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# Learning disorders and the transcendental meditation program : retrospects and prospects (a preliminary study with economically deprived adolescents)

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312066009298048

LEARNING DISORDERS AND THE TRANSCENDENTAL MEDITATION

PROGRAM: RETROSPECTS AND PROSPECTS

(A Preliminary Study with Economically Deprived Adolescents)

A Dissertation Presented

by

Yvonne Jackson

Submitted to the Graduate School of the  
University of Massachusetts in partial fulfillment  
of the requirements for the degree of

DOCTOR OF EDUCATION

April

1977

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PROGRAM: RETROSPECTS AND PROSPECTS  
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A Dissertation for Doctoral Degree

by

YVONNE JACKSON

Approved as to style and content by:



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## ACKNOWLEDGEMENT

For the knowledge of the Transcendental Meditation program, my indebtedness is to its founder, Maharishi Mahesh Yogi, and the guiding light of his activities, known affectionately as Guru Dev, Swami Brahmananda Saraswati, Shankaracharya of Jyotir Math.

## ABSTRACT

## LEARNING DISORDERS AND THE TRANSCENDENTAL MEDITATION

## PROGRAM: RETROSPECTS AND PROSPECTS

(A Preliminary Study with Economically Deprived Adolescents)

(April 1977)

Yvonne Jackson, B.S., State College, Cheyney, Pa.  
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Directed by: Professor Harvey Scribner

During the past ten years, learning disorders and the Transcendental Meditation program have been the topics of extensive writing and scientific research. A literature survey contrasting the effects of each suggests that as an adjunct to curricula, the Transcendental Meditation program can be effective in alleviating learning disorders specifically, and enhancing the learning process generally. A theory and research strategy were developed that postulated, then practically tested that proposition.

To practically test that hypothesis on aspects of personality and intellectual development of students with learning disorders from low-income families, 16 adolescents learned and practiced the Transcendental Meditation technique

for 22 weeks and 2 days. The control group consisted of 36 adolescents. The subjects were from the same urban public secondary school located in a low-income area. All subjects were randomly selected from the total number of black adolescents in a curriculum for students functioning more than two years below expected grade level in reading and mathematic achievement. Those students were in addition to the adolescents in the Educable Mentally Retarded program.

Standardized tests were used to measure the achievement levels before and after the students began the practice of the technique. Personality development was measured by three scales of the Personal Orientation Inventory: Other/Inner directed, Self-Regard, and Acceptance of Aggression. Intellectual development was measured by the Gray Oral Reading Tests and the Wide Range Achievement Test, respectively. Analyses of covariance were performed to evaluate posttest differences between the groups.

The results indicated that the students in the Transcendental Meditation program developed significantly on the personality measures at the .001 level of confidence on all three scales of the Personal Orientation Inventory.

Although the meditators performed better in reading and arithmetic achievement, the differences in this four and one-half months study were not significant.

Also noteworthy was the 44 percent dropout rate of the control subjects while the study was in progress. It is significant that there were no dropouts among the meditators from that same population where the attrition rates are as high as the 44 percent rate of the control subjects. That variable along with the others are discussed, and implications for further study are noted.

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# C H A P T E R I

## INTRODUCTION

### Problem

While learning disorders are adequately described throughout the literature, there is very little substantial research to support the notion that the many remedial practices and theories by themselves increase the orderly functioning of learning in personal and intellectual development. Even with the most sympathetic and dedicated educators, the frustrations among the students remain incalculable.

On the other hand, more than a hundred scientific research studies provide increasing evidence that the Transcendental Meditation program effectively decreases learning disorders such as subtle irregularities in perceptual and motor abilities, gnosis, memory, thought, apraxia, and emotional-social disturbances that retard scholastic achievement. The uniqueness of the program as compared with other techniques of meditation, or any program of mental, physical, or social development, is the depth and

breadth of scientific research substantiating its effects.<sup>1</sup> The possibility that it can alleviate disorders in learning and enhance the learning process in general is examined theoretically and practically in this study.

### Definition of Terms

The term learning disabilities refers to more than 100 different terms and 38 definitions used to describe learning disorders ascribed to minimal brain dysfunction.<sup>2</sup> Since no actual measurable damage to the brain can be

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<sup>1</sup>Fundamentals of Progress: Scientific Research on the Transcendental Meditation Program (Livingston Manor, N. Y.: MIU Press, 1975, pp. 16-50 (see Appendix B). The comparatively limited amount of research on other techniques and programs indicate that they do not result in the well-integrated combination of physiological, psychological, sociological, and ecological response as seen in the Transcendental Meditation program. On this basis, it is conceivable that other programs could result in strain and imbalance in the functioning of the neurophysiological system. More adequate research will weigh the possibilities. In the meanwhile, therapeutic use of them should be limited until results have been more thoroughly researched. See also David Orme-Johnson and J. Farrow, eds., Scientific Research on Transcendental Meditation: Collected Papers, Vol. 1 (Livingston Manor, N. Y.: MIU Press), forthcoming.

<sup>2</sup>U. S., Department of Health, Education, and Welfare, Minimal Brain Dysfunction in Children: Terminology and Identification (Phase One of a Three-Phase Project), by Sam D. Clements, DHEW Publication No. (NIH) 73-349 (Washington, D. C.: Government Printing Office, 1966), pp. 8-10.

found, and the intellectual, sensory, and motor functions are above subnormal ranges, the term "minimal" is used. The dysfunction is felt to be minimal in the sense of a continuum of impairments in any of the areas of brain functionings. Because the resulting behavior does not resemble the extreme behavioral disorders with measurable brain damage, such as the cerebral palsies, mental subnormalities, and sensory defects, it is felt that minimal brain damage is not so extreme as to warrant inclusion in any of those or other established categories.

There are many forms of learning problems. To go into each one would take an enormous amount of space. In order to keep this presentation brief, the general nature and structure of learning problems are discussed without getting lost in the details of a particular form.

The term "learning disorders" is used throughout this paper to discuss the general nature of learning problems. For our purpose, it has many advantages over the more popular term, learning disabilities, because:

1. It facilitates the communication of the pluristic system of learning problems that has become a discipline for medical specialists, psychologists, educators, speech



pathologists, and occupational therapists, each bringing to the system terminology consistent with its professional vocabulary.

2. It provides an adequate description of any or all learning problems because the concept itself designates the invariant, the one common denominator, that characterizes all learning and behavioral problems in any given individual to any degree, regardless of whether the etiology is ascribed to organicity (the brain) or to the environment.

3. It does not label an individual in that it implies a momentary symptom, rather than a specific long-term handicap -- it describes a process rather than a state.

The acceptance of the U. S. Department of Health, Education, and Welfare (HEW) organic classification of minimal brain dysfunction for learning problems by at least 49 states and the Association for Children with Learning Disabilities (ACLD) may reflect more the criteria for securing funds rather than its acceptance by personnel in education.<sup>3</sup> A significant impediment among those

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<sup>3</sup>R. W. Vaughan and L. Hodges, "A Statistical Survey into a Definition of Learning Disabilities: A Search for Acceptance," Journal of Learning Disabilities 6 (December 1973), 658.

professionals in accepting this classification is the limitation of knowledge of the human nervous system in the field of neurophysiology, and the limited diagnostic techniques that can make a positive identification.

Despite this and other limitations, the theory of minimal brain dysfunction is currently the most acceptable for several reasons. First, it defines the widest array of learning and other behavioral disorders in terms of the fewest simple theorems. And, secondly, it is felt that the learning and other behavioral disorders represent neurological signs of the most meaningful kind because of the influence they have on motor and perceptual abilities.<sup>4</sup>

The theoretical notion developed within this paper which led to the practical aspect of the study is that as an adjunct to traditional educational practices, the Transcendental Meditation program is an effective means of alleviating learning disorders. The foundation for the construction and testing of this theory is based on the fact that the literature from both disciplines give implications for a theory of learning from the same viewpoint.

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<sup>4</sup>U. S., Department of Health, Education, and Welfare, Minimal Brain Dysfunction in Children, pp. 6-7.

This viewpoint is neurological. It is based on the functioning of the brain. Learning disorder is attributed to minimal brain dysfunction, while the increase of orderly brain waves during meditation and the resultant improvement in learning and other behavior outside of meditation are attributed to the practice of the Transcendental Meditation technique.

Although organicity is recognized as the cause of learning disorders, it is frequently ignored in the diagnosis and educational treatment, unless it is grossly obvious. Major reasons why this practice is so prevalent may be because of the lack of a technique to determine the extent of its contribution, and a technique to treat the damage directly, in situ, without side effects as happens with drug therapy. Research on the Transcendental Meditation program suggests that the practice of the Transcendental Meditation technique alleviates learning disorders at its source while the problems it creates are being treated on the level of behavior through traditional remedial practices. Remediation cannot interfere with the practice of the natural technique, nor does the practice interfere with remediation.



## Hypotheses to be Tested

The results of research by Wallace, Benson, Wilson, Banquet, and others indicate a unique ordering of electroencephalography (EEG) in the brain during the practice of the Transcendental Meditation technique.<sup>5</sup> This ordering occurs between the frontal and posterior regions, and the left and right hemispheres of the brain. This pattern of EEG ordering during the practice of the Transcendental Meditation technique formed the basis for the three hypotheses of this study. The specific statement of each hypothesis in the following paragraphs is followed by the rationale from which it was developed.

Hypothesis 1. Students with learning disorders that practice the Transcendental Meditation technique will have significantly higher mean scores on the following scales of the Personal Orientation Inventory:

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<sup>5</sup>Robert Keith Wallace, Herbert Benson, and A. F. Wilson, "A Wakeful Hypometabolic Physiologic State," American Journal of Physiology 221 (September 1971): 795-99; Jean-Paul Banquet, "EEG and Meditation," Electroencephalography and Clinical Neurophysiology 33 (1972): 454; Jean-Paul Banquet, "Spectral Analysis of the EEG in Meditation," Electroencephalograph and Clinical Neurophysiology 35 (1972): 143-51.

- a. Other/Inner directed
- b. Acceptance of Aggression
- c. Self-Regard

The basis for this hypothesis is the research which shows that during the practice of the transcendental Meditation technique, the alpha waves that are ordinarily characteristic of the posterior cortex where the sensory controls are located spread synchronously to the frontal region of the brain. Simultaneously, the beta and theta waves ordinarily characteristic of the frontal region where motor controls are located spread coherently to cover the entire brain. This effortless brain wave ordering during meditation would suggest improved coordination between thought and action measurable by psychological tests. The benefits on behavior outside of meditation from this type of EEG ordering during the practice have in fact been measured through a variety of psychological tests with individuals from America and abroad.<sup>6</sup>

Hypothesis 2. Students with learning disorders

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<sup>6</sup>Demetri P. Kanellakos and Jerome S. Lukas, The Psychobiology of Transcendental Meditation: A Literature Review (Menlo Park, California: W. A. Benjamin, Inc.), pp. 23-37.

that practice the Transcendental Meditation technique will have significantly higher mean scores in reading achievement than the nonmeditating students, as measured by the Gray Tests of Oral Reading.

The rationale for the formulation of this hypothesis is the electrical wave synchrony that occurs between the two hemispheres of the brain during the practice of the Transcendental Meditation technique. The improved orderly functioning of the brain indicated by the synchronization of electrical waves in the left and right hemispheres in meditating subjects suggests a functional integration of the analytical and cognitive functions of the left hemisphere with the synthetic and affective functions of the right. This type of ordering may indicate an integration of the cognitive and affective components of the brain. The cognitive component of the left hemisphere may determine the quality of an individual's intellectual pursuits, while the affective component of the right hemisphere provides the dynamism, or driving force for intellectual and other pursuits.<sup>7</sup> The possibility that this type of brain

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<sup>7</sup>Sarah F. Cambell, Piaget Sampler (New York: John Wiley and Sons, Inc., 1976), p. 39.

wave ordering can result in improved language learning ability, as in reading, for example, has been suggested in the research of Tjoa, Abrams, and Collier.<sup>8</sup>

Hypothesis 3. Students with learning disorders that practice the Transcendental Meditation technique will have significantly higher mean scores in arithmetic achievement than the nonmeditating students as measured by the Wide Range Achievement Test. Because linguistic abilities affect performance in mathematics (as math is a specialized language), the rationale forming the basis of this hypothesis as in the previous one is the synchrony between the two hemispheres of the brain.<sup>9</sup>

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<sup>8</sup>Andre Tjoa, "Some Evidence that the Practice of Transcendental Meditation Increases Intelligence as Measured by a Psychological Test," Amsterdam, 1972; Allen I. Abrams, "Paired Associate Learning and Recall: A Pilot Study Comparing Transcendental Meditators with Non-Meditators," Department of Education, University of California at Berkeley, 1972; Roy W. Collier, "The Effects of Transcendental Meditation upon University Academic Attainment," College of Arts and Sciences, University of Hawaii, 1973. These papers have been compiled for the following publication: David Orme-Johnson and J. Farrow, eds., Scientific Research on Transcendental Meditation: Collected Papers, Vol. I (Livingston Manor, New York: MIU Press), forthcoming.

<sup>9</sup>Lewis R. Aiken, Jr., "Language Factors in Learning Mathematics," Review of Education Research 42 (1972): 359-85.

### Significance of Study

Research on the effectiveness of the Transcendental Meditation program with adolescents in educational settings is not uncommon. The uniqueness of this study is that the subjects were black and economically deprived, whereas the adolescents of previous studies were white and affluent.

Typically, the economically deprived student with learning problems is not evaluated as minimal brain dysfunction even though the behavioral symptoms are the same. It is felt that the source of the problem is environmental and not organic as implied in minimal brain dysfunction. The message is that learning disorders are alleviated in the individual of this population by equalizing pedagogical and other social opportunities. While the writer subscribes to the necessity of equalizing environmental opportunities, she also feels that it is not sufficient in itself to prevent or alleviate disorders now in the learning style of the individual from this population who might be affected for several reasons.

First, as a predisposing agent, the sustentative nature of inequality that permeates the social institutions



of the culture must have a substantial influence on the functioning of the nervous system. The learning disorder may be the resulting symptom of the influence. Also, common sense and an appreciation of physics will lead anyone to conclude that learning disorders cannot be considered separate nor distinct from neurological functionings. Dr. Stanley Cobb, Bullard Professor of Neuropathology at Harvard Medical School, and Psychiatrist in Chief at the Massachusetts General Hospital, has stated the impossibility for human behavior to take place without an organ to perform it.<sup>10</sup> The organ of learning is the brain which is the central station of the neurophysiological system. Social inequality represents one of the many predisposing agents that may influence its functioning. The mere suggestion of a separation between learning and the brain reflects a limited concept of the nervous system, and ignorance of the knowledge of what can be inferred about its various levels of influence on the learning process.

Secondly, as a precipitating agent, time is a factor for several reasons. Not only does it require time

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<sup>10</sup>Stanley Cobb, Borderlands of Psychiatry (Cambridge: Harvard University Press, 1943), pp. 21 and 26.

to implement legislation already passed (as in school desegregation) as a means to eliminate discriminatory practices interwoven within the fabrics of social institutions, but it takes time to bring about the change in attitudes of the individuals which form the structure of those institutions.

We cannot afford the luxury of waiting until the social climate is ameliorated. Nor do we need to. Research on the Transcendental Meditation program suggests that given the opportunity to participate in the program, the individual by his or her own volition strengthens the functioning of the nervous system during and outside the practice of the Transcendental Meditation technique.<sup>11</sup>

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<sup>11</sup>William Seeman, Sanford Nidich, and Thomas Banta, "The Influence of Transcendental Meditation on a Measure of Self-Actualization," Journal of Counseling Psychology 19 (1972): 184-87; Sanford Nidich, William Seeman, and T. Dreskin, "Influence of Transcendental Meditation: A Replication," Journal of Counseling Psychology 20 (November 1973): 555-56; Larry A. Hjelle, "Transcendental Meditation and Psychological Health," Perceptual and Motor Skills 39 (1974): 623-28; D. R. Frew, "Transcendental Meditation and Productivity," Academy of Management Journal 17 (June 1974): 362-68; P. C. Ferguson and J. Gowan, "The Influence of Transcendental Meditation on Anxiety, Depression, Aggression, Neuroticism and Self-Actualization," paper presented at California State Psychological Association, Fresno, California, January 1974; Herbert Benson and Robert Keith Wallace, "Decreased Blood Pressure in Hypertensive Subjects Who Practiced Meditation," Supplement II to

Resultant behavior suggests that not only does the individual become progressively immune to the stresses of poverty and discrimination internally, but he or she becomes increasingly immune to their external influences. In a progressive manner, from the very first day of the practice, the meditating individual starts to overcome learning disorders precipitated by those and other related agents -- all of which take their toll on the functioning of the nervous system. Not only does the practice increase the immunity to those influences while ordering the system internally, but it orders the environment externally to allow the affected student and others to realize their human potentials.<sup>12</sup>

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Circulation 45 and 46 (October 1972). The following paper will be published in the forthcoming book by Orme-Johnson and Farrow, eds., Scientific Research on Transcendental Meditation: Collected Papers, Vol. I; David Orme-Johnson, et al., "Personality and Autonomic Changes in Meditating Prisoners," La Tuna Federal Penitentiary, Texas, August 1972. See also footnotes 5 and 8.

<sup>12</sup>The following report by Landrith and Borland suggests this ordering influence of the "external environment" by the meditating individual outside of meditation: Garland Landrith and Candace Borland, "Improved Quality of City Life: Decreased Crime Rate," report presented at the news conference in Vitznau, Switzerland called to announce Maharishi Mahesh Yogi's historical five-continent world tour, March 1975. The study matched twelve cities with a population of at least 25,000 of which 1 percent practiced



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the Transcendental Meditation technique with twelve control cities that had not yet reached the "One in One Hundred" level. In the 1 percent cities, the crime rate had decreased by an average of 8.8 percent. The crime rate continued to rise at the rate of 17.8 percent per year in the control cities. The net difference is 16.6 percent. If the crime rate is taken as an indicator of the overall quality of city life, then the overall benefits of 1 percent of the population involved in the Transcendental Meditation program have very positive influences. This report will be published in the forthcoming book by Orme-Johnson and Farrow, eds., Scientific Research on Transcendental Meditation: Collected Papers, Vol. I.

A third type of brain wave ordering suggests the ordering influence of the "internal environment" of the meditator during the practice of the Transcendental Meditation technique. This third type of EEG signals (brain waves) that occurs during the practice of the Transcendental Meditation technique is seen in a more integrated relationship vertically between the cortex (the bark or gray matter) and the thalamus (ovoid mass at the base of the brain) and other subcortical levels (see Figure 4). This coherence between the cortical areas responsible for the primary physiological functions suggests the interrelationship between mind and body which offers some explanation for the results of the original physiological research by Wallace. Even though the practice of the Transcendental Meditation technique is purely mental, a profound reduction in oxygen consumption, metabolic rate, breath rate, skin resistance, cardiac output, and blood chemistry can be measured during the practice. This physiological phenomenon has an analogy from physical science in the third law of thermodynamics which states: entropy (disorder) decreases when temperature (activity) decreases, and that the condition of zero entropy, perfect orderliness, coincides with a temperature of absolute zero (absolutely no activity). See: R. Keith Wallace, "The Physiological Effects of Transcendental Meditation" (Ph.D. dissertation, University of California, 1970).

The Transcendental Meditation program is a new science, useful to students, parents, teachers, and administrators -- all aspects of education.<sup>13</sup> For this reason, it was thought that it should not be associated with remediation and rehabilitation. However, that reluctance has been softened by the understanding that learning disorders stifle the aspirations of not only the affected individuals and their families, but also that of the community, the nation, and ultimately the world.

The broader social impact and concern for learning disorders, and the need for a creative, yet cautious approach to alleviate it have been demonstrated by lay and professional persons alike. They have created a massive market for the deluge of new training materials, developed and passed federal legislation, formulated a vast number of new organizations, and provided a ready audience for the programming and publications of mass media that center on the problem.

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<sup>13</sup>Al E. Rubottom, "Transcendental Meditation and Its Potential Uses for Schools," Social Education (December 1972): 851-57; Francis Driscoll, "TM as a Secondary School Subject," Phi Delta Kappan 54 (December 1972): 236-37; Paul H. Levine, "Transcendental Meditation and the Science of Creative Intelligence," Phi Delta Kappan 54 (December 1972): 231-35.

The huge and growing research on the efficacy of the Transcendental Meditation program speaks convincingly of the real potentials of the human neurophysiological system. The possibility of realizing those potentials by alleviating learning disorders at its source through the Transcendental Meditation program was introduced in this chapter as a reality now. For this reason, the problem of learning disorders are reviewed in the following chapter as history, in retrospect.

Definition, etiology, symptomatology, and remedial education procedures that characterized much of the literature in this field are surveyed in Chapter II. The main purpose of the chapter was to make this relatively new field of knowledge comprehensible by organizing the striking diversity of data to bring out meanings not immediately apparent. Certain simplifications and schematic presentations could not be avoided in order to keep the presentation brief.

## C H A P T E R   I I

### RETROSPECT: LEARNING DISORDERS

#### Overview

Learning disorders are behavioral imperfections in the learning process that are associated with deviation of brain functioning. The imperfections manifest in various combinations of impairments in the learning process. Included in those impairments are the imperfect ability to listen, think, remember, speak, read, write, spell, and do arithmetic computations. Also included are impairments in the control of attention, impulse, balance, posture, left-right orientations, and visual-motor movements.

The disorders can be said to be inefficient styles of learning because the process lacks an orderly, even, equilibrated structure. The disequilibrium is the effect of the unevenness of the development of the learning process. The cause of the unevenness in development is disorderly neurological functioning.

There are no characteristic familial, racial, economic, or national pattern for the individual with this



trait. Notables as Leonardo daVinci, Thomas Edison, Woodrow Wilson, Albert Einstein, and Nelson Rockefeller, III showed behavioral signs of it in their early years and residuals of it throughout life.

Learning disorders as taxonomic entity with distinguishing characteristics did not gain national prominence until December 1965 through federal funding. This stirring of national conscience culminated in 1975 in the federal legislation that mandated state responsibility for the treatment and education of individuals with learning disorders in regular classrooms.

The concept of learning disorder is germane in that it may or may not include the individual with learning and other behavioral disorders due primarily to sensory or motor handicaps, to mental retardation, emotional problems, or to environmental disadvantages. Characteristically, the student has a near normal or above intelligence quotient (I.Q.) ranging from 75 or above, and/or is two or more years below grade level in academic performance expected of his or her chronological age. Or, there may be a 20-point discrepancy between I.Q.

and standardized achievement scores.<sup>14</sup>

The disorders in scholastic performances for this student range from gross, measurable disturbances to the mild, barely perceivable traits that can be detected only by the trained educational specialist. Because of the range of disorders, from the obvious to the less evident, the disorders have been classified as primary and secondary, respectively.<sup>15</sup>

Primary learning disorders show specifically in the student's scholastic performances. Secondary disorders do not. For this reason, the student with secondary disorders is generally perceived by the classroom teacher untrained in special education as "lazy." As a result, secondary disorders very frequently are accompanied by emotional and social disorders resulting from the

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<sup>14</sup>Generally the concern of educators for the comparatively slower pace of scholastic achievement for this individual is not until after the primary grades owing to the natural slower pace of the development of the learning process of some individuals in the early years. However, in recent years, much concern has been shown for early diagnosis of learning disorders during the preschool years and primary grades.

<sup>15</sup>"Find LD Major Factor in Delinquency: Schools Far from Meeting LD Needs," ACLD Newsbriefs, no. 109 (July/August 1976), p. 1.

frustration of trying, but being unable to perform scholastically as expected.

The number of students that can be classified under this concept is not known, though their numbers are increasing with the new emphasis placed on early detection supported by federal legislation and funds. The Office of Child Development sets a very conservative figure of the number of students included in this concept at 3 to 4 percent of the school population (or one such child in each classroom of any elementary school). Although the problem is widespread, concentrations can be found in urban schools, particularly in economically depressed neighborhoods, where as high as 80 percent of the students can be found to be functioning this way.<sup>16</sup>

Generally, learning disorders are associated with children of elementary school age. The reason is that with a number of children, with or without treatment, the problem diminishes with the onset of adolescence (though traces remain), or out of frustration, the adolescent, when he or she reaches the legal age, drops out of school,

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<sup>16</sup>John J. Arena, ed., The Child with Learning Disabilities: His Right to Learn (Pittsburgh: Association for Children with Learning Disabilities, 1971), p. 97.

and, consequently, is not included in the statistics.

The increase in the number of compensatory programs at the secondary level, particularly in reading and arithmetic, supported by Title I in schools in poverty areas suggests that adolescents do represent a significant number of this population. Tenth grade students account for 50.2 percent of all the dropouts in senior high schools in that city. The senior high school students attending the school in a poverty area where this study took place represent an overall dropout rate of 18.2 percent. This is a larger share of dropouts than the total high school rate of 13.4 percent in that city.<sup>17</sup>

The interdisciplinary interest in learning disorders has resulted in a pluralistic system, which, in the attempt to unify the problem, has also resulted in semantic confusion. Educators, psychologists, optometrists, ophthalmologists, pediatricians, neurologists, and speech therapists have contributed to the system terminology consistent with their professions. There are more than 100 overlapping

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<sup>17</sup>Office of Research and Evaluation, Philadelphia High School Dropouts: 1974-1975 (Philadelphia, Pa.: The School District of Philadelphia, Division of Administrative and Survey Research Services, December 1974), p. 111.



terms and 38 definitions to distinguish the etiology and to describe the conditions of learning disorders. Among the terms to distinguish the origin of the problem are minimal brain dysfunction, choriform syndrome, neurophenia, and association deficit pathology, to name a few. Terms to describe the conditions of the problem include learning disabilities, attention disorders, hyperkinetic behavior syndrome, hypokinetic syndrome, dyslexia, specific reading disability, and perceptually handicapped. A person with little experience in this discipline could hear of a student with minimal brain dysfunction and dyslexia without being aware of dealing with the same set of behavioral characteristics in each instance.

Learning disorders, as defined by HEW, are the behavioral end product of minimal brain dysfunction:

The term 'minimal brain dysfunction syndrome' refers . . . to children of near average, average, or above average general intelligence, with certain learning or behavioral disabilities, ranging from mild to severe, which are associated with deviations of function of the central nervous system. These deviations may manifest themselves by various combinations of impairment in perception, conceptualization, language, memory, and control of attention, impulse, or motor function.<sup>18</sup>

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<sup>18</sup>U.S., Department of Health, Education, and Welfare, Minimal Brain Dysfunction in Children, pp. 9-10.

The learning disorder, whether it is in the area of arithmetic, writing, spelling, or reading, is related to neurological dysfunction which may or may not be demonstrated through medical examination. The dysfunction is considered mild, affecting each student in different proportions and areas of neurological functions. Though the themes and combination of symptoms are common, no two students present the same clinical picture.

While some students with learning disorders do make adequate social adjustment, the student's self-concept and life style are derived from the estimate of his or her position as an individual with a deficit in an area of function considered important by society. For this reason, the basic problem of learning frequently leads to secondary antisocial or delinquent acts. This same segment of the population contributes disproportionately to delinquency and other social-deviancy statics.<sup>19</sup>

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<sup>19</sup>"Find LD Major Factor in Delinquency," ACLD Newsbriefs, July/August 1976, p. 1. This article presented an overview of the forthcoming results of a survey conducted by the U.S. General Accounting Office by a team headed by Richard L. Fogel during fiscal 1974. The results of the survey is the conviction of 94 percent of the juvenile correctional officials interviewed in five states, and of testing conducted by a remedial education center, The

While there is increasing emphasis today in education for early detection and training of learning disorders, the problem persists. The theoretical foundation for treatments make logical sense, the complicated diagnostic procedures are well thought out, and the training procedures are highly complex. In spite of this, there is no substantial body of research evidence to support the notion that training by itself enhances the learning process. It is apparent that some new knowledge is necessary.

### Neurological Causality

The neurological component of learning disorders may be precipitated by a number of agents. Those agents may be physical, psychological, sociological, and/or ecological. They may occur singularly, or more likely, in combination with one another. The agents precipitate disorderly functioning of the central nervous system in various areas of the brain. The consequence of the deviation of function is learning and other behavioral

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Kingsbury Center of Washington, D.C. Of the 129 adolescents tested in the 11 correctional institutions, only 1 was found to be functioning at the grade level which corresponded to his age.

disorders controlled by those areas that range from mild to severe (see Figure 1). On this basis, learning disorders are the educational end product of the disorderly functioning of the nervous system precipitated by those agents.

The reason for attributing minimal brain dysfunction to secondary learning disorders is circular in that the resulting behavior is mildly reminiscent to that of an individual with actual, measurable damage as in the cerebral palsies, mental subnormalities, and sensory defects. For example, if major, overt manifestation of brain dysfunction appeared in the sensory areas, the result may be blindness, deafness, or severe aphasia. Minimal brain dysfunction in those areas might result in an impediment to reading and arithmetic ability.

Major brain dysfunction in the intellectual areas may result in mental subnormalities. Minimal dysfunction may include symptoms such as auditory, visual, tactual agnosia. Agnosia is an input disorder that is characterized by a lack of knowing. The student is able to receive information through the senses, but is unable to comprehend or interpret it.

Minimal (Minor; Mild)	Major (Severe)
1. Impairment of fine movement or coordination.	1. Cerebral palsies.
2. Electroencephalographic abnormalities without actual seizures, or possibly subclinical seizures which may be associated with fluctuations in behavior or intellectual function.	2. Epilepsies.
3. Deviations in attention, activity level, impulse control, and affect.	3. Autism and other gross disorders of mentation and behavior.
4. Specific and circumscribed perceptual, intellectual, and memory deficits.	4. Mental subnormalities.
5. Nonperipheral impairments of vision, hearing, haptics, and speech.	5. Blindness, deafness, and severe aphasias.

Fig. 1. Classification Guide, Brain Dysfunction Syndrome.

SOURCE: U.S. Department of Health, Education, and Welfare, Minimal Brain Dysfunction in Children: Terminology and Identification (Phase One of a Three-Phase Project), by Sam D. Clements, HEW Publication No. (NIH) 73-349 (Washington, D.C.: Government Printing Office, 1966), p. 10.



Major brain dysfunction that is disfused may result in epilepsy seizures. Minor manifestations of damage may include, among other things, fluctuations in personality and/or intellectual functions. Overt manifestations of major brain damage in the motor areas may result in the cerebral palsies. Minor results might include impairments in fine motor movement or incoordination as in illegible handwriting.

The more subtle type of complaints of students with secondary learning disorders are the symptoms of respiratory ailments, particularly allergies, with the headache - stomachache - syndrome being the most common among them.<sup>20</sup> While careful clinical examinations and electroencephalographic studies may reveal subclinical seizure tendencies in individuals with the symptoms, there is no clinical evidence of seizures. However, anti-convulsants such as Dilantin or Mysoline that are specified for seizures reduce the headache-stomachache-syndrome.<sup>21</sup>

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<sup>20</sup>Janice Howard, "School Problems and Allergies," Journal of Learning Disabilities 6 (November 1973): 493-94.

<sup>21</sup>Ibid.

Though no cause and effect relationship has been established, many children with minimal brain dysfunction do present a history of allergies. Other symptoms include hyperkinesis, irritability, oversensitivity, sleep disturbances, achiness and tiredness, sluggishness, mental depression, increased salivation, sweating, and enuresis.

So far, we have been discussing the general principles of minimal brain dysfunction. Now we must consider particular agents which might affect the order of its functioning. For convenience, the various agents that can influence the functioning of the nervous system can be classified as predisposing and precipitating agents.

Predisposing agents include heredity, racial hostility, and the dynamics of poverty. Predisposing agents go before and pave the way for learning problems by creating sustained havoc on the functioning of the nervous system, thereby lowering the individual's adjustive ability.

Precipitating agents are characterized by the proverbial straw that broke the camel's back. They include certain illnesses during critical periods, loss of a loved one, and fatigue. Precipitating agents represent momentary

conditions that prove too much for the individual, and thereby precipitate the symptom.

The exact pattern of predisposing and precipitation agents may not be clear in any individual case. What precipitates the symptoms now may become a predisposing factor in tomorrow's learning. Even the learning style of the so-called bright individual indicates signs of learning disorder spasmodically that can be attributed to precipitating and/or predisposing agents. Despite this limitation, the writer will attempt to show the part various agents play in lowering the orderly functioning on the nervous system.

Predisposing or precipitating agents may be either predominantly physical, psychological, or sociological. In all probability, agents on all three levels are involved. However, whether they reinforce one another or counterbalance one another, each contributes to learning disorders by affronting the nervous system. Since the nervous system represents the essential basis for the integration of behavior, there are limits to the amount of assaults that an individual can tolerate or compensate for without manifesting symptoms of learning and other



behavioral disorders.

Rarely in the behavioral sciences is the concept of causality demonstrated except in rare cases as severe brain damage or prolonged sleep deprivation. Since learning disorders usually seem to involve the contribution and interaction of physical, psychological, and sociological causal agents, the list of agents in the following passages should be thought of as roughly synonymous with "dynamics" to imply an interaction among them.

Physiological factors. Any one or combinations of the following conditions can adversely influence normal neurological functioning. Each constitutes a direct affront on the central nervous system.

1. Fatigue and dietary deficiencies can weaken the efficient functioning of the nervous system. Prolonged deficiencies induce stress and precipitate diseases. Dietary deficiencies of mother or child during critical periods of the child's development before and after birth can seriously impede or stop future development. It is a common experience that psychological and biological functions are seriously impaired under the duress of fatigue or hunger.

2. Accidents and diseases reduce adjustive capacity by augmenting the total stress load, thereby reducing the normal functional level of the nervous system. Common causes of neurological affronts are concussions and injuries as those resulting from difficult or prolonged delivery anoxia during pregnancy, encephalitis, meningitis, cerebral hemorrhage, measles, rubella, or other diseases accompanied by high fever.

3. Biochemical anomalies or metabolic defects resulting from faulty functioning of the endocrine glands, thyroid, and adrenals influence neurological functioning.<sup>22</sup>

4. Critical periods theory is related to the concept of developmental tasks. It postulates that certain periods of prenatal, perinatal, and postnatal development are more critical than others, and that any condition which alters normal functioning during those times can manifest itself as learning or other behavioral disorders.

5. Heredity and constitution denote biological assets and liabilities that make up the personality of the individual. The cause for the disorders is theorized as

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<sup>22</sup>Hans Selye, The Stress of Life (New York, N.Y.: McGraw-Hill, 1956), p. 262.

not necessarily due to any extraneous or acquired cause, but exists before and at the time of conception. One of the basic reasons given to explain why the majority of the individuals are boys is that learning disorders are chromosomally sex linked. The ratio favoring boys over girls varies from four-to-one to as high as ten-to-one.<sup>23</sup>

6. Developmental or maturational lag, i.e., the comparatively slow normal development of the central nervous system, is attributed to genetically determined developmental rate of the interrelated parts of the central nervous system that determines the speed of the maturation of those parts. The delayed maturation hypothesis is considered important by many, since it offers an explanation for how so many individuals can actually outgrow learning problems and the fact that girls generally excel boys in academic ability during the elementary grades. It also provided a rationale to postpone evaluating children with disorderly behavioral characteristics until at least the intermediate grades before the passing of legislation in 1975 requiring early diagnosis and treatment.

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<sup>23</sup>John Conwell, The Role of Drug Therapy (Beaumont, Texas: Texas Association for Children with Learning Disability, 1970), p. 3.

This hypothesis of developmental or maturational lag frequently is used also to justify the administration of drugs (anticonvulsants, barbituates, and tranquilizers) as a means of easing the child through "critical periods" until maturation can take over. It is speculated that adolescents are able to compensate for the various deficits, or perhaps through some inborn inherent neurochemical or neurophysiological process, the abnormality is capable of correcting itself to some degree. In some few cases, the improvement does parallel the physical development of the child, tending to stabilize at or shortly after the onset of puberty though some residue of it can usually be found.<sup>24</sup>

7. Toxins as lead poisoning, alcohol, artificial food additives, and sugar have most recently been linked to hyperactivity and dullness of the intellectual faculties. Toxic sources include alcoholic mothers, fathers, or both at the time of conceptions, and alcoholic mothers during gestation. Also, lead paint, powdered soft drinks, toaster tarts, frozen waffles, ice cream, and chewable vitamins with artificial additives ingested in excess

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<sup>24</sup>Ibid., p. 4.

directly by the child can cause stress resulting in neurological damage.

8. Florescent lighting and ionizing radiation have recently been given a great deal of scientific attention. Attention is focused on the injuries resulting from the exposure to the unusual type of radiation in florescent lighting, the increased amounts of exposures to radiation from diagnostic X-rays, and to radiation in the atmosphere from nuclear weapons.

Psychological factors. Stress resulting from faulty psychological development includes symptoms that characterize the population of clients at guidance clinics. The following sources of psychological stress are cited most frequently in the literature. As noted earlier, it is not feasible to cover every source, and those covered are not necessarily mutually exclusive.

1. Early deprivations include stimulus deprivations which result in immaturities or fixations. Specific conditions in the family as maternal, environmental, and language deprivation are considered to be the most stressful and influential to future development. Maternal deprivation can result from insufficient stable emotional



contact. Environmental deprivation as the lack of early stimulation in language diminishes heterogeneity and reduces the sets of opportunities for manipulation and discrimination.

2. Overstimulation, as too much noise in the home, can result in the inability of the individual to learn in the classroom. The student does not pay attention because he or she has learned to be protected from discordants by cutting off auditory sensory functions. This habit starts in the home and continues in the classroom.

