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**TESTING AND DEVELOPING HOLISTIC INTELLIGENCE IN  
CHINESE CULTURE WITH MAHARISHI'S VEDIC PSYCHOLOGY:  
THREE EXPERIMENTAL REPLICATIONS USING  
TRANSCENDENTAL MEDITATION**

**So Kam-Tim**

**A Dissertation**

**Submitted to the Graduate School of Maharishi International University  
in partial fulfillment of the requirements for the degree of**

***DOCTOR OF PHILOSOPHY***

**June, 1995**

**Dissertation Supervisor: Professor David Orme-Johnson**

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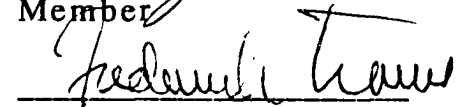
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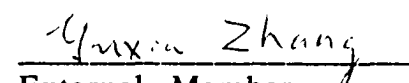
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Dissertation Supervisor

  
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Member

  
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**This dissertaion is dedicated to the  
all-pervading intelligence which brings about evolution in  
nature.**

**Also to my teachers, especially David Orme-Johnson,  
to my beloved father and mother,  
and to all the lovers of intelligence, as my guest.**

**And most especially, to our most intelligent teacher,  
His Holiness Maharishi Mahesh Yogi.**

*Veda is a field of life energy. In India, it is called Veda; in China, it is called Qi. They both have a common origin. Veda is not Indian, it is univereal. Today, the barrier of Himalaya breaks down. The two eternal sources, China and India, must be unified in one tradition based on Natural Law.*

*--Maharishi Mahesh Yogi*

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## ABSTRACT

Modern psychology defines intelligence as the ability to learn, reason, adapt, and efficiently accomplish tasks. This dissertation extended this view to the Chinese tradition of holistic intelligence as seen from Maharishi's Vedic Psychology. Maharishi Vedoc Psychology posits a universal source called pure intelligence at the basis of personality and nature, which is called the *Tao* in the Chinese tradition.

This dissertation tested the hypothesis that enlivening the holistic source of pure intelligence/*Tao* by Maharishi's Transcendental Meditation (TM) program develops holistic intelligence, optimizing all aspects of mental functioning and personality. Holistic intelligence was operationalized by six culture-fair tests: Test of Creative Thinking (TCT-DP); Constructive Thinking Inventory (CTI); Spielburger's State-Trait Anxiety Inventory (STAI); Inspection Time (IT); Cattell's Culture Fair Intelligence Test (CFIT); Group Embedded Figures Test (GEFT), which respectively measure creativity; practical intelligence; anxiety (experiential intelligence); neural efficiency (physiological intelligence); fluid intelligence; and field independence (contextual intelligence).

Three randomized, blind, controlled studies (6-12 months) were conducted with 363 Chinese students, mean age 14.5-17.5. The first study compared TM with Napping, and no-interest subjects. The second study compared TM with Contemplation technique, and control. The third study compared TM with control.

The emergence of 5 to 6 distinct components from factor analyses supported that multiple intelligences exist. MANCOVA showed that the TM groups increased multiple intelligences

significantly more than controls in three studies. For the three studies combined, the TM groups improved more than controls on all tests: TCT-DP ( $p < .000000008$ ); CTI ( $p < .00009$ ); STAI ( $p < .00001$ ); IT ( $p < .0003$ ); CFIT ( $p < .001$ ); GEFT ( $p < .00000004$ ). The effect sizes were largest on measures associated with deeper levels of mind, creativity (.77), anxiety (.63), field independence (.58), practical intelligence (.5), inspection time (.46), fluid intelligence (.4); MANCOVA showed that TM increased holistic intelligence more than Contemplation ( $p < .000001$ ) or Napping ( $p < .000045$ ).

These findings confirmed that intelligence is *holistic* and can be developed through regular experience of pure intelligence/*Tao* through Maharishi's Transcendental Meditation program. They confirm that TM has the ability to simultaneously improve a broad range of mental abilities which has a far-reaching impact on the field of intelligence and education.

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## PART ONE: INTRODUCTION AND SIGNIFICANCE

### CHAPTER 1

#### INTRODUCTION

Intelligence may simply be defined as "orderliness" (Maharishi, 1972; also see Forem, 1976; Cranson, 1989, in press; and Sternberg, 1982). Orderliness implies purposeful activities toward a goal (Maharishi, 1972, 1974, 1963, 1967; also see Wechsler, 1958; Forem, 1976; Orme-Johnson, 1987; Truch, 1977; Campbell, 1975). Granted this simple definition of intelligence, this dissertation sets out with the *purpose* to present a more *holistic* study of intelligence and creativity from both the traditional Chinese perspective and the Vedic tradition of India brought to light by Maharishi Mahesh Yogi (e.g. 1969).

To be holistic, the knowledge of intelligence has to be comprehensive. A comprehensive study of human intelligence would have to include at least the following five necessary conditions: (1) it should explain the source of intelligence as well as the very essence that constitutes the full spectrum of intelligence; (2) it should be linked with consciousness to account for psychological phenomena and mental processes, including thought and feelings; (3) it should not be separate from, but be integrated with, the behavior of everyday situations; and (4) the theory of intelligence should be testable.

In addition to these four theoretical conditions as significant parts of a testable theory, a fifth condition may be added from the

practical point of view, that (5) intelligence should be able to be experienced directly and be developed by making use of this holistic knowledge of intelligence.

While meeting these five conditions of a holistic study of intelligence, this dissertation will also answer the basic questions about intelligence posed since the birth of twentieth century psychology. There are three basic questions posed by psychologists. (1) What is intelligence? (2) How can it be measured? (3) Can it be developed? If so, how? (see Atkinson, Atkinson, Smith, and Hilgard, 1987; Cranson, 1989).

In the discussion of these three basic questions, this dissertation will also help to shed light on two dilemmas which prevail throughout the history of theory and research on intelligence in Western science. The first dilemma is whether there is a single intelligence or multiple intelligences. The second dilemma is whether intelligence is hereditary or environmentally determined, the "nature" versus "nurture" issue.

In discussing these questions and issues, Maharishi's Vedic Psychology, an aspect of Maharishi's Vedic Science, provides the most complete knowledge of intelligence, called the *Veda*. *Veda* means pure knowledge. Pure knowledge means complete knowledge which not only includes the holistic knowledge of human life and the holistic knowledge of nature, but includes the most complete knowledge of both human life and nature as an integrated whole, and the intelligence which underlies and unifies both.

This holistic knowledge of the *Veda* describes how an eternal, uncreated, unified field of universal intelligence, called pure intelligence, spontaneously unfolds itself into multiplicities of creation. In addition, this eternal field of intelligence, which can be located at the most fundamental level of nature and human consciousness, sequentially creates both subjective life and objective existence. At the same time, it structures the whole universe in an orderly way and

displayed as the innumerable laws of nature as well as human intelligence (see Maharishi, 1986, 1994a).

Since the Veda is an eternal, universal reality of all creation both in nature and human life, anyone in any tradition when he or she is fully developed can cognize this very same reality of holistic intelligence. Despite the fact that the same eternal reality may be expressed differently by different "seers" of reality in different traditions, the ultimate truth is the one that can inspire and enlighten their fellowmen to live the same wholeness of life in fulfillment. In India, this eternal intelligence of the Veda has been expressed as thirty-seven aspects of Vedic literature which recorded the sequence of transformations by which the unified field of pure intelligence progressively unfolds the diversified structures of natural law.

In China, the ancient sages have also cognized a similar unified, universal field of intelligence, but they called this eternal reality the *Tao*. In addition, these ancient Chinese sages also gave different expressions to this sequential unfoldment of natural law that structures both nature and human life in terms of symbolic logic, and then recorded it in a book now called *I Ching* (e.g. see Legge, 1969). However, both the Chinese tradition and Maharishi's Vedic Psychology provide a similar holistic knowledge of nature in conceiving that intelligence has a universal basis which spontaneously gives rise to multiple expressions or modes of intelligence in different spheres of existence.

In addition to the similar theoretical perspectives, both the Chinese and the Vedic traditions have practical techniques of various kinds to directly experience and unfold the source and the full range of intelligence in human life. In this dissertation, for example, a Contemplation technique from the Chinese culture and Maharishi's Transcendental Meditation (TM) technique were applied in different studies. The practical application of the techniques will serve to validate the proposed theories on the one hand and to improve the

holistic intelligence of the Chinese students who served as the subjects in the scientific studies on the other.

Furthermore, the practical application and the comprehensive theory of Maharishi's Vedic Psychology will not only explain and clarify the theory and research on intelligence in the history of Western science, but also extend and benefit the concept of intelligence and creativity from the Chinese culture in a more systematic way.

### **The Need and Significance for a Holistic Study of Intelligence in the Chinese Culture**

There is an obvious need for a holistic study of intelligence (e.g. see Cranson, 1989, in press; Caine and Caine, 1991; Sternberg and Wagner, 1986; Sternberg, 1985). There is also a practical need for a scientific investigation of the Chinese tradition of knowledge (e.g. see Redding, 1990, 1986, 1982a, 1982b, 1980; Redding and Ng, 1982; Redding and Richardson, 1986; Needham, 1969, 1956). Furthermore, there has been a lack of research study on the traditional Chinese culture from the universal knowledge of Maharishi's Vedic Science. The results of the "needs" and "lack" thus seem to make the present dissertation not only significant but also imperative. These needs and lack are briefly explained as follows:

#### *A Need for a Holistic Study of Intelligence*

This dissertation addresses probably the most important topic of our time. As Jensen (1979), an internationally renowned psychologist, puts it:

If there is a more important construct in all of psychology, I cannot imagine what it is. The construct of intelligence is

obviously and immensely important--to individuals and to the whole society--educationally, and occupationally, without doubt; and also, I daresay, for the general quality of human life. Its scientific importance goes without saying, for it is only through scientific study that we may gain a better understanding of this most important psychological construct. (p.16)

For such an "obviously and immensely important" construct (also see Cranson, in press), yet, current theorists only have many diverse perspectives on the nature of intelligence (e.g. see Atkinson, Atkinson, Smith, and Hilgard, 1987; Cranson, 1989). Cranson (in press), for example, points out that there are 25 or 30 approaches to the study of intelligence that may be called theories. Almost every psychologist has his own definition of intelligence.

In addition, "as typically defined by psychologists, intelligence is whatever intelligence tests measure" (Klemp and McClelland, 1986, p. 31). Nevertheless, "almost every psychologist agrees that these IQ tests are measures of only *limited* aspects of intelligence in the everyday world, but there is little agreement about what should take their place" (Wagner, 1986, p. 376, *italic added*). The need for a holistic theory and study of intelligence is thus obvious.

