1), it may be said that prospective meditators were less emotionally stable than the norm. There was also a difference on scale 7 (Domineering Tendency); compared with the norm beginning meditators exhibited less reactive aggression, corresponding to greater moderation and flexibility.

Comparison of the values of the two groups after 55 weeks of regular meditation presented quite a different picture (table 6). On five of the six scales comprising the Neuroticism dimension (scales 1, 3, 4, 8, and Neu), the subjects in the experimental group scored significantly lower than those in the normative control group. On the sixth scale of the Neuroticism dimension (scale Neu), the mean of the experimental group was higher than that of the normative group, though not significantly so, suggesting a tendency toward greater balance and self-reliance. Moreover, the experimental group yielded a significantly higher mean on the Sociability scale. On scale 7 (Domineering Tendency) the two groups exhibited an even greater difference than at pretest.

Thus, regarding question two (How does the experimental group compare to a normative group?), beginning meditators exhibited significantly higher neuroticism (nervousness, depression, irritability, inhibition, and emotional instability) than the norm, whereas one year later they exhibited significantly lower neuroticism than the norm. Also, a less reactive-aggressive, domineering style of communication and a greater tendency towards tolerance, flexibility, and moderation seemed to be characteristic traits of subjects who started TM, and these

traits continued to grow with the continued practice of the TM technique.

Twenty subjects in the experimental group participated in all three testing sessions—the pretest, the initial posttest (approximately seven weeks after the subjects began TM), and the final posttest (approximately 55 weeks after the subjects began TM). For this group, difference scores from the pretest to the initial posttest and from the initial to the final posttest were calculated. For the sake of comparison, difference scores were expressed in *z* units (standard scores). The procedure was to ascertain first the homogeneity of the variances of the scores on every scale for the first, second, and third administrations of the FPI by means of an *F*-test. No significant differences at the 0.01 level were found. Then, for every scale a weighted standard deviation was computed from these three variances. The mean differences within the first period (0–7 weeks) and the second period (7–55 weeks) were then expressed as ratios of the mean difference and the weighted standard deviation:

$$\bar{d}/s_g = z_{\bar{d}}$$

Table 7 and fig. 1 present the standardized difference score, $z_{\bar{d}_1}$, for the first period (0–7 weeks) and the standardized difference score, $z_{\bar{d}_2}$, for the second period (7–55 weeks).

If one compares the relative increase per unit of time for the two periods by means of the formula

$$Q = 6.9(z_{\bar{d}_1}/z_{\bar{d}_2})$$

where 6.9 is the factor by which the second period is longer than the first, and $z_{\bar{d}_1}$ and $z_{\bar{d}_2}$ are the changes, expressed in standard scores, within the first and second periods respectively, then a quotient (*Q*) can be computed that expresses how much greater the increase per unit of