3. Familial discord includes pathogenic patterns of interaction involving all family members. It includes overprotection, faulty discipline, and marital and sibling conflicts of excessive quantity. Overprotection is a kind of overindulgence that deprives the individual of opportunities to become emotionally matured through resolutions by his or her own inclination of the problems within the normal stages and periods of development. Faulty discipline is a lack of mature, firm, consistent guidance for adequate development. Marital and sibling conflicts are sources of frequent tension resulting in excessive

quarreling and bickering among family members.

4. Psychic traumas shatter feelings of security and conditions environmental and self-evaluations. Low expectations from others can result in frustrations and self-devaluation which creates a basis for the further development of negative self-images and low evaluations of individual competencies:

This would be especially true for the Negro child who, as we know from doll play and other studies, starts reflecting the social bias in his own self-image at a very early age. No matter how the parents might aspire to a higher achievement level for their child, their lack of knowledge as to the operational implementation, combined with the child's early failure experiences in school, can so effectively attenuate confidence in his ability ever to handle competently challenge in the academic area, that the child loses all motivation.

. . . there is a patterning of socially determined school-achievement-related disabilities which tends initially to set artificially low ceilings for these children: initially artificial, because as age increases it becomes more and more difficult for these children to develop compensatory mechanisms, to respond to special programs, or to make the psychological readjustments required to overcome the cumulative effects of their early deficits.<sup>25</sup>

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<sup>25</sup>Harold A Sloan, ed., The Psychology of Learning and Reading Difficulties (New York, N.Y.: Simon and Schuster, Inc., 1973), pp. 455-56.



Sociological factors. Anthropological studies recount how the varying patterns of social organization can precipitate learning disorders and other human malfunctions more significantly than biological differences. The common source of sociological stress are threats to the individual's existence as those of economic fluctuations, family instability, racial hostility, threats of war, rapid social change, and poverty. The disabling dynamics of poverty include a combination of any of the physiological and psychological factors already covered. Pearl L. Rosser and others specify the following:<sup>26</sup>

1. Poor maternal nutrition.
2. Lack of prenatal care.
3. Toxemia of pregnancy.
4. Prematurity.
5. Extremes in maternal ages, especially the young teenage mother.
6. Lack of childhood immunizations with subsequent preventable childhood infections.
7. Lack of general health supervision.

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<sup>26</sup>Association for Children with Learning Disabilities, Selected Papers on Learning Disabilities, Meeting Total Needs of the Learning Disabled Children: A Forward Look (Pittsburgh, Pa.: Association for Children with Learning Disabilities, 1971), p. 47.

8. High and low level exposure to lead via paint, plaster, etc.
9. High incidence of accidents.
10. Emotional deprivation and inappropriate stimulation.

Pedagogical agents have, of course, been interlaced throughout this discussion. However, the onus of the problem needs delineation. On the one side of the desk, on the side of the family, there are excessive absences, frequent changes of school, and disruptive behavior by the students. On the other side of the desk, on the side of the larger society which the school represents, there is low teacher expectation, and rejection of the student. This latter position is exemplified by Kenneth Clark in the following quotation:

I think that the first step in a rigorous and objective study of this problem is that of accepting the fact that the problem exists within a context and is enmeshed in racial class, caste, and self-image . . . It may well be that this specific aspect of deprivation, mainly rejection, does in fact directly bear on the capacity of the child to learn because it is reflected in what is taught or how he is taught or how he was related to.<sup>27</sup>

While the multitudinous agents of learning disorders

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<sup>27</sup>Sloan, p. 463.

can precipitate or predispose disorderly neurological functioning and the consequential learning style of an individual, they are not to be confused with the actual cause of learning disorders; namely, devious functioning of the nervous system, or the brain, in short. The agents are better thought of as "dynamics," because their force operates in every field -- physically, psychologically, and socially. Also, it must be emphasized that a precipitating agent of an individual's learning disorder today, may be a predisposing agent for the same individual tomorrow. In addition, depending on the inherent strength of the individual's nervous system, the influences of precipitating and predisposing agents differ from person to person. An agent that can influence neurological functioning in one individual, may have no noticeable affects on another.

The following section provides a clinical view of some of the dominant symptoms that identify the person with learning disorders. In addition, it facilitates the understanding of the problem for individuals without training in this field which, for the most part, has been limited to special education.

## Symptomatology: The Learning Disorder Syndrome

Learning disorder is a syndrome, that is a cluster of learning and other behavioral symptoms. The symptoms frequently appear together, and can be described as developmental deficits in some level of the learning process.

The symptoms serve as a guideline for the purpose of identification and diagnosis. The characteristics of individuals with learning disorders are exceedingly varied, and no single test can pinpoint all of them. Specific characteristics of learning disorders cited most often by various authors were culled from the literature by Task Force I (See U.S., HEW, p. 13). They include:

1. Hyperactivity (see Figure 1).
2. Emotional liability.
3. General coordination deficits.
4. Disorders of attention (short attention span, distractability, perseveration).
5. Impulsivity.
6. Disorders of memory and thinking.
7. Specific learning disorders:
  - a. Reading
  - b. Arithmetic
  - c. Writing
  - d. Spelling

8. Equivocal neurological signs and electroencephalographic irregularities.
9. Disorders of speech and hearing.

Specific learning disorders will be discussed to some detail in the following passages since they are the symptoms which tend to bring into focus the individual identified with learning disorders.

Specific learning disorders. Deficits in sensory, language and behavioral tasks result in specific educational problems that tend to single out the individual as having a learning problem. The disorders are not specific entities, but a syndrome with multiple characteristics and multiple agents. It is because of this that no two individuals present identical clinical pictures. The following section provides a useful framework for understanding the different descriptive systems of disorders in the learning process.<sup>28</sup>

Auditory deficits may be grouped generally as receptive and expressive aphasia. The student with receptive aphasia has problems discriminating between closely

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<sup>28</sup>For specific terms and definitions, see The Learning Incorporated Dictionary of Learning Handicaps (Manset, Maine: Learning Incorporated, 1970).



related sounds. This problem tends to be perplexing to teachers because of its inconsistency. For example, teachers may complain that this student comprehends simple oral instructions, but falters when the verbal-oral input becomes more complex and abstract. In other instances, the student that is unable to take oral dictations as in spelling or becomes completely lost when sequences of orally presented directions are given, may not show a learning impairment in the use of his or her hands by being proficient in drawing pictures as one would not expect, stereotypically, of an individual with brain damage.

Other students with aphasia may have no problems understanding the spoken words, but do have difficulty expressing themselves. This is known as expressive aphasia. Three groups of students with expressive disturbances can be identified.

The first group has difficulty in reauditorization. While this group understands and recognizes words, they cannot remember or retrieve the words for spontaneous use.

The second group has difficulty learning to say words, because they cannot execute the motor patterns necessary for speaking. In the absence of paralysis, the



student is unable to voluntarily initiate the movements of the tongue and lips necessary to form spoken words.

Students in the third group have defective syntax. While they are readily able to use single words and short phrases, they cannot plan and organize words for the expression of ideas and complete sentences. The total speech pattern is likely to appear immature as this student tends to leave words out of sentences, or twist words up in sentences. This tends to be confusing to teachers who know that the student has normal ability.

Reading disorders constitute the most common set of problems associated with learning disorders. The common criterion used to delineate reading disorders is that, on the basis of chronological age, the student is approximately two years or more below expected grade placement in reading. Very severe cases are easily identified beyond the third grade because the student may be a word caller, or may have never learned to read at all.

Reading disorders are described clinically as dyslexia, meaning word blindness, when an abnormal EEG is detected, or specific reading disability when no physical abnormalities can be detected and emotional problems

dominate. Reading disorders can be grouped into two categories: visual and auditory.

In visual disorders, the student's oral reading is characteristically slow, choppy, with a monotone effect, because of blindness to punctuations and little words as "there," "the," and "was." Comprehension is resultantly lost because of the overemphasis on the mechanics of word calling. For this reason, the student may have a grade level differentiation between oral and silent reading ability. Other problems include visual-sequential memory, such as reversing words and inverting letters. Common inversions of letters as b-d result in misreading as "bay" for "day." Reversals of words result in misreadings as "net" for "ten." Consequently, comprehension is lost, because the student reads orally what has been perceived as nonsense in that it is not in keeping with the context of the story.

The student with auditory reading disorders greatest problems are likely to be in learning phonics. While in the visual problems described above, the student may learn phonics, but has trouble applying it, here the student has trouble learning phonics because of the

difficulty in hearing initial or final sounds of words or in dividing a word into syllables. Other deficits in re-auditorizing words and sounds occur when the student looks at a letter and cannot remember its sound, or is unable to say the word even though aware of its meaning. For this reason, the student may read better silently than orally because of an ability to comprehend without reauditorizing the word. While the individual with visual disorders has difficulty in visual short-term memory and sequential memory, the student with an auditory reading disorder has difficulty in auditory short-term memory and auditory sequential memory.

Written language disorders are known clinically as dysgraphia. Dysgraphia closely parallels reading disorders. The student with this disorder may or may not be able to copy adequately and may have extreme difficulty in using written symbols. The difficulty is characterized by three types of disorders: deficiencies in visual-motor integration, revisualization, and syntax.

Visual-motor integration disorders manifest in the inability to write legibly, because of difficulty in executing the motor patterns for writing letters, numbers, or

words. This same student may be able to speak, read, and perhaps spell orally. The difficulty arises when the student becomes so involved with the mechanics of writing that the trend of thought becomes lost, or the production is simplified in order to complete the assignment. In the former case, the student may take an extremely long time to complete the work.

Revisualization disorders manifest as the inability to write spontaneously or from dictations as a result of being unable to revisualize the letters or words needed. This student's problem is not in copying letters or numbers but in remembering what the letters or words look like in the absence of a model to copy. Revisualization problems can occur with reading disorders or exist in isolation. The student may read close to grade expectation, but cannot cope with spelling and written language.

Syntax disorders result from an inability to formulate and organize thoughts into sequential form for written communication. Though the student may do well in all other areas of academic work -- i.e., can communicate orally, can copy, can revisualize and spell words correctly -- he or she becomes lost when required to respond through the

medium of written communication as in essays and stories.

Mathematical disorders are known clinically as dyscalculia. They include disorders in quantitative thinking. Mathematic disorders parallel those of qualitative thinking in linguistic disorders. Thus, the student with deficiencies in auditory receptive language, auditory memory, reading, or writing may show similar functional disorders in mathematics. There is an abundance of data to show a correlation between linguistic ability and mathematical achievement ranging between .40 and .86.<sup>29</sup>

Therefore, it is not surprising that the student with a problem in reauditorization is likely to have difficulty recalling numbers. The student may recognize the correct number when it is shown, but cannot verbalize it. The visual dyslexic student's difficulty with arithmetic word problems may be in becoming so bound up in the task of comprehending the written work of word problems when faced with workbook tasks or written directions that all sight is lost of the basic arithmetic problem.

Another common fault with the dysgraphic student

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<sup>29</sup>Lewis R. Aiken, Jr., "Language Factors in Learning Mathematics," Review of Educational Research 42 (1972): 359.



is in becoming so burdened in the task of writing numbers that it becomes virtually impossible to reproduce or copy numbers on the paper legibly enough to recall or read accurately what has been written. This student also has difficulty aligning numbers appropriately on the page for proper computation.

Discalculia may manifest also as spatial problems as when the student has difficulty estimating distances; or difficulty in distinguishing differences in sizes and shapes; or disorientation in terms of left-right distinctions; or an inability to comprehend readily the mechanics of telling time from a watch face; or this same student may have difficulty in sequencing as is used in steps of division.

Emotional, social, and personality characteristics.

While the student with learning disorder often does make quite adequate emotional, personal, and social adjustments, the disorders in learning and motoric extremes may diminish emotional and social adaptation. Emotional, social, and personality problems may result from experiences that lower self-esteem as a result of being misunderstood by others. The teacher may be confused about what she can



expect from this student, because she cannot delineate between the times when this student can and does not, or when the student cannot and does not.

The following is the attempt of Task Force I to classify some of the descriptive elements of emotional, social, and personality characteristics culled from the literature (see U.S., HEW, pp. 12-13):

1. Emotional Characteristics

- a. Impulsive
- b. Explosive
- c. Poor emotional and impulse control
- d. Low tolerance for frustration
- e. Reckless and uninhibited; impulsive then remorseful

2. Characteristics of Social Behavior

- a. Social competence frequently below average for age and measured intelligence
- b. Behavior often inappropriate for situation, and consequences apparently not foreseen
- c. Possibly negative and aggressive to authority
- d. Possibly antisocial behavior

3. Variations of Personality

- a. Overly gullible and easily led by peers and older youngsters
- b. Frequent rage reactions and tantrums when crossed
- c. Very sensitive to others
- d. Excessive variation in mood and responsiveness from day to day and even hour to hour
- e. Poor adjustment to environmental changes
- f. Sweet and even tempered, cooperative and

friendly (most commonly the so-called hypokinetic child).

Motoric symptoms may range from hypo- to hyper-activity. High activity includes impulsivity, hypersensitivity, and compensatory behavior. Of the activity extremes, the hypoactive student presents less of a problem socially because of the abnormally low level of activity he or she displays which, for the most part, only has direct effects on the student.

High activity is of two types: hyperkinetic and hyperactivity (see Figure 2).<sup>30</sup> Hyperkinetic behavior is thought to be a predisposing symptom of learning disorders that results from neurological dysfunction. It is consistent in all settings. Hyperactivity is thought to be a precipitating symptom of learning disorders that results from environmental influences. Generally, it occurs only in school primarily as a result of repeated frustration of trying, but being unable to learn the fundamentals of the primary grades.

While high activity is often an outstanding and disturbing feature of learning disorders, motility studies by

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<sup>30</sup>Joseph N. Murray, "Drugs to Control Classroom Behavior?" Educational Leadership 31 (October 1973): 22.

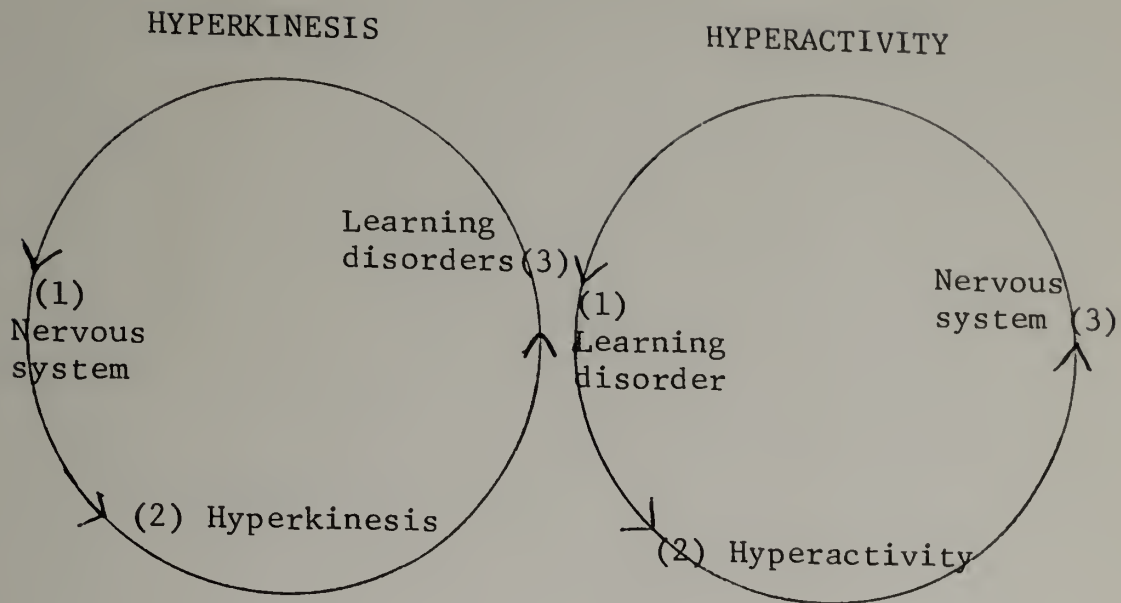


Fig. 2. High activity as the cause and effect of learning disorders. Hyperkinetic behavior is a predisposing symptom of learning disorders that results from neurological damage. It is consistent in all settings. Hyperactivity is a precipitating symptom of learning disorder that occurs primarily in school from repeated frustration of trying, but being unable to learn the fundamentals of the primary grades.

researchers as Schulman, Kaspar, and Throne that measured the quantity of activity suggest that it may not be significantly greater than that of many normal, vigorous children.<sup>31</sup> The activity of the student with learning disorder appears excessive and disorderly because it is situationally inappropriate, unpredictable, impulsive, and consequently disruptive. The differences, then, in motor activity of the hyperactive individual and the "hypersuccessful" one is qualitative rather than quantitative.<sup>32</sup>

High chronic activity of the high achieving student is usually described by teachers as directed, i.e., purposeful, vigorous, hard working, enthusiastic, and energetic. In contrast, inappropriate high activity is described as nondirective, rude, uncultured, distractable, excitable, excessive (as in aimless talking), and boisterous. Such terms in the latter group reflect irritation on the part of adults and the importance of the qualitative aspects of hyperactivity.

Parents and professionals alike describe the student as not being able to sit still, too talkative, hard

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<sup>31</sup>Sloan, p. 372.

<sup>32</sup>Ibid., pp. 372-73.

on furniture, clothing, and toys, fidgety, and irresponsible in that he or she does not complete assignments or self-initiated projects. Hyperactivity, though inappropriate, is not meant to be asocial, at least in the young child. However, by the time this student reaches secondary school, the behavior may be used deliberately to shield the fact of the learning disorder.

Thinking disorders are revealed through close observations and analyses of an individual with aphasic behavior. The basic problem is in perceiving and expressing language. Dominant symptoms include hyperactivity and withdrawal, and other inconsistencies as inappropriateness of response, short attention span, and perseveration.

The individual's inconsistency and inappropriateness of response make testing difficult in that his or her response to the same stimulus under similar circumstances may differ widely. Inappropriateness of response may also include laughing at others' misfortunes, which may give the adult the impression that the individual is lacking in cultural training from the home.

It does happen in some few cases that an individual with aphasic disorders may compensate for the psychological



inability to understand or integrate the environment by withdrawal. Subsequently the aphasic problem becomes erroneously diagnosed as an emotional disturbance, and the primary aphasic behavior may go untreated.

The tendency to perseverate, i.e., the compulsion to repeat an activity over and over even though it may be erroneous, should not be confused with perseverance which is deliberate, goal directed focusing of attention -- not a compulsion as in perseveration. With perseveration, for example, it may be equally difficult to have this individual begin a learning task as it is to have him or her end it.

On the other hand, this same individual who has difficulty in disengaging attention is also incapable of sustaining it:

He seems unable to select and hold a given stimulus out of the many irrelevant touches, sights, and sounds that, reaching his sense organs, are conveyed to his central nervous system indiscriminately and confusingly. Riding in a subway, the normal person is able to disregard the clatter of the wheels, the glare of the lights, the garish assault of advertising, as he directs and maintains his attention on what his friend is telling him. The . . . child (with learning disorder) is unable to focus his attention on a given object while attending only marginally

to irrelevant elements in the total situation (field independence).<sup>33</sup>

Impulsiveness is another trait viewed as a thinking disorder. It is the individual's tendency to act first and think afterwards. It has the appearance of rudeness, or lack of "home training." Usually there is no malicious intent. The student may express regrets immediately afterwards. At other times, the same impulsiveness is perceived as perseveration in the student's approach to problem solving. The individual makes the same mistake over and over, though each time spontaneously correcting the error.

Other symptoms of impulsivity include hypersensitivity, which is also perceived as antisocial behavior. The student's hypersensitivity gives the appearance of hostility, extreme nervousness, irritability, and aggressiveness. However, the dominant mood of the same student at other times may be of benign sweetness only shattered at times by outbursts of temper.

Compensatory behavior is described generally as disruptive behavior. Disruptive behavior may be the individual's attempt for acceptance into the group and to

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<sup>33</sup>Sloan, p. 264.

overcome the inferior position. Four processes are implicit in disruptive behavior: (1) attention getting; (2) the struggle for power and superiority; (3) revenge for feelings of being hurt; (4) a display of real or imagined inferiority through incompetence.<sup>34</sup>

Compensatory behavior, while socially inappropriate, is a natural response to relief measures. The student who cannot control the learning disorder, can (at least to a limited degree) control the inferior social position that it assigns. This limited relief measure detracts from effective, creative learning rather than facilitating it.

Attention-getting behavior tends to focus attention on the student in a way as to disengage him or her from responsibility. More often than not, it is disruptive. For example, the student may ask many needless questions, taunt other children, or frequently engage in inappropriate playfulness -- all of which draws attention to him or her.

Power-struggle behavior can be described literally as the student fighting for power with parents, teachers, and other authority figures. The student perceives the

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<sup>34</sup>Anderson, p. 17.

only way of achieving position in the group is to assert superiority through conflict. This student is described by parents and teachers as extremely stubborn, unable to sit for long periods of time, or refusing to do homework or school work. Short-term victories in the conflicts can be won by parents or teachers who revert to harsh disciplinary methods. But, invariably, the student gradually reverts back to defiance. Initial tactics might include deliberate forgetfulness as purposefully forgetting assignments or unfound claims that assignments have been completed.

Revengeful behavior can be seen in the student that gives up any attempt at cooperative efforts. This behavior can be destructive enough to result in delinquent acts. Revengeful behavior may be the individual's way of proving that he or she is a horrible person after all, or of gaining one up-man-ship on the society that has assigned such a low status. There is some evidence that juvenile delinquents and other sociopaths have a history of symptoms that suggest an underlying learning disorder. In terms of Adlerian interpretation, sociopathic behavior is the effect and not the cause of learning disorders. It is the

individual's way of compensating for the learning disorder.<sup>35</sup>

While incompetent behavior has the appearance of passivity, it is, in fact, an aggressive effort (advertently or inadvertently) to put others into service. Even before entering school, the individual has learned that people will cater to helplessness. When entering school, this individual may be viewed by peers as the "baby" of the class, and literally taken by the hand on the playground to be protected from the possibility of rough play. The teachers may promote this individual with the belief that the work could be done if the pupil or student would only try. At home, an overly protected mother may exempt the individual from the responsibilities of household chores, and even complete the homework assignments.

#### Remediation

We have seen that the impact of the number of agents that can change the style of brain functioning may

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<sup>35</sup>Alfred Adler's School of Individual Psychology holds that people are inherently social beings, and that their basic motivation is to belong to and participate in the group.



simply alter the process of behavior, or bring about transformations associated with a wide range of disorders. The actual style of functioning of the neurological structure plays a major role throughout life in the psychological, social, and physical behavior of the individual. Behavior in those areas are the indicators of neurological functioning. Learning disorders manifest as devious behavior in those indices. Disorders in those indices signal the deviations in neurological functioning, and the need for remediation.

The many remedial programs range from the general to the highly specialized, and from the simple to the very intricate. More than in any field of education, remediation involves professionals from a great number of disciplines: education, neurology, ophthalmology, optometry, pediatrics, psychiatry, psychology, speech pathology, and audiology. In addition, remediation involves well-thought out theories, evaluative procedures, and practices. In spite of this, there is no research of substance to support the notion that the innumerable programs are sufficient within themselves to alleviate learning disorders. Something more is needed. That need becomes apparent with

a simple understanding of a basic aim of the many remedial programs for learning disorders. An understanding of that aim will make explicit the innumerable practices and assumptions of human learning that underlie the many programs of remediation as well as basic educational practices.

For the sake of brevity, we can state that learning is a behavioral process, development, controlled by neurological functioning. All remedial practices aim at enhancing that process either externally, on the surface level of behavior, and/or internally, in situ, through drug therapy, at a level of greater proximity and influence on neurological structure and functioning. No doubt that all stimuli -- whether chemical, visual, auditory, tactile, or particular manner of movements and positionings and rewards and punishments -- have a driving influence on neurological functioning. But because the influence of drugs is more immediate and comprehensive than any of the behavioral practices, surely they must be working at the most basic level of behavior -- neurological structure and functioning.

The learning process, in its hierarchial order of developing intellectual abilities, includes sensory-motor,

language, perceptual, and higher cognitive abilities. Accompanying the innumerable intellectual abilities and competencies of the process are the affective aspects of behavior. The affective aspects of the process have levels of competencies that correspond with their intellectual counterparts. Affectivity provides the driving force or motivation for the development of intellectual abilities.

Ideally, remedial practices are individualized, medical-like models for teaching. They derive from ongoing diagnostic and prescriptive procedures. Such procedures determine what abilities are missing in an individual's learning process which gives the process an appearance of disorderliness. Remediation is prescribed on the basis of that deficit.

This medical model for teaching is known variably as clinical teaching, prescriptive teaching, diagnostic teaching, educational therapy, and psychoeducational methods. It is among the more popular methods of teaching, primarily because of its scientific nature: namely, theory and practice. The theory is based on the process of developing abilities. The practices evolve out of the

interpretations of the nature of a particular individual's learning disorder in contrast to what is expected in the normal process of human development.

The theory of developing abilities has been formulated through intensive studies of thousands of infants, children, and adolescents. While the theoretical foundations have been empirically verified repeatedly and make logical sense, there is no substantial body of research with evidence to support that the many remedial practices by themselves wholly affect the learning process -- psychologically, socially, and physically.

Remediation, for the most part, is aimed at isolated bits of behavior. The results of their influences are limited to those aspects of behavior. In addition, effects have not been shown to be lasting, nor do they give indications of learning abilities of greater complexity than that prior to the intervention, except in isolated cases. And even then, the amount of time, effort, and expense is not commensurable to the actual gain. At best, the individual learns to compensate rather than alleviate the learning disorder.

Remedial programs are better served when used in

conjunction with the Transcendental Meditation program. As an adjunct to remedial practices, the Transcendental Meditation program alleviates learning disorders at their root, neurological functioning.

The problem of learning disorder must be tackled at the root cause as well as on the surface effects in order to produce unified and lasting results. A skilled gardener in seeing some withering leaves on a tree, sees them as danger-signals for the whole tree. And while tending to the leaves, the surface effects, the gardener directs attention also to the roots. And by doing so, enables the sap to rise to nourish all parts of the tree. And so it must be in the remediation of learning disorders. In addition to remediating the surface effects, the problem must be alleviated at its source -- the level of neurological functioning.

Behavioral therapy. For the sake of brevity, it can be said that behavioral practices are directed at enhancing learning abilities via the behavior indices, psychologically, socially, and physically. Behavioral indices provide a level of analysis to help us gain an understanding of the innumerable pedagogical practices that aim



at influencing them. Depending on where the emphasis is placed, the importance of one index of behavior is usually emphasized more than others. But all programs aim at enhancing the learning process in each.

In addition to the indices, we must also emphasize the transactions that also occur among them, and the fact that the result of their transactions is an undivided behavioral pattern, i.e., ability or competency. For example, walking is an ability that results from the transactions of the physical readiness of the bones, muscles, and nerves of the legs and trunk; a psychological state of equipoise or balance; and a social readiness resulting from the proper amount of stimulation, encouragement, and assistance from others. Although walking is viewed as a physical pattern, its basic structure, indeed, is psychological and social as well. There is no ability, however psychological, social or physical in appearance, that is not the result of transactions among all the behavioral indices. The learning process entails behavior that is as much psychological as it is social and physical.

Simply speaking, when psychological practices are emphasized, the remedial practices are likely to entail

some form of psychotherapy, individual and/or group counseling, group dynamics, behavioral modification, relaxation techniques, and biofeedback methods. Still other programs employ the training of self-directed verbal commands as a means of controlling impulsiveness, for example. Other programs advocate teaching parents and teachers to manage the student's undirected behavior through the technique of videotape playback of interactions between them and their children or adolescents. Many programs place high emphasis on the training of self-confidence. Drug therapy is sometimes prescribed in conjunction with psychological practices. For the most part, the psychological programs require discipline of sorts, usually concentration and contemplation, of the participants. They are therefore criticized by parents, teachers, and students as commanding too much effort.

Programs with emphasis on physical practices are based on an assumption that the disorderly learning process is of neurological origin. Behavioral practices within those programs tend to be mechanical, repetitious, with the goal of structuring orderly neurological functioning that way. To the uninformed, the physical practices of those

programs seem unrelated to learning abilities, such as the ability to read, for example.

Activities in those programs may include physical drills, gymnastic type of activities that entail balance, neuromuscular integration, motor coordination, sensory, and perceptual acuity. Activities may also include the patterning of motor skills in the head region, in the arms and hands, the trunk, and legs.

Also, one may find that the variety of mechanical drills include many of the motor activities that children do playfully in the course of the natural process of growing up. Included in those activities are skipping, galloping, gliding, walking, and running movements; or tasks to differentiate body parts, left-right movements; or tasks requiring coordinated visual-motor movements, such as reaching, grasping and releasing, and tracking visual targets as in a maze; practice with discriminating closely related sounds, and with auditory and visual sequential memory.

The learning process and its developing patterns of abilities is dependent upon the maturation and functionings of crucial areas of the neurological structure.

Neurological functioning is necessary for the appearance of early physical abilities within the process which controls the appearance of higher cognitive ones. The cognition of logico-mathematical patterns, for example, that do not normally appear until adolescence are dependent upon the maturation and coordination of the grasping pattern that develops during childhood. Logio-mathematical patterns are spatial perceptions that entail the maturation or readiness of two physical abilities (vision and prehension) that occur at about four and a-half months of age.

Sensory-motor problems, including other physical signs of disorderly neurological functioning, have been demonstrated to accompany learning disorders. However, the incredible practices that have grown out of the incredible analyses and explanations of how the learning process is disrupted as a consequence, are without the significant improvement in mathematics, reading, and other learning abilities as one would expect. The value and effectiveness of those behavioral practices that are aimed at influencing neurological functioning via behavior can be enhanced enormously when used in conjunction with the Transcendental Meditation program.

The goal of social and cultural practices are twofold: (1) to transmit those cultural values that are found in normal curricula; and (2) to recompense the deficits in those areas as a result of the learning disorder. The practices to which the pupils and students are exposed are in the areas of language development, reading, spelling, and arithmetic. Training programs include exposure to basic skills in the industrial and home arts, social studies, and the sciences.

Ideally, instructions in those programs are individualized to allow the affected individual to compensate for the learning disorder in a style to overstep it. Since no two children present the same disorderliness in his or her learning style, this approach requires that each individual receives the attention of specialists with ongoing diagnostic and prescriptive procedures. It is for this reason that the practices are costly and impractical.

Orderly neurological functioning results in an even, orderly development of the learning process that opens up new patterns of abilities and potentials. While the process is continuous, the results are discontinuous. The results are qualitatively different from time to time,



and appear at approximately the same chronological age for all individuals.

The learning process while continuous, can be divided into segments that are qualitatively different. Each segment is named for the ability that has most recently become operative, which is the best the child is capable of doing. The segments, in their order of appearance, are the sensory-motor process, the language process, the perceptual process, and the higher cognitive process. A comparable level of affectivity within each section accompanies and drives the development of each intellectual segment. The formation of each new segment includes those qualities of the total process that preceded it, and, in turn, affects the quality of the process that comes after it. Variations in the speed at which people pass through the process may vary, but their order of succession is the same for everyone.

If the process within any of the segments has not developed to the optimal level as is normally expected of an individual's chronological age, a developmental lag becomes apparent. And it is that lag that creates the imbalance, the disequilibrium, the disorder in the

learning process.

It is this characteristic of behavior that reflects disorder in the normal style of neurological functioning. Normal neurological development and functioning is the basis of learning abilities and other expected behavior.

The concept of normality follows that is called an average distribution based on numbers, with most people clustering around a central point, and the rest spreading

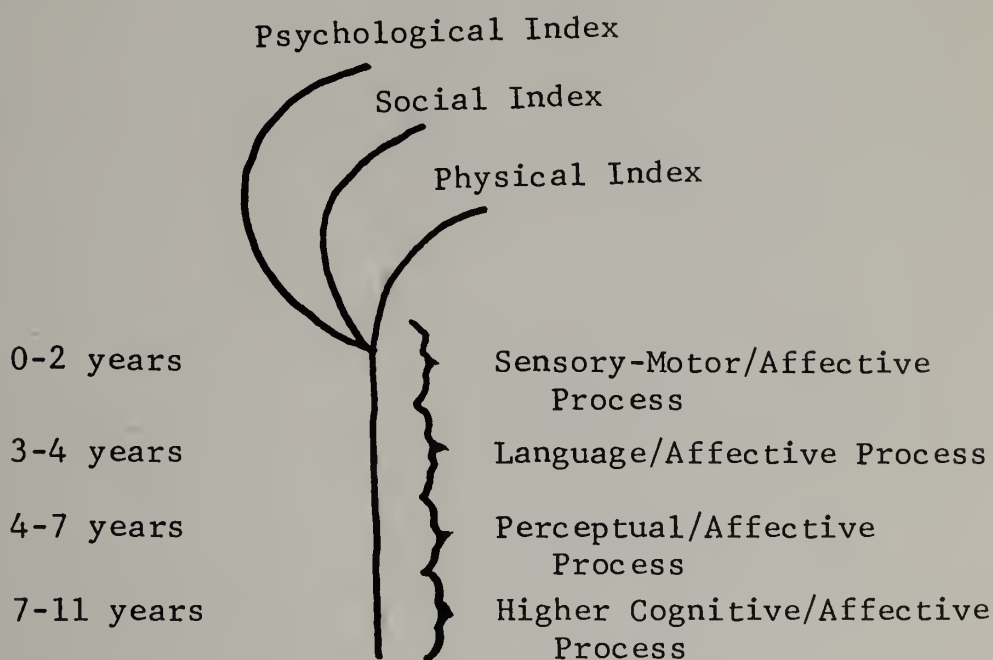


Fig. 3. Learning indices and process

out toward the two extremes. Thus, at one extreme there are those whose behavior does not attain patterns greater than that of the average 3-year-old, and at the other extreme, there are those whose behavioral patterns attain a high level of sufficiency akin to genius which can only be speculative at this point.

Not only does the behavior patterns of different individuals change by imperceptible degrees, from the normal to the abnormal, but individuals shift at different times to different positions along the range. Simple observations show that an individual's behavior can be thrown askew by insufficient rest, disappointments in love, personal failures at school and on the job, accidents, and illnesses. On the other hand, promotions, and other signs of praise and signs of approval of the individual's worth by others, as well as improvements in health, and profound rest can influence mental, social, and physical behavior.

Drug therapy. Drug therapy includes the use of anticonvulsant or depressants as tranquilizers, or stimulant

drugs as Dexedrine and Ritalin, and/or coffee.<sup>36</sup>

The drug programs are by far the most popular choice as a quick and practical remedy, despite the growing list of adverse effects. A primary reason for the popularity may be the ease in administering them and the immediate effects of manageability of hyperactivity in four out of five cases of the individuals diagnosed. Generally, the drugs affect behavior within twenty-four hours after administration. Orally administered drugs as 20 mg. Ritalin take from fifteen minutes to an hour before influencing behavior.

The actual number of students on drug therapy is unknown, though a 30 June 1970 article in the Washington Post set the figure in Omaha schools at 10 percent. A

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<sup>36</sup>See the Association for Children with Learning Disabilities Newsletter, October 1973, No. 86, in which, in a pilot study by Robert C. Schnackenberg (Director of the Child and Adolescent Service at the William S. Ball Psychiatric Institute in Columbia, South Carolina) proposed coffee drinking as having a place in the therapeutic management of the child with minimal brain dysfunction syndrome and subsequent hyperkinetic impulse disorder. Because an average cup of perked coffee contains 100 to 150 milligrams of caffeine and instant coffee 86 to 95 milligrams, it appears that the caffeine might be the active agent. This news item also appeared in other journals as Newsweek, 8 October 1973, and the Houston Post, 19 August 1973.

survey of 284 pediatricians and 244 psychiatrists and 172 general practitioners in Chicago estimated that 2 to 4 percent of the school age students were receiving stimulant medications. It has been estimated that as many as 20 percent of the children and youths in New York schools were taking stimulants therapeutically.<sup>37</sup> The stimulants, anticonvulsants and tranquilizers, are the drugs administered most frequently.

Stimulants are by far the most frequently prescribed because they tend to make the student's behavior more manageable while allowing him or her to attend to routine tasks that do not require creative or critical thinking. Among the more popular stimulants administered are the amphetamines -- Dexedrine, Methedrine and more recently, Methylphenidate (Ritalin). Benzedrine was the earlier used stimulant, but because of the obviously serious side effects, it has given way to Ritalin.

A popular myth supporting the administration of the stimulants is that the behavior they produced in the individual with learning disorders is atypical of the

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<sup>37</sup>Cynthia Jo Rich, "The Differences at Birth," Race Relations Reporter (September 1973): 13.



behavior of normal students and adults who take the drug. In addition, it was believed that the consequential side effects were not as severe as other drugs. The recent survey of Scroufe and Steward does not support these claims, and, in addition, raises the following concerns crucial for the evaluation of the administering of these drugs to students.<sup>38</sup>

1. The fact that motor activity is reduced while concentration on routine tasks is increased as an effect of the stimulants sheds doubt on the claims that their administration improves field independence.<sup>39</sup> The speculation that the decrease in motor activity is the indirect effect of increased problem-solving and learning characteristic of field independence does not seem to be affected in normal adults or students as the result of stimulants. Field independence in normal adults and students is not enhanced while under the influence of drugs.

2. While the number of long term studies to

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<sup>38</sup>Allen L. Scroufe and Mark A. Steward, "Treating Children with Stimulant Drugs," New England Journal of Medicine (23 August 1973): 407-13.