To meet the need of our time, Cranson (1989) has spearheaded a holistic assessment of intelligence based on Maharishi's Vedic theory of intelligence. As an extension of his comprehensive study, the present dissertation research will attempt to replicate and even expand the holistic assessment of intelligence in the Chinese culture based on some of his suggestions. In the section on "Implication for Future Research on Intelligence and Consciousness," Cranson asserts:

Perhaps the most obvious need in future research is to focus on the more abstract levels of the mind. The theoretical approach summarized...suggests that changes in ego function and feelings, as well as such abstract intellectual abilities as were measured here, should be investigated...Since Maharishi's Vedic Psychology

considers creativity to be associated with more abstract levels of the mind, i.e., feeling and intellect, it is curious why there was no improvement in the measure of creativity used in this study. It may be that this particular measure, the TTCT [Torrence's Test for Creative Thinking] does not measure the more subtle function of creativity...but rather a function of mental speed...Twentieth century psychologists and educators are becoming increasingly aware of the need for improved measures, and the consensus is that research on such measures has barely begun...In addition to addressing the nature of higher states of consciousness and taking a perspective that comprehends the total range of intelligence, there is an obvious need for measures that more accurately reflect the demands of everyday life on capacities related to intelligence, including creativity and field independence...Some psychologists have already begun to develop measures of "practical" intelligence, which attempt to elicit responses to situations typically encountered in everyday life (Wagner and Sternberg, 1985; Epstein, 1989)...Holistic measures are also needed... (pp. 387-390)

The current dissertation will attempt to fulfill four of the proposed implications. First, by including several different types of psychological test, the research study will attempt to use more holistic measures that are supposed to be able to assess more abstract levels of the mind.

Second, a measure of "practical intelligence," as suggested, will also be incorporated to study one crucial aspect of the Chinese concept of intelligence. Third, a more holistic measure of creativity that is supposed to evaluate both cognitive and affective, and even volitional aspects of creativity, will also be introduced.

Finally, the dissertation will address the nature of higher states of consciousness and compare both the Chinese and Maharishi's Vedic perspectives of intelligence. Both of the theories seem to be capable of comprehending the total range of intelligence as Cranson suggested.



*A Practical Need for a Scientific Investigation of Chinese Intelligence*

If intelligence has a purpose for higher *evolution* (Maharishi, 1972; also see Maharishi, 1963, 1969; Cranson, 1989, in press; Orme-Johnson, 1987, 1974; Forem, 1976; Truch, 1977; Roth, 1987; Campbell, 1973; Campbell, 1975; Sternberg, 1985), then it seems "intelligent" to investigate the truth of intelligence from any tradition that has the longest history of evolution. Which traditions are the most ancient still in existence? The Vedic culture of India is one; the Chinese tradition is certainly another.

In the light of intelligence for the purpose of evolution, the study of the Chinese concept of intelligence can be justified by at least two reasons. First, Maharishi (1969) states that traditions result from righteous and harmonious activities of generations in the direction of evolution. In Maharishi's commentary on the *Bhagavad Gita*, which Maharishi calls the essence of timeless Vedic wisdom of life, and the "textbook of Vedic Psychology", he explains:

'Dharmas', the plural of dharma, signifies the different powers of nature upholding different avenues of the way of evolution. They take expression as specific modes of activity or different ways of righteousness, which keep the whole stream of life in harmony--every aspect of life being properly balanced with every other aspect--and moving in the direction of evolution. As these specific modes of activity are passed on from generation to generation, they form what we call traditions... (p.64)

Second, in addition to explaining the basis of evolution and tradition, Maharishi (1969) also comments on the significance of the continuity of a tradition: "...Nothing that is against evolution lasts long. Therefore the tradition which has survived the ages has certainly proved itself to be the right one, the one nearest to the Truth, which is Life Eternal..." (p. 65)

The Chinese tradition is far from eternal. Yet, with its 5000 years of written history, over 6400 years of legendary record, and over two million years of symbolic record, the Chinese tradition is certainly one of the two most ancient traditions known in existence (see *The World by Heaven's Rule*, 1991; Nan, 1994). If this is the case, it may be logical to infer that there are some underlying truths in Chinese culture that make its continuous tradition possible. Hence, it may be revealing to study intelligence as the Chinese traditionally conceive of it.

A *scientific* investigation of intelligence of the Chinese tradition in a systematic manner, however, has never been done to the investigator's knowledge. This may be due to the fact that the traditional Eastern approaches to knowledge are based on subjective means of gaining knowledge, and thus they have been classified as metaphysical and thereby unscientific.

Maharishi (1972), however, has successfully formulated a new body of knowledge to investigate the ancient Vedic wisdom by the modern scientific approach, namely, the Science of Creative Intelligence (SCI) which has evolved to Maharishi's Vedic Science today. Maharishi explains that knowledge validated by both the subjective means of gaining knowledge of Vedic Science and the objective means of gaining knowledge of modern science becomes "doubly reliable." For this integrated approach to knowledge, the present research will use Maharishi's perspective as a framework for understanding the Chinese concept of intelligence.

In addition, Carl Jung and Richard Wilhelm have also attempted to approach Chinese wisdom by taking it "out of metaphysics" and placing it in "psychological experience" (Wilhelm and Jung, 1931, 1962, p. viii). To Jung, "Science is not, indeed, a perfect instrument, but it is a superior and indispensable one that works harm only when taken as an end in itself..."(p. 82). Hence, what makes the

difference is to use it appropriately: for the method is merely the path, the *direction* taken by a man. It is human intelligence that determines the results. Taking the scientific approach to understand Chinese concept of intelligence thus makes this research more intelligent.

There have been a number of cross-cultural scientific research studies of intelligence on Chinese in the Chinese culture that seem inappropriate or inadequate. All of them have involved some psychometric IQ tests of intellectual intelligence and therefore have the same conceptual inadequacy as brought out in the previous section. For this reason, there is a practical need to assess intelligence from a more holistic perspective. What still better is to assess intelligence from the eye of the traditional Chinese that this dissertation did.

The importance of looking at intelligence from the Chinese perspective also brings out two very fascinating issues related to Western science and worthy of investigating in this dissertation. First, modern Western science has not been developed in the Chinese civilization but only in Europe; however, the Chinese seems to have made many amazing discoveries of nature which have inspired even Western science (see Needham, 1969). For example, Joseph Needham (1969) ,in his decades of monumental scholarship, states that there have been many fundamental scientific inventions and discoveries, such as gunpowder, printing, compass, seismograph, and knowledge of physical laws, coming from China to the West *before* modern Western science began (also see Benfey, 1979).

To further justify this point, Needham (1969: 43, *italic added*) quotes Albert Einstein "in a delightfully cryptic letter" as follows:

Dear Sir

Development of Western Science is based on two great achievements, the invention of the formal logical system (in Euclidian geometry) by the Greek philosophers, and the discovery of the possibility of finding out causal relationships by systematic experiment (Renaissance). In my opinion one need not be astonished that the Chinese sages have not made these steps. The astonishing thing is that these discoveries *were made* at all.

Sincerely yours

Albert Einstein

Einstein, who many recognized as the greatest scientist of the Western tradition in this century, refers "these discoveries" to "the accidental nature of what Graham called the West's discovery of *how to discover*" (Redding, 1990, p. 75). In essence, Einstein means that the Chinese sages had made all these discoveries but without taking the same steps of deductive nomological explanation, logical rigor, and empirical data as Western science takes.

We do not know how accurate Einstein's statement is. But one thing is sure: "...the world of modern science, and especially branches such as nuclear physics and the biochemical study of organisms, have needed a 'tao' in which to work. They have found that the Chinese have already been there (Capra 1975, Zukar 1979)" (Redding, 1990, p. 76). The word 'tao' is the Chinese conception of the totality of nature which also expresses itself into innumerable principles of natural law governing the functioning of everything in creation. The ability of the ancient Chinese in creating 'tao' implies their ability in cognizing and recognizing the patterns of functioning of nature which ultimately implies a remarkable understanding of human intelligence. A more in-depth discussion of 'tao' in relation to expression of intelligence of the Chinese will be presented in Part Three of this dissertation. As far as the extraordinary contributions of the Chinese

to Western science is concerned, this justifies why studying Chinese intelligence is both significant and fascinating.

Naturally, if it is true that the creation of a civilization and discovery of natural law are the achievements of human intelligence, the next logical question raised is: what is the peculiarity of the intelligence of the Chinese tradition that makes these discoveries possible? Two points are again brought out by Needham and Redding which also serve the theoretical basis for this dissertation research.

First, in contrast to Western scientific tradition, the Chinese sought to comprehend the order of nature by fitting everything into a great man-made conceptual scheme. This great scheme, exemplified in the *Book of Changes (I Ching)*, could account for time, space, motion, and life. It was founded on the idea of things as groups of relations, and causation as part of the dynamism between opposites in nature (Needham 1956: 324).

Second is the ideographic nature of the Chinese language in contrast with a phonetic language of the West. Redding (1990) notes:

The graphic language relies for the creation of its components on the medium of the *senses*...that it can be 'seen.' The emergence of purely abstract and non-tangible notions is thus hindered...Further to this, and possibly reinforced by a view of the world perceived essentially through the senses, the Chinese notion of reality tends to be one in which situations are perceived as a *whole*...As Lin Yutang points out, although there is no Cartesian rationality in Chinese science, and although Chinese thinking is holistic, there is nevertheless great value in being able to think about problems as deeply embedded in a *context*. To be able to assess an entire situation and to learn how to accommodate the nuances of influence of many forces, is often far superior to the naive extraction of supposedly key variables and the attempt to link them causally especially in the social world. For the Chinese, 'reasonableness' is superior to 'reason'... (p. 77, italics added).

The peculiar characteristics of "holistic", "contextual", "non-abstract" but "sense-dependent" thought processes of the Chinese brought out here further points to the inappropriateness of those previously used psychometric IQ measures that are supposed to measure mostly abstract, analytical thinking. This thus poses a practical need for a holistic assessment of intelligence of the Chinese proposed in the present dissertation.

*A Lack of Research Study on the Chinese Culture Seen from the Universal Knowledge of Maharishi's Vedic Science*

It has been mentioned previously that Maharishi has successfully formulated Maharishi's Vedic Science by reviving the knowledge of the Vedic culture, the other most ancient tradition in existence, in order to inspire modern science with the most holistic knowledge. With its universal application of the technology of consciousness, Maharishi's Transcendental Meditation program and TM-Sidhi program, Maharishi's Vedic Science has been scientifically shown in over 20 countries with diverse ethnic, social, cultural, economic, and political environments to be able to unfold intelligence from all levels of life. Yet, no research study on the Chinese culture has ever been conducted so far, nor has any psychological study in Eastern Asia.

The present dissertation research will thus further validate the universal nature of the complete knowledge of Maharishi's Vedic Science. Since Maharishi's ultimate goal is to revive the full value of every tradition, to create Heaven on Earth, with the holistic knowledge of Vedic Science (see Maharishi, 1963, 1969, 1976, 1978, 1985, 1986a, 1986b, 1986c), it goes without saying that in the world family the Chinese tradition should be thus revived because it is a vital one. If the mission of the student of Maharishi's Unified Field Based Education is to "bring the (complete) knowledge out," then what will

be a more "intelligent" topic for the investigator who comes from the Chinese tradition than to study the intelligence of the Chinese tradition in the light of Vedic wisdom!