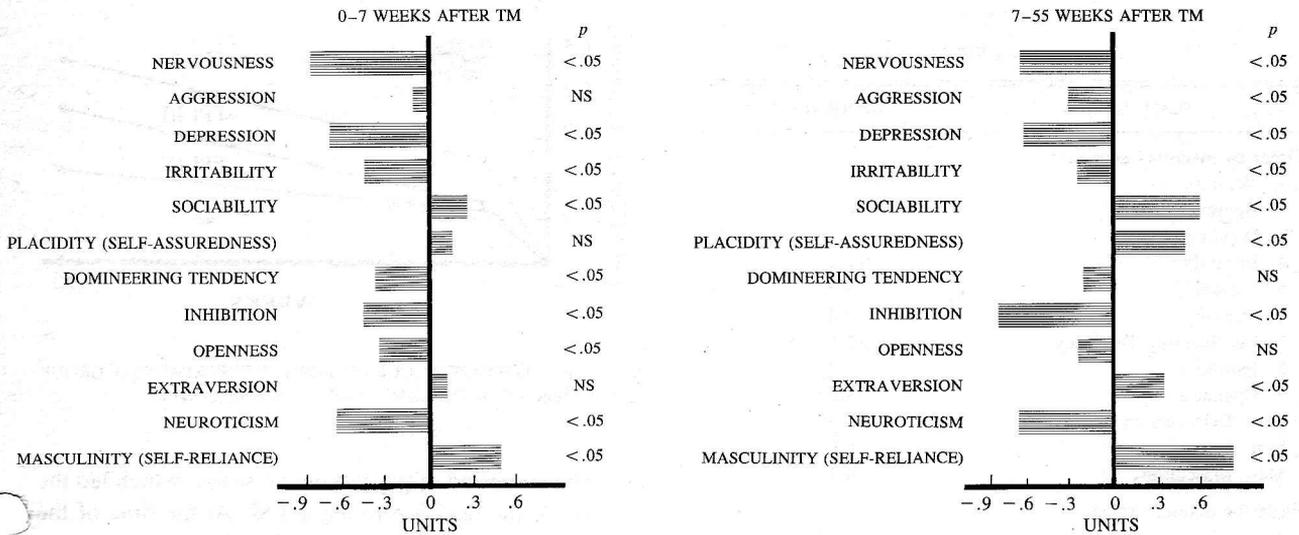


FIG. 1. STANDARDIZED DIFFERENCE SCORES FOR THE EXPERIMENTAL GROUP FOR THE FIRST SEVEN WEEKS (LEFT) AND THE NEXT 48 WEEKS (RIGHT) AFTER LEARNING TM

TABLE 7

STANDARDIZED DIFFERENCE SCORES OF EXPERIMENTAL GROUP FOR FIRST PERIOD OF SEVEN WEEKS (z_{d_1}) AND FOR SECOND PERIOD OF 7-55 WEEKS (z_{d_2}) AND WEIGHTED STANDARD DEVIATIONS (S_w)

SCALE	z_{d_1}	z_{d_2}	S_w
1. Nervousness	-0.84*	-0.63*	5.84
2. Aggressiveness	-0.10	-0.30*	4.05
3. Depression	-0.68*	-0.61*	5.63
4. Irritability	-0.43*	-0.25*	5.03
5. Sociability	0.27*	0.59*	5.65
6. Placidity	0.17	0.48*	4.59
7. Domineering Tendency	-0.38*	-0.21	2.92
8. Inhibition	-0.45*	-0.81*	3.88
9. Openness	-0.35*	-0.25	1.98
Ext. Extraversion	0.12	0.34*	4.58
Neu. Neuroticism	-0.63*	-0.66*	4.78
Mas. Masculinity	0.48*	0.81*	4.07

* $p < 0.05$.

time was in the first period than in the second period. The quotients for the 12 scales are presented in table 8.

Those quotients where one of the z scores was not significant could not be evaluated because they were not meaningful. (Even the other quotients may only be considered to be rough estimations.) In cases where Q was small (Aggressiveness, Extraversion, and Placidity), significant changes developed only after a longer period of the practice of meditation. In cases where the change in one period was not significant and Q was large (Openness and Domineering Tendency), significant changes were found only in the first few months of the practice of the TM technique.

Changes on the other scales describe a curve that has a steeper slope during the first seven weeks than during the

remaining 48 weeks. Differences in the slopes of the curves result because scales with higher quotients (Irritability, Nervousness, Depression, and Neuroticism) describe steeper slopes during the first period and more flat slopes in the second period than do scales with smaller quotients (Sociability, Inhibition, and Masculinity).

A comparison of data in table 8 with the factor analysis of the nine mathematically independent scales described in the FPI test manual (1) shows that the Nervousness and Depression scales (and to a lesser extent the Irritability scale) correspond to the dimension FPI II (in the sense of Eysenck's "Neuroticism"), that the Sociability and Inhibition scales correspond to the dimension FPI III (in the sense of Eysenck's "Extraversion-Introversion"), and that the Irritability and Domineering Tendency scales correspond to the dimension FPI IV (reactive aggressiveness versus moderation, consideration of others, and tolerance of frustration). This seems to justify the organization of the results on the nine scales into three groups, each of which has a particular pattern of development. Developmental curves for dimensions FPI II, III, and IV for the experimental group are shown in fig. 2.