<sup>39</sup>Field independence is the ability to pay attention to one set of sensory cues without being influenced by a variety of extraneous and conflicting ones.

measure the drug effect on scholastic achievement are too few to draw conclusions, the few longitudinal studies that have been done suggest that the outlook for school performance is relatively poor.

3. Research on "state dependency learning" suggests that habits learned while the subject is under the influence of drugs or alcohol do not carry over into sober or undrugged behavior.

4. Students with learning disorders and normal children appear to have similar patterns of tolerance and withdrawal reactions from the drugs. Among them are difficulty getting to sleep, irritability, crying without provocation, lethargy while on the drugs, and an increased need for sleep when withdrawn from the drugs. Conwell reports tachycardia (an abnormally fast heartbeat) and a tendency for increasing agitation in some students as the length of time the drug is used increases.

5. Relatively high dosages of amphetamine or methylphenidate continued over months may significantly reduce weight gain and growth in statute. This effect may reflect the influence of the drugs on appetite, but it is also likely that the result is a central affect:

amphetamines have been reported to effect the release of growth hormones. The latter possibility raises the disturbing thought that stimulants might influence the rate of sexual development as well as growth in general.

6. The deterioration of behavior reported when children are temporarily withdrawn from medications may be interpreted as evidence of behavioral dependence rather than evidence of positive drug effects previously reported.

The anticonvulsants as Dilantin or Mysoline are the two most frequently used medications prescribed to control petit mal seizures and hyperactive behavior. Dosages of Dilantin and Mysoline are sometimes given in combinations. Research on these drugs produce conflicting results on the overall efficacy of such drugs. The more common side effects of Dilantin include skin rash, excessive hair growth, and overgrowth of the gum margins.<sup>40</sup>

Surveys on the effects of the Barbituates disclose that they tend to increase activity and cause a deterioration of behavioral patterns. Normally, they are not recommended for children who are overactive or easily distracted.

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<sup>40</sup>Conwell, p. 6.

Tranquilizers as Chlorpromazine (Thorazine) and the Benzodiazepine derivatives as Librium and Valium appear to have an effect in regulating the activity within the nervous system because of the apparent reduction of anxiety, reduced aggressive tendencies, and the general relaxing effect on the subject. This type of drug is generally prescribed for the management of the overstimulated, overactive, detractable, and impulsive individual. However, sedation of behavior can only be predicted in 50 to 70 percent of the cases, and frequently serious side effects have been reported as excessive sedation, and undesirable drop in blood pressure, producing dizziness, light-headedness, and occasional fainting.<sup>41</sup> These side effects are not unusual in adults who take the drug.

Deanol (known as Keaner) acts somewhat differently than the amphetamines since it is thought to be converted to acetylcholine within the neurons themselves and in this way produce direct activation of the nerve cells in situ. The use of this drug has gradually dropped because of the inability of subsequent investigators to reproduce with consistency the reports that 67 to 88 percent of

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<sup>41</sup>Ibid.

patients improve.<sup>42</sup>

The national concern for learning disorders has evolved legislation and financial support to delineate and treat them. Still the problem persists, though not from the lack of theory, but because remedial practices are directed more to behavior than to the deeply underlining cause of failure, the nervous system.

From a historical viewpoint, the problem of learning disorders are probably as ancient as mankind because of its dynamics with language. But, as a discipline, a taxonomic entity with distinguishing characteristics, it is a new area represented by the concern of a broad spectrum of educators, sociologists, psychologists, philosophers, physiologists, biologists -- in short, men and women of many professions. The semantic confusion that characterizes the discipline represents the contributions of the many professions as well as the multifarious nature of the problem that has given rise to the national concern for learning disorders.

In Chapter III, we shall prospect the possibility of alleviating learning disorders at the source, the brain,

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<sup>42</sup>Ibid., p. 8.



through the practice of the Transcendental Meditation technique, and thereby alleviate the many shapes to which it gives form. The prospect draws from research to develop a scientific theory that is tested experientially in Chapter IV.

## C H A P T E R   I I I

### PROSPECT: THE TRANSCENDENTAL MEDITATION PROGRAM

#### Introduction

During the past seven years, a simple scientific method of deep rest known as the Transcendental Meditation program has been found to produce orderly brain wave activity during the practice and orderly behavior outside the practice (see Appendix B).<sup>43</sup> In the widening number of educational institutions which have added the program to their curricula, researchers and staff have observed the accelerated amelioration of psychological, physical, and social growth among students and staff (see Appendix C). Quantitative empirical data on the effects of the technique, both published and informally disseminated, have stimulated the interest of educators (see Appendix B).

The Transcendental Meditation program is unique in its method and scope. As does all sciences, it has a theory and practice. The theory is known as creative

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<sup>43</sup>See footnotes 5 and 6.

intelligence. The Transcendental Meditation technique is the practical aspect of the theory of creative intelligence. It is a simple mechanical procedure that automatically enhances the learning process and ultimately attains its goals of developing human potential naturally through regular, consistent practice. The technique is practiced only twice a day, 15 to 20 minutes mornings and evenings.

Unlike other methods of meditation or programs of self-improvement such as biofeedback, relaxation, and other techniques, the Transcendental Meditation technique is completely natural. It utilizes the natural tendency of the mind to be orderly.

This measurable tendency of the mind towards increasing orderliness during the practice of the Transcendental Meditation technique, as demonstrated on the EEG pattern of coherent brain activity, has a parallel in the third law of thermodynamics in physics which states that by lowering temperature, entropy is reduced (as in refrigeration). Likewise, during the practice of the Transcendental Meditation technique, mental activity (temperature) decreases, and from this we see the EEG brain wave pattern becoming increasingly orderly during the practice. Outside,

the practice, behavior becomes increasingly orderly as human potential unfolds through repeated practice.

Other methods of meditation are manipulative and controlling, employing concentration and/or contemplation which manipulates only particular functions. Consequently, the results are not the type of integrative response involving the total individual (mentally, physically, socially, and environmentally) as found in the Transcendental Meditation program. In addition, the effects of other practices lack the extensive short- and long-term research as has been done on the Transcendental Meditation program. The implication is that since these manipulative techniques have been scientifically shown not to produce the integrative nor profound effects as does the practice of the Transcendental Meditation technique, the imbalanced effects through manipulation may, in fact, result in adverse effects through long-term practice. More adequate research will weigh the possibilities. In the meanwhile, therapeutic use of them should be restricted until their effects have been more thoroughly researched. Conversely, the practice of the Transcendental Meditation technique as a result of nourishing life at a basic level, the nervous system,

develops life as a whole while enriching the parts. The benefits to the individual extend naturally into the environment to improve society, the nation, and, ultimately, the whole world.

In addition to the naturalness of the Transcendental Meditation technique which makes it easy for anyone to learn, the program does not employ mental control, physical control, belief, suggestion, hypnosis, religious tenets, special diet, or any change in life style. Thus, the practice is universally acceptable in that it bypasses national, religious, and political barriers, as well as differences in age, sex, attitude, intelligence, and health. Far from requiring recourse to a reclusive style of living, the technique integrates well with normal activity to enhance the receptivity, explicitness, and the level of energy needed for an active, creative, and modern life.

The Transcendental Meditation technique is practiced by the child before adolescence as an integral part of normal activities. The adolescent and adult practice the technique twice daily, for fifteen to twenty minutes as prescribed, while sitting comfortably with eyes closed.



The adolescent and the child as young as four may be taught the technique if one or both parents practice it and both parents give consent. With this consent, he or she learns to practice the technique as an integral part of activity.

Instruction in the technique is very specific. When the meditator uses it, he or she knows exactly what to do. Moreover, the technique can be practiced in almost any setting. Because it is natural, no paraphernalia is needed. In addition to being easily administered, the effects of the practice of Transcendental Meditation technique are comprehensive (involving all behavioral indices), immediate, cumulative, and free from adverse side effects.

The Transcendental Meditation program was introduced to the modern world in its practical form in 1958 by Maharishi Mahesh Yogi. The technique is only imparted by teachers personally trained and certified by him at Maharishi International University (MIU). To date, there are more than 11,000 teachers around the world.

The Basic Course: A Process of  
Teaching and Learning

The basic course in the Transcendental Meditation

program is a process of teaching and learning through direct experience. Learning the technique is very, very simple because it utilizes the natural tendency to have a thought. Anyone who can think a thought can learn the Transcendental Meditation technique.

The process of teaching and learning is presented systematically in the basic seven-step course. Teaching is intellectual and expressive. It entails directing the experiences of the learner and giving intellectual understanding of the experiences step-by-step. Learning is receptive. It entails the mediator receiving the direct experience of the intellectual principles expressed by the teacher. The completion of the seven steps have been found sufficient to establish a person both in the practice of the technique itself and the understanding of it. However, a continuing program in the theoretical aspect of the Science of Creative Intelligence is offered in group meetings and advanced lectures at local centers or in a curriculum designed for secondary schools presented on school sites for those wishing to take advantage of it. With the learning of the technique via the seven steps, the program is essentially "do-it-yourself," which means about

15-20 minutes of meditation at a convenient time in the morning and evening.

The first three of the seven steps are intellectual. They offer a vision of possibilities. In the remaining four steps, the Transcendental Meditation technique is actually learned on the basis of direct experience. In step four, the first day of actual learning, the meditator is given the experience of finer levels of thought, which spontaneously reduces his physiology measurably. In response to his individual perceptions and reactions of the experience, further instructions are then given which continue in succession over the three days (steps 5, 6 and 7) to ensure the meditator's successful continuation and understanding of the practice. The seven steps are as follows:

1. Introductory lecture and discussion of about an hour duration. Prospective meditators are given a vision of possibilities based on scientific research of how the practice of the technique can enhance life while developing human potential mentally, physically, socially, and environmentally.

2. Preparatory lecture and discussion of about

an hour duration where prospective meditators are given an intellectual understanding of the natural mechanics of the technique.

3. Personal interview with course instructor of about five minutes per person immediately following the preparatory lecture to give the teacher of the Transcendental Meditation program and prospective meditator an opportunity to become acquainted and to clarify personal concerns.

4. Individual, personal instructions in the technique combining direct experience and intellectual understanding; about forty-five minutes per person. Instructions are individual because no two people learn the same.

5. Group instructions of about an hour and a half where the mechanics of the practice are understood intellectually on the basis of direct experience.

6. Group instructions of about an hour and a half where the mechanics of stress reduction are intellectually understood on the basis of direct experience.

7. Group instructions of about two hours where the development of full potential is understood intellectually on the basis of experiences of the four days (steps 4-7) of actual instructions.

Periodic verification of experiences is encouraged following the basic course to ensure that the technique remains effortless. Experiential rather than intellectual, the purpose of checking is to maintain regular practice of the technique by giving the meditator the right experience in meditation, thereby ensuring a smooth future of right experience without the presence of a teacher. Checking usually is recommended once a week for the first month and once a month for the first year. Since regularity of meditation is sine qua non to the project, the meditators will be checked daily as an assurance.

Contrasts of Effects on the Learning Process:  
The Learning Disorder Syndrome and the  
Transcendental Meditation Program

When an individual does not learn as expected, the variation in behavior is explained by the previous emphasized fact that the individual reacts to agents of neurological damage as a functional unit: physically, psychologically, and socially. Behavioral deviations may range from the "soft" neurological signs of minimal defects that are detectable by EEG, or result in major, gross deviations. Typically, behavioral deviations are in any one, several,



or all of the segments of the learning process. Those segments, in their order of appearance, include:

1. the sensory-motor process (birth through age two)
2. the language process (three through seven and a-half years)
3. the perceptual process (four through seven and a-half years)
4. the higher cognitive process (six or seven through age eleven to thirteen)
5. the emotional/social process

The age level at which each segment can be expected to appear within the process is based on age norms. For the child with gross brain damage, the process develops more slowly and may never reach maturity in this life. But, for each child, the sequence of their appearance remains the same.

The holistic effect of learning disorder and the Transcendental Meditation program on the learning process has been the subject of extensive research during at least the past ten years. Because the results of each on behavior is so comprehensive, surely, both must be operating at the starting point of behavior, neurological functioning.

A literature survey contrasting the influence of

each on the learning process suggests that as an adjunct to curricula, the Transcendental Meditation program can alleviate learning disorders particularly and enhance learning generally. What follows is a literature summary contrasting those effects. The summary is sectioned into the segments designating the sequential development of the learning process. This process underlies learning abilities and disabilities. Each section is preceded by an explanation of the quality of behavior that characterizes each segment. The explanations are followed by an outline contrasting the effects of learning disorder and the Transcendental Meditation on behavior in that segment as described in the literature. The survey starts with neurological functioning.

Neurological functioning. The search for an organ for learning ability and disability has been narrowed down to brain functioning. While it is thought that environmental agents can predispose or precipitate abnormal brain functioning, the actual cause of learning disorders is abnormal brain functioning.

Disorderly cerebral functioning refers to devious activities of organs of the brain distinguishable from

developmental norms. The deviations show in behavior as learning and adjustment problems. In cases where the deviations are so slight as to defy any detection of anatomical damage, the condition is known by various names as cerebral dysfunction, minimal brain damage, minor brain damage, minimal brain dysfunction syndrome, minimal cerebral damage, minimal cerebral dysfunction, minimal chronic brain syndrome, organic brain damage, and organic brain dysfunction.

Electroencephalography (EEG) is a common medical technique to record brain functioning in the form of the electrical activity emitted. Those who show behavioral problems in such tests as the Wechsler Intelligent Scale for Children (WISC) have a greater incident of EEG abnormalities (Soan, p. 216). Those EEG findings are contracted with those found in subjects practicing the Transcendental Meditation technique.

Learning Disorders

1. Diffused electroencephalogram (EEG) findings<sup>44</sup>

Transcendental Meditation

1. Orderly EEG findings during and after meditation:<sup>45</sup>
  - a. Frequency (7)
  - b. Appearance (8)
  - c. Interhemispheric (9)
  - d. Anterior-Posterior(10)
  - e. Increased strength and orderliness of phase coherence (51)
  - f. Increased strength and orderliness in stability (52)
  - g. Increased strength and orderliness in the energy output of the brain hemispheres (53)
  - h. Increased orderliness in the amplitude between the two brain hemispheres indicating increased harmony between them in their functioning (54)

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<sup>44</sup>D. E. Smith, "A Synaptic Transmission Theory of Severe Reading Disability," University of Michigan School of Education Bulletin 29 (November 1957): 25-28; D. B. Lindsley, "Bilateral Differences in Brain Potentials from Two Cerebral Hemispheres in Relation to Taterality and Stuttering," Journal of Experimental Psychology 26 (1940): 211-35.

<sup>45</sup>This numeral and those following in parentheses refer to the scientific research charts on the Transcendental Meditation program in Appendix B that may or may not correspond to the footnote references.

Robert Keith Wallace, Herbert Benson, and A. F. Wilson, "A Wakeful Hypometabolic Physiologic State," American Journal of Physiology 221 (September 1971): 795-99;

Learning Disorders

2. Abnormalities in alpha rhythms (alpha patterns are associated with subjective feelings of greater relaxation)<sup>46</sup>
3. Disturbances in the regulations of bioelectric brain potentials<sup>48</sup>

Transcendental Meditation

2. An increase of alpha waves in the frontal areas of the brain during the practice of the Transcendental Meditation technique(6).<sup>47</sup> This unique EEG pattern is seldom observed, except in monks with 20 and more years of experience
3. Orderly electrophysical and EEG patterns during the practice of the Transcendental Meditation technique<sup>49</sup>

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Jean-Paul Banquet, "EEG and Meditation," Electroencephalography and Clinical Neurophysiology 33 (1972): 454; Jean-Paul Banquet, "Spectral Analysis of the EEG in Meditation," Electroencephalography and Clinical Neurophysiology 35 (1972): 143-51; Bernard C. Glueck and Urs Strobel, "Biofeedback and Meditation in the Treatment of Mental Illnesses," Comprehensive Psychiatry 16 (1975): 203-321; David Orme-Johnson and J. T. Farrow, Scientific Research on Transcendental Meditation, Collected Papers, Vol. 1, 160-64; 165-72; 173-81; 182-86; 187-207; 208-12.

<sup>46</sup>Lindsley, pp. 211-35.

<sup>47</sup>Robert Keith Wallace and Herbert Benson, "The Physiology of Meditation," Scientific American 226 (February 1972): 84-90; Orme-Johnson and Farrow, pp. 173-81.

<sup>48</sup>M. Streifler and F. Gumpertz, "Cerebral Potentials in Stuttering and Cluttering," Confinia Neurologica 15 (1955): 344-59.

<sup>49</sup>Banquet, "EEG and Meditation," p. 454; Banquet, "Spectral Analysis of EEG in Meditation," pp. 143-51; Orme-Johnson and Farrow, pp. 160-64; 187-207; 208-12.



Sensory-motor process. This segment of the learning process provides the early physical conditions for later learning abilities. Included are the individual's physical adaptors to the circumstances of life. The sensory-motor process includes physical maturation, the ability to coordinate and balance the organs of action (i.e., the hands, feet, tongue, the organs of reproduction, and elimination), and the five senses of perception (i.e., sight, hearing, smell, taste, and touch).

The sensory-motor process is the continuous reorganization of patterns involving the organs of action. Each new organization results in greater capabilities and competencies. The grasping pattern, for example, which is at the basis of visual perceptions that are not fully realized until adolescence, is dependent upon retinal functioning that occurs at about four and a-half months of age. Retinal functioning is the early sensory-motor condition for the later visual perceptions of the adolescent.

The sensory-motor process normally evolves through the natural course of development in the head, arms, hands, trunk, legs, and senses during normal activities of pushing, carrying, and pulling the body from one position to another.

When the child has ample opportunity for a variety of experiences to manipulate and discriminate, the sensory-motor process becomes sufficiently refined to evolve into patterns coordinating muscle and nerve control in the eyes and other senses, in the head, trunk, fingers, legs, feet, tongue, and sphincter. Those abilities include competencies, such as being able to focus the sensory organs as to be attentive and discriminative; balance and symmetry in the head as to obtain an upright position without support; competence in the use of the hands as to grasp, manipulate, and later write; competence in keeping the trunk erect as to support locomotion; and bladder and bowel control. Other proficiencies include fingers that can poke, manipulate buttons, zippers, shoe laces, paint brushes, crayons, and pencils; legs that can support the weight of the body, and eventually walk, skip, hop, gallop, clumb, swim, tricycle, and roller skate; feet that can cruise, a tongue that can form words and phrases; sphincters that can control bladder and bowel activities.

At the base of the sensory-motor process is the autonomic system, the physical-chemical controller of the sensory-motor mechanisms. It regulates, adjusts, and

coordinates internal functions of the body, especially of the chest and abdomen, as blood chemistry and pressure, digestion, heart rate, breathing rate and oxygen consumption, and aspects of emotional behavior. The activity of the autonomic system is called autonomic because it was formerly thought to behave independently of the brain.

While the brain structures the manner in which the sensory-motor mechanisms behave, the autonomic nervous system provides, so to speak, the fuel for their activities. The efficiency and stability of its behavior determines the amount of energy available to the individual for maturation and other activities of the sensory-motor mechanisms.

The autonomic nervous system stimulates the focusing mechanism of the eyes and the pupil constrictor muscles which enables or disables the individual's performance in reading and other learning processes (Sloan, pp. 303-4). Extreme activity of the autonomic nervous system can cause the individual to be hyperactive, hypoactive, and/or to have sluggish focusing eye mechanisms. Excessive activity can cause enlarged pupils which result in an increased sensitivity to light. In such cases, the body's own defensive adaptive reactions can result in diseases known as

diseases of adaptation.

The diseases of adaptation result from excessive or insufficient functioning of the autonomic nervous system. They include diseases of the eyes, infections, allergies, and other types of hypersensitive diseases; asthma; high blood pressure; diseases of the heart, blood vessels, and kidneys; rheumatic and rheumatoid arthritis; digestive diseases; metabolic diseases; nervous and mental diseases; and diseases of resistant in general.

Autonomic functionings were thought to be relatively unalterable, permanent characteristics of the individual. Research on the effects of the practice of the Transcendental Meditation technique on autonomic functionings is changing that theory. The practice has been shown to produce more optimal levels of autonomic functioning, and as a result, improvement in the sensory-motor process.

#### Learning Disorders

#### Transcendental Meditation

Faster reaction time (15).<sup>50</sup>  
Indication of:

- |   |                          |
|---|--------------------------|
| 1. Dullness                                     | 1. Increased alertness   |
| 2. Clumsiness (i.e., irregular motor sequences) | 2. Improved coordination |

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<sup>50</sup>Orme-Johnson and Farrow, pp. 309-11.

Learning Disorders

3. Awkwardness (i.e., overflow of movement)
4. Mirror writing, reading, and/or speaking
5. Lack of fluency in reading and locomotion
6. Poor posture
7. Imbalance
8. Ambidexterity, erratic eye movements
9. Incoordination of fine and gross muscular groups

Transcendental Meditation

Increased speed in running (57).<sup>51</sup> Indication of increased:

3. Muscular integration

Increased skill in jumping (59).<sup>52</sup> Indication of:

4. Improved laterality dominance
5. Improved rhythm
6. Improved posture
7. Improved balance
8. Neuromuscular integration
9. Coordinated relaxation and contraction of specific muscular groups

The improvement in physical skills of individuals practicing the Transcendental Meditation technique suggests a holistic development of the sensory-motor processes and autonomic functions. Other sensory-motor processes enhanced by the practice include:

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<sup>51</sup>Ibid., pp. 312-15.

<sup>52</sup>Ibid., pp. 316-21.



Learning Disorders

10. Distractibility and impulsivity
11. Hypoactivity and hyperactivity
12. Hyperactivity
13. Excitability
14. Tachycardia (increased heartbeat), noted particularly in students treated with stimulant drugs
15. Tense, can't sit still

Transcendental Meditation

10. Improved ability to focus attention and less distractibility (43).<sup>53</sup>
11. Improved stability of the autonomic nervous system (13-14).<sup>54</sup> Including:
12. Decreased metabolic activity (1).<sup>55</sup>
13. Decreased breath rate (2).<sup>56</sup>
14. Decreased workload of the heart (3).<sup>57</sup>
15. Decreased lactate in the blood (4).<sup>58</sup> Lactate has been associated with anxiety neurosis and attacks, and high blood pressure.

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<sup>53</sup>Kenneth R. Pelletier, "Influence of Transcendental Meditation upon Auto-Kinetic Perception," Perceptual and Motor Skills 39 (1974): 1031-34.

<sup>54</sup>David W. Orme-Johnson, "Automic Stability and Transcendental Meditation," Psychosomatic Medicine 35 (July-August 1973): 341-49.

<sup>55</sup>Wallace and Benson, pp. 84-90.

<sup>56</sup>Allison, pp. 833-34.

<sup>57</sup>Wallace, "The Physiological Effects of Transcendental Meditation . . ."

<sup>58</sup>Wallace and Benson, pp. 84-90.

Learning Disorders

16. Perserveration

Transcendental Meditation16. Decreased skin resistance indicating deep relaxation, reduction of anxiety, and emotional disturbances (5).<sup>59</sup>

The language process. Speech is just one of the many vague and hazy abstractions used to represent objects, experiences, and values. Other abstractions include art, pantomime, facial expressions, signs, symbols, photographs, and indices (i.e., some aspect of the real object -- e.g., smell, feel, sound, taste -- that gives clues to identify or mentally reconstruct the whole, real experience). The language process goes before to pave the way for the higher level representations of speech, reading, writing, and arithmetic. The language process enables human beings to formulate concepts or ideas. And for that reason, it is one of the main distinctions between people and animals.

Although the language process plays a tremendously important role in the later ability to formulate concepts, conceptual thinking does not automatically happen when the child begins to use speech. The child's early speech, such

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<sup>59</sup>Wallace, Benson, and Wilson, "A Wakeful Hypometabolic Physiologic State," pp. 795-99.

as "Mama," not only represents mother, the object, but generally every experience that mother represents, such as security, love and comfort. Gradually, speech becomes more exact as it is used to represent specific objects and events in time. Time is conceptualized first in the present. Later it includes concepts of past and future. Thus, while the twelve-month-old child's utterance of "Mama" represents a present need for security, at eighteen months the child uses it as a name, to represent mother, the object, specifically. The later appearance of memory makes it possible for the child to project a representation of mother in the form of the word "mama" into the past or the future. While the twelve-month-old may feel abandoned when left with a sitter while mother goes off to work, the three-year-old knows she will return.

As with the other processes underlying learning, language unfolds in sequences: first imitations (e.g., the infant mimics bodily the movements of the mobile suspended over the crib and the intonations of mother's voice), then later, the child is able to associate meaning to objects and events, and see cause and effect relationships. For example, the child begins to associate the sound "doll"

with the object of doll from repeated experiences where the word is uttered when the object is given. Later still, the child learns that the utterance of the word "doll" can cause an effect of someone giving the doll to him or her. And even later, the child begins to classify objects and events. That is, the child is able to relate objects and events on the basis of some one characteristic they hold in common, such as all dolls are toys. By the time the child is adolescent, he or she has mastered this sort of logical thinking. Through normal development of the language processes, the adolescent reaches the end point of it. He or she is able to draw relationships from information and design experiments to follow along after the relevant information to make conclusions and decisions.

Language disorders are of two types: those resulting from physical disorders (such as imperfect hearing), and early physical, psychological, and social deprivations. Deprivation places limitations on the quality and quantity of stimulations; diminishes heterogeneity of experiences; and reduces the sets of opportunities for manipulation and discrimination so necessary for normal language development.

Learning Disorders

1. Stable intelligent quotients (I.Q.)
2. Learning disability
3. Retarded academic performances
4. Poor memory
5. Poor association of meaning with symbols
6. Lack of facility in the organization of language

Transcendental Meditation

1. Increased intelligent growth rate (18).<sup>60</sup>
2. Increased learning ability (19).<sup>61</sup>
3. Increased academic performances (20).<sup>62</sup>
4. Improved memory (19).<sup>63</sup>
5. Stability of thinking (57).<sup>64</sup>
6. Increased organization in thinking (56).<sup>65</sup>

The perceptual process. This process is the direct, innocent differentiation of qualities and quantities of the physical, tangible world by way of the senses. It is an innocent response to sensory stimuli in that it does not entail thinking, i.e., conceptualization. Seeing is

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<sup>60</sup>Orme-Johnson and Farrow, pp. 361-67; 368-76.

<sup>61</sup>Ibid., pp. 377-81; 382-84.

<sup>62</sup>Ibid., pp. 393-95; 396-99.

<sup>63</sup>Ibid., pp. 377-81.

<sup>64</sup>Ibid., pp. 382-85.

<sup>65</sup>Ibid., pp. 385-92.



believing to the child who relies on the process to solve problems. Thinking is not a part of the activity of evaluating the reality that is perceived.

The fact that perception does not include thinking is what makes this process innocent. For example, the conceptualization of a tree might include thinking about how it compares to other trees, botanical knowledge about it, whether or not it provides shade, one's like or dislike of it, and other images, associations, and memories in regard to one's past experiences with trees.

The perceptual process provides the basis for the later higher, cognitive, conceptual process that requires the ability to systematize, arrange, and organize sensory stimuli. Essentially, early perceptual experiences form the basis for later, more complex problem solving behavior of causality that requires logical, hypothetical, scientific, adult-like conceptualizations. The perceptual base for conceptual abilities develops during infancy from activities where completely separate objects or events become differentiated, but continually related. New and repeated experiences can lead to more accurate perceptions and adaptations, or maladaptations as in the case of learning

disorders.

A useful prototype to illustrate this is the infant shaking a rattle to hear the noise. To the infant between four and eight months of age, the reaching, grasping, moving of the rattle, and the noise is perceived as one consolidated experience. It is normally not until between twelve and eighteen months of age that that total process (starting with grasping the rattle and ending with the noise) is perceived by the infant as separate events or causes leading to an effect (i.e., hearing the noise).

Overt motor activity is necessary for the child to perceive the concepts of physical reality -- i.e., time, space, and causality. The child's early perceptual concepts are developed through experiences such as holding its own bottle and later throwing it; inserting objects into holes or breaking objects apart; by building block towers and tearing them down; by lifting and pounding drinking cups; constructing large and small sand piles and leveling them off; and perceiving objects from different perspectives while sitting, standing, etc. It is the nature of those activities which helps the child to understand the concepts of our physical world -- time and space and the

variety of simple causal relationships between objects and events occurring within them.

Learning Disorders

1. Difficulty in sensory discrimination in depth, colors, tones, and sizes (i.e., large-small)
2. Disorders in figure-ground discrimination
3. Lack of precision in directional motor responses

Transcendental Meditation

1. Increased perceptual ability in auditory discrimination (16).<sup>66</sup>
2. Improved ability to focus attention along with the ability of broader comprehension (43).<sup>67</sup>
3. Superior perceptual-motor performances (17).<sup>68</sup>

The higher cognitive process. The preceding segments of the learning process (i.e., sensory-motor, language, and perception) go before and pave the way for the cognitive part. Normally, at about the age of six or seven, if all is well in the preceding segments, the child begins to conceptualize, i.e., use logic and judgment in

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<sup>66</sup>F. M. Brown, W. S. Steward, and J. T. Blodgett, "EEG Kappa Rhythms during Transcendental Meditation and Possible Threshold Changes Following." Paper presented at the Kentucky Academy of Science, Danville, Kentucky, November 1971; Orme-Johnson and Farrow, pp. 331-34.

<sup>67</sup>Orme-Johnson and Farrow, pp. 337-45.

<sup>68</sup>Ibid., pp. 322-25.

his or her experiences and activities. This child knows that reality is not necessarily that which meets the eyes. He or she begins to verify observations and attempts to understand the cause and effect relationships in the surroundings. This stage marks the buddings of the young scientist -- with a memory that is more accurate and integrated, an ability to compare, analyze, infer -- in short, a child who can make judgments and draw conclusions in a more systematic and abstract fashion. It is at this point that the child traditionally is launched into formal education. Until the child is at the point at which the physiology, psychology, and sociology is normally sufficiently matured, he or she is not legally required to attend school.

The development of higher cognitive abilities starts at about six or seven and reaches its optimal point between the ages of eleven and thirteen, the period of adolescence. It is during this period, between six and thirteen, that the child displays learning ability or disability, depending on the prior development of the learning process. Developmental lags in any of the previous segments result in learning disorders that show during this

period when normally children display competencies in higher cognitive abilities.

During the period of adolescence that normally starts between eleven and thirteen, the disorders may begin to correct themselves. However, residuals of learning disorders do continue into adolescence and through adulthood. This is noted particularly in the individual with severe perceptual and motor difficulties, and in the individual with a negative self-concept resulting from the psychological conditioning that can develop as a result of having a deficit in an ability considered important to society.

#### Learning Disorders

1. Stable intelligence and increased neuroticism
2. Disorders in paired-associate learning and recall

#### Transcendental Meditation

1. Increased intelligence and reduced neuroticism (18).<sup>69</sup>
2. Increased paired-associate learning and recall (19).<sup>70</sup>

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<sup>69</sup>Ibid., pp. 363-67; 368-76.

<sup>70</sup>Ibid., pp. 377-81.



Learning Disorders

3. Disorders in classification and organization
4. Illogical thinking

Transcendental Meditation

3. Increased ability to classify learned materials (56-57).<sup>71</sup>
4. Increased ability to think logically (55).<sup>72</sup>

The emotional and social process. It might appear to the reader that the segments of the learning process discussed in the preceding paragraphs are only responsible for intellectual and cognitive abilities, and that affectivity, i.e., the emotional/social aspect that makes up the personality, develops separately. It may just be that the same intelligence that governs the sequential development of the learning process, and which finds its expression in the individual by way of brain functioning, is the same affectivity (i.e., the same influence) that emotes as the dynamics of the personality:

It may even seem that affective, dynamic factors provide the key to all mental development and that in the last analysis it is the need to grow, to assert oneself, to love, and to be admired that constitutes the . . . force of

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<sup>71</sup>Ibid., pp. 385-92.

<sup>72</sup>Ibid.

intelligence, as well as of behavior in its totality and in its increasing complexity.<sup>73</sup>

At the risk of sounding esoteric, from all that we have seen of the processes of learning, it can be concluded that in its infinite value, intelligence is creative. And that creative intelligence emotes within each individual, on the basis of neurological functioning, in the unfoldment of the learning process which we call evolution in all bodily movements and in the senses, and in all thoughts and decisions. Personality is but a piece, the mask of creative intelligence localized. The two aspects, personality and creative intelligence, are at the same time inseparable and irreducible. The amount of creative intelligence each person's nervous system emits is reflected in his or her abilities and disabilities -- physically, psychologically, and socially:

It is precisely this unity of behavior which makes the factors in development common to both the cognitive and the affective aspects; and their irreducibility in no way rules out a functional parallelism which is rather striking even in details (. . . in connection with "object relations," interpersonal connections, and moral sentiments). Indeed, the sentiments involve incontestable hereditary (or instinctive) roots subject to maturation. They derive a fundamental

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<sup>73</sup>Campbell, pp. 74-75.

enrichment from interpersonal or social exchange. But beyond these three factors, they unquestionably involve conflicts or crises and reequilibrations, for the formation of personality is dominated by the search for a coherence and an organization of values that will prevent internal conflicts . . . . Even if we disregard the function of the moral sentiments, with their normative equilibrium . . . , it is impossible to interpret the development of affective life and of motivations without stressing the all-important role of self-regulations whose importance, moreover, all the schools have emphasized, albeit under various names.<sup>74</sup>

The same "self-regulations" or creative intelligence that structures our learning, structures our affective behavior as well. When this expression is limited by disorderly neurological functioning, learning and social disorders, such as crime and antisocial acts have an apparent correlation, i.e., a coexistence within the same individual. The individual practicing the Transcendental Meditation techniques learns not to be disorderly, i.e., not to make mistakes -- either cognitive or affective.

#### Learning Disorders

1. Personality deterioration

#### Transcendental Meditation

1. Personality development (27 and 50).<sup>75</sup>

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<sup>74</sup>Ibid., p. 75.

<sup>75</sup>Sanford I. Nidich and Thomas Banta, "The Influence

Learning DisordersTranscendental Meditation

- |                                   |   |
|-----------------------------------|---|
| 2. Decreased inner control        | 2. Increased inner control (28). <sup>76</sup>        |
| 3. Increased anxiety              | 3. Decreased anxiety (30 and 35). <sup>77</sup>       |
| 4. Psychological deterioration    | 4. Improved psychology (29). <sup>78</sup>            |
| 5. Decreased self-esteem          | 5. Increased self-esteem (31). <sup>79</sup>          |
| 6. Mental health deterioration    | 6. Improved mental health (32). <sup>80</sup>         |
| 7. Decreased psychological health | 7. Increased psychological health (33). <sup>81</sup> |
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of Transcendental Meditation on a Measure of Self-Actualization," Journal of Counseling Psychology 19 (1972): 184-187.

<sup>76</sup>Larry A. Hjelle, "Transcendental Meditation and Psychological Health," Perceptual and Motor Skills 39 (1974): 623-28.

<sup>77</sup>Phillip C. Ferguson and John C. Gowan, "The Influence of Transcendental Meditation on Anxiety, Depression, Aggression, Neuroticism and Self-Actualization," paper presented at California State Psychological Association, Fresno, California, January 1974.

<sup>78</sup>Orme-Johnson and Farrow, pp. 420-24.

<sup>79</sup>Ibid., pp. 428-33.

<sup>80</sup>Ibid., pp. 453-61.

<sup>81</sup>Ferguson and Gowan.

<u>Learning Disorders</u>	<u>Transcendental Meditation</u>
8. Decreased self-actualization	8. Increased self-actualization (34). <sup>82</sup>
9. Emotional and thinking disorganizations resulting in antisocial acts	9. Rehabilitation of emotional and thinking processes in prisoners (40). <sup>83</sup>
10. Criminal acts and juvenile offenses	10. Rehabilitation of prisoners (41 and 44). <sup>84</sup>
11. Frequent need for prescribed and nonprescribed drugs	11. Spontaneous reductions in the use of prescribed and nonprescribed drugs (42.) <sup>85</sup>
12. Frequent use of alcohol and cigarettes	12. Spontaneous reductions in the consumption of alcohol and cigarettes (38). <sup>86</sup>
13. Decreased productivity	13. Increased productivity (21-22). <sup>87</sup>

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<sup>82</sup>Ibid., pp. 417-19.

<sup>83</sup>Ibid., pp. 585-93.

<sup>84</sup>Ibid., pp. 556-61; 562-68; 569-76; 577-84.

<sup>85</sup>Mohammad Shafii, Richard A. Lavelly, and Robert Jaffe, "Meditation and Marijuana," American Journal of Psychiatry 131 (January 1974): 60-63; Drug Abuse, Proceedings of the International Conference (Philadelphia, Pa.: N.P., 1972), pp. 369-76.

<sup>86</sup>Ibid., pp. 369-76.

<sup>87</sup>David R. Frew, "Transcendental Meditation and Productivity," Academy of Management Journal 17 (June 1974): 362-68.



Learning Disorders

14. Decreased performance in personal and organizational activities
15. Deterioration of attitude and behavior
16. Deterioration of surroundings

Transcendental Meditation

14. Increased performance in personal and organizational activities (23).<sup>88</sup>
15. Improved attitude and behavior (24).<sup>89</sup>
16. Improved environment (01).<sup>90</sup>

More Visions of Possibilities: Scientific  
Research on Neurological Functioning

Scientific research on the effects of the Transcendental Meditation program suggests that the Transcendental Meditation practice establishes a pattern of orderly, coherent thinking and emotional stability through profound rest. The influence of deep rest takes place directly at the neurophysiological level in the function of the brain. The enhanced functioning resulting from the profound rest induced by the practice may compensate for the minimal brain dysfunction believed to be the source of learning disorders. This can be better understood in: (1) review of what is

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<sup>88</sup>Ibid.