## **Overview**

The following overview of the dissertation, together with the sections on issues, needs and significance presented so far, form Part One of this dissertation. These points discussed in this Chapter One will lay the ground for the subsequent three parts of the presentation.

Chapter Two and Three of Part Two will present an overview of intelligence and its relationship to creativity from the prevailing paradigm of social science. A more expanded vision of intelligence and wisdom from the perspective of the Western traditions will also be discussed in Chapters Four and Five.

Chapter Six will briefly review some of the cross-cultural studies of intelligence in the Chinese culture using conventional Western measures; some weaknesses will be identified to set the stage for a more holistic research proposed in this dissertation.

Part Three of the dissertation will consider intelligence and consciousness from the perspectives of Maharishi's Vedic Psychology in Chapters Seven and Eight as well as of the Chinese tradition in Chapter Nine, Ten, and Eleven. An integrated discussion of the two Eastern theories, as well as a complete theory of intelligence, will conclude Part Three of this dissertation in Chapter Twelve.

Finally, Part Four will present three empirical studies of the Chinese conception of intelligence in the light of Maharishi's Vedic Psychology. Improvement of intelligence according to both theories will be operationally defined in terms of six different measures and discussed in Chapters Thirteen and Fourteen.

The methodology of the research will be presented in Chapters Fifteen. The Chinese concept of intelligence will be tested against three hypotheses and interpreted in the Results of Chapters Sixteen. A meta-analysis of all three results will also be presented in the final section. The dissertation will end with Chapter Seventeen in which a detailed discussion of the results in the light of both Maharishi's Vedic Psychology and the traditional Chinese theory of intelligence will be presented. A grand conclusion will also be drawn from the theoretical and practical implications of the findings.



## **PART TWO: NATURE OF INTELLIGENCE AND CREATIVITY FROM THE PERSPECTIVES OF SOCIAL SCIENCE AND WESTERN TRADITION**

In modern psychology, "there is no general agreement as to what constitutes intelligence, and intelligence cannot be considered apart from an individual's culture and experiences" (Atkinson, Atkinson, Smith, and Hilgard, 1987, p. 389). Since psychology separated itself from philosophy in the late nineteenth century to become a social science, there has been increasing concern for measurement and laboratory methods. As a result, the study of intelligence has been primarily defined by "intelligence tests" designed to measure so-called "intelligence". Intelligence is then defined in terms of the test designer's own perception of intelligence which in turn is, as stated, is shaped by the his or her own background as well as by the paradigm of knowledge of the time.

For example, Sir Francis Galton, a naturalist and mathematician, was the first person to attempt to develop tests of intellectual ability a century ago. Based on the evolutionary theory of his cousin, Charles Darwin, Galton believed that certain families are biologically superior to others; and superior intelligence is simply an exceptional combination of sensory and perceptual skills which are passed on from the previous generation. Despite his great contribution in inventing the correlation coefficient, his very limited view of intelligence plays no significant role in psychology. Even today, however, intelligence tests being used have also confined themselves to primarily measure the cognitive aspect of intellectual ability.

In this Part Two, the presentation will begin with the discussion of intelligence and creativity from contemporary psychology in Chapters Two and Three. In Chapter Four, the discussion of intelligence will be expanded by some thinkers from the Western tradition in chapter four. These thinkers include the early Greek philosophers, especially Plato and Aristotle, from whom Western psychology traces its root and history. To bridge the gap between the perspectives of contemporary theorists and the those of the Eastern traditions, a broader view of intelligence from recent social scientists will be briefly presented in Chapter Five. Finally, Part Two of this dissertation will end with some results of the cross-cultural scientific studies of intelligence in the Chinese culture. Some critics of these research studies will be cited in Chapter Six.

## CHAPTER 2

### THE CONCEPT OF INTELLIGENCE IN CONTEMPORARY PARADIGM OF SOCIAL SCIENCE

In contemporary Western psychology, there have been as many definitions of intelligence as the number of psychologists studying intelligence. Based on "Intelligence and its Measurement (1921)," Sternberg (1985, 1982) concludes that "there have existed, for many years, and continue to exist to this day, serious differences among psychologist in their views on the nature of intelligence..." (p. 608). These differences can be seen in the many different definitions of intelligence that have been proposed. To paraphrase very briefly some of the many definitions, intelligence has been variously defined in terms of one's ability to think abstractly, to acquire knowledge, to adapt to one's environment, to profit from experience, and to acquire new abilities.

Neisser (1976) points out the most salient problem in the field of intelligence. He states, "As typically defined by psychologists, intelligence is whatever intelligence tests measure. These tests usually involve the manipulation of symbols to solve problems for which all the information is given. There is only one correct solution; the time allotted to reach the solution is short; and relevance to problems in real life is minimal" ( p. 31). Nevertheless, "...almost every psychologist agrees that these IQ tests are measures of only limited aspects of intelligence in the everyday world, but there is little agreement about what should take their place" (Wagner, 1986, p. 376).

The diverse opinions on what is intelligence, how best to study and understand it, and how it might be measured, result from the partial understanding of the nature of intelligence and its relationship to consciousness as a whole (see Orme-Johnson, 1988). Before the more complete theories of intelligence will be presented in later chapters, the following section reviews some of the most important approaches to intelligence in the conventional field of psychology.

Intelligence has been explained in terms of: a general factor, mental processes, distinct multiple intelligences, practical intelligence in the course of development of the field.

## **General Intelligence versus Specific Intelligence Abilities**

### *General Intelligence*

Some psychologists following Binet and Simon (1905) view intelligence as a *general* capacity for comprehension and reasoning that manifests itself in various ways. Binet noted that bright children tended to score higher than dull children on all the many different kinds of items contained in his test, such as memory span, arithmetic skills, and vocabulary knowledge. He assumed, therefore, that the different tasks sampled a basic ability or faculty.

David Wechsler (1958) also believed that "intelligence is the aggregate or *global* capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment."

Some other psychologists also perceive that there is such a thing as "general intelligence." They believe that intelligence tests sample a number of mental abilities relatively independent of one another. One method of obtaining more precise information about the kinds of abilities that determine performance on intelligence tests is factor analysis. The originator of factor analysis, Charles Spearman (1904), proposed that all individuals possess a general intelligence

factor (called  $g$ ) in varying amounts. A person could be described as generally brighter or more dull, depending on the amount of  $g$  he possessed.

Hence, according to Spearman, the  $g$  factor is the major determinant of performance on intelligence test items. In addition, special factors, each called  $s$ , are specific to particular abilities or tests. For example, tests of arithmetic or spatial relationships would each tap a separate  $s$ . An individual's tested intelligence would reflect the amount of  $g$  plus the magnitude of the various  $s$  factors. Performance in mathematics, for example, would be a function of a person's general intelligence and mathematical aptitude.

### *Specific Intelligence*

On the other hand, some later investigators like Thurstone (1938) objected to Spearman's emphasis on general intelligence. Thurstone felt that intelligence could be broken down into a number of primary abilities. To determine these abilities, he applied factor analysis to results from many different tests. One set of test items was designed to measure verbal comprehension; another, to measure arithmetical computation; and so on. Thurstone identified seven factors as the primary mental abilities revealed by intelligence tests: verbal comprehension, word fluency, number, space, memory, perceptual speed, and reasoning. His hope of discovering the basic elements of intelligence through factor analysis was not fully realized for several reasons. His primary abilities are not completely independent; the significant intercorrelations among them provide some support for Spearman's concept of a general intelligence factor. In addition, the number of basic abilities identified by factor analysis depends on the nature of the test items. Other investigators, using different test items and alternative methods of factor analysis, have identified from 20 to 50 factors to represent the range of intellectual

abilities (Ekstrom, French, Harman, & Derman, 1976; Ekstrom, French, & Harman, 1979; Guilford, 1982). This lack of consistency in the number and kinds of factors raises doubts about the validity of the factorial approach.

### **Information Processing Approach**

In the 1960s, with the development of cognitive psychology and information-processing models, an alternative perspective on intelligence was to try to understand *intellectual* behavior in terms of the underlying cognitive processes that operate when we engage in intellectual activities (Hunt, 1985). The information-processing approach can be illustrated by the work of Sternberg (1985) and his componential model of intelligence. He assumes that the test taker possesses a set of mental processes, or what he calls components, that operate in an organized way to produce the responses observed on an intelligence test.

Sternberg lists five main classes of components-- Metacomponents, Performance, Acquisition, Retention, and Transfer. Sternberg has shown that individual differences on a specific task selected from an intelligence test are principally determined by the efficiency of the *encoding* and *comparison* processes. For example, the experimental evidence shows that individuals who score high on analogy problems (skilled performers) spend more time encoding and form more accurate mental representations than do individuals who score low on such problems (less skilled performers).

An information-processing approach and a factorial approach seem to provide complementary interpretations of performance on intelligence tests. Factors such as Thurstone's primary mental abilities can be useful in identifying broad areas of strengths and weaknesses. They may indicate that a person is strong in word fluency but weak in

reasoning. If additional testing is conducted, an information-processing analysis could provide a diagnostic profile of the processes responsible for the observed deficiency, for example, at the level of retention components (such as slow or inaccurate recall of relevant information).

*Practical intelligence.* To further generalize his approach, Sternberg (1985) argues that a comprehensive theory of intelligence would involve a much larger set of component processes than have been identified to date by psychologists working in the restricted environment of a laboratory. In addition to "academic intelligence," he suggests that a larger set of components would also relate to "practical intelligence." They would be organized and operated roughly as the following four categories:

First is the ability to learn and profit from experience. Second is the ability to think or reason abstractly. Third is the ability to adapt to the vagaries of a changing and uncertain world. The final is the ability to motivate oneself to accomplish expeditiously necessary tasks.

Although other psychologists working from the perspective of the factorial approach and the information-processing approach would generally agree with this list, most intelligence tests in use today are only good at assessing the first two abilities. This explains why conventional intelligence tests have shown to be very effective in predicting academic achievement. As far as personal achievement outside academic work is concerned, some new assessments seem need to be developed. As a result, more accurate assessments of motivation and practical problem-solving ability will be available to improve the predictive power of intelligence tests. The later part of this dissertation will present some of these new methods for the proposed dissertation studies.

## **Gardner's Multiple Intelligences Model**

Along the line of broadening the conception of what is called intelligence, Gardner (1983) has proposed that there are at least six distinct kinds of intelligence: namely; linguistic, logical-mathematics, spatial, musical, bodily-kinesthetic, and personal. These six intelligences are independent of one another, each operating as a separate system (or module) in the brain according to its own rules. The first three are familiar components of intelligence which are highly regarded in Western society, and are similar to what other theorists have proposed; they are measured by standard IQ intelligence tests measure. Gardner, however, analyzes historical and anthropological evidence to suggest that other intelligences, such as musical talent, have been more highly valued at earlier periods in human history and even today in some non-Western cultures. Because of heredity or training, some individuals will develop certain intelligence more than others, but every normal person should develop each to some extent. Further, the activities a culture emphasizes will influence how a specific intelligence develops: for example, a body endowed with unusual bodily-kinesthetic intelligence may become a baseball player in the U.S. or a martial art master in China.