With regard to the pattern of development, the decrease in the Neuroticism dimension (FPI II) is dominant in the first months, and only in the following months does a change in the direction of greater spontaneity, friendliness, and sociability (FPI III) occur to a marked extent. Scales representing the dimension FPI IV (Domineering Tendency and Irritability) remain relatively constant after a smaller change in the beginning than that which occurred on the other two dimensions. This is understandable, since the pretest values on scale 7 (Domineering Tendency) were already significantly lower for the meditators than for the norm group.

TABLE 8
QUOTIENTS FOR FPI SCALES

SCALE	QUOTIENT
Order by inventory sequence	
1. Nervousness	9.2
2. Aggressiveness	2.3*
3. Depression	7.7
4. Irritability	11.9
5. Sociability	3.2
6. Placidity	2.4*
7. Domineering Tendency	12.5*
8. Inhibition	3.8
9. Openness	9.7*
Ext. Extraversion	2.4*
Neu. Neuroticism	6.6
Mas. Masculinity	4.1
Order by quotient value	
Aggressiveness	2.3*
Extraversion	2.4*
Placidity	2.4*
Sociability	3.2†
Inhibition	3.8†
Masculinity	4.1‡
Neuroticism	6.6‡
Depression	7.7‡
Nervousness	9.2‡
Openness	9.7*
Irritability	11.9§
Domineering Tendency	12.5*§

NOTE: Quotients (see text) compare the relative increase per unit time of the two test periods (0-7 weeks and 7-55 weeks). Scales Ext, Neu, and Mas are composed of items from the other nine scales and are therefore mathematically dependent upon these scales. The nine primary scales are independent from one another.

*This score is regarded as uncertain (see text). ‡Denotes scales of FPI II dimension. §Denotes scales of FPI IV dimension.

†Denotes scales of FPI III dimension.

DISCUSSION

Meditating subjects showed significantly greater changes in the direction of emotional stability, self-confidence, self-reliance, spontaneity, friendliness, and extraversion than the control group. Since both groups had learned the TM technique at the beginning of the study, the positive effects seen in the experimental group cannot be attributed simply to a placebo effect from learning the practice. The most important factor for bringing about positive personality development seems to have been the regular practice of the TM technique. This was the main variable on which the two groups differed.

An objection might be that due to certain personality traits some subjects may have been predisposed to continue meditating and others may not have been, leading to a biased control group. However, no significant differences between the two groups on any of the scales of the FPI could be shown at pretest. (See table 2.)

The higher Neuroticism scores of the subjects beginning TM (compared to the norm) may be interpreted as

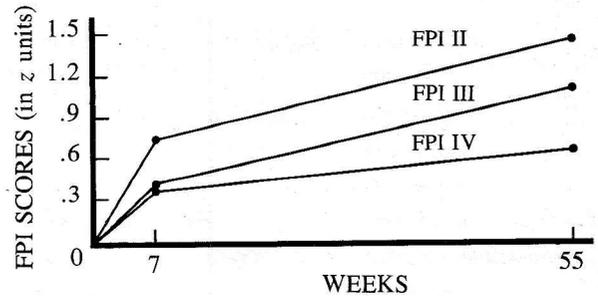


FIG. 2. DEVELOPMENTAL CURVES FOR THE EXPERIMENTAL GROUP (MEDITATORS) FOR THE DIMENSIONS FPI II, III, AND IV

indicating a period of psychological stress, which led the subjects to the decision to learn TM. At the time of the pretest, therefore, compensatory and restorative processes seem to have prevailed. The TM technique is, in effect, a "compensation for disorder" (8). With the decrease in psychosomatic disturbances a few months after subjects learned the technique, the predominance of restorative processes also decreased somewhat, and growth in creative tendencies and social integration increased. The priority of "self-maintenance" belongs to the restorative phase, and the growth of self-actualization presupposes the satisfaction of these basic needs brought about by the compensatory and restorative processes. (See the discussion of deficiency motivation and growth motivation by Maslow (5).)