<sup>89</sup>Ibid.

<sup>90</sup>Orme-Johnson and Farrow, pp. 651-62.

known about the functioning of the different areas of the nervous system with respect to the learning process; and then (2) by relating this information to the scientific research which suggests the neurological effects of the practice of the Transcendental Meditation technique for the individual and the environment.

Electroencephalic ordering: three types. The research of Dr. Jean-Paul Banquet indicates that the electroencephalic (EEG) signals (brain waves) induced during and after the practice of the Transcendental Meditation technique are markedly synchronous and coherent.<sup>91</sup> This is an indication of superior integration and coordination of different brain areas. The three types of integration implied by this observed wave synchrony are of (1) the right and left hemispheres; (2) the front and back sectors; and (3) vertical synchrony.

1. Synchrony of the right and left hemispheres of the brain. Research led by Dr. Roger Sperry, of the California Institute of Technology, indicate that each hemisphere of the brain has a separate functioning (see Figure 4).

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<sup>91</sup>See footnote 45.

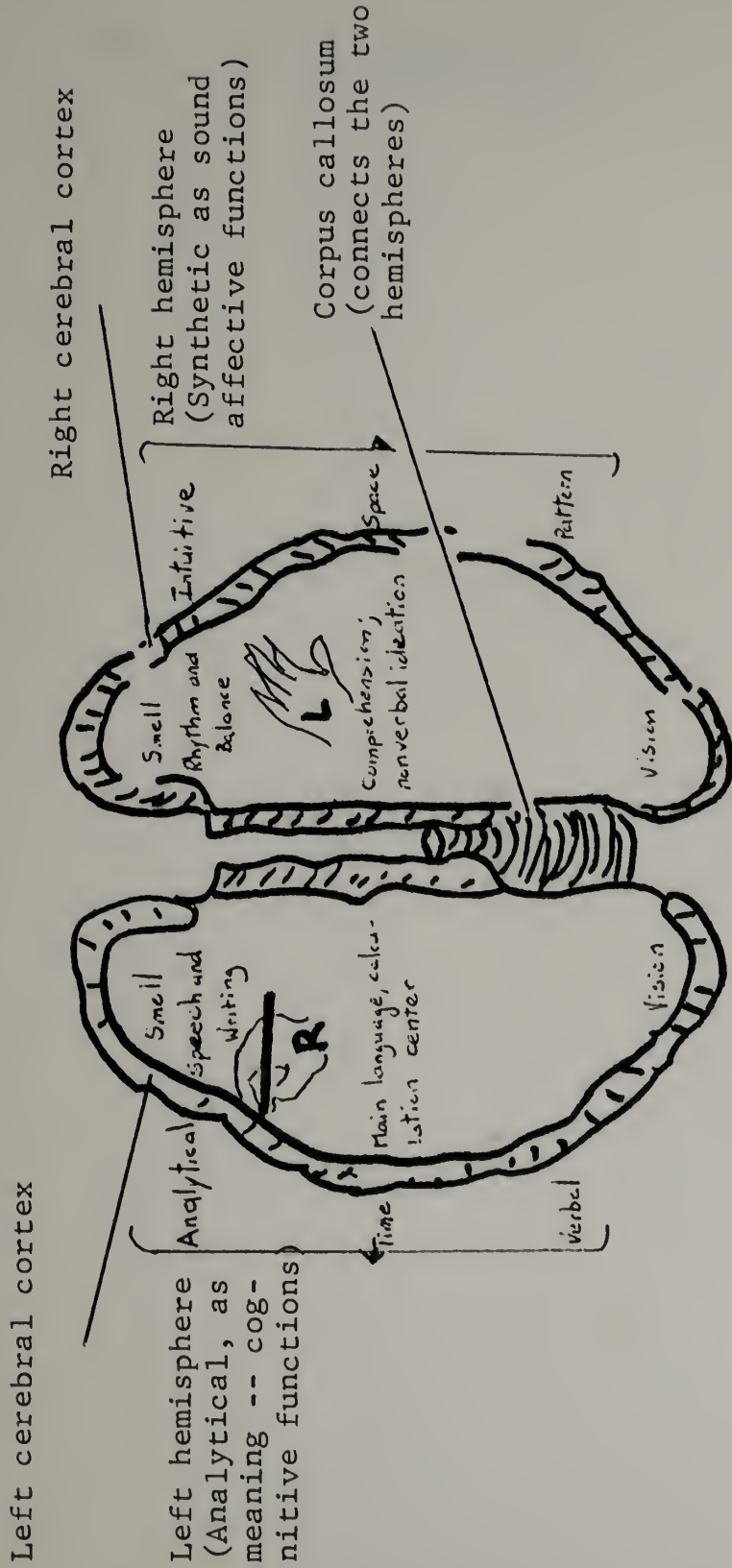


Fig. 4. Higher functions in the right and left hemispheres of the brain.

The right hemisphere controls synthetic functions as sound, while the left controls analytical thinking as meaning.

Dr. Banquet's studies show that during the practice of the Transcendental Meditation technique, the brain waves from the two hemispheres fall in step with one another in frequency and in phase. This ordering implies subjective correlates of better coordination between: (a) aspects of meaning and sound in language; (b) form and spatial location in vision; and (c) analytical and synthetical thinking.

The more obvious correlates of this aspect of induced orderliness of the two cerebral hemispheres indicated by Banquet would seem to be improved academic performance, as denoted in the studies by Collier and Heaton and Orme-Johnson (20);<sup>92</sup> increased organization of learned material (57); increase in solving arithmetic problems accurately (56); increased ability to organize memory (55); and increased intelligence growth rate (18 and 49).

2. Synchrony of the front and back sectors of the brain. The alpha waves, ordinarily characteristic of the posterior cortex, spread synchronously and coherently

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<sup>92</sup>Numerals in parentheses refer to the scientific research chart in Appendix B.

to the frontal region during and following the practice of the technique. Simultaneously, the beta and theta waves spread from the frontal region to include the entire brain (6 and 10). Since the sensory processors are in the posterior end of the brain and the motor controls in the anterior, this ordering in terms of electrical wave synchrony suggests a correlation with the improved coordination of thought and action and the improved perceptual-motor performance reported by meditators and evident in psychological tests (17). The more obvious correlates of this aspect of the induced orderliness of the EEG pattern outside of meditation would seem to be faster reaction time (15), and improved perceptual-motor performance.

3. Vertical synchrony in the brain and levels of rest. The third type of ordering is seen in a more integrated relationship vertically. This takes place between the cortex and the thalamus and other subcortical centers.<sup>93</sup> The coherence between the parts of the brain responsible for conscious thinking (cortical) and for the primary physiological functions (e.g., heartbeat and

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<sup>93</sup>The thalamus is involved in the transmission and integration of certain sensations as vision.



breathing) tend to shed light on the classical research of Dr. Keith Wallace of MIU which disclosed that the purely mental technique of Transcendental Meditation had profound physical effects on oxygen consumption, metabolic rate, breath rate, skin resistance, cardiac output, and blood chemistry (1 and 3-6). The coherence between the conscious thinking cortex and the primary physiological functions controlled by subcortical functions suggest that general result of closer connection between mind and body.

The level of rest during the practice of Transcendental Meditation is significantly deeper and gained more quickly than any period of a full night's sleep or any state of hypnosis. Oxygen consumption is a measure of the overall level of rest (metabolic rate). During the practice of the Transcendental Meditation technique, metabolic rate decreases to about 16 percent and stays low during meditation, while within six hours of sleep, metabolic rate decreases to about 9 percent, the deepest level of rest experienced in a normal cycle. In one hour of hypnosis, metabolic rate does not change (1).

The improved integration between cortical and these archicortical functioning suggest that type of ordered

functioning known to operate in learning ability as:

(a) integration of synthetic and analytic thinking; (b) better linguistic and verbal ability; (c) a widened range of idea associations; (d) better perceptual-motor coordination; and (e) more effortless memory. The latter is illuminated by the results of studies which indicate that meditators improve in terms of long- and short-term recall and in both aspects of memory -- acquisition and recall (19).

Emotional stability. Intellectual facility supported by emotional balance results in good academic performance. This effect has also been objectively shown to result from the practice of the Transcendental Meditation technique.

The studies on galvanic skin response suggest that meditators respond to and recover more rapidly from stressful stimuli more stably than nonmeditators (13). This is an accepted measure of emotional balance and strength. In addition, standardized measures of emotional health and psychological functioning indicate that meditators grow in values of self-actualization, that is, firm identity, spontaneity, and solidity of character -- qualities of a secure and orderly emotional life (27 and 29).

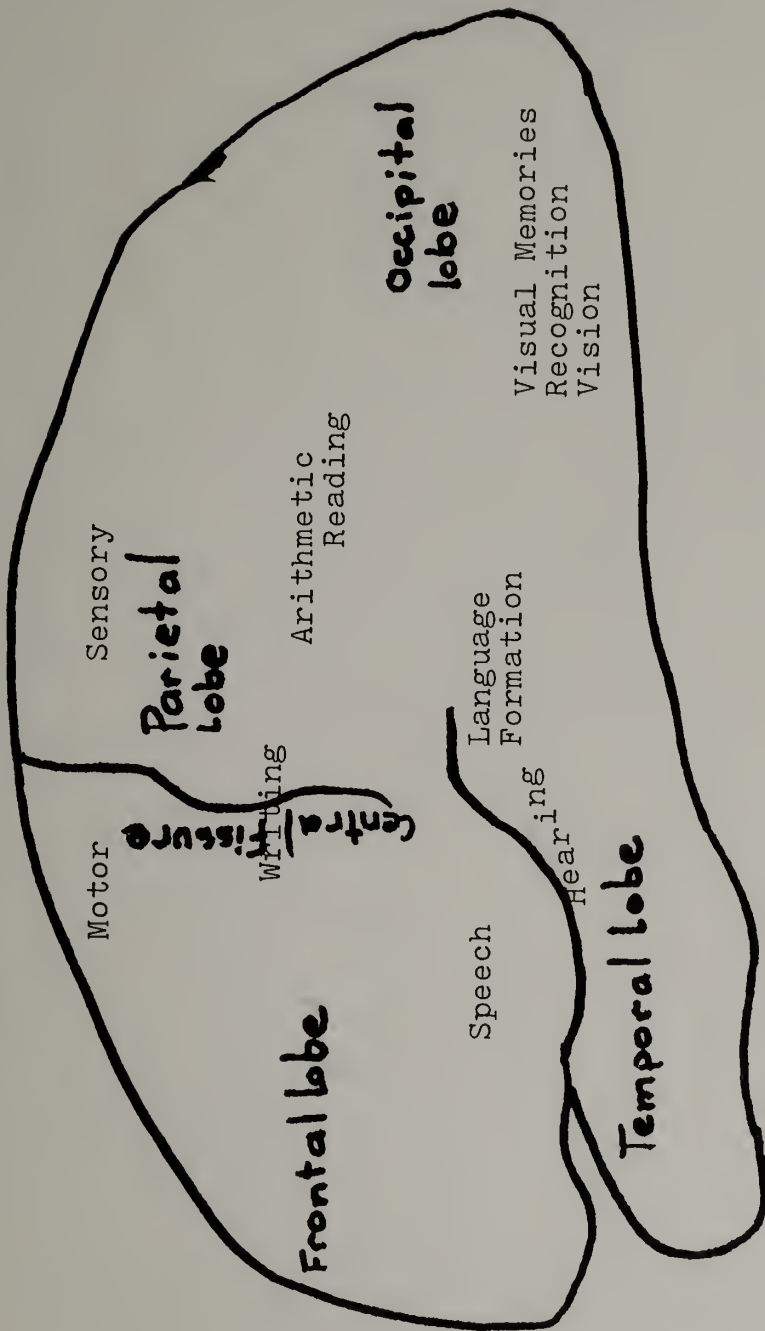


Fig. 5. Language functions as seen from a side view of the brain.

In conclusion, it may be noted that the practice of the Transcendental Meditation technique gives cause to a more orderly style of neurological functioning; effects coherency in the processes of learning; and enhances behavior as a unit -- physically, psychologically, and socially. Thus, we see that neurological functioning controls learning and that learning is a process, developmental, and not a state. It is as much a feature of the physiology as it is the psychology and sociology. Scientists have already begun to study the unitary, stabilizing effects of the practice of the Transcendental Meditation technique on the individual. It has only been during the past year or two that its ecological effects are now being considered. Let us turn to those results and possibilities.

Ecological stability. The benefits to the individual have been found to enhance the ecology as well. In cities where 1 percent of the population practices the Transcendental Meditation technique, the crime rate and the sickness rate of that city declines, indicating the orderly effect meditators have on those environments (01).

This proximity effect (which is becoming popularly known as the Maharishi effect in journalism) is the tendency

of increasing orderliness to spread from a concentrated source (the individual) to the environment. The scientific background of this 1 percent principle can be found in the various systems of inquiry. For example, in neurophysiology, the orderly functioning of 1 percent of the brain cells is sufficient to maintain coherent functioning of the entire brain; in biology, the orderly functioning of DNA, constituting less than 1 percent of the cellular material, is the basis for the orderly functioning of the entire cell; in chemistry, one crystal introduced into a super saturated solution is more than enough to crystallize the entire solution; in laser mechanics, stimulated emission by 1 percent of the atoms is sufficient to produce macroscopic wave coherence resulting in laser light; and, in physics the orderly alignment of 1 percent of the electrons in a magnet is more than enough to maintain the strength of the whole magnet. Research on the effects of the practice of the Transcendental Meditation technique suggests that because of the concentrated influence of orderliness and balance resulting from the practice of the technique, 1 percent of the population practicing it is sufficient to maintain the coherent functioning of the entire environment.



The theoretical notion developed within this chapter is that as an adjunct to special educational practices, the Transcendental Meditation program is an effective means to alleviate learning disorders. The foundation for the construction of this theory is based on the literature review from both disciplines. Each implies that the basis of learning is the nervous system. Learning disorder is attributed to minimal brain dysfunction, while the increase of orderly brain waves during the practice of the Transcendental Meditation technique, and improved learning and other behavior outside of meditation, are attributed to the practice of the technique. The improved behavior in meditators, substantiated by scientific research, include specific symptoms contained within the primary diagnosis of minimal brain dysfunctioning.

The Transcendental Meditation technique is completely natural. And as with any natural processes (such as breathing), it does not have any side effects. The naturalness of the practice makes it universal in its scope, and unique in the world today. Its principles are fundamentally different from any other form of meditation or method of mental or physical development now being taught. For this

reason, it is not to be confused with any of them.

The comparatively limited amount of research on other programs indicate that they do not result in the well-integrated combination of physiological, psychological, sociological, and ecological response as seen in the Transcendental Meditation program. Unlike the practice of the Transcendental Meditation technique, they teach manipulation of particular functions through concentration or contemplation. On this basis, it is conceivable that those practices could result in strain and imbalance in the functioning of the neurophysiological system. More adequate research will weigh the possibilities. In the meanwhile, therapeutic use of them should be restricted until their effects have been thoroughly researched.

With this theoretical construct, and the distinction between the Transcendental Meditation program and other programs, we can now turn to the practical aspect of this study in the following chapter. Chapter IV is a report of the experiment that tested the theoretical prospects in this chapter.

## C H A P T E R   I V

### PRACTICAL APPLICATION

#### Hypotheses to Be Tested

On the basis of the literature review on learning disorders and the Transcendental Meditation program summarized in Chapters II and III, respectively, it is now possible to formulate the expected outcome of the practical aspect of this study:

1. There will be a difference in the mean raw scores between meditating and nonmeditating tenth-, eleventh-, and twelfth-grade students on the following scales which measure facets in the development of the self-actualizing person on the Personal Orientation Inventory:

- a. Other/Inner (O/I)
- b. Acceptance of Aggression (A)
- c. Self-Regard (Sr)

2. There will be a difference in mean raw scores between meditating and nonmeditating tenth-, eleventh-, and twelfth-grade students in errors on word pronunciation as measured by the Gray Oral Reading Tests.

3. There will be a difference in mean raw scores between meditating and nonmeditating tenth-, eleventh-, and twelfth-grade students in arithmetic achievement as measured by the Wide Range Achievement Test.

### Method

Subjects. The study was conducted in a Title I Philadelphia public secondary school composed of black students which drew its population from economically disadvantaged neighborhoods (see Table 1).<sup>94</sup>

TABLE 1  
INCOME CRITERIA

Number of Children or Other Dependents	Family Income
1	\$ 6,910
2	\$ 8,030
3	\$ 9,070
4	\$10,440

SOURCE: Bureau of Labor Department's December 1974 "Definition of Low Income Families."

<sup>94</sup>Title I of the Elementary and Secondary Education Act is the largest Federal aid-to-education program. It was passed in 1965 to provide financial assistance to local school districts in planning and operating special programs for educationally deprived children. See U.S., Department

From the total student population of 2,977, the 75 students proposed for this project were identified either by the California Achievement Test (CAT) or the Philadelphia Secondary Informal Reading Inventory (IRI) administered annually, as reading at preprimer, primer, and first instructional levels. This total was adjusted to seventy-six at the commencement of the project to allow for the shift in numbers. These students were in addition to those in the remedial educable program. The students ranged in ages 16 through 19, and grades 10 through 12. Based on the results of this preliminary testing, the students were rostered into a program called CARE (Content Area Reading Emphasis), auspicated by the alternative Schools Project of the School District of Philadelphia.

CARE is described as "a modified house plan and school within a school" with a basic instructional, supportive, and administrative staff. CARE students follow a block roster for ungraded classes in reading, arithmetic, social studies, physical and health education, social guidance, and the industrial and home arts. This pilot

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of Health, Education, and Welfare, Programs for Educationally Deprived Children Under ESEA Title I, 1971, p. iii.



project on the effectiveness of the Transcendental Meditation program on black youths with learning failures attending a public school in a low-income area in a major city is limited to the students in CARE for the following reasons:

1. The CARE students were the only students that could be rostered into the Transcendental Meditation program during the school day without disrupting the curricula already underway in the school when the program was introduced.

2. The accessibility of CARE students during school hours permitted them to participate in the supportive services prescribed by the Transcendental Meditation program during that time to assure regular practice of the technique at home. Regular practice of the technique twice a day is sine qua non for effectiveness.

3. The principal requested that we perform the experiment with this group. The request was prompted by the threat of the withdrawal of funds from the CARE project, because students from previous years had not shown significant growth on any variable to justify continued financial support.

Instruments. A test evaluation form by Harrington enabled the researcher and CARE staff to compile information on several measures of the variables (i.e., personality, reading and arithmetic) concurrently.<sup>95</sup>

The tests of personality evaluated were narrowed to those developed to measure the extent to which the individual is developing and utilizing potentialities. Essentially, the purpose of the personality inventory for this project was to measure personality growth. For this reason, the tests considered were limited to those measures of the "normal" personality. It should be noted that in selecting tests of personality, researchers necessarily work from their own biases on the selection of the developmental aspects of growth patterns to be measured. Of the tests considered, the choice was narrowed to the following three: California Psychological Inventory (CPI); the California Test of Personality, 1953 revision; and the Personal Orientation Inventory (POI). Of the three, the Personal Orientation Inventory was selected. The POI is a welcomed effort to fulfill the void of available measures

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<sup>95</sup>W. E. Harrington, A Study Guide for Measurement (Dubuque, Iowa: William C. Brown, Publishers, 1969), pp. 134-45.

of personality growth. Personality is a crucial index in this study because of the popular notion that cognitive and affective facilities are complements.<sup>96</sup> The POI was used in another sample by Seeman, Nidich, and Banta with subjects practicing the Transcendental Meditation technique.<sup>97</sup>

Of the twelve scales of the POI, the Other/Inner, Self-Regard, and the Self Acceptance scales were chosen because of their relevancy to the more dominant personality disorders of students with learning disorders. For example, many students with learning disorders tend to be overly gullible and easily led by peers and older students. The Other/Inner scale is a measure of whether reactivity orientation is basically towards others or the self. Another outstanding characteristic of personality in many students

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<sup>96</sup>Sarah F. Campbell, Piaget Sampler (New York, N.Y.: John Wiley & Sons, Inc., 1976), p. 39.

<sup>97</sup>For six of the twelve POI scales used in this study, two months after the study commenced, there were no differences between the meditators and nonmeditators. There were, however, differences between the two groups on the remaining six scales that was significant in four of the meditators as follows:

Inner/Outer Directed. . . . .	(p .02)
Self-Regard . . . . .	(p .02)
Spontaneity . . . . .	(p .001)
Acceptance of Aggression. . . . .	(p .02)
Acceptance. . . . .	(p .01)
Capacity for Intimate Contact . . . . .	(p .05)

with learning disorders is a denegrating attitude towards the self for having a deficit in an area of function considered important by society. The Self-Regard scale measures affirmation of self because of worth or strength, and the Acceptance scale measures affirmation of the self in spite of weaknesses or deficiencies.

Reading usually is assessed in the several strands of reading, i.e., oral, silent, and listening. Of the three, oral reading was selected for assessment. Because of its overt nature, it provided a more objective measure of achievement of the mechanical elements in reading on which abilities are based.<sup>98</sup> In addition, it has been suggested that oral reading and personality development are directly related.<sup>99</sup> This factor is particularly important since affective development is an important factor in this project (see Chapter III).

A survey of test catalogues revealed a variety of reading instruments that could be used. Those tests considered from among them for this project included Durrell

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<sup>98</sup>William S. Gray, "Reading," Encyclopedia of Educational Research, ed. Chester W. Harris, 3rd ed. (New York, N.Y.: Macmillan Co., 1960), p. 1564.

<sup>99</sup>Gertrude C. Winston, "Oral Reading and Group Reading," Elementary English 40 (April 1963): 392-93.



Analysis of Reading Difficulty; the Gilmore Oral Reading Test; and the Gray Oral Reading Tests. While each test was given a comparable overall evaluation, of the three, the Gray Oral Reading Tests were selected primarily for two reasons: (1) the high reliability of .98, which left no doubt that the tests were measuring something systematically and similarly; and (2) the Gray tests have provisions of more than one form which may be used for pretesting and post-testing in this project. A comparison of the forms shows many important similarities. Similar features include a series of short selections for oral reading ascending in difficulty, and a scoring procedure in which raw scores are based on time and the total number of errors in pronunciation. Forms A and D were used for pretest and posttest, respectively.

Achievement tests in Arithmetic computation assessment were narrowed from the many available. Those considered included the SRA Achievement Series: Arithmetic; the Metropolitan Achievement Test; and the Wide Range Achievement Test. The tests were considered because they assess the functional level of achievement of basic concepts associated with arithmetic. Other tests of arithmetic



achievement that included problem-solving and concepts were not considered because of the demand they make on the reading skills of the student which tends to obscure the assessment.

While all three tests were acceptable for the purpose of the project, of the three, the Wide Range Achievement Test was selected for its high reliability and efficiency in assessing the level of achievement in the development of basic concepts associated with arithmetic. Though length of time is an important factor in the administration of any of the achievement tests, it is particularly crucial in arithmetic. Of the achievement tests in reading and arithmetic administered routinely to the students throughout the School District, the arithmetic was most traumatic to the CARE students; many of them were reluctant to take it. Anderson's explanation for this aversion to arithmetic that is frequently observed with students with learning disorders is that it relates to the severe problems in spatial relationships that is most common in learning disorders.<sup>100</sup> For this reason, he explains, many of the students are taught numbers and number

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<sup>100</sup>Anderson, p. 29.

combinations through techniques that do not teach understanding of the basic relationships between the different functions which can be exceedingly traumatic to the student with learning disorders.

Procedure. The POI, the Gray Oral Reading Tests, and WRAT were administered twice to both groups. The first administration was one day before the students began the practice of the Transcendental Meditation technique. The second administration took place 156 days (22 weeks, 2 days) following the commencement of the practice. In the few cases where a S was absent from the control group, the missing score was assigned the mean value of the particular treatment group.

All scores were obtained by administering the tests to both groups simultaneously. With the exception of the Gray Oral Reading Tests, which were administered by the CARE English/reading teacher, all tests were administered by the examiner. One or more CARE staff persons and the examiner were present on both pretesting and posttesting occasions. For the POI, the E read the statements to the entire class.

From separate lists of fifty males and twenty-five

females from the CARE program, a teacher's assistant assigned equal numbers by means of a random number table to the two treatment conditions: the Transcendental Meditation group and a guidance group. This selection method yielded equal numbers of males and females for each of the treatment conditions with the exception of the extra odd number female who was assigned to the experimental group. A few days before the study commenced, this number was adjusted, allowing for the one control female who dropped out of school and the one male and female added to the CARE roll, which brought the total number to seventy-six. The additional students were selected for the experimental group from the control group by means of the random number table. The breakdown of the final count yielded forty experimental subjects and thirty-six control subjects (see Table 2).

TABLE 2

## TOTAL NUMBER OF PROJECT PARTICIPANTS

	Experimental Group	Control Group	Subtotal
Males	26	25	51
Females	<u>14</u>	<u>11</u>	<u>25</u>
Totals	40	36	76

Parental consent was obtained for Ss in the experimental group. The meditating (experimental group) received the usual thirty to forty-five minutes of individual instructions into the practice of the Transcendental Meditation technique (see "The Basic Course" in Chapter III). At the end of the session, the students were given instructions to meditate twice daily at home for periods of fifteen to twenty minutes. The meditators then met as a group for additional instructions and verification of the practice following the initial session for three consecutive days of forty-five minutes. After this initial learning period, the group met with the E once weekly during the thirty-minute a week advisory/lunch period at 1:30 P.M. for group and individual checkings, and with a CARE teacher-advisor for the remaining four weekly advisory periods for thirty minutes for a five- to ten-minute group meditation.

The Ss assigned to the guidance group met also during the advisory period though with a different advisor thirty minutes daily during each school day. The group was guidance-oriented, that is, information-giving and process-oriented.

The aim of this pilot study was to examine the

effects the practice of the Transcendental Meditation technique might have on aspects of personality and cognitive development on the population studied. For this determination, the mean pretest and adjusted posttest scores on the three dependent variables were compared. Analysis of covariance was performed to evaluate posttest differences between the groups. The level of significance was set at .05.

### Results

The mean pretest and adjusted posttest scores on the five dependent variables are presented in Table 3. There is no significant difference in the pretest scores among the groups on any measure.

As shown in Table 3, the meditation group gained on all three measures of personality on the POI. There was no significant difference on the measures of reading and arithmetic on the Gray and WRAT, respectively. Analysis of covariance was performed to evaluate posttest differences between the groups. Inspection of the data presented in Table 3 reveals a significant difference among the groups on all three scales of POI (1,  $F = 70.482$ ,  $df = 1$ ,  $p = .001$ ;



TABLE 3

MEAN PRETEST AND ADJUSTED POSTTEST SCORES  
ON DEPENDENT VARIABLE MEASURES

Treatment Group	POI		SR		A		GRAY		WRAT	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Meditation	67.938	81.500	10.250	12.313	12.375	16.813	6.073	6.500	14.188	16.313
Guidance	69.300	71.750	10.050	9.450	13.700	14.500	6.000	6.250	14.450	15.750

Sr,  $F = 18.685$ ,  $df = 1$ ,  $p = .001$ ; and A,  $F = 32.056$ ,  $df = 1$ ,  $p = .001$ ). See Appendix D for the complete CANOVA tables. There was no significant difference among the groups on the measures of reading and arithmetic achievements.

For the purposes of this study, there seem to be no particular reason to assume that the individual measures of the POI relate meaningfully to each other. Also, the scoring scales for those measures differ so that the results of each cannot effectively be compared as a means of inferring something about the relationships between the constructs they represent. For example, a seventy-nine on the POI Other/Inner measure does not mean that Other/Inner directiveness is 7.9 times as intense in an individual as is Acceptance, as indicated by a 10 on the POI Acceptance measure. Therefore, an appropriate analysis of the data is in terms of the pre-post differences on each separate measure taken as an index of the absolute level of change, and as an index of change relative to the nonmeditating subjects of the control group.

The number of subjects in the experimental group was too small to treat sex as a variable in the CANOVA to support any reliable inferences about that variable.

Therefore, the data was collapsed across that variable, and all subjects were treated together. Also, there is no indication from the data that important differences distinguish male and female subjects. Only the subanalysis of WRAT scores, with females taken separately, indicates that sex is influencing the results. And even in that case, the affect is not dramatic (see Appendix D).

### Discussion

Implications. This study set forth and tested the theoretical foundation that the practice of the Transcendental Meditation technique can alleviate learning disorders in selected aspects of personality and cognitive functioning of adolescents from low economic groups. The results confirm that the meditating students of this study practiced the technique with beneficial results when compared to non-meditating students from the same population.

The meditating students became more self-actualizing in significant aspects of personality relevant to learning disorders as measured by the scales in the POI. They became more Inner/Outer directed. This means that they became more guided by their own principles and motives, and less

gullible and easily led by peers. The results of the scale on Self-Regard indicated that the meditators were experiencing an increase of self-acceptance based on their strength as a person. At the same time, they were less self-rejecting because of their disorderly learning processes. The high score on the Acceptance of Aggression scale indicated an increased ability on the part of the students to accept feelings of anger and aggression without condemnation and the accompanying guilt, as opposed to frequent rage reactions and tantrums when crossed as a result of rejecting such feelings.

A self-actualizing person is variably described as becoming free by his or her own volition, of the emotional blockages to the expression of his or her unique capabilities or potentialities. Subjectively, this trait was observed to have grown rapidly and to have become eminently prominent in the meditating students, according to their teachers (see Appendix A). The meditators were variably described as more alive, alert, aware, and assertive. Contrary to popular thinking about meditation, the teachers' testimonials described not only an increase of activity, but an increase of purposeful, self-regulated activity. It

was also felt that, individually and collectively, the meditators exuberated a greater sense of presence, direction and dignity. This suggested the growth of their self-regulatory constructs along with a heightened sense of freedom from the external controls of the pressure of peers to conform out of fear.

The personal growth occurred with such rapidity, that each advisory period when the meditators met as a group presented a new and improved face. While the stages of growth transitions were most welcomed and enjoyed, they were not always without grueling incidences during the early weeks of the practice. The smooth running advisory sometimes became explosive and disorganized during the transitions when greater stages of equilibrium were being established. The eventual stabilization resulted from the students' volition. Behavioral changes occurred internally. The advisor and the Transcendental Meditation teacher did what they could to expedite it, which consisted mostly of hoping that it would pass quickly as it usually did within a day or two. External controls as reward-seeking, punishment-avoiding situations of experimental psychology were not used.



The assigned advisor of the meditating students was besieged by requests from the meditators for tutoring and astonished by the spontaneity of their growing desire to be helped and to their cooperation with one another during the advisory period. One student began coming to school an hour before it started to study alone. He later engaged the help of a teacher whom he met by chance one morning whose husband dropped her off at school an hour early on his way to work.

By their own volition, cooperation, and assertions, the meditators began to recompense those skills which they lacked as they developed personally -- individually and collectively. Along with the growth of personality came a heightened perception of needs and deficits in scholastic skills. The "crab in the basket" syndrome became less and less, as more and more each student spoke freely of his or her accomplishments and competencies, and encouraged others to speak of theirs without fear of being pulled down into the basket of low self-esteem by the ridicule of classmates.

Theoretically, the personal growth of each student can be said to be a reconstruction of the preceding level of development that extended the previous one. The new

level served as the platform which expanded that student's development, and individually inspired that of the others to levels that surpassed the preceding one to an ever greater degree. This was the process of the proximity or ecological effects. This effect, which has become popularly known as the "Maharishi effect," is the tendency of increasing orderliness to spread from concentrated individual sources to the environment as a result of the practice of the Transcendental Meditation technique (see section under ecological stability in Chapter III).

This new way of the meditators in relating to themselves and to others represented a sharp contrast to the parallel relationships that was so prominent among them and with their teachers before they began the practice of the Transcendental Meditation technique (see Appendix A). Without knowing the identity of any meditator, the subject teachers attested to the growth and development of each with two exceptions (though those two attested to their own development). Prior to meditating, interpersonal relationships were the results of conflict. The growth of cooperativeness, along with reasoning ability, tolerance and assertiveness, evolved as the students advanced in the

practice of the technique.

The finding of no differences between the meditators and nonmeditators in reading and arithmetic achievement may be attributed to several factors:

1. The Ss were sampled from a program where students were deficient in basic skills for reading and arithmetic commensurable to success in those areas. The possibility is that the meditation-induced improvements on the personality variables might have been sufficient energetics for significant improvement on those skill variables as it was subjectively (according to teachers' ratings) had the meditators started the practice with some knowledge of basic skills. The rationale for such a possibility is based on the homogeneity of personality and cognitive development that is gaining prominence in educational and developmental literature (see section under emotional and social processes in Chapter III). The meditators' cognition of their deficits and the personality energetics to correct them, while necessary, were not sufficient within the four and one-half month time period of this study to show significant differences. Though it is conceivable that with the prominence of their personality growth, given

time, the heightened subjective teacher ratings which they received in the skill areas will be measurable by such objective techniques as Gray and WRAT.

2. A second possibility is that the practice of the Transcendental Meditation technique requires practice over a longer period of time than the twenty-two weeks and two days of this study. While the meditators, as compared to the nonmeditators, did improve on the cognitive scales, the improvement was not significant within the time period of this study.

3. A third possibility in relationship to the above is that in addition to the practice of the Transcendental Meditation technique, students at this level of cognitive skills must also be exposed to teachers with diagnostic teaching skills to recompense the deficits in those areas.

4. A fourth, and very important possibility, is the need to present the full Transcendental Meditation program, the Science of Creative Intelligence (SCI) curriculum with the theoretical aspect of the program to the practice of the Transcendental Meditation technique. There are several advantages: (a) it provides an opportunity for

the meditators to grasp intellectually their practical experiences resulting during and outside the use of the technique; (b) it assures regularity of the practice by giving the students confidence in knowing that the easy, simple, natural practice works (see Appendix B); and (c) it allows the teacher of the Transcendental Meditation program the opportunity to meet regularly with the students to share the benefits of his or her personal growth. Also, by meeting with the meditators regularly, the teacher can avert or nip misunderstandings regarding the practice that may arise in students individually or collectively. Through daily contacts, the teacher can check the student's meditations individually as required, and within the group on a daily basis. Irregular practice of the Transcendental Meditation technique indicates a misunderstanding on the meditator's part that could easily be averted or corrected by the daily presence of a teacher.

#### Methodological considerations and recommendations.

The term, productive failure, refers to a research study which does not progress in toto as proposed. Nevertheless, it is productive in that the researcher learns new and discards old cherished psychological factors which enables



others to move the research forward.<sup>101</sup> Such is the case with this project. Those factors of this project are made explicit here to move forward the research of future Transcendental Meditation projects with student groups. They include the following:

1. The Ss identified for the experimental group would all begin the practice of the Transcendental Meditation technique, which they did not. Actually, sixteen of the original forty started (see Table 4). The data analysis is based on those sixteen Ss. The underlying assumption for the belief that all would start was the gross scholastic and emotional deficiencies within this population. It was felt that the students would be enticed by a program offering the possibility of relief. This assumption was further strengthened by the fact that, (a) following the selection procedure, thirty-eight of the forty Ss gave verbal consent to start, and (b) their parents gave written consent, and verbal consent by telephone.

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<sup>101</sup>David A. Fox, The Research Process in Education (New York, N.Y.: Holt, Rinehart, and Winston, Inc., 1969), pp. 33-34.

TABLE 4  
 ACTUAL NUMBER OF PROJECT PARTICIPANTS --  
 EXPERIMENTAL GROUP

	Boys	Girls	Subtotal
Meditators	12	4	16
Non-Meditators:			
On Role	12	8	20
Dropped	2	2	4
Transferred	<u>0</u>	<u>0</u>	<u>0</u>
Total	26	14	40

This trend has been fairly consistent among other student populations around the world to conclude that everyone who expresses interest cannot be expected to start, at least not initially. Nevertheless, the practice of the technique by 1 percent of any population has been found to be sufficient to produce the "Maharishi or proximity effect," which states that individuals who practice the Transcendental Meditation technique become vessels of concentrated sources of energy and intelligence who spontaneously spread that orderliness to others within proximity to them (see section under "Ecological Stability" in Chapter III). The

Ss classroom teachers, who later learned the identity of the meditators in their classroom, attested to this phenomenon (see Appendix A). This phenomenon has been observed consistently enough to have made the goal of the organizations which teach the Transcendental Meditation program to teach 1 percent of the population -- it does not matter who. One percent meditating is enough to cause rapid change in a society. This assumption requires further study with student groups.

2. A variable for which there was no control was the 44 percent, or fourteen of the total number of the thirty-six control Ss that dropped out of school and the two that transferred while the project was in progress. This left a total number of twenty control Ss remaining in the project (see Table 5). The data analysis is based on those twenty Ss.

The attrition rate encountered in the control group was of such a nature as to suggest the practice of the Transcendental Meditation technique had some affect on the meditator's attitude towards school. The basis of this assumption is that the control subjects included both the self-committed and the noncommitted to personal change

TABLE 5  
 ACTUAL NUMBER OF PROJECT PARTICIPANTS --  
 CONTROL GROUP

	Boys	Girls	Subtotal
Non-Meditators:			
On Roll	14	6	20
Dropped	10	4	14
Transferred	<u>1</u>	<u>1</u>	<u>2</u>
Total	25	11	36

because of the random manner in which they were selected. The fact that none of the sixteen meditators were included in this attrition rate is significant.