### **Summary**

In summary, different psychologists have looked at intelligence differently. There are 25 or 30 approaches to the study of intelligence that may be called theories (see Cranson, in press). The three most influential twentieth century theories of intelligence, however, have been the Factorial Approach of general intelligence, the Information-Processing Approach of Robert Sternberg, and the Theory of Multiple



Intelligence of Howard Gardner that have been presented in this dissertation. With this overview of how modern psychologists see the nature of intelligence, the next chapter will explore another intimate concept of intelligence--creativity. Understanding the relationship between creativity and intelligence in Western psychology will lay the foundation for relating to Eastern perspectives presented in Part Three of the dissertation.

### **CHAPTER 3**

## **RELATIONSHIP BETWEEN INTELLIGENCE AND CREATIVITY IN THE CONTEMPORARY PARADIGM OF SOCIAL SCIENCE**

Having reviewed some of the diverse and perhaps irreconcilable approaches to intelligence, the question arises: "how is creativity related to intelligence?"

Similar to intelligence, creativity has also been known by whatever creativity tests measure. In terms of assessments of creativity, however, there have been more disagreements on what a creativity test should test than what an intelligence test should test (Ross, Amabile, and Steinmetz, 1982).

For the intelligent tests being used today, for example, most theorist and investigators of intelligence would agree that they measure at least some limited aspect of intellectual functioning (Cronbach, 1984). However, for the creativity tests commonly being used, such as those of Torrance (1966) and Guilford (1967) that will be presented later, many theorists of creativity would even assert that they do not measure anything even coming close to creativity (Amabile, 1982; Gruber, 1986; Sternberg & Davidson, 1986). It seems that there have been even more difficulties in approaching and assessing the nature of creativity.

A frequently recurring theme in considering creativity and intelligence has been that creativity is not independent of the general factor of intelligence (Yamamoto, 1965). Intelligence appears to be a necessary but not sufficient condition for creativity (Rossiman & Horn, 1971; Sternberg, 1985). However, many, if not most, theorists of the

dual phenomena of creativity and intelligence hold the view that intelligent thinking must also include some degree of creative thinking (see Haensly & Reynolds, 1989).

Various theories have seen either intelligence or creativity as a component of the other. The Association Hierarchy Model, Guilford's Divergent Production Model, Torrance's Scientific View, and Sternberg's Triarchic Theory, for examples, consider intelligence as a component in theories and assessment of creativity. In contrast, The Learning Theory, Neurological-Biological Theory, and Developmental Theory, for example, view creativity as a component in theories and assessment of intelligence. These two opposite perspectives of theories are briefly reviewed in the following section.

### **Intelligence as a component in theories and assessment of creativity**

#### *The Association Hierarchy Model*

In the Association Hierarchy Model, among studies of creativity initiated with a focus on the creative process itself is that of Mednick (1962). Mednick defines creativity as "the forming of associative elements into new combinations which either meet specified requirements or are in some way useful" (p. 220).

Mednick has established two immediate criteria for assessing creativity: the degree of mutual remoteness of the elements of a new combination, and the combination's usefulness. He also postulates that the probability and speed of creative solutions would be affected by the condition of the organism. One of those conditions is the repertoire of elements available to an individual. Other conditions that may affect the association of elements into new combinations include: cognitive style, and previous or current disposition to the problem at hand or to methods of approaching problems. The greater an

individual's intelligence, the more likely that the encoding will make available to the individual a wider and more complex hierarchy of associations in a variety of representations from which a creative solution could be selected.

Mednick's theory led to the Remote Associates Test (RAT), which was designed to elicit creative combinations and thus measure an individual's creative potential. Mednick, however, focuses only on the semantic component of associations.

### *Guilford's Divergent Production Model*

Similar to Mednick, Guilford also approaches creativity from a process orientation, using the operations component of his *structure-of-the-intellect* (SOI) model (Guilford, 1968), and its relevant operation known as "divergent thinking/production" (1959) to examine creativity. Yet, Guilford asserts that "creativity and creative productivity extend well beyond the domain of intelligence" (Guilford, 1950, p.445). Guilford suggests that the genetic aspect in intellect (ability) has to be supported by personality (temperament) and the contribution of environment (motivational factors) for the development of creative nature.

Early in his studies of the creative process, Guilford (1963) attempts to demonstrate how factors of intelligence fit into the operations used in creative thinking. He maintains that typical problem-solving models (e.g., Dewey, 1933) essentially describe the same phenomenon as typical creative production paradigms (e.g., Wallas, 1926, 1945).

In Guilford's description of intellectual operations, the degree of continuity in producing associations is termed *fluency* (see Guilford, 1968, p.125). Within his divergent production operation, generation of ideas may exhibit greater or lesser degrees of diversity in their basic categorization, called *flexibility*. Both fluency and flexibility, which

simply measure the quantity and quality of divergent production, depend not only upon the efficiency of the mental search, but also on the manner of encoding and the organizational efficiency of the encoding. Through incorporating the divergent production process as only one of the five basic operations in intellectual activity, Guilford's theory inextricably links intelligence and creativity. Guilford (1968, p.132-134) demonstrates that low-IQ individuals (who lack the available quantity and quality of stored ideas to be either fluent or flexible, or to efficiently retrieve ideas and accomplish complex transference) do not show high divergent production scores, whereas high-IQ individuals exhibit a wide range of divergent production scores.

Likewise, it could be expected that with increased intelligence, divergent production would access an increasingly wider repertoire of ideas from which to retrieve, compare, combine, and transfer. In either case, in assessment, the more specific the divergent production test (i.e., semantic, figural, and symbolic content, and the units, relations, and systems products), the less likely will be a tight relationship with a broader based, general intelligence test. Guilford's theory thus appears not only to contribute to creative ability, but maintains that creativity is actually one form of the process of intelligence.

#### *Torrance's Scientific View*

Guilford's (1963) elaboration of the unique intellectual ability of sensitivity to problems has also become the cornerstone of Torrance's definition of creativity. Torrance (1967) defines creativity as "the process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, an so on. Creativity is involved in: identifying the difficulty; searching for solutions; making

guesses; formulating hypotheses and possibly modifying and retesting them; and finally communicating the results" (pp. 73-74).

In generating this definition, Torrance set the stage for an objective observation of an elusive process of creativity. Toward this end, Torrance's definition suggests a relationship between creativity and intelligence in which the focus is on the process of using particular mental abilities applied to some specific content in order to accomplish an end not previously in place. This fits Spearman's ideas (1930) about mental creativity as the power to transfer relations and generate new correlates and Newell's, Shaw's, and Simon's (1962) definition of creative problem solving.

As in Guilford's theory, Torrance's methods of assessment of creative potential, especially the figural and verbal forms of Torrance's Tests of Creative Thinking (1966), emphasizes the ability to generate many new ideas (fluency) that are unusual (originality), and represent a variety of categories (flexibility), as well as the ability to embellish the ideas (elaboration). Torrance's approach to creativity and its implications for the transference of behaviors to multiple situations thus indicates that intelligence is a part of creativity.

### *Sternberg's Triarchic Theory*

Sternberg's Triarchic Theory of Intelligence sees intelligence as a necessary but not sufficient condition for creativity, and also relates general intelligence and creativity to practical intelligence through the componential view. Sternberg (1985) attributes creativity largely to the insightful use of knowledge-acquisition components and to extremely sensitive feedback between the various kinds of components. The insightful use of knowledge-acquisition is more than just fluid ability; it certainly involves crystallized ability of the experience of the individual.

Sternberg proposed that if, in knowledge acquisition, knowledge has been organized in a serviceable and richly interconnected way, the feedback between the various kinds of components is more likely to occur. For interesting creative behavior to happen, however, a rather substantial knowledge must be there. Otherwise, there will not be anything to and from which transfer of information can occur. This explains that a high level of functioning in the knowledge-acquisition components would seem to be a necessary condition for creativity to be shown. Since sophisticated knowledge base does not guarantee that the knowledge base will be used with sophisticated feedback between kinds of components, these high levels of functioning are not in themselves sufficient for creativity to occur.

Sternberg's componential view of creativity stating that differences in the knowledge base and its organization distinguish experts from novices found supports from recent research on expert-novice distinctions (see, e.g., Chase and Simon, 1973; Chi, Glaser, and Rees 1982; Glaser and Chi, 1979; Larking, McDermott, Simon, and Simon, 1980). Horn (1979) also suggested the consistent view that creativity may be better understood by investigating crystallized intelligence than by investigating fluid intelligence. Despite this research support, Sternberg admitted that the mechanism of the componential view does not account for all creative behavior or give a full account of creative behavior to which it can be applied. In Sternberg's words:

Our previous failures to isolate interesting loci of creative behavior may derive from our almost exclusive emphasis upon fluid abilities. The creativity tests that have resulted from this emphasis have measured what I believe to be rather trivial forms of creativity having little in common with the forms of creativity shown by creative novelists, scientists, artists, and the like. At the same time, it seems certain that high levels of crystallized abilities are not sufficient for creativity. Possession of knowledge does not guarantee creative use of that knowledge. (p. 126)

Creativity thus seems to be beyond both fluid intelligence and crystallized abilities or broader than all the different components of intelligence known to theorists today.

In addition, Sternberg (1985) has also used people's implicit theories of intelligence, creativity, and wisdom to understand the nature of their relationships. Results showed that there is an intermediate relation between intelligence and creativity. Other relationships among the three concepts will be presented in the next chapter on wisdom.

## **Creativity as a component in theories and assessment of intelligence**

### *The Learning Theory*

Classical learning theory, in contrast, considers creativity to be a component of intelligence. Intelligence becomes "learning process functioning at its optimal level under appropriate situational conditions and satisfying some external value-type criteria not inherent in the behavior itself" (Maloney & Ward, 1976).

From this perspective, Thorndike (1926) focused on associations as the "accumulation" of intelligence, in which greater number of connections have been made. If creative production may be considered the result of accessing the more remote associations in one's mental storage (Mednick, 1962), then we can begin to see a tenuous notion of creativity and intelligence as having common origin. The role a wide variety of prior learning experiences might then play is in establishing a vast and diverse hierarchy from which unique associations could be generated.



### *The Neurological-Biological Approach*

The neurological-biological approach to intelligence and creativity, assesses behavioral correlates of neuroanatomical and neurophysiological functioning. There has been, however, controversy on hemispheric lateralization of the brain for abilities (Gardner, 1983).

This category of theory has been distinguished by Hebb's (1972) ideas on intelligence A and B and by Cattell's (1963) theory of fluid and crystallized intelligence, referring, respectively, to innate biological capacity and to experience with the environment. Recent theories in this category have focused on the integrative functions within the brain and of the brain and nervous system, on the biochemical aspects within the brain and at the nerve endings; and on the measurable excitations of specific areas of the brain in response to specific types of tasks.

A nebulous reference to creative production might be suggested for Hebb's intelligence A, with the assumption that biological capacity is related to problem-solving abilities, and for Cattell's fluid intelligence, with assumption that untutored ability would represent the raw material of creative as well as intelligent responses. In this latter case, experiences with the environment could enhance creative responses only if the experiences did not overwhelmingly reinforce mundane responses.