Characteristic patterns may be seen in the development of meditators. The significant changes on scales with high quotients (Nervousness, Depression, Irritability, and Neuroticism), even within the first seven weeks after subjects were instructed in the TM technique, may be attributed mainly to the immediate effects of TM, whereas significant changes on other scales with lower quotients (Sociability and Inhibition) continue throughout the remainder of the first year of meditation and may be attributed more to the long-term, cumulative effects of TM. This is confirmed by the findings of Weiss (9), who dealt specifically with the short-term effects of TM. Using an adjective checklist, Weiss found the following significant psychological changes, among others, immediately after meditation, compared to immediately before meditation: higher activation, reduced deactivation (dislike for purposeful action), reduced fatigue, decreased introversion, reduced motor excitation, decreased depression, and elevated mood. The amount of change after a single meditation was not correlated with the length of time since the subject began TM. Single meditations were not found to produce changes in extraversion, self-confidence, or anxiety.

However, positive changes in these variables over a longer period of time have been reported (3, 4). We may

conclude that these changes developed as a result of the accumulation of the immediate effects of the TM technique and the continuous transformation of the self-image produced thereby. It seems likely that by producing a repeated, positive experience of self, the regular practice of the TM technique produces a progressive reduction in the rigidity of psychological processes, which has arisen from repression of frustrating perceptions. Along with this increasingly positive experience of the self, meditators experience a growing acceptance and a more positive comprehension of the self and the environment. Thus, personality development takes the direction of increased openness towards the environment and others and increased spontaneity; this process leads to a new awareness of the self, exhibited by increased self-reliance, self-confidence, openness to interpersonal relationships, and independence. (See Staehelin's *Urvertrauen* (7) and Maslow's *Self-actualization* (5).)

A comparison of our results with those of Schenkluhn and Geisler (6) shows common features in the two sets of findings. Schenkluhn and Geisler describe four phases in the development of drug abusers during the first year after they learned the Transcendental Meditation technique. The four phases are as follows:

1. *Motivation and Orientation*: Relevant characteristics of this phase are the overcoming of acute problems, increased openness towards others, greater self-orientation, and the relaxing of rigid attitudes and behavioral routines.
2. *Confrontation*: Relevant characteristics are the confrontation of unsolved problems, breaking away from the drug subculture (accompanied by anxiety), and oscillation between adherence to personal ideals and adherence to the group norm.
3. *Growing Initiative and Confidence in Mastering Unsolved Problems*: Relevant characteristics are first attempts to solve old problems, an erratic approach to the acute conflict situation, the development of new social contacts and friends, and the gaining of a new self-comprehension.
4. *Initiative and Self-development*: Relevant characteristics are a desire for greater development of one's own capacities, starting a permanent job or advanced training, finding new social relationships, and helping in the drug rehabilitation of others.

When we compare the four rehabilitative phases of Schenkluhn and Geisler to the developmental curves of the FPI found in this study (fig. 2), a clear relationship is found between the description of phase one (clearance, opening, and orientation) and development during the first seven weeks after learning TM shown by the FPI results (reduction in neuroticism, nervousness, and depression and increase in emotional stability). Further-

more, the common characteristics of phases two, three, and four, namely initiative and growing confidence, correspond to changes shown on the FPI during the second period of this study, namely increased spontaneity, openness to interpersonal relationships, liveliness, and self-reliance.

The regulative-compensatory aspect dominated during the beginning of the developmental process observed by Schenkluhn and Geisler, as well as during the one observed by us. During the following months it was largely replaced by the process of growth and self-development. Here we find a confirmation of Maslow's thesis mentioned above, that the process of self-actualization (growth of existence in the sense of expansion of creativity and integration on all levels) presupposes the fulfillment of basic needs.

The effect of the Transcendental Meditation technique is not restricted to the restoration of disturbed psychophysiological functions, but rather TM is found to set in motion developmental processes that clearly correspond to the higher motivations of Maslow's hierarchy, such as "transcending" and "self-actualization." The effective compensatory-regulative function of the TM technique, then, has to be regarded as being subordinate to the essential, higher function that it serves—the expansion of creativity, integration, and fulfillment.

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