There is growing evidence that personality factors are prominent in school dropouts. The problem is critical nationally. For example, the attrition rate for Philadelphia, a representative school district, was 13.4 percent according to the 1974-75 statistics of the Office of Research and Evaluation Report Number 7647. And at Simon Gratz Senior High School, where this project took place, the attrition rate was 18.2 percent. Tenth graders accounted for 50.2 percent of all the dropouts of Philadelphia

public schools. The attrition rate among student meditators requires further study.

3. Despite group meditations in the presence of the classroom teacher, and group checking weekly, none of the meditators practiced the technique as prescribed as was assumed. However, on the average, all of the meditators practiced the technique similarly as indicated by a poll taken monthly. The poll consisted of a check list on which each student indicated whether he or she had meditated twice a day, at least once a day, once every other day, once a week, occasionally, or never. On the average, the students meditated once every other day.

To ensure regular practice of the Transcendental Meditation technique with students in school projects, the full Transcendental Meditation program, the Science of Creative Intelligence (SCI), the theory of creative intelligence as well as the practice of the Transcendental Meditation technique to contact it, should be presented by the teacher of the Transcendental Meditation program. This will allow the teacher to meet regularly with the students to share the benefits of his or her development, and to provide intellectual understanding of the theoretical



aspects of the program, along with daily checkings in group settings and individually as needed. If a methodological question arises regarding the influence of the teacher's rapport with the Ss on the results of such projects, the burden of proof rests with those raising the question. This is the nature of the Transcendental Meditation program for education. The SCI curriculum has been developed in this way. Adherence to this prescription gives assurance of strong meditators who practice the technique as prescribed. Furthermore, the course should be an accredited major and given during the school day to afford it (at the very least) equal status to other major subjects within the curriculum that have also been proven to enhance the student and the society.

Conclusions from the study have been limited to the population studied. However, the results should encourage further investigation. Long-term longitudinal studies are particularly encouraged since the affects of the practice of the Transcendental Meditation technique are immediate and cumulative with regular practice as prescribed. Case studies are also encouraged to explore the holistic affects of the practice that are beyond the

range of quantitative data. It is further recommended that each student serve as his or her own control since development resulting from the practice is cumulative from the individual point where each meditator begins.

In contrast to the mass survey approach that relies on predesignated variables dealing with what the researcher perceives, the case study survey can identify processes and interactions which may be brought about by the practice of the Transcendental Meditation technique on aspects of learning and personality within and among individual students which cannot be studied otherwise. Moreover, the more we learn how the technique may possibly influence the learning process in some few individuals, the probability is that we shall learn much more about how it can affect the process in masses of people under controlled experimentation.

Assumptions. Lurch and Paskewitz suggested in the Journal of Nervous and Mental Disease (1971) that in previous meditation research the Ss may have entered the experiment expecting to experience a change. The circumstances of the Ss in the present study with a history of school failure and lack of significant response to

compensatory education make the possibility of such motivation remote.

Also, researchers are cautioned not to confuse research on the Transcendental Meditation technique with other meditative practices. The practice of the Transcendental Meditation technique is unlike any other program of meditation or methods of personal or physical development (see Chapter III). Any practice that is not imparted by a teacher certified by Maharishi International University is not the practice of the Transcendental Meditation technique, and should not be confused with them.

## C H A P T E R   V

### THE POSSIBILITIES

#### Fulfilling the Goal of Education Through the Transcendental Meditation Program

To justify itself, education should enable the individual to develop the full potential of life. By the full potential of life is meant that the individual should live life to the maximum capacity at all levels -- physically, mentally, socially and environmentally. On the physical plane, this means the possibility of having a healthy body in which all the limbs, the senses, and the nervous system function in coordination with one another. On the mental plane, it means the individual has the ability to make more use of mental potential as opposed to the 5 to 10 percent to which psychologists say we "normally" use. Socially, it means improved relationships with others, not on the level of mood-making or trying, but in a spontaneous way. And, on the environmental plane, the full potential of life means that the individual has the ability to enhance life in all fields of his or her daily existence.

How well the teachers and the meditators viewed themselves as realizing their potential in the areas of life is transcribed in Appendix A under subjective evaluations. In reading the transcript of the students' evaluation, the reader is struck by the heightened sensitivity of the students -- an outstanding characteristic of individuals with learning disorders. Their awareness of the potential of life is more sensitive than any other to date by meditating adolescents of high scholastic achievement. The following is a summary of that testimonial. It is divided into those four areas of life.

1. Mental Potential

- a. Improved grades (academic achievement)
- b. Learning is easier (improved memory)
- c. Longer study periods (improved concentration)
- d. More frequent study periods (increased appreciation of the relevancy of knowledge to oneself)

2. Health

- a. Not as easily upset (habitation, i.e., a growing inner stability)



- b. Improved athletic skills (better physical coordination)
  - c. Fewer nose bleeds (improved physical health)
  - d. Fewer colds (decrease in respiratory diseases)
  - e. Faster recovery from colds (strengthened immunity system)
  - f. Less tense (increased stability of the autonomous nervous system)
  - g. Improved appetite
  - h. Consuming a wider variety of nourishing foods
  - i. Less dreaming (fewer sleep disturbances)
3. Social Relationships
- a. Improved self-confidence
  - b. Congregate more socially (less defensive)
  - c. More aloneness, less feelings of loneliness (greater appreciation of self)
  - d. Increased self-sufficiency
  - e. Less influenced by the opinions of others

- f. More attractive to others
  - g. More assertive
  - h. Improved communication
  - i. Increased communication
  - j. Increased tolerance
  - k. Less conformity (decreased "gang" activities)
4. Environmentally
- a. Increased tolerance of self and others
  - b. Generalized that they contributed less to the disorders generally in life since beginning the practice, and that the world be "better" if everybody experienced what they were experiencing

While the Transcendental Meditation program is not to be confused with Yoga because of its contemporary interpretations of effort and control, the following quote from William James in Psychical Research captures the essential value of the Transcendental Meditation program to education:

I wonder whether the yoga discipline may not be, after all, in all its phases simply a methodical way of waking up deeper levels of will power than are habitually used, and thereby increasing the individual's vital tone and energy. I have no doubt whatever that most people live,

whether physically, intellectually or morally, in a very restricted circle of their potential being. They make use of a very small portion of their possible consciousness, and of their soul's resources in general, much like a man who, out of his whole bodily organism, should get into a habit of using and moving only his little finger. . . . May the yoga practices not be, after all, methods of getting at our deeper functional levels?

-William James<sup>102</sup>

### Implications

When learning disorders are not remediated at the basis of development, neurophysiological functioning, programs and practices are not likely to be successful, thus giving credence to the notion that the students are unable to learn. The thrust of programming for the educator who functions on the basis of the traditional neurological model to explain learning disorders is likely to be with the end product. Thus, efforts to alleviate the syndrome of learning disorders will be on the level at which the basic problem of minimal brain dysfunction manifests as behavioral disorders. The remedial practices associated

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<sup>102</sup>See Al E. Rubottom, "Transcendental Meditation and Its Potential Uses for Schools," Social Education (December 1972): 851.

with this model are, therefore, necessarily limited to problems in perceptual-motor training, and diagnostic-teaching methods which orders the curriculum to the unique competencies, needs and interests of each student while ignoring the cause. While the educator may recognize the role of discouragement and other aspects of the individual's emotional responses to the disorders, the thrust of programming is associated with the manifestations, i.e., the symptoms, of the basic neurological disorder.

While the second approach developed in this paper is also neurologic in the assumption that minimal brain dysfunction is the basis for the development of the learning disorder syndrome, the uniqueness of the approach advocated rests in the direction of efforts to alleviate the disorders. Any ordering of behavior through this approach occurs at the level of the nervous system. While traditional methods work on the level of behavior, the Transcendental Meditation program, by working at the level of the functioning of the human nervous system, alleviates the cause of the problem. The pattern of increased orderliness established on the level of neurophysiology is correlated with the profound rest that is produced by the Transcendental

Meditation technique. The deep rest can be measured by the metabolic rate lower than the deepest level of rest during any period of a full night sleep (see Appendix D). Surely a technique that produces such comprehensive results (mentally, physically, socially and ecologically) must be working at a fundamental level.

In addition to working with the problem of learning disorders at the root of the problem, this approach to be effective must also remediate on the level of behavior as in the traditional method. In this sense, this novel approach to remediation must necessarily be thought of as an interactionist position combining both methods. But, while it represents a combination of two methods, emphasis must be on the strengthening of the problem at its roots, for it is only on this basis that remediation on the surface level of behavior can be effective.

#### Recommendations

As the Transcendental Meditation program is a new science, useful to all aspects of education and other fields of life, it was thought that it should not be associated directly with problems of any sort. It was with some



reluctance that the program was prescribed for remediation and rehabilitation. However, realizing that any problem within the realm of education reflects on all of the greatest aspirations of a society, time has softened that reluctance. The Transcendental Meditation program

. . . has been called the solution to all problems -- but does such a solution really exist? In every area of life problems crop up, and the seemingly endless array of causes and origins of causes for each one would appear to admit to no solution even within the confines of that limited situation.

If we examine closely, however, the ultimate, root cause of any special problem, we can in fact see how near a solution would be if our creativity were a little greater, our perspective a few degrees wider, our patience and strength a little more enduring, and above all, our inmost desires and feelings more profoundly in accord with nature -- qualities that cannot be made to grow, but which are obviously inherent in us all and waiting for an opportunity to spontaneously blossom. In the final analysis, each individual problem exists not outside, in the environment, but in our own temporary inability to cope with the events of the world and successfully fulfill our basic needs and infatuations. Indeed, after its solution, the original "insoluble" nature of any problem is always found to have been an erroneous vision of the situation, a misconception about what was possible, or simply lack of a sufficiently creative attitude to make the best possible use of the natural course of events.<sup>103</sup>

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<sup>103</sup>Maharishi International University Catalogue (Los Angeles: MIU Press, 1974), p. 21.

The Transcendental Meditation program in conjunction with traditional methods of education offer a simple, natural procedure for contacting the inner field of pure intelligence and thereby channeling increased clarity, energy, creativity, foresight, and achievement into literally every dimension of life. There is a huge and growing scientific testimony to the efficacy of this procedure which speaks convincingly to the real potential of the human nervous system. One need only imagine 1 percent of an entire population expressing the order of a fully developed mind, body and behavior to glimpse the easy accomplishment of not only alleviating learning disorders, but enhancing the learning process in all individuals that can result in the development of an ideal society in this one generation.

APPENDIX A  
SUBJECTIVE EVALUATIONS

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June 21, 1976

N E W S L E T T E R

THE TRANSCENDENTAL MEDITATION PROGRAM:

Preliminary Results

The Transcendental Meditation program at Gratz SHS was made possible by a \$1,000.00 private grant. This preliminary report summarizes the observed effects of the practice of the Transcendental Meditation technique by students/staff of the Curriculum Area Reading Emphasis (CARE) program. The final report, based on statistical testing, will be prepared in September.

\* \* \* \*

Contrary to popular thinking about meditation, the testimonials of the meditating students and the anecdotal reports from the CARE staff describe an increase of activity in the students who practice the Transcendental Meditation technique. In the words of one teacher, the students are generally described as more "alive," "alert," "aware," and "outspoken." The observed increase of activity, though

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excessively playful at times, is orderly in that, being under the student's control, it is not haphazard or chaotic. Essentially, the increasing activity gives the students a greater sense of presence. Some aspect of the increased activity was noted to some degree for each student, with the exception of two who had become irregular in the practice, but have since resumed it. All the students, without exception, express satisfaction with the effects of the daily practice on their activities outside of meditation. Several of the meditators, for the first time in their school careers, are experiencing scholastic success by their own volition.

In listening to the testimonies and anecdotes, one is struck with the fast pace of development since the youngsters began the practice in April. The results of the statistical testing in September will determine whether the preliminary reports of improvement in behavior occurred as the result of the practice of the Transcendental Meditation technique (as has been shown in similar research internationally) or by chance.

The acceleration of growth is easily observed during the advisory period in Room 4 (which one should feel free to do) when the CARE meditators meet as a group. Instead of the usual gradual transition that characterizes the

(more)



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growth and development of social groups, one observes instead changes characterized by such rapidity and abruptness that each session presents a new and improved group face. The increasing orderliness, harmony, characterizing the group is indicative of the increased orderliness of behavior in the individual meditators making up the group.

While the stages resulting from the growth transitions are most welcomed and enjoyed, the process of the transitions do not always occur without incident. Sometimes the smooth-running advisory becomes explosive and disorganized during the process of establishing a greater stage of equilibration within the group. Stabilization results from the students' volition; behavioral changes are internally charged. The advisors do what they can to facilitate it, mostly hoping that it passes quickly, as it usually does, within a day or two. External controls as reward-seeking, punishment-avoiding situations of experimental psychology are not used.

Technologies in the sciences of psycho-physiology, biochemistry and electroencephalography have enabled researchers to measure empirically in the laboratory the changes produced by the Transcendental Meditation technique. Essentially, during the 15-20-minute twice daily practice, a unique state of consciousness (unlike waking, dreaming, or sleeping) is induced. This fourth state of conscious-

(more)

"THE TRANSCENDENTAL MEDITATION PROGRAM . . ." 4

ness is characterized as "restful" (the basic precondition for all regenerative processes) "alertness." At the same time the meditator is strengthened from within by the release of stress, he accumulates less stress and fatigue in daily activity. The effects in activity are immediate and cumulative. Included are improved emotional and physical health, enhanced performance, and decreased tension in human relations.

Unlike other methods of meditation or programs of self-improvement, the Transcendental Meditation program does not employ mental or physical control, belief, suggestion, hypnosis, religious tenets, special diets or postures, or any change in life style. Thus, the practice is universally acceptable in that it by-passes national, religious, and political barriers, as well as differences in age, sex, attitude, intelligence, and health.

Specifically, how has the behavior of the meditating students at Gratz been enhanced by the practice of the Transcendental Meditation technique? What follows is a summary by the CARE students and staff themselves. While all the following traits listed do not characterize the growth of any one meditating student, all the factors have been observed in some meditator within the group. Growth is observed as more prominent in some than in others, but

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"THE TRANSCENDENTAL MEDITATION PROGRAM . . ." 5

occurring to some degree in all, including the two mentioned earlier, according to the students. The factors observed are under self-concept, motivation, social behavior, intellectual functioning, and health.

1. Improved self-concept:
  - a. More lively
  - b. Less defensive; more reasonable
  - c. More confident--shown in expressed interest in post-secondary training and education
  - d. Increased sense of self-determination shown in heightened assertiveness and sensitivity to subtle attempts of control by adults and peers alike; less passivity, dependency, and withdrawal.
  - e. Decrease in boisterous and loud behavior
  - f. Less withdrawn, shy
  - g. Increase display of confidence--ask and respond to question in academic settings
  - h. Less susceptibility to peer pressure--e.g., will assist teacher in cleaning room, despite teasing; will eat lunches provided by school, despite teasing; will discuss academic accomplishments; will come to class on time; etc.
  - i. Less procrastination

(more)

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- j. More happy--increased playfulness, teasing; less worried and depressed, i.e., more outgoing
2. Motivation:
- a. Internal motivation to achieve as shown in expressed concern for passing; heightened aspirations
  - b. Increased ability to delay gratification--a natural growth of the practice is this greater appreciation of the subtle succession of obtainments in life leading towards distant goals--direct effect of appreciation for the immediate general good feeling immediately following each practice of the Transcendental Meditation technique that is cumulative in the lives of meditators
3. Social behavior:
- a. Heightened sense of belonging as shown by increased participation in advisory activities, the intra-structure of the school and community, e.g., tutoring and athletics
  - b. Increased group participation, interaction, and cooperation during advisory
  - c. Increased cordiality expressed in social nicety as addressing individuals by name, verbalizing compliments, and bidding one a good day

(more)

"THE TRANSCENDENTAL MEDITATION PROGRAM . . ."

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- d. Improved grooming
  - e. Increase use of moderate tone speech
  - f. Wait for recognition
  - g. Increased reasonability resulting in fairness and cooperativeness
4. Health:
- a. Increased responsibility for maintaining the cleanliness of the advisory room
  - b. Increased energy, the general effect is the meditators do not feel as tired at the end of the day as they did before
  - c. Decreased insomnia
  - d. Lessening of the use of non-prescribed drugs and alcohol
  - e. Fewer colds
  - f. Lessening of asthmatic attacks
  - g. Improved eating habits; all meditators eat some portion of the school provided lunch
  - h. Increase in personal cleanliness--e.g., request for soap and towels, and the washing of hands during advisory
  - i. Random hyper-activity channeled into structured, organized activity as straightening room

(more)



## "THE TRANSCENDENTAL MEDITATION PROGRAM . . ."

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- j. Students report the ease in getting out of bed in mornings since beginning the practice of the Transcendental Meditation technique
  - k. Increased efficiency--the general effect is that the meditators accomplish more with less effort
5. Intellectual functioning:
- a. Improved memory
  - b. Improved skills; increase in skills
  - c. Increased flexibility in learning styles as shown in openness to new suggestions for learning
  - d. Improved academic performance--in one classroom, the two meditators, once the lowest achievers academically, are now the highest
  - e. Increased concentration--longer study periods
  - f. Increased grade-point average
  - g. Decrease impulsions; increased reasonability

Yvonne Jackson

Guidance Counselor

Teacher of the Transcendental  
Meditation Program

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The following evaluation of the Transcendental Meditation program is an extempore by four male student participants who lingered following the posttesting. The report was taken from a 20 minute tape, so that the exact words and phrases are accurately recorded. They are sufficiently edited to present a readable page, with some elimination of redundancies. The recording was made twenty-two weeks, three days commencing the practice of the Transcendental Meditation technique.

Examiner: Have you noticed any changes since beginning the practice of TM?

Student #1: I think better.

E: What do you mean when you say that you think better?

S #1: Like, he was right when he said girls are more attracted to you, or you are more attracted to them--I don't know. It seems like you can get anybody you want.

E: How many of you find that girls are more attracted to you since you've started the practice of TM? Anybody else notice that?

S #2: Yes, I've noticed that girls have better feelings toward me.

E: What about you, S #3, have you noticed any change?

S #3: No.

E: S #4?

S #4: No.

E: What about people in general being attracted to you, not necessarily just females, but do you find that you get along better with boys, men, or . . .

S #1: When I use to loose in basketball, I use to smack them (other males) down. But, now I say, "Good game."

E: Now, you've said two things: you've said that people are more attracted to you--girls and others. You find that you're able better to get along with others . . .

E: They've been attracted, but, you know . . .

E: It's even better, now.

S #1: Yes.

E: And you find that you don't get upset as easily. How many of you find that's true? Things that use to upset you before don't upset you as much, now? S #3, I saw you shake your head (affirmatively). Could you give us an example?

S #3: Since I've been playing baseball, I use to strike out alot. Now, I hit the ball.

E: Anybody else notice improvement in phisical skills?

S #1: In basketball today, I played an NTA (non-teaching assistant) a game of 21. I shut him out; I didn't give him a shot.

E: Do you play any sports, S #2?

S #2: Yes, I play basketball, tennis.

E: Have you noticed improvements, or have you not noticed any?

S #2: Some improvement. I feel I can do little drills better than usual. It's coming along as I go on with meditation twice a day. I notice when I meditate at night, before I go to bed, I can get up earlier (than usual).

E: (Reminds students of importance of not practicing the technique close to bed time).

S #4: Last year I wasn't doing so good. I was getting D's, now this year I'm getting A's. What I think is that learning is more easy.

E: How many of you have noticed a change in your grades?

S #2: My grades have gone up a few points, and I'm sure they'll go up even more next year, because we started TM kind of late, and I didn't really get in stride. But, I'll be better next year. My self-control is better. I know I can make it better, because I got a good friend, TM. (Laughter from the group)

E: How many of you feel more confident--that's what I hear S #2 saying.

S #1: I've always felt confident, but . . .

S #2: It's stronger.

S #1: Yes. It's stronger.

E: Is there anyone who does not feel more confident now that they've been meditation--I mean, the confident was

there, but is it stronger, now? What about you, S #3?

S #1: Ole mumbles.

S #3: Yes (very softly).

(Laughter from group)

E: Alright, so we talked about improvement in our academic skills. S #3 mentioned that it's easier for him to, not only study and retain more--his memory has improved--but, also an improvement in his grades. So, not only has he seen an improvement in learning, but apparently his teachers have noticed it, and it shows in his grades. What about health? Student #3, you mentioned something about health. And Student #2, you told me something about your health, also, earlier in the project. Why don't we start with S #1?

S #1: About my health? My nose?

E: Yes.

S #1: I use to have my nose cauterized some nights.

E: And what is that?

S #1: I think they burned the tissue in my nose to stop the bleeding; it used to bleed alot--constantly bleed. I didn't know why.

S #2: Like a hemophiliac?

S #1: No. My clog wasn't working--it would just bleed and bleed.



E: And you said it use to bleed alot around this time of year, when the weather was warm.

S #1: Yes.

E: What changes have you seen, now?

S #1: It doesn't bleed any more--not that much; it doesn't bleed like it use to bleed.

E: S #2, you had mentioned something earlier in the project about your health.

S #2: About colds and sniffing? I always had a cold, and couldn't get rid of it. The doctor would say, "Get rest." And I would go and get rest, but still couldn't get rid of it. But, now since I've been meditating, the colds just seemed to go away.

E: And that was at the beginning of the project, when the weather was still cold . . .

S #2: When I first started meditation.

E: So, it was almost immediatedly that you began to see a change.

S #2: I think that if everybody in the world meditated, it would be a better place, because you could deal with people more.

E: That's beautiful, S #2. I see S #1 (facial expression) saying, "Ah, here comes the speech!" (Laughter). But that's absolutely right . . .

S #1: My man gets carried away when he starts talking.

E: That's good. That's his gift. Do you (S #2) find you talk more since you've been meditating . . .

S #1: He's been talking like that--ever since we've been in first grade.

S #2: Yes, I do talk more, but I know more of what I'm talking about, too.

E: How many (of you) feel more confident, now, when you speak--as though there is more of a certainty about what you have to say?

S #1: Right! Pride and dignity!

S #2: And you hold your head up high. That what S #2 needs more of.

S #1: The brother is scared; he doesn't know what to say.

S #2: No. He has to get it together.

E: Do you feel you have gotten it more together, S #2? (He nodded affirmatively). What about the others? Do you feel that S #3 has gotten it together.

S #2: I do. He talks more in class--and playing a little. You know, he use to be real quiet; he wouldn't say anything . . .

S #1: He use to be like a little cat!

S #2: I know.

S #1: He would crawl around and then sit down.

S #2: He congregates a little more.

E: Do you feel you're more outgoing, now, S #3?

S #3: (Nodded affirmatively).

E: (Reminds Ss that TM does not help you to become what you are not, but more of what you are. For example, those who are conservative, become secure in that conservatism.)

S #2, you did say something in relationship to that. Do you remember you were saying that you don't follow the crowd as much as you use to?

S #2: Yes.

E: Tell us about that.

S #2: About when I use to hang around on the corner?

E: Well, yes, but . . .

S #2: Oh! I know what you mean, about me being my own man, about making my own decisions?

E: Yes.

S #2: If somebody said, "Let's do this," I would do it without really thinking about it--I wouldn't want to do it, because I knew it was wrong, but I would do it anyway, because I wouldn't want to lose a friend. But, now I wouldn't care if I lost a friend, because if I know it's wrong, I'm not going to do it if I feel it's going to hurt me--I just make my own decisions . . .

S #1: You should have been doing that, brother . . .

S #2: I know that, but, but when I didn't know that! But, I know it, now!

S #1: I've always made up my own mind--but, now, I'm by myself most of the time, now!

S #2: And, another thing--have you noticed this, S #1--older people--when you know they are wrong--like your mom, or someone--you wouldn't ever say it. You would know, but you would have a feeling, so that you would never tell them. But, now, I'll tell them.

S #1: I would always tell them--when I thought I was right, I would argue someone down when I know . . . I do it more, now! I wouldn't care what happens to me! Even if they would kill me; I would argue them down!

E: You've become more assertive.

S #1: Right!

E: You said that even if they killed you, which means you have integrity.

S #1: Right! Because they can't live my life . . .

S #2: You live your own.

S #1: Right! And I do what I want to do.

E: Tell me about your experiences with adults. You said that you . . .

S #2: Communicate better.

E: What have your parents said about you--have they said anything at all about you? Have they noticed any changes since you've started meditating?

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S #2: I think they have, but I don't think they've said anything--you know, my grandmother--I don't live with them--I go down there sometimes, they just--you know--we'll be congregating and talking, and I'll bring up a good point, or make a good suggestion, and they'll just look at me and say (he nodded his head affirmatively several times)--they won't say anything; they'll just smile.

E: Yes. But, you can tell by the smiles . . .

S #2: That they know I'm right, and I won't force the issue anymore.

E: S #3, tell us about your experiences with the power sewing machine.

S #3: It's easier now to operate. Before, I didn't know how to thread it up. But, now, I thread it in about 30 seconds.

S #2: It's good!

S #1: He's trying!

E: And that happened right after you started meditating. The sewing teacher was amazed.

S #1: (To #4, asks:) Give me one of those (half-pint of milk). I don't know why I'm drinking it; I don't usually drink it.

E: How many of you find you have started eating different things--that your diet has changed since you have started meditating?



S #1: I've tried eating alot of vegetables . . .

E: More so than when you did before you were meditating?

S #1: Yes.

E: And you mentioned milk. Is that something new (added to your diet)?

S #3: Me, too. I almost eat anything, now!

E: Is that right?!? How many of you find that your diet has changed--that your appetite is better?

S #1: Yes. I use to only be able to eat one chicken breast, but now I eat two.

E: You're eating more.

(All shook heads affirmatively)

E: Do you find that you're doing more during the course of a day.

(All shook heads affirmatively)

E: What about sleeping? Do you find that your sleeping patterns have changed in any way? Dreams, nightmares, or restful sleep . . .

S #1: I don't even dream, anymore!

S #2: Me either!

E: What about you, S #4? Everybody says they don't--I see you shaking your head "no," too. The reason you don't remember dreams, now, is that your mind is more orderly, and while you continue to dream, they are not as profound, and therefore, do not interfere so prominently

with the sleep state. So, you're resting much better in the night, which means that you should feel more refreshed in the morning. Do you (feel more refreshed)?

S #2: I do!

S #1: I don't, because I go to bed too late.

E: What did you say, S #3?

S #3: I said that I can't even get up, now.

(Laughter from the group)

E: How many of you find it's harder to get up now that you've been meditating?

(All said, "Me," with the exception of #2)

S #2: Ms. E, I've noticed this: when I meditate, I wake everybody else up; I get up before the alarm clock, and it alarms at six (a.m.).

S #1: Yes, but you're a fool for waking up a six, anyway!  
(Laughter)

S #2: Once I get up, I can't get back to sleep, because the light gets into my eyes--it's day time . . .

E: Let's go back a little bit; you said that S #2 was a fool for getting up so early in the morning. Tell us, S #2, what you're able to accomplish when you get up--are you able to get more done?

S #2: (Very emphatically) I have time to meditate and eat, and anything else; I can study a little work before I come (to school), or do a little odds and ends that I

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do after I come home (from school)--I can do them before I leave! So, that gives me more time to do other things when I come home.

S #1: Let's see what we've got so far.

E: O.K. I'll play the tape back.

#

## HEMPSTEAD PUBLIC SCHOOLS

BOARD OF EDUCATION OFFICE  
185 PENINSULA BOULEVARD  
HEMPSTEAD, NEW YORK 11550

187

July 27, 1976

Ms. Yvonne Jackson  
7441 Limekiln Pike  
Philadelphia  
Pennsylvania

Dear Yvonne:

In reviewing the development of transcendental meditation for the year 1975/76 at Gratz High School, I have come to the following conclusions:

- 1) Providing the transcendental meditation option for students, parents and staff members is a distinct and positive opportunity.
- 2) The pursuit of a practice of TM by participants at Gratz High School during the school year was a settling and positive force for the enthusiasm and increased morale that was evident in the persons whom I informally interviewed during the year, after their meditation experiences had begun. T.M. was certainly an asset to our school and created an influence that was without question an advantage.
- 3) Based on my observations of T.M. during the last school year, it is my recommendation that public schools should continue to try to find funds to create this alternative for both the young people and adults related to the school program. It is my further observation that adequate resources should be available so that a program such as the one you developed at Gratz need not suffer because of other priorities, either human or physical.
- 4) Although I did not anticipate in the wholesale endorsement of T.M. by the Gratz Counseling Staff, it was a pleasant surprise.

Yvonne, good luck in your continued efforts in promoting the growth of transcendental meditation and good fortune to you in your growing efforts as an educator.

Ms. Yvonne Jackson

- 2 -

Thank you for the thoughtful note you sent me before I left and perhaps we will have an opportunity, in the not too distant future, to share our observations of the school year and to speculate a little bit about what destiny will hold.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Oliver", written in dark ink.

Oliver W. Lancaster  
Superintendent of Schools

P.S. If you have any concluding data for the school year, I'd appreciate it if you sent me a copy.



EASTCHESTER PUBLIC SCHOOLS  
Union Free School District No. 1  
Eastchester, N.Y. 10707

Telephnone  
914-793-6130

580 White Plains Road  
Eastchester, N.Y.10707

August 2, 1971

Dr. Roger Meredith  
Assistant Superintendent for Instruction  
Department of Education  
Parliament Buildings  
Victoria, British Columbia, Canada

Dear Dr. Meredith:

During the past several months, the Eastchester Public Schools, Eastchester, New York, have facilitated bringing to its junion and senior high school students The Science of Creative Intelligence, more popularly known as the technique of Transcendental Meditation.

Our concern for bringing this unique and distinctive type of educational experience to our youngsters was motivated as the result of our becoming acquainted with the growing accumulation of evidence\* which appears to support the following:

1. Students improve their grades.
2. Students get along better with teachers.
3. Students get along better with parents.
4. Students get along better with other students.
5. Evidence of lessening use of drugs.

Our experience with this program has been as successful with our adult population and faculty members as it has been with our students. A public information program explaining the technique of Transcendental Meditation as part of The Science of Creative Intelligence was conducted during a two month program which included the following points:

1. Small informal lectures to school administrators.
2. Meetings and lectures to all principals and vice-principals.
3. Lectures to faculty.
4. Lectures to parents.
5. Presentation of the concepts and technique of Transcendental Meditation to the Board of Education.
6. Public meetings - lectures.

-2-

Dr. MeredithAugust 2, 1971

At each of the occasions, as listed above, the significance and meaningfulness of the technique of Transcendental Meditation included in The Science of Creative Intelligence was presented by a teacher of Transcendental Meditation.

The community at large was informed through the medium of news releases which followed each lecture.

The introductory lectures of The Science of Creative Intelligence met tremendous student support, and more surprisingly, faculty approval. The demand was so great that it has become necessary to offer a course on The Science of Creative Intelligence for our Adult Education Program this fall.

In order to sustain the program, that is to say, to keep it current and fresh in the minds of the youngsters, we provided an introductory lecture held in early July. A double sized classroom couldn't contain the overflow and we had to open the whole school.

As a statement of endorsement concerning the acceptance of this technique of Transcendental Meditation, this autumn of 1971, The Science of Creative Intelligence will become a regular course as part of our overall instructional program.

If you are interested in any further information on the Eastchester program, don't hesitate to call or contact Jane Himer, 50 Mill Road, Eastchester, New York 10709. We are happy to do all we can, therefore, please feel free to contact us.

Sincerely yours,

(SIGNED)

Francis G. Driscoll

Francis G. Driscoll  
Superintendent of Schools

FGD:tm



February 21, 1974

Mr. Jarry Jarvis, Director,  
Students International Meditating Society  
1015 Galey  
Los Angeles, California

Dear Mr. Jarvis:

In the best of my professional estimate I feel it most important to institute and extend Transcendental Meditation and Science of Creative Intelligence programs in the curricula of public schools.

The researched data in areas of physiological, psychological and medical areas give a sound basis for this recommendation. Specifically, evidence as to the positive effects of TM on self-actualization, increased perceptual ability, faster reaction time, increased perceptual ability, and increased learning ability offer a resource of great projected impact in the education of children in our schools.

We know that the needs for positive self concept, freedom from stress, and the problems of increasing psychological disturbances and addiction syndromes are more difficult for our nation's adolescents than ever before. Indeed, the dilemmas of these problem areas are still clearly on the increase.

It appears that the appropriate need for introducing TM programs in our schools begins in the junior high and middle school years and extends through the high school. The tasks of adolescence definitely provide the necessary frame of reference for what it has been demonstrated TM can achieve. The results of public school efforts in this regard offer all the more promise for achieving results similar to those in Eastchester, New York and in the Dade County, Florida school districts.

I base this recommendation upon my own observations of these programs as well as the researched evidence to support these claims. As a Curriculum Specialist with major concern for emerging adolescent education in our schools I feel confident of the potential of TM to produce as I have recommended. These positions are supported additionally through the experiences with my wife and our children in our own practice of TM.

Sincerely,

Conrad F. Toepfer, Jr.,  
Associate Professor  
State University of New York at  
Buffalo

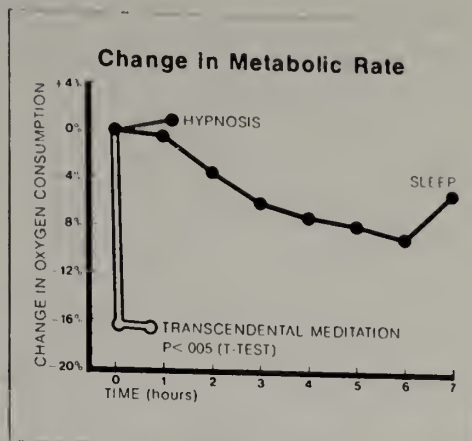
OBJECTIVE EVALUATION

APPENDIX B



## Changes During TM

### Levels of Rest



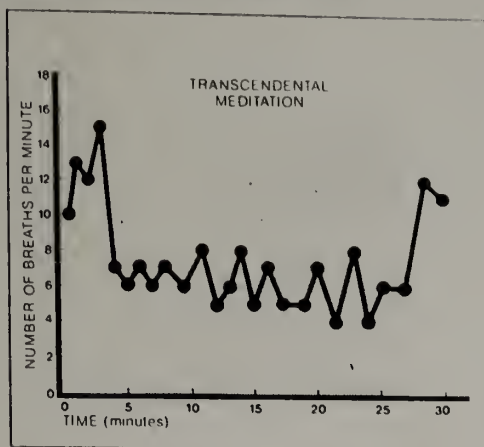
During Transcendental Meditation oxygen consumption and metabolic rate markedly decrease, indicating a state of deep rest. Further, the study reports that the partial pressures of oxygen and carbon dioxide in the blood remain essentially constant. Thus the decrease in total oxygen consumption during Transcendental Meditation is not caused by a manipulation in breathing pattern or forced deprivation of oxygen, but is a natural physiological change due to a lowered requirement for oxygen by the cells during this effortless process.

Reference Wallace, R K and H Benson, "The Physiology of Meditation," *Scientific American*, Vol. 226, No. 2, pp. 84-90, February 1972, USA

SOURCE: Fundamentals of Progress: Scientific Research on the Transcendental Meditation Program. Livingston Manor, N.Y.: MIU Press, 1975. Reprinted with permission.

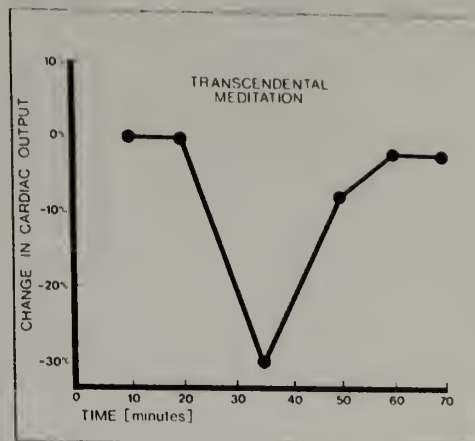


### Natural Change in Breath Rate



**2** During Transcendental Meditation, breath rate decreases significantly, indicating a more relaxed and rested state of the nervous system. (These data are from a deep meditation, one subject.)

### Change in Cardiac Output

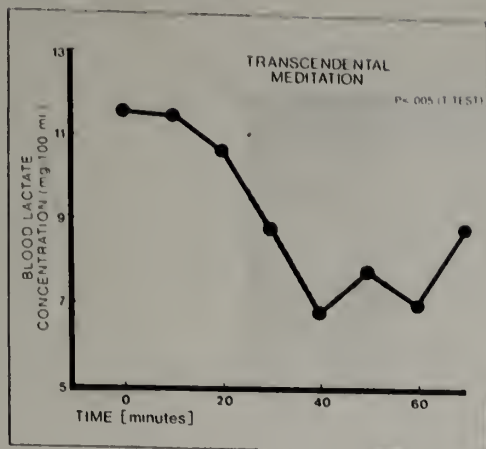


**3** During Transcendental Meditation, cardiac output markedly decreases, indicating a reduction in the workload of the heart. (These data are from a deep meditation, one subject.)

Reference: Allison, J., "Respiratory Changes During the Practice of the Technique of Transcendental Meditation," *Lancet*, No. 7651, pp. 833-34, April 1970, London, England.