### *The Developmental Theory*

The Developmental Theory, on the other hand, conceptualizes intelligence as action represented by mental organizational structures that change with maturation and experience. Creativity is considered within the framework of the mental organizational structures each individual constructs from his interaction with the environment.

In a developmental theory, adaptation of the individual to the environment is the goal of intellectual activity. Epistemological

orientation is reflected in, for example, Piaget's concept of schema and his principles of assimilation, accommodation, and equilibration. Piaget emphasized that these internal organizational processes are available to all, and he focused on universality of these internal organizational processes.

From a developmental perspective, then, multiple creative possibilities exist in the schemata each individual constructs from his particularly unique interaction with the environment. Carrying this further, the concept of generative processing (Wittrock, 1974) proposes that, at any point in one's epistemological development, construction of knowledge is based upon the quantity and quality of one's prior experience. The quality of original ideas will greatly depend upon the appropriateness with the understanding of others in the population. In turn, this may depend upon the extent to which an individual has developed related schemata, based on reliable experiences.

In short, the developmental theory appears most clearly suited to an explanation of the mutual origin of creativity and intelligence in mental function, the interrelatedness of creative and intelligent responses within that function, and the reasonableness of universal goal-oriented adaptation. This adaptation is accomplished through appropriate application, timing, and intermingling of intelligent responses (planning, executing, monitoring) and creative responses (extending beyond previously derived solutions to novel and useful ones).

## **Summary and Conclusion**

To summarize the above discussions, it is obvious that the nature of intelligence and creativity have been considered in many different ways in the field of psychology. There are different

approaches trying to understand intelligence and creativity from different angles and levels, but each only captures part of the total picture.

For many years, the study of intelligence and creativity was dominated by the study of intelligence and creativity tests. The study of tests tended to shift the focus of research away from theoretical issues and toward measurement issues. At the very best, most of these tests, especially the psychometric IQ tests, are only good at predicting academic competency for which purpose they have been originally constructed.

In addition, since the nature of intelligence is not completely understood, creators and users of intelligence and creativity tests may be less than fully reflective about just what it was that the tests were measuring. The notion that intelligence or creativity is whatever it is that test happens to measure has been a predominant one, whether or not this notion has been explicitly acknowledged.

If this is the case, it is far from valid to use these measures of "intelligence" and "creativity," to assess what has been going on in different cultures, such as the Chinese, in which the concept of intelligence and creativity may be very different from the West. Not that these measures cannot be used in the Chinese culture, but one should at least know what does "intelligence" mean to a particular culture in study and then use the appropriate measures accordingly. This will ensure the assessment of intelligence and creativity more meaningful and accurate.

To conclude, as we can see from these reviews of contemporary intelligence theories, theorists have little consensus on the definition of intelligence. There are, however, a few elements which are common in many definitions of intelligence (Sternberg, 1982, p. 978; 1985, p.xi; Sternberg and Detterman, Eds., 1986, pp. 9-15). "Creativity" is one element. Others include "adaptability", "orderliness", "efficiency", and the ability to "discriminate" between objects of thought or perception,

and the capability of "integration" of the parts to form wholeness, or creating new solutions to solve problems, so that "progression" or "evolution" is made possible.

By integrating all these elements of intelligence, the nature of intelligence may be made more complete. Broad as they may seem, however, all these elements are only a partial descriptions of the *functioning* or *expressed* values of the intelligence. A holistic definition of intelligence would also include its own nature as a universal, unified source of pure intelligence that will be discussed in Part Three of the dissertation. As a bridge to Part Three, the next chapter will first present some broader concepts of intelligence seen from the more ancient Western tradition.

## CHAPTER 4

### INTELLIGENCE IN THE WESTERN TRADITION: SOME BROADER PERSPECTIVES

In order to create a more comprehensive theory of intelligence, some psychologists, as mentioned in Chapter Two, have begun to extend the scope of intelligence to include more domains. Beyond the dominant paradigm of conceiving intelligence solely from the cognitive perspective, the *experiential* component of personality of an individual, for example, has been considered as an important part in the study of what is called "practical," or "pragmatic," or "social" intelligence (e.g. Sternberg, 1985; Epstein and Meler, 1989; Wagner, 1986).

Practical intelligence plays an important role for an individual in adapting to the changing environment, and thereby to achieve success in everyday life (see Sternberg, 1985; Epstein and Meler, 1989). Practical intelligence stems from "experiential knowledge." The concept of practical intelligence thus extended the concept of intelligence beyond the academic reality to the "real world" which is one of five necessary conditions set out in the introduction of this dissertation to make a comprehensive theory of intelligence.

It is also noteworthy that "experiential intelligence" has also been associated with some specialized research on such conceptually related constructs as "Wisdom."

## Wisdom as a Broader Concept of Intelligence in Modern Psychology

As briefly presented in the last chapter, Sternberg (1985) conducted a prestudy and four experiments to understand the nature and use of people's implicit theories of intelligence, creativity, and wisdom. Results show that there is a greatest similarity between the implicit theories for intelligence and wisdom, but least similarity between the implicit theories for creativity and wisdom. "The relation between intelligence and creativity is intermediate between that of intelligence and wisdom, on the one hand, and that of creativity and wisdom, on the other" (p. 617).

If the construct of intelligence can be considered and organized in terms of multidimensionally related hierarchy (refer to Sternberg, 1985, 1990), then, as Birren and Fisher (1990) state, "wisdom is at the top of a hierarchically organized system in which wisdom is a complex compound of elements blended with experience." (p. 318)

The construct of wisdom, for example, has been proposed to be related to Cattell-Horn's theory of crystallized and fluid intelligence and is associated with one side of this "dual process" of intelligence (e.g. Baltes, Dittmann-Kohli, and Dixon, 1984; Baltes and Smith, 1990; Baltes, Smith, Standing, and Sowarka, in press; Dittmann-Kohli and Baltes, 1990). Although the attempts to identify the component parts of wisdom have not been very successful, the research studies on wisdom have certainly helped to expand the true nature of intelligence to incorporate the experience of *self* and *feelings*.

This can be justified in Chandler's and Holliday's (1990) principle components analysis of 500 subjects' common language descriptions of the "attributes and characteristics" of the wise people, in which they concluded that exceptional understanding involving *broad awareness* of life-experience as well as correct judgment and accurate comprehension are "prototypical" to wisdom.

Other factors such as general competence, interpersonal skills and social unobtrusiveness also appear to be "necessary," though not prototypical aspects of wisdom. These results have not only suggested that *experiential* knowledge is crucial to be a wise person, but the most profound level of intelligence also involve a broad and holistic spectrum of abilities than just general competence usually defined by "intelligence."

A broader perspective to intelligence seems to involve more *integration* between cognitive and affective processes of the individual (e.g. Kramer, 1990; Csikszentmihalyi and Rathunde, 1990; Clayton and Birren, 1980). In addition, Pascual-Leone (1990) as well as Orwoll and Perlmutter (1990) also emphasize the importance of the integration of developed cognition and personality, which includes affect, as a whole, to make someone wise. Birren and Fisher (1990) summarize different presentations of wisdom and come to the same conclusion that wisdom involves the integration of cognitive and emotional processes, and a balance of these two well-developed, though opposing, aspects of personality which also leads to *constructive* behavior that a wise man will display. Taking all these consistent views together, a more holistic perspective to intelligence, which has been called wisdom, may include a highly integrated cognitive and affective functioning of the personality resulting from a profound insight or broad awareness and discriminating ability into life.

Since the self of an individual may be considered as the total aggregation of all cognitively and affectively related functioning and processes, this high integration of the personality can also be stated as the knowledge of the self as a whole; or wisdom is simply a profound *self-knowledge* with which most theorists of wisdom in twentieth century psychology agree (e.g., Pascual-Leone, 1990; Kramer, 1990; Orwoll and Perlmutter, 1990; Csikszentmihalyi and Rathunde, 1990; Erikson, Erikson, and Kivnck, 1986). The similar ideas of self-

knowledge and the integration of cognition and affect that constitute the nature of wise men and women can also be found in early Western tradition.

### **Classical Perspectives of Wisdom in the Western Tradition**

In classical accounts of wisdom, there has been the same emphasis of self-knowledge and cultivation of both emotional and intellectual virtues as contemporary psychology. In contrast to modern psychologists' descriptions of wisdom, however, classical accounts often emphasize the more fundamental experience of an "universal field of wisdom" that the wise man has.

Plato and Aristotle, for example, emphasize that the philosopher, the "lover of wisdom," should possess highly developed cognitive and affective qualities, and the central goal of education was to culture knowledge of the self--for example there is the maxim of "Know thyself" to become wise (e.g., *Republic*, 6). In addition to the relative wisdom, however, Plato also stresses that the lovers of wisdom should have the ability to "fix their eyes on the absolute truth" (*Republic*, 484, d). This absolute wisdom is an "experience" of that knowledge of true being and reality differentiated from the relative wisdom of academic knowledge or opinion. In Plato's word, this true wisdom is "the delight that the contemplation of true being and reality brings" (582, c).

In addition, in Plato's religion, there was an intellectual element called the *Logos*. *Logos* should be translated as "reason." The idea of "reason" in the full meaning of *Logos*, however, is not just in terms of the ability to reason or of pure intellectual thinking as commonly conceived in the West today. *Logos* "is the bridge between the One and the many." It is the "principle that brings the many back to the One



and man back to God" (Russell, p. 404-5). "The one" could be understood as the "absolute truth" or "true being." "The many" are the relative wisdom of knowledge which could be comprehended by intellectual thinking. True wisdom is therefore to connect the knowledge of the relative with the absolute through the principle of the *Logos*.

Furthermore, Aristotle has a similar view of true wisdom as "intimately associated with philosophical wisdom" as the experience "originates in an absolute mind." He calls this "pure speculation" as true wisdom when "it may be properly maintained." (*Protrepticus*, Fragment 25).

In summary, it seems that the ancient accounts of the Western tradition have seen the wisdom of the individual life as based on the universal source of wisdom (see Plato, *Philebus*, 30, b-c). Robinson (1990), Csikszentmihalyi and Rathunde (1990), Clayton and Birren (1980) also review other historical accounts which describe the similar experiential knowledge of the wise man in terms of an absolute, eternal, unchanging level of true reality. On this transcendental basis, the wise display the most exalted intelligence in their judgment and behavior that can only be true and right.

## Summary and Conclusion

To summarize these contemporary and classical perspectives to wisdom and intelligence-related concepts, it may be concluded that the sole focus on the intellectual ability in the study of intelligence in modern psychology is highly inadequate. This has resulted in what Csikszentmihalyi and Rathunde (1990) note as cultural or historical bias, because "contemporary discussions on almost any way of knowing," have almost left out "such integrative notion as "universal truth," "an essential component of the ancient conception of wisdom..."

(p.30). This bias may also well apply to any other intelligence-related investigations in the current paradigm of social science.

The discussion in this chapter has suggested that the construct of wisdom may be able to broaden the understanding of intelligence. In the domain of wisdom studies, however, much of it is sparser and is outside the psychological tradition (see review of literature in Clayton and Birren, 1980). The problem is seen in that there do not even exist any tests with sufficient acceptance to generate disagreement (Sternberg, 1986).

One successful attempt has come from Chandler (1990) who assesses "ego development or awakening wisdom" and proposes that Loevinger's ego development as a measure of it.

Chandler quoted Loevinger's assertion that "ego development 'represents [this] common thread' (p. x). It is holistic self development (Loevinger, 1976, 1984), inclusive of cognitive, moral, social, and affective development" (p. 68). Furthermore, Chandler points out that this holistic development of cognitive, moral, social, and affective development is highly parallel to the expansion of the *conscious capacity* of the mind which could be seen as a progressive awakening of inherent wisdom at the deeper levels of mind identified by Maharishi's Vedic Psychology (also see Maharishi, 1969; Alexander et al., 1990).

This wider perspective on the conscious capacity of the mind in explaining wisdom has suggested a new way to assess intelligence as a whole. This holistic perspective on intelligence will be presented in the coming chapters, in Part Three, of this dissertation when the Chinese and Vedic perspectives to intelligence are discussed. To bridge the gap from contemporary Western psychology to the Eastern traditions, the following section will present a newer and broader perspective of intelligence than that offered by modern social science.

## **CHAPTER 5**

### **TOWARD A NEW DEFINITION OF INTELLIGENCE IN CONTEMPORARY SOCIAL SCIENCE**

As almost every psychologist agrees that psychometric IQ tests are measures of only limited aspects of intelligence in the everyday world (see Wagner, 1986), theorists have been trying to formulate a more holistic definition of intelligence. One of the proposals from Caine and Caine (1991), for example, has borrowed and modified the term "Wide Awakeness" as what they think should be an ideal description of intelligence.

Their description of being "wide awake" as the essential nature of an "intelligent" man, in the real sense, seems to be consistent with more of the Chinese and Vedic perspectives on intelligence that will be presented. Furthermore, their idea also relates awareness to other aspects of mental processes and functioning, including self, feelings, reasoning, thinking, perception, and even physiology. Together, these come close to a comprehensive study of human intelligence as proposed in one of the five conditions in the introduction of this dissertation. The following will first look at a new definition of intelligence; then three specific issues related to a new understanding of intelligence will be discussed--emotion, threat, and enriched environment.

## Towards a Redefinition of Intelligence

Caine and Caine (1991) describe their definition of intelligence as follows: "Our notion of intelligence has much in common with Maslow's notion of self actualization. We have borrowed and modified the term 'Wide Awakeness' to describe what we think intelligence will ultimately look like..." (p. 1)

Maslow's (1968) concept of self-actualization means that a person has a fundamental tendency toward personal growth and maximal realization of his or her potential. Thus, an intelligent man or woman, according to Caine and Caine, is one who has fully developed his or her own self or personality as a whole, which consists of all the thoughts, emotions, perceptions, and behaviors that characterize "I" in western psychology (see Atkinson, Atkinson, Smith, Hilgard, 1990).

In terms of "Wide Awakeness," the fully developed self, or actualized self, may be logically explained as full awareness of the functioning of the self as a whole. Hence, the notion of the full awareness of the thoughts, emotions, perceptions, and behaviors of a self-actualized man has extended the proposed concept of intelligence that considers intellectual ability alone.

This broader perspective of intelligence can then be understood in terms of different mental and physiological functioning. Caine and Caine state that:

...Regardless of individual talents, wide awake people are '*balanced*' emotionally and physically. They can distinguish real reasons for fear from situations which provide a challenge because their responses are more thought out and reflective and less automatic. They have what Gardner calls intrapersonal intelligence as well as the capacity to relate to *inner awareness* or "gut feelings" to their external experiences and challenges. Their senses of smell and sight and hearing and their other perceptual capacities tend to be heightened and readily connect with the "languages" of

mathematics, physics, literature and *self understanding* as they "feel" and "sense" their subject and engage in *creative exploration*...(p. 2, italics added)

Caine and Caine seem to describe an intelligence that does not have much to do with skills and "talents," but rather results from some kinds of *integration* of the inner awareness of the self with different aspects of mental faculty and physiology to the external environment. Based on "inner awareness" or "self understanding," their feelings ("gut feelings"), intellect (as seen in the ability to "distinguish real reasons, be more thought out, and reflective"), thinking and senses (as seen in the "heightened perceptual capacities"), and "physiology" become "balanced," and integrated (as seen in the "capacity to relate to," "readily connect with") to function as an intelligent whole. This intelligence is then expressed in the "creativity" of outer exploration. Creativity thus seems to be the natural result of being intelligent.

From these descriptions, intelligence can be seen in terms of multiple expressions--from the self to feeling, intellect, mind, senses, physiology, and creative behavior. Intelligent or wide awake people seem to develop the ability to integrate these different levels of functioning into a whole personality.

In addition, the integration of personality seems also to make the wide awake people maintain a balanced vision and behavior in the midst of complexities. This can be seen in that:

...Wide awake people have what Maclean would call frontal lobe development--they understand complex *interrelationships* such as ecological issues of all types. Wide awake people are *realistic* even while they have enormous *compassion* for others. We would therefore argue that *ethics* and intelligence must be linked, if only because a wide awake person appreciates the interconnectedness of *all* and *acts* accordingly. We also suspect that the almost total distinction currently made between the individual and the community will have to be modified. In many respects the brain is a social brain. And in many respects

intelligence is a function of the way we interact in *context*. One probable results is that an intelligent person will, in some ways, be a person who is a member of an intelligent--or wide awake--community. (p. 3, italics added)

Empowered with an integrated personality as discussed previously, an intelligent person thus seems to have very developed feelings, or "compassion," and sharp intellect, or the ability to discriminate right from wrong, of being righteous or ethical. Again, the balanced quality of heart and mind seems to result from the holistic development of the self in being wide awake. The intelligent person sees the wholeness without losing sight of the parts and has the ability to act "practically" or expediently in the context of the situation. This intelligent expression of the value of heart and mind, and behavior can also be seen to have a physiological correspondence as well.

These multiple expressions of intelligence may be termed as experiential intelligence (of the self and feeling), intellectual intelligence (of the mind), practical intelligence (of expedient behavior), and biological intelligence (of the physiology). In addition, these different aspects of intelligence may give a more concrete description of a "self-actualizer." Caine and Caine, for example, describe as follows:

If you will, wide awake people can pass tests on memorized facts and on the ability to use those facts in unique situations. They are people who see diversity as a natural phenomenon throughout nature and look for the complex patterns that give us clues about the hidden order in what, on the surface, appears to be chaos. They are emotionally mature. They are creative and original thinkers. And they are richly endowed with linguistic and technical understanding. (p. 4)

Again, it can be seen from the above description that an intelligent person has developed great insight or wisdom into the underlying intelligence of nature ("hidden order"). Based on his or her holistic vision of the self, a wide awake person can see and apply creativity and order, *creative intelligence*, in everything he or she does and in his or her own life.

To conclude this redefinition of intelligence, Caine and Caine explain that today's difficulty in understanding intelligence is due to the fragmented approaches to particular "tendencies and talents" and to losing sight of the underlying wholeness of these tendencies and talents, wide awakesness. In their words:

...Such a definition of intelligence seems difficult to accept today because of our obsession with identifying separate but common elements and ignoring interrelatedness. As we begin to appreciate the interpenetration of every skill, every subject and every ability, we will be better able to grasp how wide-awakesness works. At the moment, the overwhelming investment in testing instruments of a particular nature or another precludes a realistic shift to defining intelligence as wide awakesness. It is simply too complex for what the average person can conceive of as a practical definition. (p. 5)

### **Three Issues on a New Understanding of Intelligence**

In addition to this proposed redefinition of intelligence, Caine and Caine have also suggested three issues to a new understanding of intelligence. These issues include (1) the role of emotions in learning and memory, (2) the effect of threat in affecting learning, and (3) the role of an "enriched" environment for growth of intelligence.

These three issues also seem noteworthy in the study of Chinese and Vedic intelligence in this dissertation. As we will see in

the following sections, they will clarify some of the needs from both the theoretical and practical bases for testing and improving intelligence.

### *The Role of Emotions in Learning and Memory*

The ability to learn and memorize are certainly important aspects of intelligence. A number of research studies have showed that cognitive abilities are not independent but are heavily influenced by affects and emotions (see e.g. Hebb, 1972; Tyhurst, 1951; and Freud, 1976). Caine and Caine (1991) therefore assert that both thought and feelings have to be taken into account for a new understanding of intelligence. They state that:

Unlike computers we have emotions. What we haven't done, and what brain research is finally suggesting, is that we have failed to reconcile ourselves with the notion that the brain is an emotional brain. It confirms that memory is emotional and that the context is part of what is learned (Masumoto and Sanders, 1988). In part it is the fact that we think with feelings that give metaphors their power. Mankind has been able to separate itself from its emotional nature in some respects by means of characters such as Dr. Spock and Sherlock Holmes [in the Star Trek]. In reality, however, when we allow only the neo-cortex, the "heartless computer" (Isaacsonk 1982), to reign without our emotions, we tend to resemble psychopaths much more readily. On the other side of the continuum, mankind has also unleashed some devastating emotional energy without an adequate use of the intellect to guide it. A new understanding of intelligence will have to combine both thought and feelings. (p. 7)

As suggested, a more holistic investigation of intelligence in this dissertation also seems necessary to assess both cognitive and affective aspects of intelligence.



### *The Effect of Threat on Learning*

Since emotions influence cognition, negative emotions like fear and threat must have negative effects on learning. Learning is another very important aspect of intelligence tied to memory. It may be said that threat and fear is "unintelligent" because Caine and Caine (1991) suggest that feeling insecure will hamper the ability to recognize more holistic patterns and processes that broader intelligence represents. This is also consistent with Maslow's model of hierarchy of motivation that feeling safe is requisite for self-actualization. Caine and Caine explain that:

We have many automatic (not thought out, logical or reflective) responses that are deeply linked to our survival needs. Even as our brain is ready to make new connections it is also hunting for the familiar and "safe" connections it has always made before. This is what a broader, self actualized type of intelligence may very well be as Maslow suggested, dependent on meeting our survival needs before we explore the more creative, abstract and compassionate capacities that we have available. We appear to need to feel safe in life in order to recognize the larger, more complex patterns and processes indicative of broad intelligence. Such a capacity requires a sense of what Pribram (Pribram, 1978) calls "active uncertainty." It is an appreciation of a larger "whole" that makes sense and within which smaller fears and crises are submerged so that they do not trigger phobic-like responses. In fact there is almost conclusive evidence that fear related to a sense of helplessness is extremely debilitating for growing brains, both young and old (Jacobs and Nadel, 1986; Caine and Caine, 1991). The term that Les Hart (1983) used to describe what happens is "downshifting". When we downshift, we revert to primitive instinctual behaviors and to early learned and deeply entrenched "programmed" behavior. We also reduce our capacity to handle uncertainty, be creative, and learn. An analogy is to a camera lens which narrows and therefore lets in less light...(pp. 8-9)

The implication of all these theories mentioned in the quotation seems that in order to unfold the creative intelligence of an individual, the learning process and environment should be free from the

"unintelligent" influences of stress and fear that "downshift" one's potential. This can be seen from the conclusion shown from Caine and Caine's research:

....Our own research on downshifting has convinced us that the traditional teaching model consisting of time limits, external control via reward and punishment and focusing on preconditioned outcomes under the control of an authority lead to conditions that are conducive for memorization and repetition, but not to making meaningful connections in the learning brain. A consequence is that we revert to repetition and the training of automatic responses rather than the type of learning which engages moment to moment autobiographical or "wholistic", interconnected memories. Yet the latter are fundamental in the perception of wholeness and interconnectedness. (p. 10)

Again, the ability to perceive the whole and interconnectedness are the basis of intelligence. Fear and threat, on the other hand, jeopardizes the holistic experience of awareness that gives rise to insight and wisdom. Logically, these theories may serve as the basis for measuring intelligence on the experiential level in terms of freedom from stress, threat, and fear.