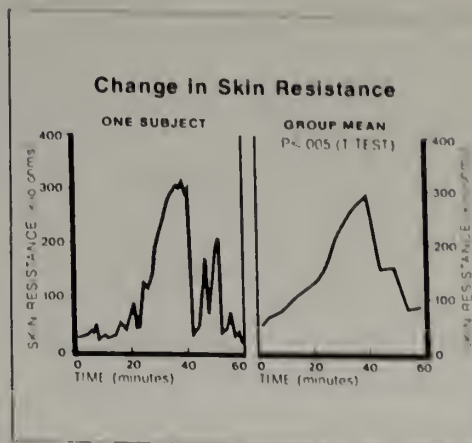
Reference: Wallace, R.K., "The Physiological Effects of Transcendental Meditation: A Proposed Fourth Major State of Consciousness," Ph.D. Thesis, Department of Physiology, University of California, Los Angeles, USA, 1970.

## Biochemical Changes



**4** A high concentration of lactate in the blood has been associated with anxiety neurosis, anxiety attacks and high blood pressure. During Transcendental Meditation the concentration of blood lactate markedly decreases.

## State of Relaxation



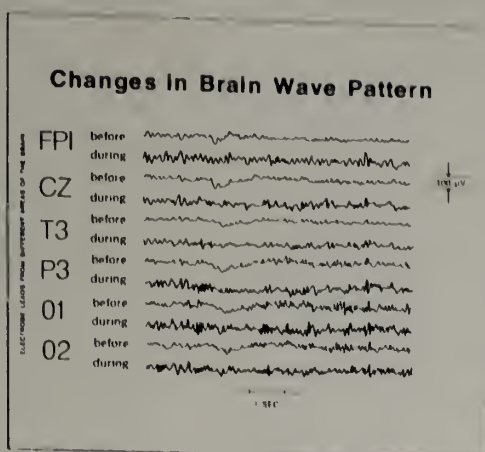
**5** During stress or anxiety skin resistance decreases. During Transcendental Meditation skin resistance increases significantly, indicating deep relaxation, reduction of anxiety, and reduction of emotional disturbances. The chart on the left shows a deep meditation for one individual and the chart on the right is the group mean of fifteen subjects.

First Reference Wallace, R.K. and H. Benson, "The Physiology of Meditation," *Scientific American*, Vol. 226, No. 2, pp. 84-90, February 1972, USA

Second Reference Wallace, R.K., H. Benson and A.F. Wilson, "A Wakeful Hypometabolic Physiologic State," *American Journal of Physiology*, Vol. 221, No. 3, pp. 795-799, September 1971, USA

Reference Wallace, R.K., H. Benson and A.F. Wilson, "A Wakeful Hypometabolic Physiologic State," *American Journal of Physiology*, Vol. 221, No. 3, pp. 795-799, September 1971, USA

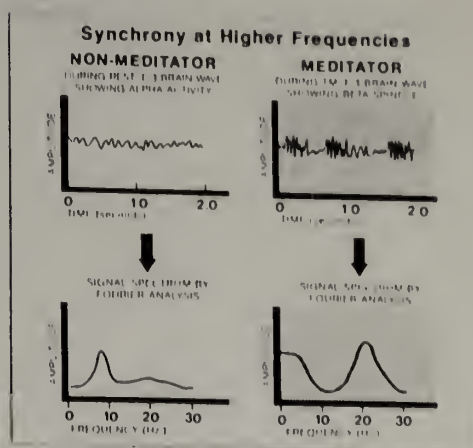
## Restful Alertness



**6** During Transcendental Meditation there is a spreading of 8-9 cycles per second waves to the more frontal areas of the brain with the occasional occurrence of prominent and synchronized 5-7 cycles per second waves. When taken together with the deep rest shown in Charts 1-5, these brain waves indicate a unique physiological state different from waking and sleeping—a state of alertness along with restfulness. This discovery by Wallace, et al., in 1970 has been replicated by Banquet in 1973 (see Charts 7-10).

Reference: Wallace, R.K., H. Benson and A.F. Wilson, "A Wakeful Hypometabolic Physiologic State," *American Journal of Physiology*, Vol. 221, No. 3, pp 795-799, September 1971, USA.

## Brain Wave Synchrony I

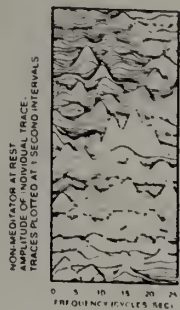


**7** Whereas most subjects show spindles in alpha waves (10 cycles per second) during rest, during Transcendental Meditation the brain waves also show periods of beta spindles (22 cycles per second) synchronized and in phase from all points on the scalp, indicating a unique condition of orderliness in the brain physiology. The frequency of this highly ordered pattern indicates inner wakefulness and, in correlation with deep metabolic rest, may represent the underlying physiology of the reported experience of 'profound wakefulness' or 'pure awareness' or 'unbounded awareness'.

First Reference: Banquet, J-P., "EEG and Meditation," *Electroencephalography and Clinical Neurophysiology*, Vol. 33, p. 454, 1972, USA

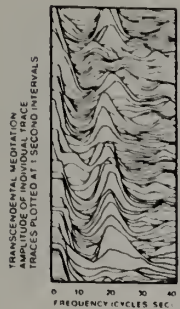
Second Reference: Banquet, J-P., "Spectral Analysis of the EEG in Meditation," *op. cit.*, Vol 35, pp 143-151, 1973, USA

## Brain Wave Synchrony II



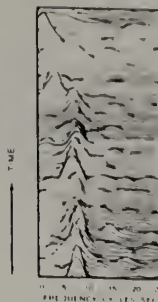
1

**Non-mediator**  
Wakefulness with desynchronized EEG of mental activation, mixed, incoherent frequencies



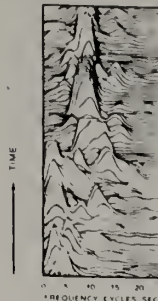
2

**Mediator**  
Transcendental Meditation a time series of spectra showing a beta wave (22 cycles per second) of very constant frequency, and background of constant slow waves. This pattern is seen during deep meditation.



3

**Non-mediator**  
Drifting from relaxed wakefulness of alpha waves (8 cycles per second) to drowsiness of slow frequencies, mixed theta (4 cycles per second) and delta (2 cycles per second)



4

**Mediator**  
A shift from theta (5 cycles per second) in deeper meditation, to alpha (10 cycles per second) towards the end of meditation

## Comparing 1 with 2

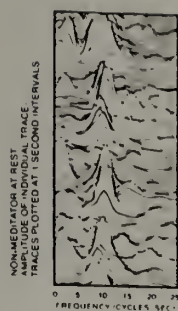
Ordinary waking consciousness is represented by random, inconsistent mixed waves (1) with dominant fast frequencies. During Transcendental Meditation, orderliness increases (2); organized coherent waves of constant fast frequency.

## Comparing 3 with 4

Just as the transition from wakefulness to sleep, as indicated by the shift from alpha to slower waves (3), is a natural progressive change, so the transition from meditation to the waking state, as indicated by the shift from theta to alpha waves (4), is a natural progressive change — gradual and effortless.

## 8

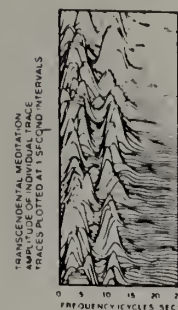
**Spectra of EEG signals during ordinary rest and drowsiness compared to Transcendental Meditation: a fourth major state of consciousness.**



5

**Non-mediator**

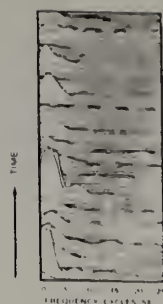
Drowsiness alternating bursts of alpha and mixed slow frequencies (delta and theta)



6

**Mediator**

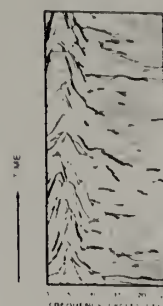
Transcendental Meditation a typical time series of spectra showing persistent alpha (12 cycles per second) and theta (5 cycles per second) waves simultaneously and continuously



7

**Non mediator**

Light sleep disappearance of alpha, presence of mixed slow intermittent waves (dominant low and high amplitude delta)



8

**Mediator**

Transcendental Meditation a typical series of spectra in time showing a long period of pure high amplitude, single frequency theta waves (5 cycles per second)

**Comparing 5 with 6**

Transcendental Meditation is a new form of rest, clearly distinct from drowsiness or sleep. Drowsiness is characterized by alertness, alternating with light sleep (5) whereas Transcendental Meditation brings experience of deepest physical rest simultaneously with expanded alertness (6).

**Comparing 7 with 8**

Transcendental Meditation is clearly distinct from sleep (7). A click stimulus presented during meditation blocked the theta for 1 to 3 seconds whereupon it spontaneously reappeared. However, during drowsiness in non-meditators, the click caused an arousal reaction with no return to theta.

**Conclusion**

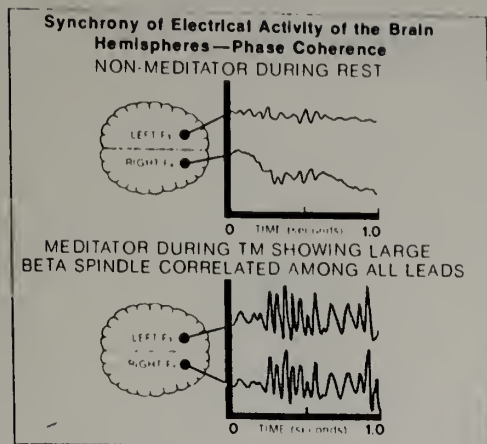
When the known brain waves of waking and different sleep phases (including dreaming) are compared with the patterns which characterize different phases of Transcendental Meditation there is a strong indication that the process of TM gives rise to a fourth major state of consciousness.

First Reference: Banquet, J. P., "EEG and Meditation," *Electroencephalography and Clinical Neurophysiology* Vol. 33, p. 454, 1972, USA

Second Reference: Banquet, J. P., "Spectral Analysis of the EEG in Meditation," *op. cit.*, Vol. 35 pp. 143-151, 1973, USA

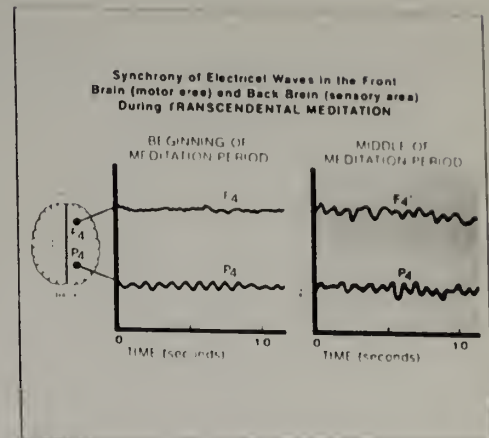


## Brain Wave Synchrony III



**9** Transcendental Meditation synchronizes electrical waves in the left and right cerebral hemispheres, bringing about concordance of phase. This fact, together with the findings of increased intelligence (Chart 18), increased learning ability (Chart 19) and increased academic performance (Chart 20), may be interpreted as implying functional integration of the analytic and verbal skills of the left hemisphere with the synthetic and spatial skills of the right hemisphere. On the basis of this integration brought about by Transcendental Meditation the nervous system becomes more flexible and stable at the same time.

## Brain Wave Synchrony IV



**10** During Transcendental Meditation the alphabrain waves (8-12 cycles per second) spread spontaneously (without specific training) from the back to the front of the brain, representing a more integrated functioning which results in a pattern of increased orderliness. This finding of improved physiological order based on integration suggests a possible explanation for the observed improvements in the capacity of the brain to perform its integrative functions of thinking (Chart 20) and thought action coordination (Chart 15) due to the practice of Transcendental Meditation.

First Reference: Banquet, J.P., EEG and Meditation, *Electroencephalography and Clinical Neurophysiology* Vol. 33, p. 454, 1972, USA

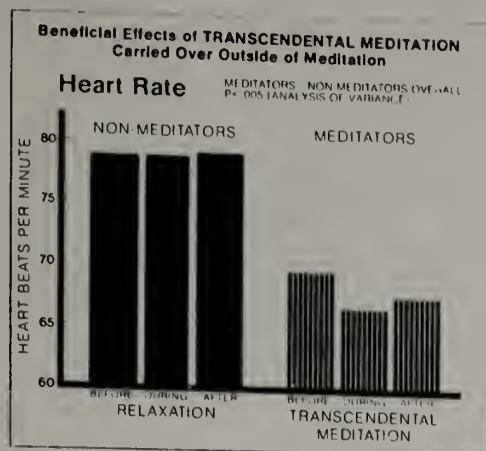
Second Reference: Banquet, J.P., "Spectral Analysis of the EEG in Meditation," *op. cit.*, Vol. 35, pp. 143-151, USA

First Reference: Banquet, J.P., EEG and Meditation, *Electroencephalography and Clinical Neurophysiology* Vol. 33, p. 454, 1972, USA

Second Reference: Banquet, J.P., "Spectral Analysis of the EEG in Meditation," *op. cit.*, Vol. 35, pp. 143-151, 1973, USA

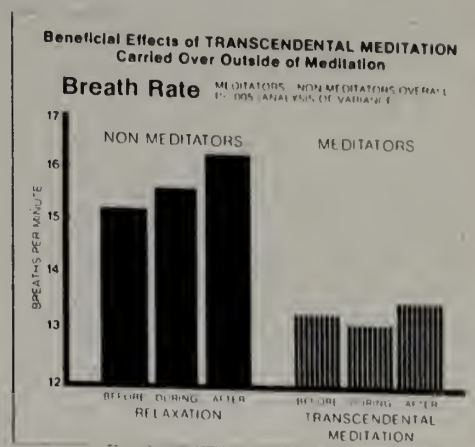
## Benefits in Daily Activity due to TM

### Improved Physiology Stabilized I



**11** Transcendental Meditation produces superior physiological rest and causes the heart to maintain a restful pace even outside of meditation. This gradually brings about a permanent and beneficial reduction in heart rate, indicating less wear on the heart; improved cardiovascular efficiency in meditators.

### Improved Physiology Stabilized II

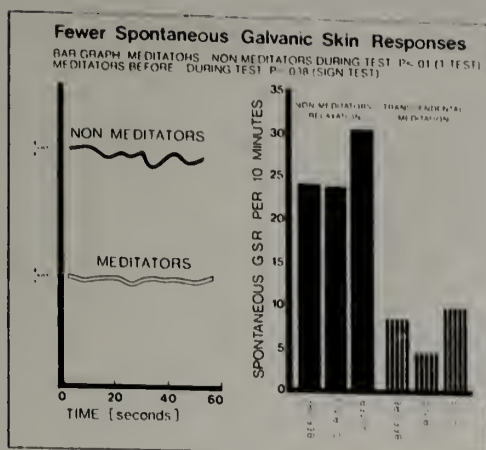


**12** Transcendental Meditation produces superior physiological rest and causes the breath to maintain a restful pace even outside of meditation. This gradually brings about a permanent and beneficial reduction in breath rate, indicating improved efficiency of the system as a whole.

Reference: Rouff, T.J., "Low Normal' Heart and Respiratory Rates in Practitioners of Transcendental Meditation," Huxley College of Environmental Studies, Western Washington State University, Bellingham, USA, September 1973. Submitted for publication.

Reference: Rouff, T.J., "Low Normal' Heart and Respiratory Rates in Practitioners of Transcendental Meditation," Huxley College of Environmental Studies, Western Washington State University, Bellingham, USA, September 1973. Submitted for publication.

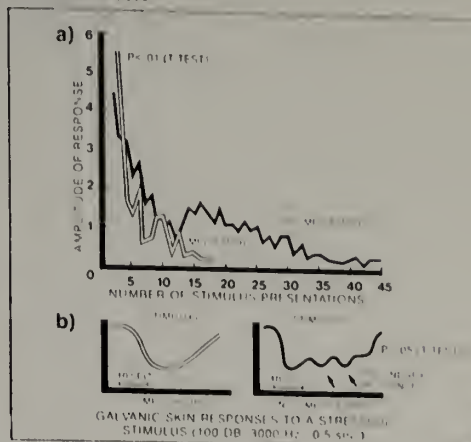
### Increased Stability



**13** Transcendental Meditation stabilizes the nervous system as shown by fewer spontaneous galvanic skin responses. This stability continues to be maintained after meditation. Fewer spontaneous galvanic skin responses are known to indicate more resistance to environmental stress, psychosomatic disease, and behavioral instability, as well as efficiency in the activity of the nervous system and therefore more energy for purposeful activity.

Reference: Orme-Johnson, D.W., "Autonomic Stability and Transcendental Meditation," *Psychosomatic Medicine*, Vol. 35, No. 4, pp 341-349, July-August 1973, USA

### Effective Interaction with the Environment

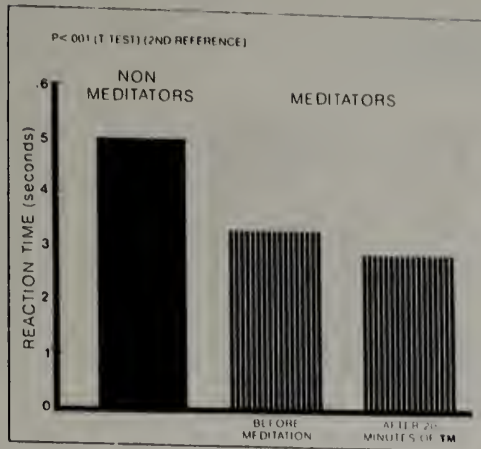


**14 a)** Meditators recover from stress more quickly than non-meditators. This is demonstrated by rapid habituation of the galvanic skin response to a stressful stimulus. This faster habituation is known from other studies to be correlated with a more mature style of functioning of the nervous system. In addition, meditators show a more stable response to the stressful stimulus than non-meditators.

**b)** The smoother graph of the meditator indicates a more stable functioning of the nervous system. The practice of Transcendental Meditation strengthens the individual's nervous system and allows him to interact more effectively with his environment.

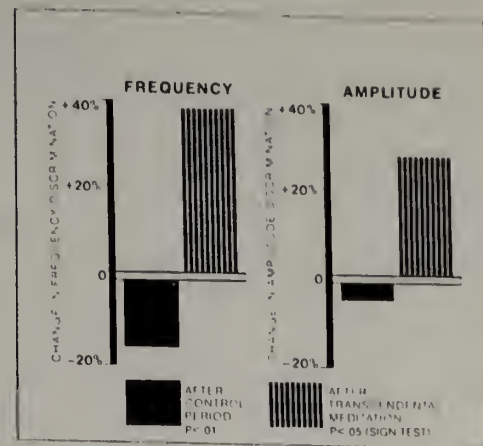
Reference: Orme-Johnson, D.W., "Autonomic Stability and Transcendental Meditation," *Psychosomatic Medicine*, Vol. 35, No. 4, pp 341-349, July-August 1973, USA

### Faster Reaction Time



**15** Transcendental Meditation speeds up reaction time, indicating increased alertness, improved coordination of mind and body, reduced dullness and improved efficiency in perception and performance.

### Increased Perceptual Ability



**16** Improvement of auditory ability indicates increased clarity and refinement of perception following Transcendental Meditation.

First Reference: Shaw, R. and D. Kolb, "One-Point Reaction Time Involving Meditators and Non-Meditators," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

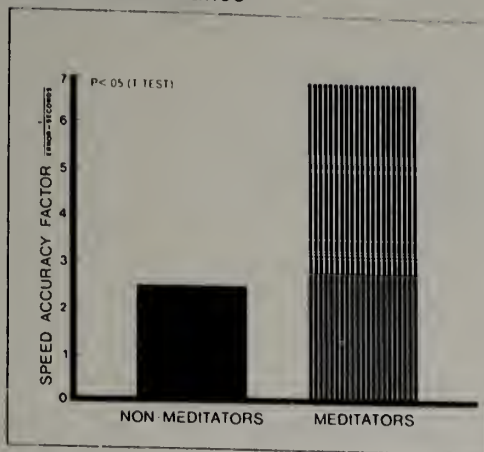
Second Reference: Orme-Johnson, D.W. and D. Kolb, "An Experimental Analysis of the Effects of Transcendental Meditation on Reaction Time," Department of Psychology, Maharishi International University, Santa Barbara, California, USA, January 1974. To be submitted for publication.

First Reference: Graham, J., "Auditory Discrimination in Meditators," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

Second Reference: Pirot, F.M., "Transcendental Meditation and Perceptual Auditory Discrimination," Department of Psychology, University of Victoria, Victoria, British Columbia, Canada, 1973. Submitted for publication.

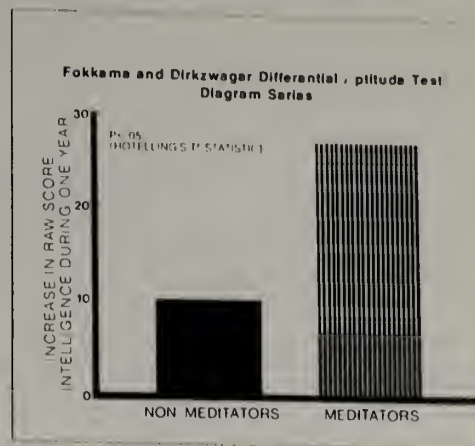
Third Reference: Brown, F.M., W.S. Stewart and J.T. Blodgett, "EEG Kappa Rhythms During Transcendental Meditation and Possible Perceptual Threshold Changes Following," Center College of Kentucky, Danville, Kentucky, USA. Paper presented at the Kentucky Academy of Science, USA, November 1971.

### Superior Perceptual-Motor Performance



**17** Subjects who practice Transcendental Meditation perform faster and are more accurate in a complex perceptual-motor test (Mirror Star tracing). Good performance indicates greater coordination between mind and body, greater flexibility, increased perceptual awareness, greater efficiency and neuromuscular integration.

### Increased Intelligence Growth Rate



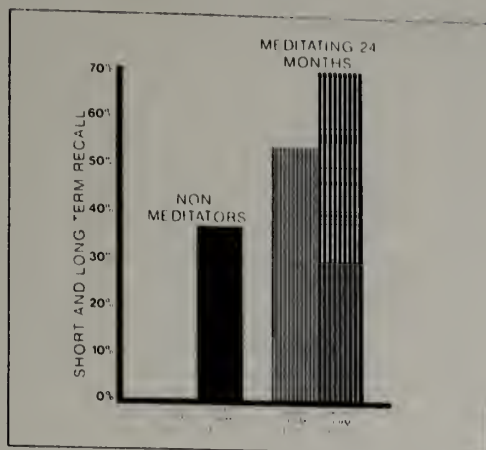
**18** Research on high school students in Holland over a one year period indicated a significant increase in the growth rate of intelligence among those regularly practicing Transcendental Meditation when compared to a non-meditating control group.

Reference: Blasdel, K., "The Effects of Transcendental Meditation Upon a Complex Perceptual Motor Task," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme Johnson, D.W., I. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA

Reference: Tjoa, S.A., "Some Evidence that the Practice of Transcendental Meditation Increases Intelligence as Measured by a Psychological Test," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme Johnson, D.W., I. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974



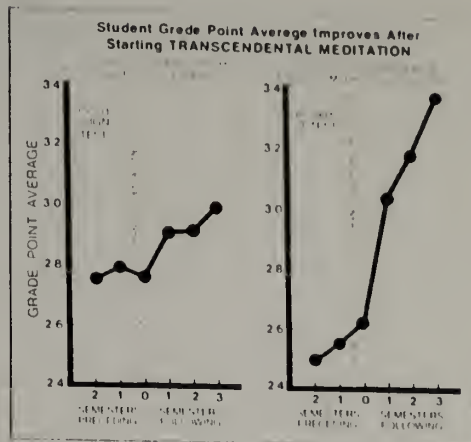
### Increased Learning Ability



**19** Studies show that meditators perform better on recall tests and learn more quickly than non-meditators. Meditators also show significantly better results on more difficult material. The relationship between months of continued practice of Transcendental Meditation and increasing improvements in recall ability demonstrates that TM directly improves the ability to learn.

Short Term Recall  $P < .05$  (Wilcoxon Signed Rank Test)  
Long Term Recall  $P < .01$  (Kruskal Wallis Trend Test)

### Improved Academic Performance



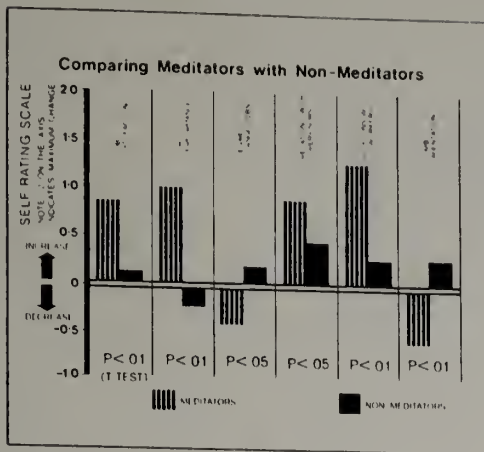
**20** Grades sharply improved after students started Transcendental Meditation as shown by Grade Point Average. Study 1 consists of students chosen for their stable academic grade histories prior to beginning TM. Study 2 consists of students who became teachers of TM.

Reference: Abrams, A.I., "Paired Associate Learning and Recall: A Pilot Study Comparing Transcendental Meditators with Non Meditators," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

Study 1 Reference: Collier, R.W., "The Effect of Transcendental Meditation Upon University Academic Attainment," College of Arts and Sciences, University of Hawaii, USA, April 1973. In press. Proceedings of the Pacific Northwest Conference on Foreign Languages, Seattle, Washington, USA.

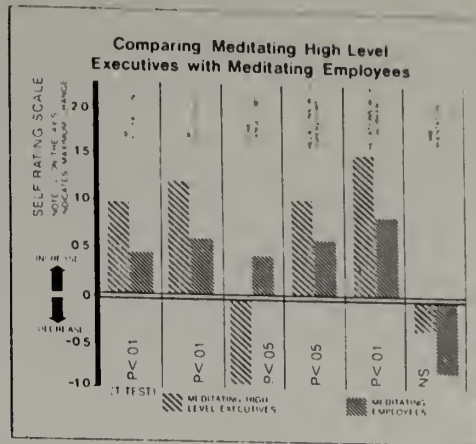
Study 2 Reference: Heaton, D.P. and D. Orme Johnson, "Influence of Transcendental Meditation on Grade Point Average: Initial Findings," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

Increased Productivity I



**21** Meditators show more job satisfaction, improved performance, more stability in their jobs and better interpersonal relationships with their supervisors and co-workers. Whereas meditators report that they feel less anxiety about promotion (shown by reduced climb orientation), their fellow employees see them as moving ahead quickly. This indicates that a faster pace of progress is more natural for persons practicing Transcendental Meditation.

Increased Productivity II

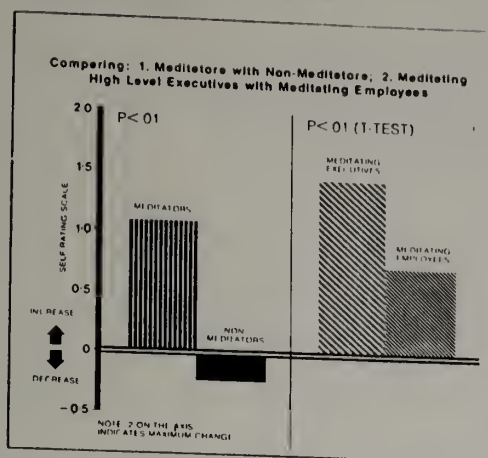


**22** Meditating executives at higher levels of responsibility show improved job performance and job satisfaction, more stability in their jobs and improved interpersonal relationships comparatively much more than meditators who work at lower levels of organization. The higher the level of authority, the greater the gain in productivity through Transcendental Meditation. See Charts 23-26.

Reference: Frew, D.R., "Transcendental Meditation and Productivity," *Academy of Management Journal*, Vol. 17, No. 2, pp. 362-8, June, 1974, USA.

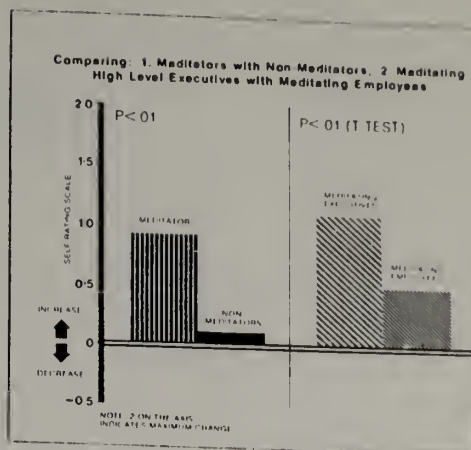
Reference: Frew, D.R., "Transcendental Meditation and Productivity," *Academy of Management Journal*, Vol. 17, No. 2, pp. 362-8, June, 1974, USA.

## Improved Job Performance



**23** Transcendental Meditation has been shown to significantly increase performance at all levels of work, individual and organizational. The study shows a comparatively greater increase in job performance in the lives of meditators at higher levels of management, who have greater responsibility, than those who work at less responsible levels.

## Increased Job Satisfaction

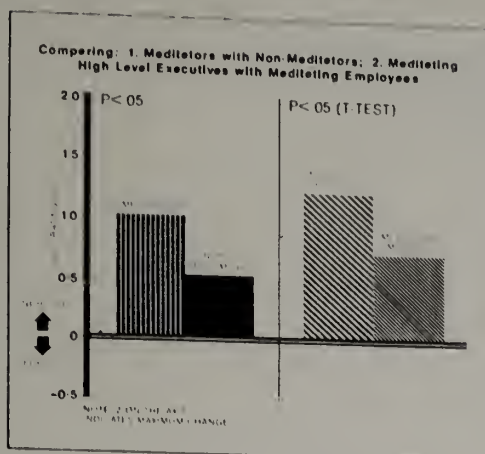


**24** Meditators show a greater increase in job satisfaction since beginning the practice of Transcendental Meditation than do non-meditators over the same period of time. Executives at higher levels of management show this increase more.

Reference: Frew, D.R., "Transcendental Meditation and Productivity," *Academy of Management Journal*, Vol 17, No. 2, pp 362-8, June, 1974, USA

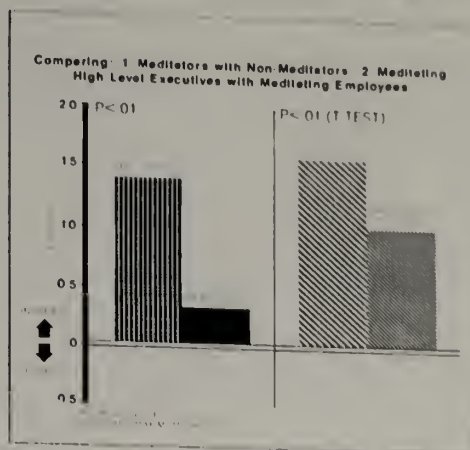
Reference: Frew, D.R., "Transcendental Meditation and Productivity," *Academy of Management Journal*, Vol 17, No. 2, pp 362-8, June, 1974, USA

### Improved Relations with Supervisors



**25** Transcendental Meditation leads to more rewarding and productive interpersonal relationships in business. The study shows that the effect of Transcendental Meditation in improving relationships with supervisors is comparatively greater at higher levels of organization.

### Improved Relations with Co-Workers

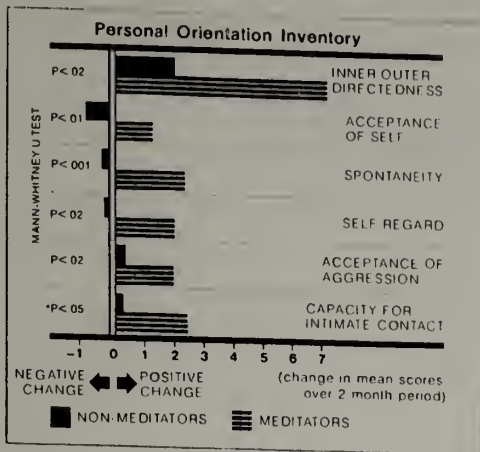


**26** The study shows that meditators at all levels of business experience improved relationships with co-workers. This improvement is found to be comparatively greater at higher levels of organization in the lives of executives with greater responsibility.

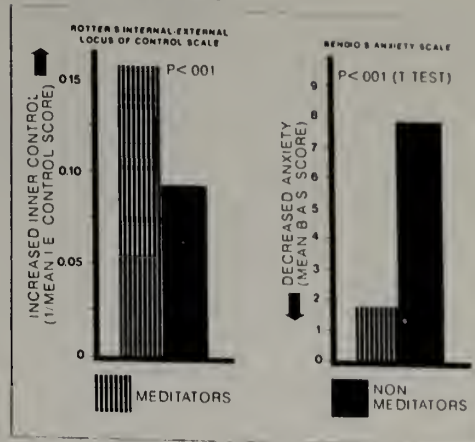
Reference: Frew, D.R., "Transcendental Meditation and Productivity," *Academy of Management Journal*, Vol. 17, No. 2, pp. 362-8, June, 1974, USA

Reference: Frew, D.R., "Transcendental Meditation and Productivity," *Academy of Management Journal*, Vol. 17, No. 2, pp. 362-8, June, 1974, USA

**Development of Personality**



**Increased Inner Control, Decreased Anxiety**



**27** Subjects practicing Transcendental Meditation, measured once prior to beginning the practice and again two months later, show positive improvement in spontaneity, self-regard, acceptance of aggression, capacity for intimate contact and inner and outer directedness, when compared to a matched control group of non-meditators. The test used was the Personal Orientation Inventory (P.O.I.) developed by Shostrom. Two independent studies also using the P.O.I. confirmed these results. (T TEST)

**28** Research using Rotter's Locus of Control Scale and Bendig's Anxiety Scale shows that subjects practicing Transcendental Meditation have significantly more internal control and are significantly less anxious than non-meditators.

First Reference: Seeman, W., S. Nidich and T. Banta, "The Influence of Transcendental Meditation on a Measure of Self-Actualization," *Journal of Counseling Psychology*, Vol. 19, No. 3, pp. 184-7, 1972, USA.

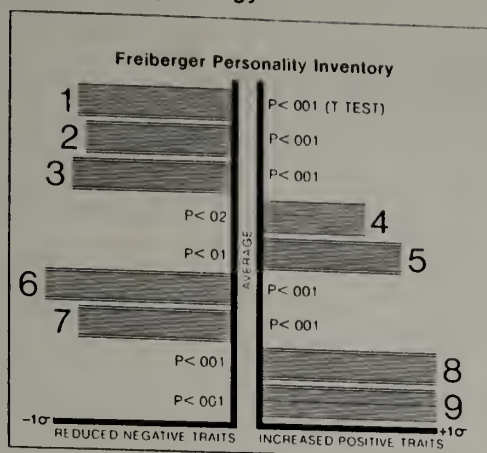
Second Reference: Nidich, S., W. Seeman and T. Dreskin, "Influence of Transcendental Meditation: A Replication," *Journal of Counseling Psychology*, Vol. 20, No 6, pp 555-6, November 1973, USA

Third Reference: Hjelle, L.A., "Transcendental Meditation and Psychological Health," *Perceptual and Motor Skills*, Vol. 39, pp. 623-8, 1974, USA.

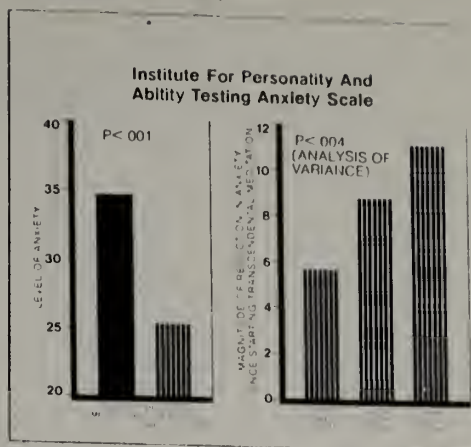
Reference: Hjelle, L.A., "Transcendental Meditation and Psychological Health," *Perceptual and Motor Skills*, Vol. 39, pp. 623-8, 1974, USA.



## Improved Psychology



## Decreased Anxiety I

**29** Transcendental meditators exhibit:

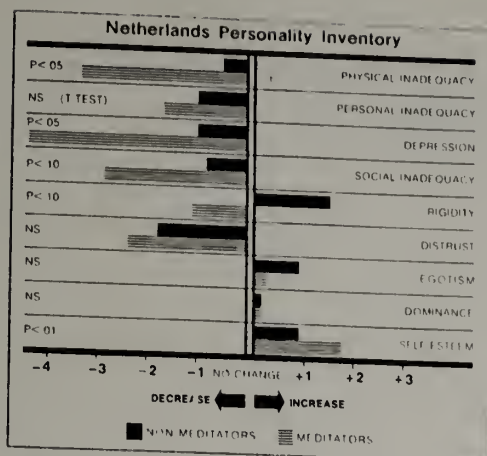
1. *Reduced Nervousness*, reduced psychosomatic disease
2. *Reduced Depression*, more self-assurance and contentment
3. *Reduced Irritability*, more tolerance in frustrating situations
4. *Increased Sociability*, liveliness, friendliness
5. *Increased Self-assuredness*, more self-confidence, good humor
6. *Decreased Tendency to Dominate*, more respect, cordiality and tolerance
7. *Decreased Inhibition*, more naturalness, spontaneity and self-sufficiency
8. *Increased Emotional Stability*, improved ability to concentrate
9. *Increased Staying Power and Efficiency*

Reference: Fehr, T., U. Nerstheimer and S. Torber "Study of 49 Practitioners of Transcendental Meditation with the Freiberger Personality Inventory." *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

- 30** Research using the Institute for Personality and Ability Testing Anxiety Scale indicates that, after starting Transcendental Meditation, subjects show a significant decrease in anxiety level and exhibit significantly less anxiety than non-meditators. The reduction of anxiety is progressively greater with length of practice of TM.