### *The Role of an "Enriched" Environment*

The question on how much environmental factors are responsible for individual differences in intelligence has been one of the two fundamental debates in the history of theory and research on intelligence in western science. Caine and Caine (1991) ask similar questions in the following:

How much does interaction with the environment actually contribute to the development of intelligence? For instance, how much actual physical interaction is needed for growing infants

and children and how do such activities or lack of some effect the development of the brain. What effect does television, or any passive learning process including many "educational toys", have that is different from the results of interacting directly in tangible experiences with significant adults and peers? As a result of Marian Diamond's work (Diamond, 1988) we know, for example, that experience changes the physiological configuration of the brain in crucial ways, even in adults. (p. 10)

It thus seems that intelligence could be developed by enriching experiences that change the physiological configuration of the brain even in adults. Furthermore, this intelligence enhancement through enriching experiences has been a well recognized principle from developmental neurobiology (Blakemore and Cooper, 1970; Hubel and Weasle, 1979; Milgram and Macleod, 1987).

What western science does not know, however, is that there exists an absolute field of enriching experience, the pure field of creative intelligence, from which all experiences, intelligence, and creativity spring. Being able to gain access to this source of creativity and intelligence and experience this most enriching field directly through some technologies of consciousness may serve as a means to improve intelligence from the "inner environment" of our own Self (see Cranson, 1987, in press; Alexander et al., 1990). This experiential phenomenon will serve as a practical basis for testing a comprehensive theory of intelligence mentioned earlier in this dissertation's introduction.

## **Summary and Conclusion**

This chapter on a new definition of intelligence has borrowed a few insights from Caine and Caine. Their conclusion of the whole discussion is naturally part of the conclusion of this chapter also. They state:

Perhaps our most important point is that current definitions of intelligence are too static and narrow whether there are one or seven or thirty. They are for describing tendencies and talents in which an individual excels. But a genuine definition of intelligence based on an understanding of the capacity of the human brain and mind must include a broader understanding of how our brain organizes the "stuff of life" and then must leave room for discovering what we are capable of becoming. (p. 12)

"This broader understanding of how our brain organizes the 'stuff of life'" has been understood as Wide Awakeness of our own self as proposed by Caine and Caine. From the basis of inner awareness, intelligence seems to be seen from multiple expressions in terms of creativity, experiential intelligence, intellectual intelligence, physiological intelligence, and practical intelligence. True intelligence then results from some kind of *integration* of the inner awareness of the self with different aspects of mental faculty which correspond to these multiple intelligences. This holistic and interconnected experience of awareness will then gives rise to wisdom of the self and the underlying intelligence of nature.

Furthermore, a new understanding of intelligence seems necessary to have to include a balanced development of thought and feelings, discriminative focus in the context of broad comprehension. In terms of feelings, the negative emotions of fear and threat which restrict holistic experience and thereby the growth of intelligence should be a main consideration in the study of intelligence. In addition, experiencing an enriching environment could serve as a means for the growth of intelligence.

To conclude, the new definition of intelligence along with the aforementioned new insights have broadened the understanding of intelligence from the perspective of modern psychology. Wide Awakeness is not only consistent with the broader definition of

intelligence in terms of wisdom or self-knowledge presented in the previous chapter, the ideas of broad awareness, balanced feelings and physiology, as well as practical behavior have also touched upon at least two more proposed conditions toward a comprehensive study of human intelligence.

From the perspective of Maharishi's Vedic Psychology, a limitation of the theory of Wide Awakeness of intelligence, however, stems from the lack of the complete knowledge of pure awareness that makes Wide Awake less possible. Moreover, Vedic Psychology directly improves the theory by providing a practical technique to enliven Wide Awakeness from the "inner environment" of the Self.

Nevertheless, the notion of Wide Awakeness has provided a modern framework for considering and testing the similar holistic concept of Chinese intelligence presented in the next section. Before going into Part Three, however, the next chapter will conclude Part Two of the dissertation by overviewing some of the major studies on intelligence in the Chinese culture. The inadequacy of these previous studies would not only stimulate more ideas for the present research, but also further validate the necessity of the redefinition of intelligence proposed in this chapter.

## CHAPTER 6

### CROSS-CULTURE STUDIES OF INTELLIGENCE IN THE CHINESE CULTURE FROM WESTERN PSYCHOLOGY

#### Some Examples of Early Cross-Culture Studies

According to Hsiao (1929) in his article "The Mentality of the Chinese and Japanese," there had been cross-cultural studies on the intelligence of the Chinese children as early as 1918. Until 1929, more than ten similar research studies had been conducted, and the results show that there are no differences in the intelligence among the Chinese, Japanese, and American. Twenty-six years later, Rodd (1959) used Cattell's Culture Fair Intelligence Test to test 1,290 high school students in the province of Taiwan, and the results showed that the level of intelligence between the Chinese and American was the same.

In addition, Hwang (1964), in an unpublished research study, adopted Raven's Progressive Matrices Test to measure intelligence of 1108 junior high school students in Taipei district of Taiwan and showed that the level of intelligence is about the same as the high school students in Britain of the same age.

Another study on cross-cultural comparisons of intelligence published by Goodenough (1949) in an article titled "Racial Differences in the Intelligence of School Children," unlike other studies, shows very interesting results. From "The Man-Drawing-Test" he used, Goodenough found that the Jewish children have the highest IQ score, average 106.1; Chinese the second highest, average 104.1; and Danish,

Swedish, Norwegian, Japanese, Americans, German, British, French, and then Swiss come after in sequence.

## Critiques

There have been numerous similar studies on cross-cultural comparisons of "intelligence" like these done in different cultures. Basically, all of these studies used those conventional psychometric IQ tests developed in the West. Criticism of these studies of intelligence have mainly centered around questioning the criteria by which intelligence is being tested and/or compared.

Almost without an exception, the results of these intelligence studies are determined by the kind of intelligence test being used. Different Chinese scholars have expressed their opinions on similar questions. Some of these comments cited below may suggest some directions for studying intelligence and creativity in the Chinese culture.

First of all, Hang (1971), a noted philosophy professor of a university in Taiwan, for example, in his article "The Definition of National Character," points out that most of anthropologists today agree that there is no sufficient reason to believe any innate difference in abilities among different races. Intelligence differences are considered to be caused by *cultural factors* (De Vos and Hippler, 1969).

Otherwise, there has been much agreement that intelligence is at least affected by cultural experience (e.g. see Cole, Gay, Glick, and Sharp, 1971; Goodnow, 1961; Goodnow, 1976; Gardner, 1983; Atkinson, Atkinson, Smith, and Bem, 1990; Berry, 1971; Wober, 1974; and Sternberg, 1985). If this is the case, the kind of intelligence measure developed in a particular culture may likely reflect the results that are valued by that particular culture. In other words,

cultural differences have to be taken into account whenever cross-cultural measures of intelligence are conducted.

In addition, Hang asserts that even though the aforementioned studies have found that the level of intelligence Chinese students and both American students, and British students are almost the same, the conclusion can only be applied to the domains of intelligence tests used in Cattell's, Raven's, and Hsiao's studies. In other words, "these tests may not measure all the factors of intelligence or at least not those outside their domain" (p. 418). It is likely that these domains of intelligence are those valued most by the Western tradition as these intelligence tests have been developed in the Western culture. As an extension of the last point, Hang also implies that these intelligence measures failed to assess the holistic value of intelligence of the people of a particular culture.

Similarly, Goodenough's study does not immediately conclude that any aspect of intelligence of the Jewish and Chinese children exceed that of other countries. "The Man-Drawing-Test" itself, for example, has been criticized to display not only a high loading of cultural biasedness but also, and more specifically, a sexually-biased character. At best, the result is limited to the factors of intelligence tested by this *one* particular intelligence test. When a different intelligence test is designed and used, the result may be very different or even opposite.

With regard to Hsiao's research studies on Chinese and Japanese intelligence, Hang further argues that if Hsiao were to study the Chinese and Japanese from different locations (i.e. to take subcultural differences into account), then the results could be more valid. Rodd's and Hwang's studies might be better than Hsiao's in that the students they tested in Taiwan were immigrants from different provinces of mainland China, and these more diverse representations make a better measure of the Chinese intelligence in general.



Hang also agrees with the view of Professor Yang (1965), a noted psychologist at the National University of Taiwan, that due to the underdevelopment in many aspects of China, many Chinese begin to lose confidence in their intelligence as well as in their traditional culture. The pessimistic view among the Chinese on their own perceived "inferior" intelligence and creativity is well reflected in Chin and Chin's (1963) survey of 1263 university students: 47% of the students think that the creativity of modern China is inferior to Japan and 73% believe it is inferior to the United States.

The implication of this inferiority complex of the Chinese is far-reaching because even the cross-cultural comparisons of intelligence that have used the conventional IQ tests developed in the West have not shown any difference in the intelligence between the Chinese and Western cultures. What if the intelligence of the Chinese is assessed by some measures that are more holistic or appropriate for the Chinese in the light of the Chinese culture?

The chances are that these holistic measures may reveal more of the whole picture of the peculiarity of the Chinese intelligence. This will not only provide a more accurate evaluation of the Chinese intelligence for diagnostic purposes, but also make the Chinese more appreciative of their own true value, as well as the uniqueness of their own culture.

In the introduction of this dissertation, it has been briefly presented that due to the differences in Chinese language and the traditional approach to knowledge, there are reasons to believe that Chinese intelligence is expressed differently from that of the West. Hang also expresses a similar reason why the Chinese should not feel inferior:

The underdeveloped conditions in China only show that the traditional culture of China lacks certain characteristics of the Western cultures, such as analytical, systematic approach,

proactive attitude, and so forth. But the modern world is just the artifacts of the Western cultures. That the Chinese traditional culture does not show the same direction of development as the West does not mean that the Chinese lacks this ability, nor that the Chinese have no creativity at all. In fact, some of the cultural products of the Chinese are the result of high creativity. This is well-recognized by the whole world. We cannot negate the creativity of the Chinese just because China has not created modern science! (p. 418)

#### **Four Research Considerations**

To conclude these literature reviews and critiques, four important issues seem noteworthy for further considerations in the study of intelligence and creativity in the Chinese culture. First, due to the partial understanding of the nature of intelligence and the limitations of the related IQ and creativity measures that have been used so far, these previous studies on the intelligence of the Chinese might not have assessed intelligence and creativity of the Chinese appropriately or *broadly* enough.