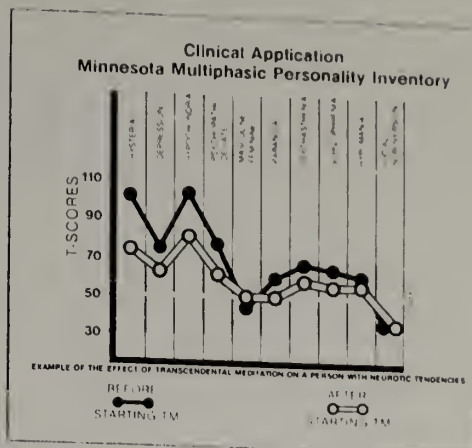
Reference: Farwell, L., "Effect of Transcendental Meditation on Level of Anxiety," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

## Increased Normality



**31** Tests on personality variables during a nine-week study of meditating groups, matched for age, sex and level of education, revealed that individuals show a significant decrease in physical and social inadequacy, depression and rigidity, and show increased self-esteem upon beginning Transcendental Meditation.

## Improved Mental Health

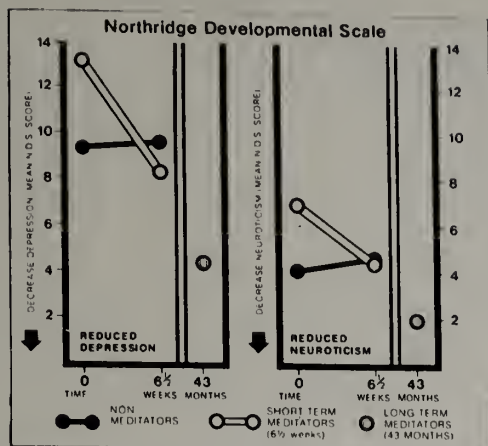


**32** A study with the Minnesota Multiphasic Personality Inventory (MMPI) showed significant normalization of personality characteristics within a few months after learning Transcendental Meditation, as seen in the results of the subject shown above. In this study, meditators as a group decreased significantly more than did control subjects in hypochondria ( $P < .05$ ), schizophrenia ( $P < .05$ ), Taylor Manifest Anxiety ( $P < .05$ ), subscales of the MMPI. Meditators also showed a significantly greater overall reduction on MMPI subscales ( $P < .01$ ), indicating an overall improvement in mental health.

Reference: Van den Berg, W P and B Mulder, "Psychological Research on the Effects of Transcendental Meditation on a Number of Personality Variables Using the NPI," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D W, L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA

Reference: Orme-Johnson, D W., "Transcendental Meditation for Drug Abuse Counselors," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D W, L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, 1974, USA

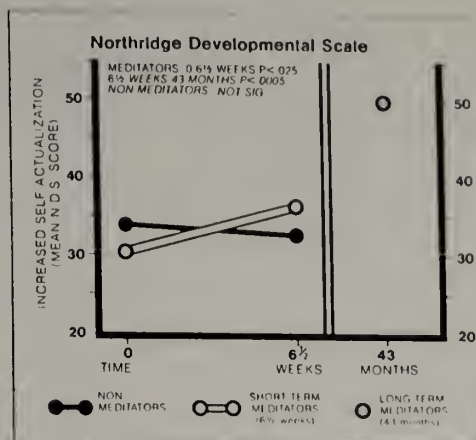
## Increased Psychological Health



**33** Research using the Northridge Developmental Scale shows that the practice of Transcendental Meditation significantly reduces the level of depression and neuroticism in the individual. The level of these variables was significantly lower for long-term meditators (as denoted by the circle on the chart) than for short-term meditators, indicating that psychological health increases with length of time meditating.

Meditators: 0-6½ weeks,  $P < .005$  (left),  $P < .01$  (right), 6½ weeks-43 months,  $P < .01$  (left),  $P < .005$  (right).  
Non-meditators: not significant

## Increased Self-Actualization

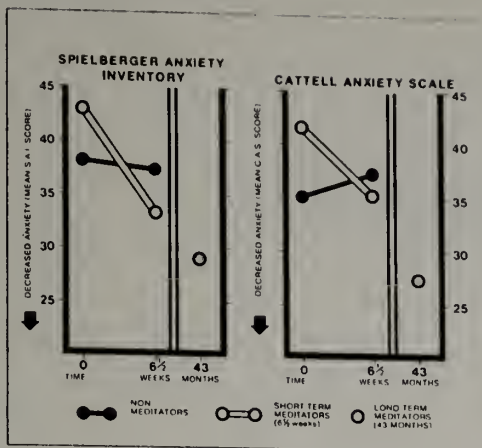


**34** Subjects practicing Transcendental Meditation show a significant increase in self-actualization when compared to a group of non-meditators, as measured by the Northridge Developmental Scale. The level of self-actualization was highest in long-term meditators (as denoted by the circle on the chart), indicating that the benefits of Transcendental Meditation are cumulative.

Reference: Ferguson, P.C. and J. Gowan, "The Influence of Transcendental Meditation on Anxiety, Depression, Aggression, Neuroticism and Self-Actualization," School of Education, California State University at Northridge, USA, 1973. Paper presented at California State Psychological Association, Fresno, California, USA, January 1974, also in *Journal of Humanistic Psychology* (in press) USA.

Reference: Ferguson, P.C. and J. Gowan, "The Influence of Transcendental Meditation on Anxiety, Depression, Aggression, Neuroticism and Self-Actualization," School of Education, California State University at Northridge, USA, 1973. Paper presented at California State Psychological Association, Fresno, California, USA, January 1974, also in *Journal of Humanistic Psychology* (in press) USA.

## Decreased Anxiety II

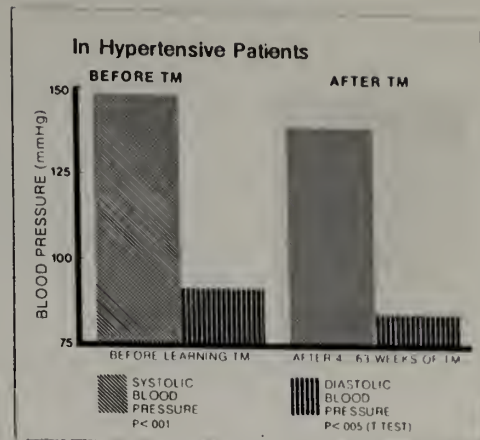


**35** A study using the Spielberger Anxiety Inventory and the Cattell Anxiety Scale shows a significant decrease of anxiety in practitioners of Transcendental Meditation. Note that even though the short-term meditators showed the highest level of anxiety prior to starting Transcendental Meditation, their anxiety level was reduced to below that of the non-meditators after six and a half weeks of regular practice. The anxiety level was lowest in the long-term meditators (as denoted by the circle on the chart), indicating that the benefits of TM are cumulative.

Meditators 0-6½ weeks,  $P < 0.05$  (left),  $P < 0.025$  (right). 6½ weeks-43 months,  $P < 0.025$  (left),  $P < 0.005$  (right)  
Non-meditators not significant (T-Test)

Reference: Ferguson, P.C. and J. Gowan, "The Influence of Transcendental Meditation on Anxiety, Depression, Aggression, Neuroticism and Self-Actualization," School of Education, California State University at Northridge, USA, 1973. Paper presented at California State Psychological Association, Fresno, California, USA, January 1974, also in *Journal of Humanistic Psychology* (in press) USA.

## Decreased Blood Pressure

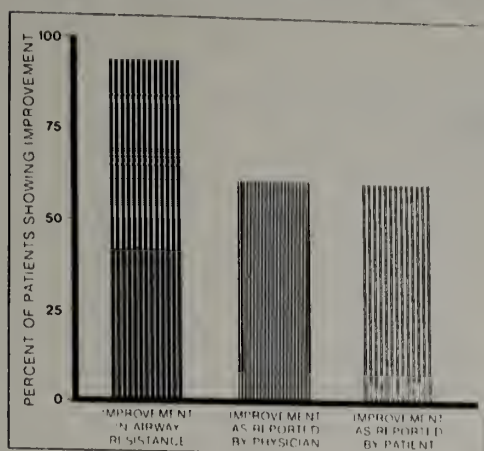


**36** Systolic and arterial blood pressure was recorded 1,119 times in 22 hypertensive patients before and after learning Transcendental Meditation. The decreases in blood pressure after practicing Transcendental Meditation were statistically significant and indicate the clinical value of Transcendental Meditation in helping hypertensive patients.

Reference: Benson, H. and R.K. Wallace, "Decreased Blood Pressure in Hypertensive Subjects Who Practiced Meditation," Supplement II to *Circulation*, Vols 45 and 46, October 1972, USA.

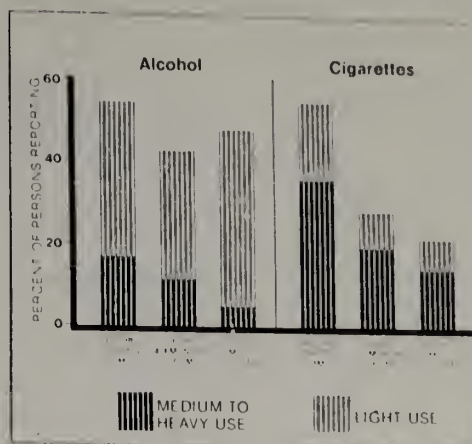


### Beneficial Effects upon Bronchial Asthma



**37** After the practice of Transcendental Meditation ninety-four percent of a group of asthmatic patients showed improvement as determined by the physiological measurement of airway resistance. Sixty-one percent of the asthmatic patients showed improvement as reported by their personal physicians and independently by the patients themselves. These results indicate that the practice of Transcendental Meditation can be beneficial for patients with bronchial asthma.

### Reduced Use of Alcohol and Cigarettes



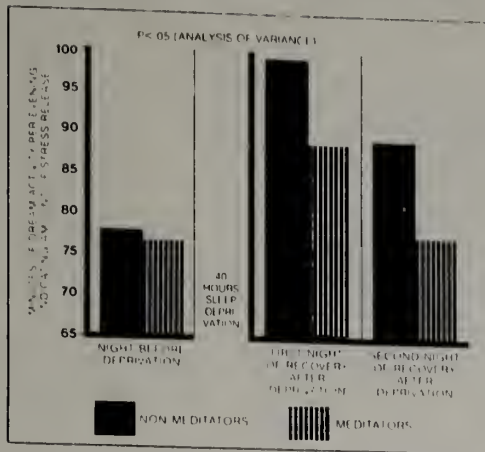
**38** A retrospective study of 1,862 subjects who practiced Transcendental Meditation for an average of 20 months showed a significant reduction in the reported use of alcohol and cigarettes. Transcendental Meditation has been shown to provide deep relaxation to the entire nervous system (Charts 1 and 5) and remove tensions (Chart 13), giving rise to a more calm, restful and creative functioning of mind and body. These effects may be taken to explain the gradual decrease seen in the need for alcohol and cigarettes.

First Reference: Honsberger, R. and A.F. Wilson, "The Effects of Transcendental Meditation Upon Bronchial Asthma," *Clinical Research*, Vol. 22, No. 2, 1973, USA.  
 Second Reference: Honsberger, R. and A.F. Wilson, "Transcendental Meditation in Treating Asthma," *Respiratory Therapy: The Journal of Inhalation Technology*, Vol. 3, No. 6, pp. 79-81, November-December 1973, USA.  
 Third Reference: Wilson, A.F., R. Honsberger, J.T. Chiu and H.S. Novey, "Transcendental Meditation and Asthma," *Respiration* (in press) USA.

Reference: Benson, H. and R.K. Wallace, *Drug Abuse, Proceedings of the International Conference*, Philadelphia, USA, Lea and Febiger, pp. 369-376, 1972. *Congressional Record*, Serial No. 92-1 (U.S. Government Printing Office, Washington, D.C., 1971).

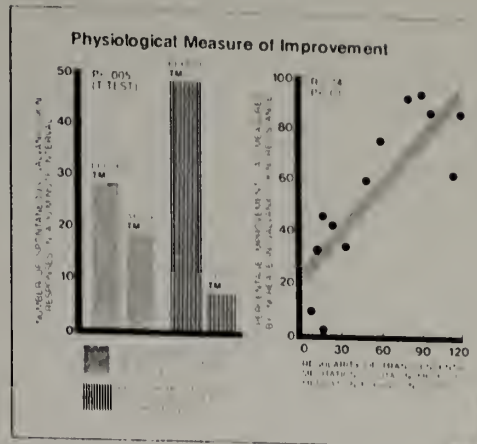


### Faster Recovery from Sleep Deprivation



**39** Measurements showed that after 40 hours of sleep deprivation, meditators recovered much more quickly than non-meditators. Measurement of recovery was by duration of compensatory dreaming.

### Rehabilitation of Prisoners I



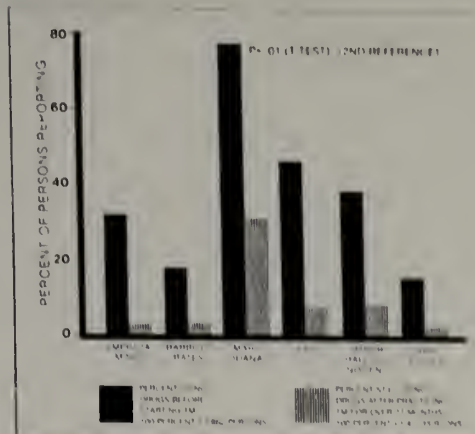
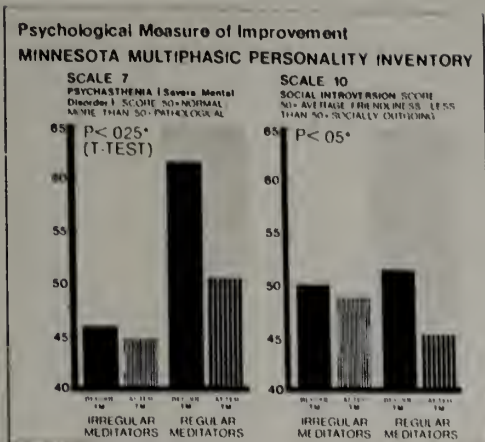
**40** Transcendental Meditation helps prisoners reduce their level of stress as measured physiologically by the level of spontaneous galvanic skin responses. Notice that the group that started with the highest stress level achieved the lowest level during two months of regular meditation. The chart on the right shows that regularity of meditation is positively correlated with the degree of increase in autonomic stability. A meditator remains stable, indicating he can naturally adapt himself to new situations. This in turn indicates a state of integration of his emotions and thinking.

Reference: Miskiman, D E., "The Effect of Transcendental Meditation on Compensatory Paradoxical Sleep," *Scientific Research on Transcendental Meditation Collected Papers*, Orme-Johnson, D W , L Domash and J Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

Reference: Orme Johnson, D W, J Kiehlbauch, R Moore and J Bristol, "Personality and Autonomic Changes in Meditating Prisoners," La Tuna Federal Penitentiary, Texas, USA, August 1972. To be submitted for publication

Rehabilitation of Prisoners II

Reduced Use of Non-Prescribed Drugs



**41** Transcendental Meditation helps prisoners by reducing their level of stress, as indicated by the Minnesota Multiphasic Personality Inventory (MMPI), given before and after two months of continued practice of Transcendental Meditation. Reduced values of these scales (psychasthenia and social introversion) indicates the growth of adaptability in the prisoner's thinking. With the growth of adaptability, the meditating prisoner is able to maintain greater emotional (autonomic) stability (Chart 40) in response to new environmental demands. This integration of thinking and emotions provides a basis for a balanced, useful life in society.

**42** A retrospective study of 1,862 subjects who practiced Transcendental Meditation for an average of 20 months showed decreases in the reported use of non-prescribed drugs. Because Transcendental Meditation improves inner control and decreases anxiety (Chart 28) and strengthens mental health (Charts 29 and 33) and general well-being, it may be concluded that the desire for drugs is thereby decreased or eliminated.

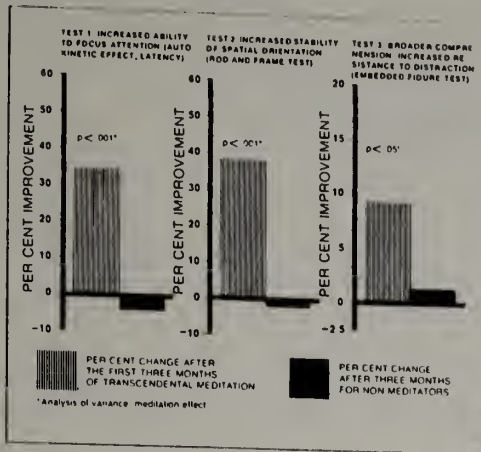
\*Change in irregular - change in regular meditators. P < 0.25 (left), P < 0.5 (right) (T-Test)

Reference: Orme-Johnson, D.W., J. Kiehlbauch, R. Moore and J. Bristol. "Personality and Autonomic Changes in Meditating Prisoners." La Tuna Federal Penitentiary, Texas, USA, August 1972. To be submitted for publication.

First Reference: Benson, H. and R.K. Wallace. *Drug Abuse, Proceedings of the International Conference*, Philadelphia, USA. Lea and Febiger, pp. 369-376, 1972. *Congressional Record*, Serial No. 92-t (U.S. Government Printing Office, Washington, D.C., 1971).

Second Reference: Shafiq, M., R. Lavelly and R. Jaffe. "Meditation and Marijuana." *American Journal of Psychiatry*, Vol. 131, No. 1, pp. 60-63, January 1974. USA.

### Broader Comprehension and Improved Ability to Focus Attention



**43** The results of this experiment on perceptual ability indicate the growth of—

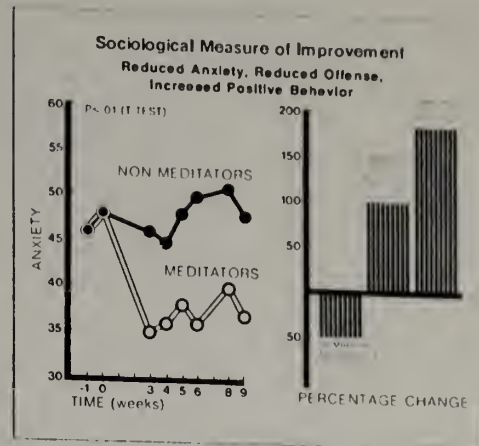
1. Increased stability of focus of attention, the ability to focus on specific objects of the perceptual field without being distracted by the environment;
2. Increased ability to spontaneously maintain broad, comprehensive awareness while attending to a particular element of the field.

These improvements are associated with increased mental health, reduced anxiety, and increased stability of the autonomic nervous system—all indications of improved neurological organization and, consequently, a more evolved consciousness.

The neurological development underlying the improved ability to focus attention and the development of broad comprehension is unique to Transcendental Meditation because until now it was believed that these basic perceptual abilities do not change beyond early adulthood. This experiment confirms neurophysiologically the development of full mental potential through Transcendental Meditation.

Reference: Pelletier, K., "Influence of Transcendental Meditation upon Autokinetic Perception," *Perceptual and Motor Skills*, Vol. 39, pp. 1031-34, 1974, USA.

### Rehabilitation of Prisoners III



**44** Four measures on prisoners practicing Transcendental Meditation indicated:

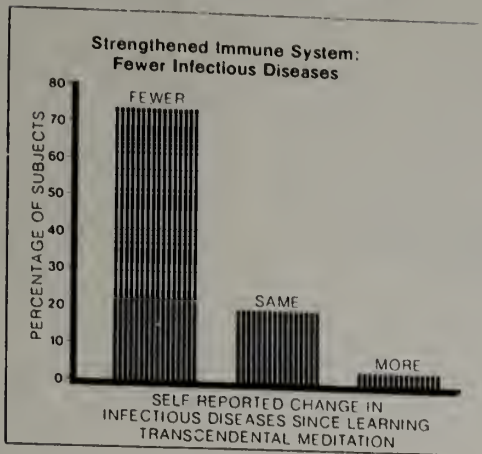
1. A reduction in anxiety
2. A reduction in the number of violations of prison rules
3. An increase in the number of positive activities indicated by participation in a number of activities such as sports, clubs and education (100 percent more).
4. An increase in the time spent in positive activities (179 percent more)

Transcendental Meditation produces the physiological normalization (Chart 41) necessary for true rehabilitation.

First Reference: Ballou, D., "Transcendental Meditation at Stillwater Prison," Department of Anthropology, Kansas University, Lawrence, Kansas, USA, January 1974 To be submitted for publication.

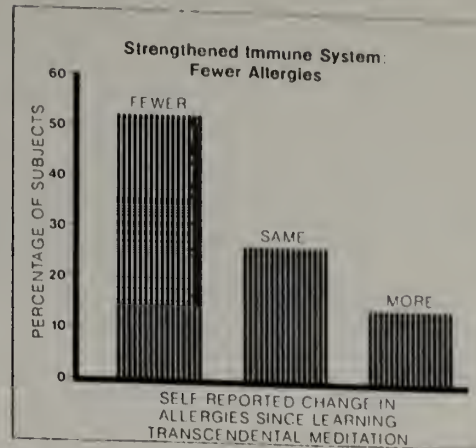
Second Reference: Cunningham, M and W Koch, "A Pilot Project at the Federal Correctional Institute at Lompoc, California," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D W., L Domash and J. Farrow (Eds), Vol 1, Los Angeles, MIU Press, 1974, USA

## Improved Resistance to Disease I



**45** In a retrospective survey of 408 meditators who had previously suffered from infectious diseases, more than 70 percent reported a decrease in the number of infectious diseases per year. This suggests that Transcendental Meditation strengthens the immune system, the body's main system to preserve health.

## Improved Resistance to Disease II



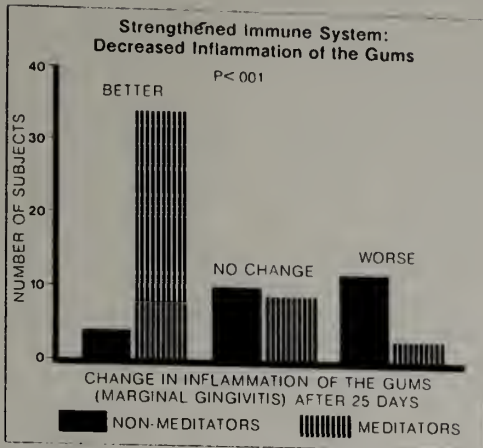
**46** In a retrospective study of 156 meditators who previously suffered from allergies, 56 percent reported a decrease or cessation of allergies. This indicates that Transcendental Meditation normalizes the immune system.

Reference: Papentin, F., "Self-Purification of the Organism and Transcendental Meditation: A Pilot Study," *Scientific Research on Transcendental Meditation Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

Reference: Papentin, F., "Self-Purification of the Organism and Transcendental Meditation: A Pilot Study," *Scientific Research on Transcendental Meditation Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.



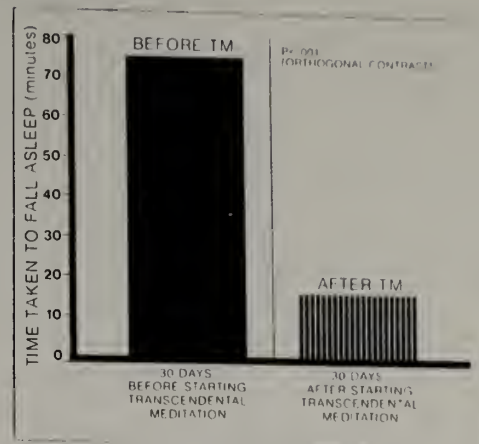
### Improved Resistance to Disease III



**47** Forty-six persons practicing Transcendental Meditation were clinically examined for a common inflammation of the gums before and after a special course of extended meditation. The improvement in the practitioners of Transcendental Meditation was marked and significantly greater than control subjects, indicating that TM strengthens the immune system and the regenerative capacity of the gums, providing a stronger basis for dental health.

Reference: Klemons, I.M., "Changes in Inflammation Which Occur in Persons Practicing Transcendental Meditation," College of Health, Physical Education and Recreation, Pennsylvania State University, University Park, Pennsylvania, USA, 1972. Unpublished manuscript

### Relief from Insomnia



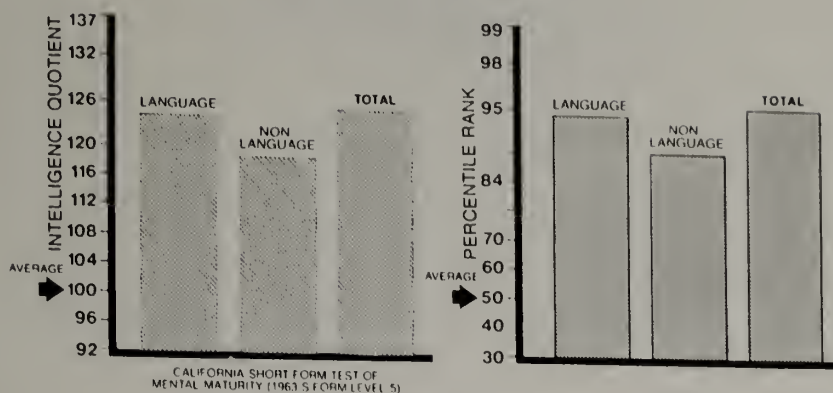
**48** Transcendental Meditation significantly reduced the time taken for insomniacs to fall asleep. As a therapy against insomnia, Transcendental Meditation was found to be:

1. Simple to administer
2. Immediately effective
3. Stable over time
4. Without unfavorable side effects

Reference: Miskiman, D.E., "The Treatment of Insomnia by Transcendental Meditation," *Scientific Research on Transcendental Meditation Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA



## Developed Intelligence

MIU Santa Barbara Campus  
Results of Intelligence Testing

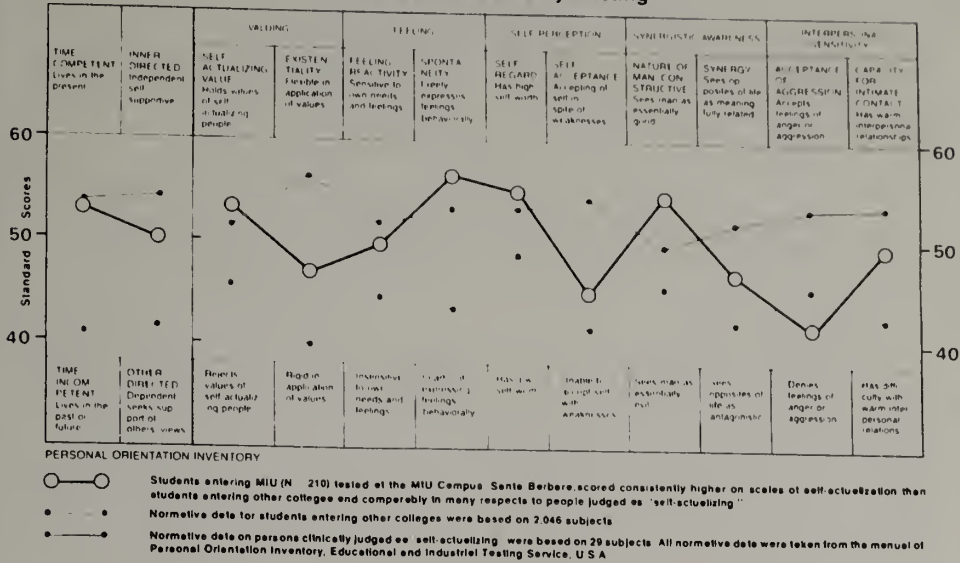
A random sample of MIU students (N = 168) had a mean IQ of 125, which places them above 95% of the general population on Intelligence.

40 A random sample of MIU students scored a mean IQ of 125 in the California Short-Form Test of Mental Maturity, placing them above 95% of the general population in intelligence. These results, together with tests that reveal a higher intelligence growth rate among meditators than among non-meditating control groups (Charts 18 and 63), indicate the profound influence of the regular practice of Transcendental Meditation in development of full mental potential.

Reference: Orme-Johnson, D W., "Psychological Testing of MIU Students. First Report," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

Developed Personality

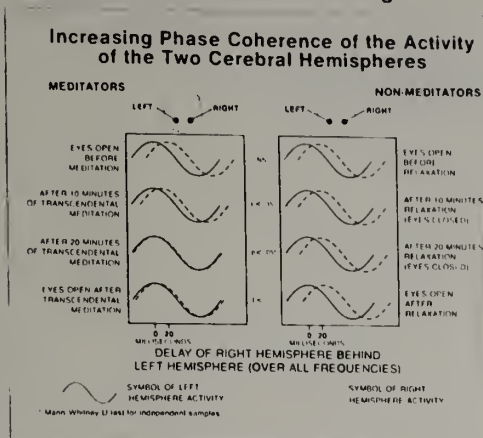
MIU Santa Barbara Campus  
Results of Personality Testing



**50** In this personal development test, MIU students scored consistently higher on scales of self-actualization than students entering other colleges and compared in many respects to persons clinically judged as self-actualizing. The MIU students were self-actualizing, as indicated by a high degree of time competence, inner directedness, self-actualizing value, flexibility in application of values, sensitivity to own needs, spontaneity, an excellent sense of self-worth, a developed capacity for warm interpersonal relationships, and a positive tendency to see man as essentially good.

Reference: Orme-Johnson, D.W., "Psychological Testing of MIU Students: First Report," *Scientific Research on Transcendental Meditation: Collected Papers*, Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA.

## Increased Strength and Orderliness of Brain Functioning I



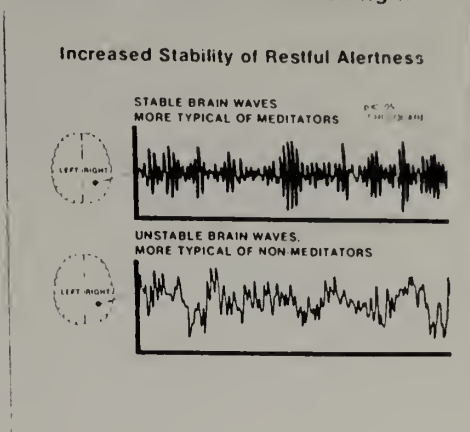
During Transcendental Meditation the brain waves of the right and left hemispheres come more into phase. This increasing coordination of the activity of the two sides of the brain continues after meditation and may account for the greater creative thought observed in meditators. Creative thought, the ability to intuitively see into the fundamentals of nature and then to develop a verbal or symbolic expression of that intuition, is based on the functional integration of the intuitive, spatial skills of the right hemisphere with the analytic, verbal skills of the left hemisphere. Scientific research on Transcendental Meditation has disclosed two relevant sets of facts:

1. that the activity of the two sides of the brain becomes more integrated, as shown in this experiment
2. that creative output increases in quality and quantity (see Charts 20-25)

The logical inference from these results is that Transcendental Meditation enlivens and enriches the neurophysiological basis of creative thought.

Reference: Westcott, M., "Hemispheric Symmetry of the EEG during Transcendental Meditation," *Scientific Research on Transcendental Meditation: Collected Papers*. Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA

## Increased Strength and Orderliness of Brain Functioning II

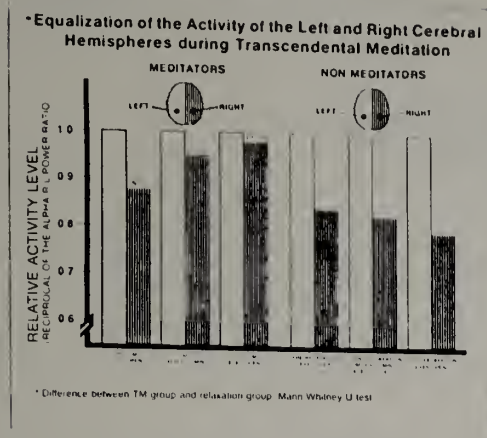


The brain waves (8-14 cps) during Transcendental Meditation were found to be more stable than for control subjects. Stable brain rhythms are known to be correlated with stable awareness and superior performance. Increasing stability of awareness is an indication of developing the fullness of life.

The fact that this effect persists even after meditation indicates the tendency of the neurophysiology to become habituated to maintaining broadened awareness in the direction of full mental potential (see Chart 43).

Reference: Westcott, M., "Hemispheric Symmetry of the EEG during Transcendental Meditation," *Scientific Research on Transcendental Meditation: Collected Papers*. Orme-Johnson, D.W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA

### Increased Strength and Orderliness of Brain Functioning III



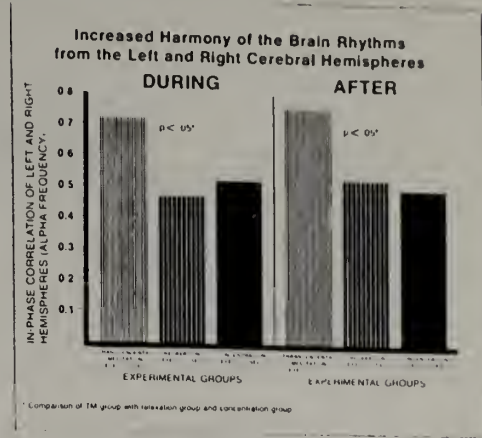
During Transcendental Meditation the energy output of the two hemispheres of the brain becomes nearly equal, indicating that a state of balance and synchrony is reached. Ordinarily during thought processes the brain goes out of equilibrium, with the left or right hemisphere dominating depending on the nature of the task. The fact that the brain becomes balanced during Transcendental Meditation indicates the growth of the ability to think without losing balance and perspective.

The finding that the brain maintains balance after meditation shows that this ability of thinking without losing balance becomes habituated in activity, indicating enlivenment of brain potential in the direction of full mental potential.

This independent study by an English researcher in 1974 corroborates and extends the previous work by French and American researchers, showing that Transcendental Meditation produces more orderly, synchronized brain activity.

Reference: Westcott, M. Hemispheric Symmetry of the EEG during Transcendental Meditation. *Scientific Research on Transcendental Meditation: Collected Papers*. Orme Johnson, D.W., L. Domash and J. Farrow (Eds.). Vol. 1. Los Angeles: MIU Press, 1974, USA.

### Increased Strength and Orderliness of Brain Functioning IV



The correlation between the amplitude of brain wave activity of the left and right hemispheres increases during Transcendental Meditation and remains at a high level after meditation. This indicates an increasing harmony between the functioning of the two sides of the brain. These neurophysiological measurements account for the growing harmony in the thinking and behavior of meditators.

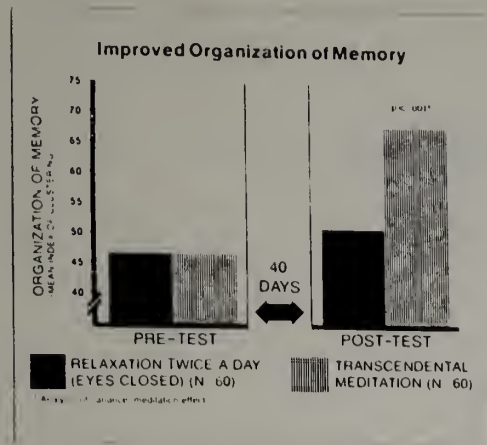
It is known that the diffuse portion of the reticular activating system is responsible for the general level of wakefulness and the synchrony of the two hemispheres; the specific portions of the reticular activating system are responsible for the ability to concentrate the attention on a particular subject.

Increased integration of the diffuse and specific reticular activating systems provides a basis of broadened awareness which supports the focus of attention on boundaries while maintaining full comprehension. This suggests the direction that the neurophysiological activity takes in order to develop full mental potential—that is, the ability to focus sharply without losing unbounded awareness (see Chart 43).

Reference: Westcott, M. Hemispheric Symmetry of the EEG during Transcendental Meditation. *Scientific Research on Transcendental Meditation: Collected Papers*. Orme Johnson, D.W., L. Domash and J. Farrow (Eds.). Vol. 1. Los Angeles: MIU Press, 1974, USA.



## Increased Orderliness of Thinking I

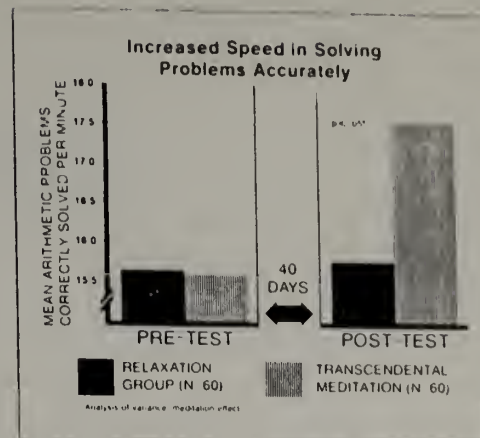


After the first 40 days of Transcendental Meditation, meditators increased markedly in their ability to organize learned material in their memories, whereas the control group, who just relaxed in the usual way, did not change significantly. This test shows that the organization of learned material into meaningful categories by meditators was spontaneous—it happened automatically while they were engaged in another task (see Chart 56).

It is interesting to note that charts 51-54, showing physiological changes, and charts 55-57, showing psychological changes, indicate parallel findings of increased orderliness and precision of neurophysiology and thinking.

Reference: Miskiman, D. E. "The Effect of Transcendental Meditation on the Organization of Thinking and Recall (Secondary Organization)." *Scientific Research on Transcendental Meditation: Collected Papers*. Orme Johnson, D. W., L. Domash and J. Farrow (Eds.), Vol. 1. Los Angeles, MIU Press, 1974, USA.

## Increased Orderliness of Thinking II



After beginning Transcendental Meditation, meditators significantly increased in speed of solving arithmetic problems accurately. The problems were given so that the subjects did not have opportunity to rehearse new material before taking a test of memory. Two facts were found:

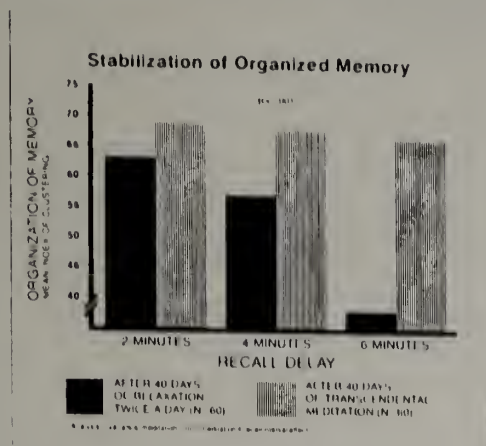
1. The efficiency of solving the arithmetic problems increased in meditators.
2. The meditators' memories spontaneously became more organized while they solved the problems (see Chart 55).

These results show that Transcendental Meditation increases the clarity and efficiency of conscious thought processes and at the same time improves the unconscious processes leading to spontaneous and purposeful organization of thought. More spontaneous computing of orderly, purposeful, intelligent thought indicates unfolding of full mental potential.

Reference: Miskiman, D. E. "The Effect of Transcendental Meditation on the Organization of Thinking and Recall (Secondary Organization)." *Scientific Research on Transcendental Meditation: Collected Papers*. Orme Johnson, D. W., L. Domash and J. Farrow (Eds.), Vol. 1. Los Angeles, MIU Press, 1974, USA.



### Increased Orderliness of Thinking III

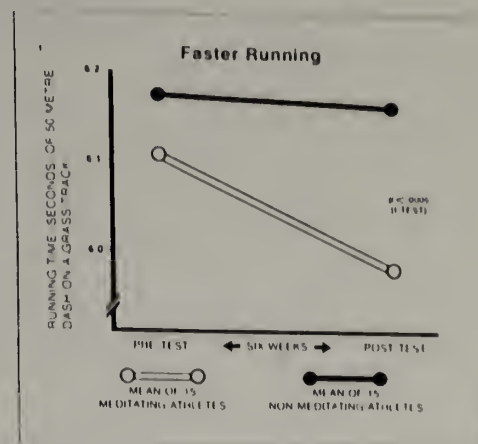


The organization of memory in meditators was stronger and more stable over time than in control subjects. This indicates an increased clarity and stability of mind in those who practice Transcendental Meditation. Whereas Transcendental Meditation produces increased orderliness of thinking, ordinary relaxation with eyes closed had little effect (Charts 55-57).

These results, along with the finding that Transcendental Meditation produces more orderly brain functioning than does ordinary relaxation (Charts 51-54), indicate that Transcendental Meditation is different from relaxation and that it is a new technology with profound implications for developing a more orderly physiology and psychology.

Reference: Miskiman D.L. The Effect of Transcendental Meditation on the Organization of Thinking and Recall (Secondary Organization). *Scientific Research on Transcendental Meditation: Collected Papers*. Orme Johnson D.W., F. Domash and J. Farrow (Eds.). Vol. 1. Los Angeles, MUI Press, 1974, USA.

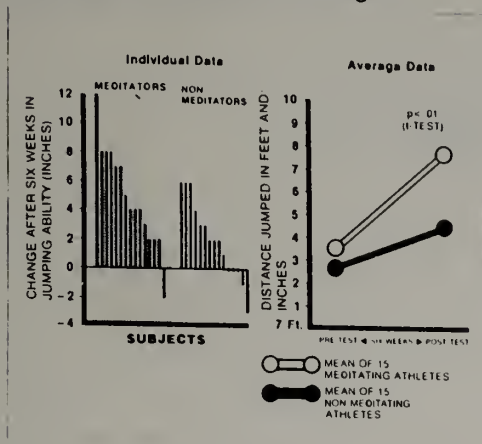
### Improved Athletic Performance I



Athletes instructed in Transcendental Meditation improved their running times in the 50 meter dash by 12 seconds whereas control subjects only improved by 01 seconds over the same training period. This result indicates that Transcendental Meditation promotes the holistic development of mind-body coordination along with muscular flexibility and integration.

Reference: Reddy M.K. The Effects of Transcendental Meditation on Athletic Performance. A.P. Sports Council Lal Bahadur Stadium, Hyderabad, India.

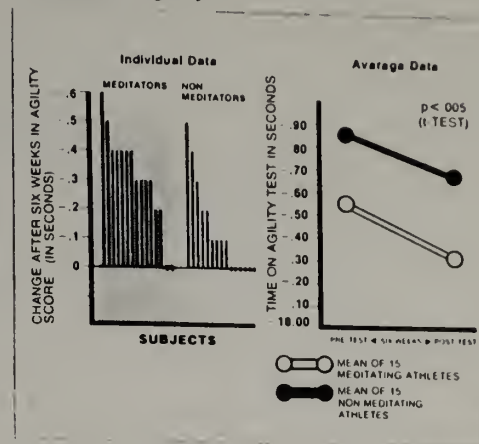
### Improved Athletic Performance II: Improved Neuromuscular Integration



Skill in jumping demands a high level of neuromuscular integration, the ability to focus one's attention and energies allowing for coordinated relaxation and contraction of specific muscle groups (spontaneous neuromuscular discrimination), good judgment, and balance. Athletes were tested on the standing broad jump before and after six weeks of general pre-seasonal training. Those athletes who began and regularly practiced Transcendental Meditation during the six-week period showed significantly greater improvement on the standing jump than non-meditating control subjects. This experiment along with the experiments referred to below indicates a holistic development of the entire physiology of action through the practice of Transcendental Meditation: faster reaction (Chart 15), superior perceptual-motor performance (17), improved perceptual acuity (16), improved ability to concentrate (29), improved stability of the autonomic nervous system (13, 14), increased agility (60).

Reference: Reddy, M. K., "The Effects of Transcendental Meditation on Athletic Performance," A. P. Sports Council, Lal Bahadur Stadium, Hyderabad, India

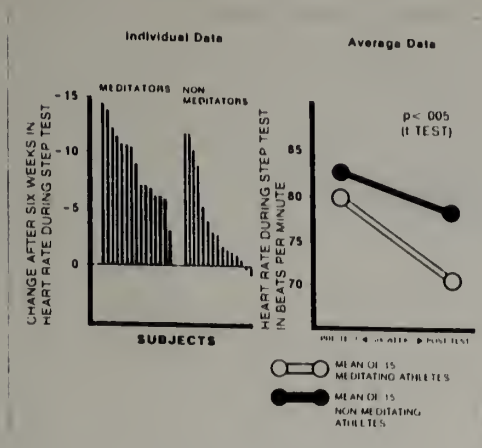
### Improved Athletic Performance III: Increased Agility



In this test of agility, the athletes were timed on their speed around a course of five poles. After six weeks of general training along with Transcendental Meditation, meditating athletes improved significantly more than the non-meditating athletes of the control group undergoing the same pre-seasonal training. This test shows that Transcendental Meditation contributes significantly to the development of speed, coordination, balance, and presence of mind.

Reference: Reddy, M. K., "The Effects of Transcendental Meditation on Athletic Performance," A. P. Sports Council, Lal Bahadur Stadium, Hyderabad, India

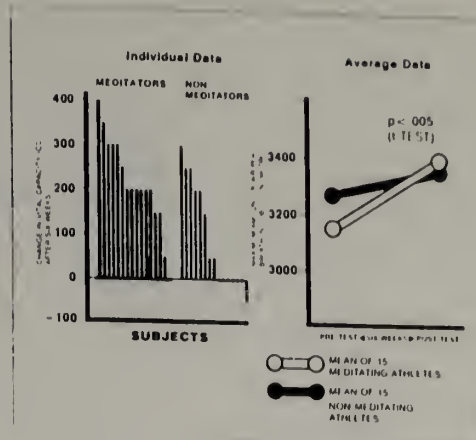
### Improved Cardiovascular Efficiency



The heart rate of athletes was measured during standardized physical activity – the step test. After six weeks of Transcendental Meditation, meditators showed a significantly lower heart rate during activity, indicating a marked improvement in cardiovascular efficiency. Cardiovascular efficiency means that the heart does less and accomplishes more – it accomplishes the work of nourishing the tissues and maintains a greater reserve capacity for emergency situations. This experiment in conjunction with Charts 3 and 11 shows that the cardiovascular efficiency gained during Transcendental Meditation is maintained after meditation during both rest and vigorous activity.

Reference: Reddy, M. K., "The Effects of Transcendental Meditation on Athletic Performance," A.P. Sports Council, Lal Bahadur Stadium, Hyderabad, India

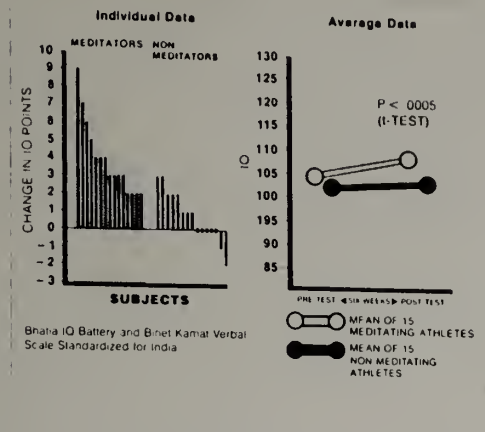
### Increased Vital Capacity



Athletes were measured on vital capacity (the maximum amount of air they could exhale in one breath) before and after six weeks of general training. Those athletes who practiced Transcendental Meditation increased significantly more on vital capacity than the non-meditators of the control group. The ability to take in and exhale more air indicates increased resiliency and elasticity of the tissues and increased strength of the respiratory muscles. This ability, along with the increased cardiovascular efficiency (Chart 61) indicates a great extension of the range of physiological adaptability in meditators. The cardiorespiratory efficiency indicated in this experiment and in Chart 61 is the most significant factor in athletic endurance.

Reference: Reddy, M. K., "The Effects of Transcendental Meditation on Athletic Performance," A.P. Sports Council, Lal Bahadur Stadium, Hyderabad, India

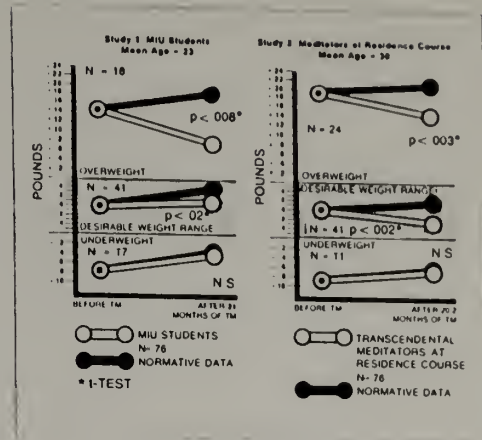
## Increased Intelligence in Athletes



IQ tests were administered to 30 athletes before and after six weeks of preseason training. Of these, 15 regularly practiced Transcendental Meditation and 15 did not. Retesting at the end of preseason training showed that the IQ of the meditating athletes increased significantly more than that of the non-meditating athletes. This experiment was performed at the same time on the same athletes who improved in cardiorespiratory efficiency and athletic performance. The experiment shows that the holistic physiological improvement indicated by Charts 58-62 is also demonstrated in the holistic psychological development of the athletes, indicated as more refined intellectual functioning. The refinement and enrichment of the physiological and psychological faculties shown by these results demonstrates the holistic development of the individual.

Reference: Bai, L. "The Effects of Transcendental Meditation on Intelligence and Personality in Athletes," Lal Bahadur Stadium, Hyderabad, India

## Normalization of Weight



Transcendental Meditation was found to produce a significant and enduring normalization of weight in two studies. Statistics of meditators were compared with statistics from a major life insurance company and the following facts were found:

1. Overweight meditators tended to lose significant amounts of weight, becoming closer in weight to the desirable weight range.
2. Meditators in the desirable weight range tended to maintain their weight, whereas adults usually gain about one pound every year.
3. Underweight meditators gained a normal amount of weight over time approaching desirable weight.

The weight range was determined to be desirable on the basis of longevity and morbidity data by the life insurance company (Overweight individuals tend to have a shorter life expectancy.) The tendency of weight to normalize in meditators has profound implications for maintaining good health and enjoying a longer life.

Reference: Weldon, J. T. and A. Aron. "Weight Change with Age and Transcendental Meditation," *Scientific Research on Transcendental Meditation. Collected Papers*. Orme Johnson, D. W., L. Domash and J. Farrow (Eds.), Vol. 1, Los Angeles, MIU Press, 1974, USA

APPENDIX C

LIST OF EDUCATIONAL INSTITUTIONS  
OFFERING THE TM PROGRAM



A partial list of secondary schools where courses in the Transcendental Meditation program have been taught to date:

San Lorenzo High School, San Lorenzo, Ca., 1974-75 school year

Institute for Living High School, Hartford, Ct., 1972 spring, 1975 fall

Bulkeley High School, George J. Penney High School, Watkinson School, and East Hartford High School  
Jan. 1974-June 1975

Four Dade County, Miami high schools (fall 1972-spring 1975)

Lenox Memorial High School, Pittsfield, Mass., spring 1975-spring 1976

The Pingrey School, Elizabeth, N.J., Sept. 1972-present.

Narragansett Public Schools, Narragansett, Rhode Island, fall 1974-June 1975

Eastside, Columbia, Union Hill and West New York Memorial High, New Jersey, 1975-76

SOURCE: Institute for the Advancement of Education in Affiliation with Maharishi International University, 17310 Sunset Boulevard, Pacific Palisades, California, May 21, 1976.

The following is a list of college level, adult education, and extension division SCI courses given on-campus to date:

COLLEGE LEVEL

ANTIOCH COLLEGE (Yellow Springs, Ohio)  
Introduction to the Science of Creative Intelligence,  
Philosophy Department,  
Spring 1974 - 5 credits

ATLANTIC COMMUNITY COLLEGE (Mays Landing, New Jersey,  
Introduction to the Science of Creative Intelligence,  
Spring 1973

BOSTON COLLEGE (Chestnut Hill, Massachusetts)  
Science of Creative Intelligence, Psychology Department,  
Spring 1975 - 3 credits

CALIFORNIA SCHOOL OF PROFESSIONAL PSYCHOLOGY (Fresno, Calif.)  
Beyond Waking, Sleeping and Dreaming, Humanities series  
of Psychology Program,  
Summer 1975 - 2 credits

CALIFORNIA LUTHERAN COLLEGE (Thousand Oaks, California)  
Transcendental Meditation and the Science of Creative  
Intelligence, Philosophy Department,  
Winter 1974 - 4 credits

CALIFORNIA STATE UNIVERSITY, CHICO (Chico, California)  
Personal Dynamics to Mental Health through the Science of  
Creative Intelligence, Health Science Department,  
Spring 1973 - 1 credit

CHICO STATE COLLEGE (Chico, California)  
Science of Creative Intelligence, Department of Education,  
Spring 1972 - 2 credits

CITY UNIVERSITY OF NEW YORK, LEHMAN COLLEGE (New York, N.Y.)  
Introduction to the Science of Creative Intelligence,  
Experimental Program of the Office of the Dean of Students,  
Winter 1972-73

COLUMBIA COLLEGE (Chicago, Illinois)  
Transcendental Meditation and the Science of Creative  
Intelligence,  
Spring 1974 - 2 credits

DOMINICAN COLLEGE (San Rafael, California)  
Introduction to the Science of Creative Intelligence,  
Graduate School of Education,  
Fall 1972 - 2 semester hours

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June 1975

DOMINICAN COLLEGE (San Rafael, California)  
Transcendental Meditation and An Introduction to the Science  
of Creative Intelligence, In-Service Series,  
Spring 1974 - 2 credits

DRAKE UNIVERSITY (Des Moines, Iowa)  
SCI: A Theoretical and Practical Inquiry into the  
Potentialities of Human Consciousness, New College,  
Spring 1973 - 2 credits

EL CAMINO COMMUNITY COLLEGE (Gardena, California)  
Introduction to the Science of Creative Intelligence,  
Fall 1973

GODDARD COLLEGE (Plainfield, Vermont)  
The Science of Creative Intelligence,  
Spring 1973 - 5 credits

HARVARD UNIVERSITY (Cambridge, Massachusetts)  
Science of Creative Intelligence, Interdepartmental,  
Spring 1973 - all 1-semester courses receive 1/2 course credit

HARVARD UNIVERSITY (Cambridge, Massachusetts)  
Transcendental Meditation and Western Philosophy,  
Fall 1973

HAWAII LOA COLLEGE (Kaneohe, Hawaii)  
Seminar in the Growth of Consciousness,  
Summer 1975 - 4 credits

HUMBOLDT STATE COLLEGE (Arcata, California)  
Science of Creative Intelligence, Creative Arts and  
Humanities,  
Summer 1971 and 1972 - 4 credits

KENT STATE UNIVERSITY (Warren, Ohio)  
Introduction to the Science of Creative Intelligence,  
Trumbull Campus,  
Spring 1973

LOUISIANA STATE UNIVERSITY (Baton Rouge, Louisiana)  
Science of Creative Intelligence,  
Fall 1971

LOUISIANA STATE UNIVERSITY (Baton Rouge, Louisiana)  
Science of Creative Intelligence, Provost's course,  
Spring 1974 - 2 credits

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MACALESTER COLLEGE (Saint Paul, Minnesota)  
Potentialities of Consciousness: Toward a Science of  
Creative Intelligence, Philosophy Department,  
Winter 1964 - 1 credit

MARYVILLE COLLEGE (Maryville, Tennessee)  
Science of Creative Intelligence, Faculty Elective,  
Winter 1972 - 3 credits

MIAMI DADE JUNIOR COLLEGE (Miami, Florida)  
Science of Creative Intelligence,  
Winter 1972 - 3 credits

NATHANIEL HAWTHORNE COLLEGE (Antrim, New Hampshire)  
Science of Creative Intelligence, Philosophy Department,  
Spring 1974 - 3 credits

NEW SCHOOL FOR SOCIAL RESEARCH (New York, New York)  
Science of Creative Intelligence,  
Spring 1972 - 3 credits

NORMANDALE JUNIOR COLLEGE (Minneapolis, Minnesota)  
Introduction to the Science of Creative Intelligence,  
Fall 1973

NORTHEASTERN ILLINOIS UNIVERSITY (Chicago, Illinois)  
Seminar on Creative Intelligence, Humanities Department  
Fall 1973 - 4 credits

NOTRE DAME COLLEGE (Manchester, New Hampshire)  
Science of Creative Intelligence, Humanities Department,  
Fall 1973 - 4 credits

RICHLAND COLLEGE (Dallas, Texas)  
Introduction to the Science of Creative Intelligence,  
Community Services Program,  
Spring 1973

SACRAMENTO STATE COLLEGE (Sacramento, California)  
Science of Creative Intelligence, Interdisciplinary Studies,  
Spring and Fall 1971 - 3 credits

SAINT MARY'S COLLEGE (St. Mary's City, Maryland)  
Introduction to the Science of Creative Intelligence,  
Independent Colloquium,  
Fall 1973

SONOMA STATE COLLEGE (Rohnert Park, California)  
Potentialities of Consciousness: Toward a Science of  
Creative Intelligence, Hutchins School of Liberal Studies,  
Spring 1975 - 3 credits



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SOUTHAMPTON COLLEGE (Long Island, New York)  
Science of Creative Intelligence, Department of Natural  
Science,  
Intersession 1973 - 1/2 course credit

SOUTHERN ILLINOIS UNIVERSITY (Carbondale, Illinois)  
Introduction to the Science of Creative Intelligence:  
Knowledge and Evolution  
Fall 1975 - 3 credits

STANFORD UNIVERSITY (Palo Alto, California)  
A Vision of Possibilities, Interdepartmental Series,  
Winter 1970 - 3 credits

TEXAS CHRISTIAN UNIVERSITY (Fort Worth, Texas)  
Science of Creative Intelligence, Special Courses Division,  
Fall 1973

UNIVERSITY OF ALASKA (Anchorage, Alaska)  
Science of Creative Intelligence, Department of Philosophy,  
Fall 1973 - 3 credits

UNIVERSITY OF CINCINNATI (Cincinnati, Ohio)  
Introduction to the Science of Creative Intelligence,  
Department of Psychology,  
Winter and Spring 1973 - 3 credits

UNIVERSITY OF COLORADO (Boulder, Colorado)  
Creative Intelligence and the Evolving Universe, Experi-  
mental Studies,  
Winter 1971

UNIVERSITY OF ILLINOIS (Urbana, Illinois)  
Science of Creative Intelligence, Higher Education Department,  
January-May 1974 - 3 credits

UNIVERSITY OF ILLINOIS (Urbana, Illinois)  
Music and Consciousness (as viewed in SCI),  
Spring 1975

UNIVERSITY OF KANSAS (Lawrence, Kansas)  
Introduction to the Science of Creative Intelligence,  
Liberal Arts and Sciences,  
Fall 1973 - 3 credits

UNIVERSITY OF LOUISVILLE (Louisville, Kentucky)  
Introduction to the Science of Creative Intelligence,  
Philosophy Department,  
Fall 1973 - 3 credits



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UNIVERSITY OF OREGON (Eugene, Oregon)  
Introduction to the Science of Creative Intelligence,  
Architecture and Allied Arts,  
Spring 1973 - 2 credits

UNIVERSITY OF VIRGINIA (Charlottesville, Virginia)  
Science of Creative Intelligence,  
Fall 1971 - 3 credits

UNIVERSITY OF WISCONSIN (Madison, Wisconsin)  
An Introduction to the Science of Creative Intelligence,  
Education Department,  
Fall 1973 - 3 credits

UNIVERSITY OF WISCONSIN (Milwaukee, Wisconsin)  
Introduction to the Science of Creative Intelligence,  
Spring 1974 - 2 credits

WEST GEORGIA COLLEGE (Carrollton, Georgia)  
Psychology of Fulfillment, Humanistic Psychology Department  
Fall 1973 - 5 credits

WESTERN NEVADA COMMUNITY COLLEGE (Reno, Nevada)  
Introduction to the Science of Creative Intelligence,  
Philosophy Department,  
Spring and Fall 1973 - 3 credits

YALE UNIVERSITY (New Haven, Connecticut)  
Potentialities of Consciousness: Toward a Science of  
Creative Intelligence, Calhoun College,  
Fall 1972 - 1 credit

YALE UNIVERSITY (New Haven, Connecticut)  
Potentialities of Consciousness: Toward a Science of  
Creative Intelligence, Saybrook College,  
Fall 1971 - 2 credits

YORK UNIVERSITY (Toronto, Ontario, Canada)  
Science of Creative Intelligence,  
Fall 1971 - 1 credit

YUBA COMMUNITY COLLEGE (Marysville, California)  
Introduction to the Science of Creative Intelligence,  
Psychology Department,  
Spring 1974 - 3 credits

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ADULT/CONTINUING EDUCATION, EXTENSION DIVISION

Atlantic Community College - Mays Landing, New Jersey  
 Berkshire Community College - Pittsfield, Massachusetts  
 Bunker Hill Community College - Charlestown, Massachusetts  
 Central Piedmont Community College - Charlotte, North  
 Carolina  
 Central YMCA Community College - Chicago, Illinois  
 Cerritos Community College - Norwalk, California  
 Colorado Mountain College - Glenwood Springs, Colorado  
 Cypress College - Cypress, California  
 Dade Community College North - Miami, Florida  
 Des Moines Adult Education - Des Moines, Iowa  
 Dutchess Community College - Poughkeepsie, New York  
 Edinboro State College - Edinboro, Pennsylvania  
 Edmonton Adult Education - Edmonton, Alberta, Canada  
 Exeter Township High School - Reading, Pennsylvania  
 Fairfield Adult Education - Fairfield, Connecticut  
 Francis W. Parker School - Chicago, Illinois  
 Georgia Southern College - Statesboro, Georgia  
 Grand Rapids Junior College - Grand Rapids, Michigan  
 Hartnell College - Salinas, California  
 Indiana State University - Terre Haute, Indiana  
 Jamestown Community College - Jamestown, New York  
 Kingston Collegiate and Vocational Institute - Kingston,  
 Ontario, Canada  
 Louisiana State University - Baton Rouge, Louisiana  
 Margate Jewish Community Center - Margate, New Jersey  
 Marygrove College - Detroit, Michigan  
 Massasoit Community College - Brockton, Massachusetts  
 Memphis State University - Memphis, Tennessee  
 Metropolitan State Junior College - Minneapolis, Minnesota  
 Miami Dade Community College - Miami Beach, Florida  
 Miami Springs Community School - Miami Springs, Florida  
 Middle Township Adult Education - Middle Township, New  
 Jersey  
 Montclair Adult School - Montclair, New Jersey  
 Mount Diablo Evening School - Concord, California  
 North Miami Beach Community Education - North Miami Beach,  
 Florida  
 North Shore Community College - Beverly, Massachusetts  
 Northern Orange County Community College District -  
 Fullerton, California  
 Northwestern Michigan College - Traverse City, Michigan  
 Olney Central College - Olney, Illinois  
 Olympia Voc-Tec Institute - Olympia, Washington  
 Palomar Junior College - San Marcos, California  
 Rancho Santiago Community College District - Orange,  
 California

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Rollins College, Winter Park, Florida  
Roseville Adult Education - Roseville, Minnesota  
Rutherville Adult School - Rutherford, New Jersey  
Saint Mary's College - Moraga, California  
Saint Xaviers College - Chicago, Illinois  
San Ramon Unified Adult School - San Ramon, California  
Santa Barbara Adult Education - Santa Barbara, California  
Sauk Valley College - Dixon, Illinois  
Thomas More College - Fort Mitchell, Kentucky  
Thornwood Adult School - South Holland, Illinois  
University of California - Berkeley, California  
University of California - Los Angeles, California  
University of Maryland - College Park, Maryland  
University of Miami - Miami, Florida  
University of Montana - Missoula, Montana  
University of Utah - Salt Lake City, Utah  
University of Wisconsin - Green Bay, Wisconsin  
University of Wisconsin - Madison, Wisconsin  
University of Wisconsin - Milwaukee, Wisconsin  
The University of Wisconsin - Parkside, Wisconsin  
University of Wisconsin - Waukesha, Wisconsin  
Urbandale Adult Education - Urbandale, Iowa  
Vancouver Community Education - Vancouver, B.C., Canada  
Victoria Composite High School - Edmonton, Alberta

SOURCE: Institute for the Advancement of Education in  
Affiliation with Maharishi International University, 17310  
Sunset Boulevard, Pacific Palisades, California, June 1975.

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Proposed College Level SCI Courses for Fall 1975

ATLANTA COLLEGE OF ART (Atlanta, Georgia)  
The Science of Creative Intelligence; General Studies; Fall  
Gene Spiegel

GREEN RIVER COMMUNITY COLLEGE (12401 SE 320th, Auburg,  
Washington 98002)  
Continuing Education; September to December; 0 Credits

HIGHLINE COMMUNITY COLLEGE (South 240th and Pacific Highway  
South, Midway, Washington 98301)  
Community Services; September to December; 0 Credits

NORTHWESTERN MICHIGAN COLLEGE (E. Front Street, Traverse  
City, Michigan 49684)  
Community Service Program; September 29 to December 1; 0-  
1½ credits  
Henry Clark, J. Hemalatha, Susan Round

SOUTHERN ILLINOIS UNIVERSITY (Carbondale, Illinois 62901)  
Introduction to the Science of Creative Intelligence:  
Knowledge and Evolution; Philosophy or Philosophy of Educa-  
tion; Fall; 3 Credits  
Chris Kapilla or Jim Davis

TANANA VALLEY COMMUNITY COLLEGE-CONSTITUTION HALL (Univer-  
sity of Alaska, Fairbanks, Alaska 99701)  
Science of Creative Intelligence; Special Interest; October  
15 to December 17; 3 Credits  
Helen Nelson

UNIVERSITY OF MISSOURI-COLUMBIA (Columbia, Missouri)  
Towards a Science of Creative Intelligence; Honors - College;  
August 25 to December 17; 3 Credits  
Kenneth Chandler, Ph.D.

Proposed Adult/Continuing Education SCI Courses for Fall 1975

BUNKER HILL COMMUNITY COLLEGE (Rutherford Ave., Charleston,  
Mass. 02129)  
Introduction to TM and SCI; Night School, Continuing Educa-  
tion; September to November  
Michael Dawson



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JAMESTOWN COMMUNITY COLLEGE (Falconer St., Jamestown, N.Y.  
14701)

Transcendental Meditation: Principles and Possibilities;  
Modular (Mini) Course Program; October 17 to December 18;  
1, 2, or 3 credits  
George Wolfe

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APPENDIX D

STATISTICAL PROCEDURE: ANALYSIS  
OF COVARIANCE

## STATISTICAL PROCEDURE: ANALYSIS OF COVARIANCE

The analysis of covariance (CANOVA) is a statistical procedure used to test hypotheses involving comparisons between the means of two or more groups that are functions of one or more variables. In this study, pretest scores were used as a covariant. The technique was appropriate for this study because it allowed for differences between two intact groups. This statistical procedure made allowances for variations that could be attributable to anything other than the methods (i.e., the practice of the Transcendental Meditation technique and guidance), as chance variations (e.g., guessing), individual variations (e.g., intelligence), and errors in measurement.

The analysis of covariance uses the regression procedure to predict the final status of the groups on the research variables on the basis of those initial variations. The procedure then identifies the variations beyond that attributable to the initial differences. The analysis of variance procedure is then used to test how much the variation differs significantly within each separate group and

between subjects within the groups. Variance is the square of the standard deviation.

Theoretically, if the differences attributable to the methods were significantly greater than the variations attributable to chance, individual or errors in measurement, then we would consider the methods to have had different effects. This is based on the variation between Ss within groups being significantly greater than the variation within Ss within groups.

While in this study there were significant differences on the three measures of the Personal Orientation Inventory (POI), Other/Inner (O/I), Self-Regard (Sr), and Acceptance of Aggression (A), the differences were not significant on the Gray Tests of Oral Reading (Gray) and the Wide Range Achievement Test, Arithmetic (WRAT). The statistical results of those measures are summarized on the following pages.

CANOVA  
Component Analysis of Variance  
Including  
Multivariate Analysis of Variance

Problem 1: 1 Factor, 10 Variables

Factor G 2 Levels

Deviation Contrasts

Input Variables

POI I/O PRE POI SR PRE POI A PRE POI I/O POST POI SR PST

POI A POST GRAY PRE GRAY POST WRAT PRE WRAT POST

Analysis of 1 Criteria and 1 Covariate

POI I/O POST POI I/O PRE

Format of Data Cards

(T42, I1, T10, 3F3, 0, 1X, 3F3.0, 2F2.0, 2F3.0)

2 Cells

TABLE 6  
MEANS AND STANDARD DEVIATIONS

Factor	Variable	POI I/O Pre	POI Sr Pre	POI A Pre	POI I/O Post
G					
1* 16 Obs.					
	M	67.938	10.250	12.375	81.500
	SD	8.767	2.206	3.423	10.875
2** 20 Obs.					
	M	69.300	10.050	13.700	71.750
	SD	6.578	2.064	2.975	6.265

\*Denotes experimental group (meditators). \*\*Denotes control group (guidance).



TABLE 6 -- Continued

Factor	Variable				
	POI Sr Post	POI A Post	Gray Pre	Gray Post	
G					
1	16 Obs.				
	M	12.313	16.813	6.063	6.500
	SD	2.726	3.391	1.389	1.673
2	20 Obs.				
	M	9.450	14.500	6.000	6.250
	SD	2.012	3.103	1.835	1.860

TABLE 6 -- Continued

Factor	G	Variable		
		WRAT Pre	WRAT Post	
1	16 Obs.			
	M	14.188	16.313	
	SD	2.136	2.869	
2	20 Obs			
	M	14.450	15.750	
	SD	3.069	4.822	

Cell 1

Raw Regression Coefficients

Variates

Covariates      POI I/O Post

POI I/O Pre      1.177

Cell 2

Raw Regression Coefficients

Variates

Covariates      POI I/O Post

.773

TABLE 7  
 TEST OF EQUALITY OF REGRESSION  
 IN ALL CELLS  
 POI I/O

Source	ss	df	MS	F	P Less Than
Within Cells	432.552	32	13.517		
Regression	78.192	1	78.192	5.785	.022
Within Cells	510.744	33	15.477		
Regression	2009.006	1	2009.006	129.805	.001
G*	1090.854	1	1090.854	70.482	.001

\*Contrasts between groups.

Estimates Adjusted for 1 Covariate

Criteria

Contrast                      POI I/O Post

G

1                              5.562

Raw Regression Coefficients

Covariates                      Within Cells

POI I/O Pre                      1.009

Component Analysis of Variance

Problem    1 Reanalysis    1 with the Following    1 Criteria and 1 Covariate

POI I/O Post                      POI I/O Pre

Special Order of Effects

Criteria

Contrast                      POI I/O Post

WG

1                              82.263

2                              71.139



Problem 2 1 Factor 10 Variables

Cell 1

Raw Regression Coefficients

Variates

Covariates POI Sr Post

POI Sr Pre .928

Cell 2

Raw Regression Coefficients

Variates

Covariates POI Sr Post

POI Sr Pre .464

TABLE 8  
 TEST OF EQUALITY OF REGRESSION  
 IN ALL CELLS  
 POI Sr

Source	ss	df	MS	F	P Less Than
Within Cells	108.092	32	3.378		
Regression	8.272	1	8.272	2.449	.127
Within Cells	116.364	33	3.526		
Regression	72.024	1	72.024	20.426	.001
G*	65.887	1	65.887	18.685	.001

\*Contrasts between groups.

Estimates Adjusted for 1 Covariate

Criteria

Contrast      POI Sr Post

G

1              1.363

Raw Regression Coefficients

Covariates      Within Cells

.684

Component Analysis of Variance

Problem      2 Reanalysis      1 with the Following      1 Criteria and Covariate

POI Sr Post      POI Sr Pre

Special Order of Effects

Estimates Adjusted for 1 Covariate

Criteria

Contrast      POI Sr Post

WG

1              12.237

2              9.511

Problem 3    1 Factor    10 Variables

Cell 1

Raw Regression Coefficients

Variates

Covariates    POI A Post

POI A Pre    .922

Cell 2

Raw Regression Coefficients

Variates

Covariates    POI A Post

POI A Pre    .785

TABLE 9  
 TEST OF EQUALITY OF REGRESSION  
 IN ALL CELLS  
 POI A

Source	ss	df	MS	F	P Less Than
Within Cells	102.290	32	3.197		
Regression	1.630	1	1.630	.510	.480
Within Cells	103.920	33	3.149		
Regression	251.518	1	251.518	79.870	.001
G*	100.948	1	100.948	32.056	.001

\*Contrasts between groups.



Estimates Adjusted for 1 Covariate

Criteria

Contrast            POI A Post

G

1                    1.723

Raw Regression Coefficients

Covariates            Within Cells

POI A Pre            .855

Component Analysis of Variance

Problem 3 Reanalysis 1 with the Following 1 Criteria and 1 Covariates

POI A Post            POI A Pre

Special Order of Effects

Estimates Adjusted for 1 Covariate

Criteria

Contrast            POI A Post

WG

1                    17.442

2                    13.996

Problem 4 1 Factor 10 Variables

Cell 1

Raw Regression Coefficients

Variates

Covariates Gray Post

Gray Pre 1.054

Cell 2

Raw Regression Coefficients

Variates

Covariates Gray Post

Gray Pre .937

TABLE 10  
 TEST OF EQUALITY OF REGRESSION  
 IN ALL CELLS  
 GRAY

Source	ss	df	MS	F	P Less Than
Within Cells	19.353	32	.605		
Regression	.270	1	.270	.447	.508
Within Cells	19.624	33	.595		
Regression	88.126	1	88.126	148.198	.001
G*	.318	1	.318	.535	.470

\*Contrasts between groups.

Estimates Adjusted for 1 Covariate

Criteria

Contrast      Gray Post

G

1                      .095

Raw Regression Coefficients

Covariates      Within Cells

Gray Pre                      .974

Component Analysis of Variance

Problem      4 Reanalysis      1 with the Following      1 Criteria and 1 Covariate

Gray Post      Gray Pre

Special Order of Effects

Estimates Adjusted for 1 Covariate

Criteria

Contrast      Gray Post

WG

1                      6.466

2                      6.277

Problem 5 1 Factor 10 Variables

Cell 1

Raw Regression Coefficients

Variates

Covariates WRAT Post

WRAT Pre WRAT Post

1.024

Cell 2

Raw Regression Coefficients

Variates

Covariates WRAT Post

WRAT Pre 1.180



TABLE 11  
 TEST OF EQUALITY OF REGRESSION  
 IN ALL CELLS  
 WRAT

Source	ss	df	MS	F	P Less Than
Within Cells	244.081	32	7.628		
Regression	1.216	1	1.216	.159	.692
Within Cells	245.298	33	7.433		
Regression	319.890	1	319.890	43.035	.001
G*	6.573	1	6.573	.884	.354

\* Contrasts between groups.

## Estimates Adjusted for 1 Covariate

## Criteria

Contrast	WRAT Post
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G	1	.430
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## Raw Regression Coefficients

Covariates	Within Cells
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WRAT Pre	1.137
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## Component Analysis of Variance

Problem 5 Reanalysis 1 with the Following 1 Criteria and 1 Covariate

WRAT Post	WRAT Pre
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## Estimates Adjusted for 1 Covariate

## Criteria

Contrast	WRAT Post
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WG	1	16.478
	2	15.617

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