In response to this concern, this dissertation research has attempted to use multiple measures to cover the fuller expressions of intelligence broadly according to the Chinese concept of intelligence, which will be presented in Chapter 9. In addition, taken together these measures are also more universal and holistic by nature so that they are not only fair for every culture but can assess the deeper and more holistic structure of personality to capture the holistic meaning of intelligence in Chinese culture (see chapter 13).

Second, Hang suggests that the external validity of Hsiao's research would improve if he had Chinese subjects from different locations of China. To improve the external validity of the study, this dissertation research has chosen students from three schools at three different locations--south, middle, and north--of Taiwan (see Chapter 15).

The third consideration from the critiques is that due to different cultural backgrounds, the intelligence and creativity of the Chinese might have manifested differently from those growing up in other cultures, especially from the West, as Gardner (1983) has suggested (also see De Vos and Hippler, 1969; Atkinson, Atkinson, Smith, and Bem, 1990). It is thus important to take these possible differences into consideration. This dissertation has also considered the most salient aspects of the Chinese thought processes, namely sense-dependent immediacy and contextual thinking, and evaluated Chinese intelligence accordingly (see Chapter 9 and 10).

Finally, what seems to matter most in assessing intelligence and creativity in Chinese culture is the very meaning of intelligence and creativity to the Chinese itself. The investigator asserts that because the conception of intelligence and creativity of the traditional Chinese is *broader* than that of the contemporary Western theories, some broader or more holistic theory and measures of intelligence is not only important for assessing the intelligence of the Chinese, but also indispensable in resolving the predicaments of studying intelligence and creativity in modern psychology today. Toward this ends, Part Three will present the holistic meaning of intelligence and creativity from the Eastern traditions. The complete understanding will prepare for the empirical research on Chinese intelligence presented in Part Four.

### **PART THREE: INTELLIGENCE OF THE EASTERN TRADITIONS**

As seen in Part Two, one thing that many psychologists agree on is that intelligence can mean somewhat different things in different cultures (Berry, 1974; Cole, Gay, Glick, and Sharp, 1971; Goodnow, 1976; Wober, 1974; Sternberg, 1985; Gardner, 1983; see also Neisser, 1976, 1979). Based on this consensus, it is no surprise that the Vedic tradition of India and the Chinese culture, two contrasting traditions to the West, have very different understanding and meaning of the nature of intelligence. This discussion on intelligence from Maharishi's Vedic Psychology will begin Part Three of this dissertation in Chapter 7. Chapter 8 will continue presenting the development of higher intelligence in terms of higher states of consciousness in Maharishi's Vedic Psychology.

Chapter 9 will present a parallel perspective of intelligence from the Chinese tradition to Maharishi's Vedic Psychology. Chapter 10 will further confirm the holistic meaning of Chinese intelligence in terms of Chinese language that has been structuring the mind and expression of intelligence of the Chinese for thousands of years. The distinct thought processes of the Chinese are also derived from the discussion. The connections of consciousness and developing higher intelligence from the perspectives of the Chinese tradition will be discussed in Chapter 11. Finally Part Three will conclude the whole discussion of intelligence in the Eastern traditions with an integrated approach to intelligence from both the Chinese and Vedic cultures in Chapter 12.

## CHAPTER 7

### MAHARISHI'S VEDIC PSYCHOLOGY ON INTELLIGENCE

From the previous discussions on intelligence from the field of modern psychology, it seems obvious that a more holistic and profound knowledge about human and nature is needed in order to have a complete understanding of the nature of intelligence. Unfortunately, because of the profundity of the subject matter, a more holistic understanding of intelligence has been historically confined to the domain of metaphysics or philosophy. A scientific study of intelligence and creativity of the Chinese would become difficult without a holistic theory of intelligence combined with a systematic means of investigation.

A holistic theory of intelligence combined with a systematic means of investigation is now available with the recent revival by Maharishi Mahesh Yogi of the timeless Vedic knowledge in terms of modern science. This is called Maharishi's Vedic Science (Maharishi, 1985a, 1985b). As an aspect of Maharishi's Vedic Science, Maharishi's Vedic Psychology provides a holistic knowledge of life and has made the study of the Chinese intelligence easier. This revived new science, also called the Science of Creative Intelligence (SCI) in the early 1970's (Maharishi, 1972), provides a complete theory of the creative intelligence of man and nature, quite parallel to that of the Chinese tradition. The following will begin by briefly reviewing Maharishi's Vedic Science followed by the discussion of creativity and intelligence in terms of SCI.

## **Maharishi's Vedic Science**

"Maharishi" means great seer. A seer sees the truth. The great seer "enlivens the truth in the life of everyone." The truth is the Veda, because Veda means pure knowledge or complete knowledge. Pure knowledge also means pure consciousness or pure intelligence. Pure intelligence is complete knowledge or holistic intelligence that structures and organizes the total potential of Natural Law in the universe, including in human life (Maharishi, 1985a, 1985b, 1994a).

Maharishi's Vedic Science is therefore the science of the most holistic knowledge of intelligence. This holistic intelligence was recently revived by Maharishi Mahesh Yogi from the Vedic tradition in which the seers had cognized this holistic intelligence. Maharishi, being the great seer, is able to apply this holistic intelligence to the practicalities of daily life for the benefit of everyone. This practical knowledge of intelligence makes it possible not only for anyone to know the holistic nature of intelligence but also to develop the full potential of human life.

In order to know the holistic nature of intelligence, the field of pure intelligence has first to be known. Maharishi explains that the holistic nature of intelligence as the field of pure intelligence gives rise to dynamics of transformation, the Veda. Maharishi's Vedic Psychology explains that this dynamics of transformation of the wholeness of pure intelligence can be understood as the expressions of pure intelligence. Pure intelligence is called creative intelligence in Maharishi's Science of Creative Intelligence. Creative intelligence is defined by Maharishi (1972) as:

The impelling life force which manifests itself in the evolutionary process through creation of new forms and new relationships in the universe...Creativity is the cause of change and is present everywhere, at all times. Intelligence is a basic quality of existence exemplified in the purpose and order of change. Creative Intelligence, then, is the single and branching

flow of energy (creativity) and directedness (intelligence) observable in all phenomena, and the Science of Creative Intelligence is the study of the nature, origin, range, growth and application of creative intelligence...This science arose from the major discovery that there exists throughout creation and in every human being an inexhaustible source of intelligence, energy and happiness, and that this source can be easily and systematically drawn upon by everyone for spontaneous use in daily life. (Forem, 1976, p. 99)

In the quotation, Maharishi defines intelligence as the basic quality of existence exemplified in the "purpose and order of change," and creativity is the life force which manifests itself in the evolutionary process through the creation of new forms and new relationships in the universe that causes change. Both intelligence and creativity, however, have their common source in pure intelligence.

In order for everyone to be able to "enliven and draw upon this inexhaustible source of intelligence," the pure intelligence, in the human mind, Maharishi teaches an easy and systematic technology of consciousness, called the Transcendental Meditation (TM) program. Through the practice, anyone can develop the most holistic intelligence in life. To justify these points in full, the following will review the theory of the sequential unfoldment of creative intelligence and the technology of consciousness in more detail.

## **The Theory of the Sequential Unfoldment of Creative Intelligence**

### *The Unified Source of Creative Intelligence*

Maharishi Vedic Science states that the basis of all existence is a field of pure intelligence--the source of the intelligence or orderliness of nature. The field of pure intelligence, however, is also a field of pure existence--the self-sufficient source of all that exists in nature. Being a field of intelligence as well as a field of existence, it is awake to its own

nature. This property of self-referral is the seed of the creative potential of nature giving rise to the numerous values in creation (Maharishi, 1972; also see Orme-Johnson, 1988). This creativity of pure intelligence is referred as creative intelligence. The mechanics of how this creative intelligence unfolds itself is explained by Maharishi (1972):

This is the first step of progress on the path of intelligence becoming creative intelligence: In its preparation to assume the role of creative intelligence, the unmanifest value of pure intelligence through its own nature, by virtue of its own existence, becomes consciousness. This makes the existence of intelligence conscious, and when the existence becomes conscious, that is, aware of itself, intelligence becomes intelligent. This intelligent aspect of the unmanifest value of pure intelligence then assumes the role of creative intelligence. This explains the mechanics of how the unmanifest value of intelligence becomes creative intelligence and transforms into many, many manifest values. (p. 8:4)

#### *Pure Intelligence of Three Values*

Maharishi explains that the property of self-referral, or wakefulness to its own nature, creates the relationship of observer or knower and observed or known. Being the observer and observed at the same time, pure intelligence must be the process of observation as well. On the level of the unified state of pure consciousness, however, each of the three values is the same pure intelligence. This three-in-one structure of pure intelligence is called the Samhita (unity) of Rishi (knower), Devata (process of knowing), and Chhandas (known) (Maharishi, 1986a, pp. 40-41) in Maharishi's Vedic Science.

Maharishi explains that the infinite values of creation results from the self-referral dynamics of the three-in-one structure.

...In that pure consciousness we have three values--observed, observer and observation--and we have one unified state of the three. Here we have one and three at the same time. When we have



one and three together in that self-referral state of pure consciousness, there is that infinite contraction for remaining one and there is that quick expansion to become three. When they are simultaneously three and one there is infinite dynamism. This infinite dynamism of the togetherness of three creates its own noise. This noise is the noise of the unmanifest field, which is unmanifest because it is open to itself--pure singularity but with three qualities, three and one together. In this togetherness of one and three we find infinity pulsating--infinity pulsating in that state of pure awareness where the awareness knows its unboundedness. Infinity, fully awake within itself, is fully awake to its infinite value. At the same time it is awake to a point value. In this we find the dynamism of infinity converging to a point and a point expanding to infinity. This infinite dynamism of the self-referral nature of pure consciousness cause noise...It creates vibrations within itself. (pp. 64-66)

Maharishi explains that the simultaneously one and three, unified and diversified, structure of opposite values within the nature of pure intelligence creates an "infinite frequency" of oscillation from infinity to a point. This infinite frequency of noise, or vibration inherent within pure intelligence as a fundamental form of vibration, gets transformed into other modes of vibration in an orderly and sequential way. It is this sequence of transformation within these dynamics of the three-in-one structure which is responsible for the sequential emergence of all the phenomena of nature; the creative power of nature is thus inexhaustible. Maharishi (1986, 1985a) states:

The interaction of the different intellectually conceived components of this unified, self-referral state of consciousness is that all-powerful activity at the most elementary level of nature. That activity is responsible for the innumerable varieties of life in the world, the *innumerable streams of intelligence* in creation" (Maharishi Mahesh Yogi, 1986, pp. 25-26, italics added). The unified field [of pure intelligence] progresses sequentially. There is the sequential progression of the unified field into the specificities of life, the space-time boundaries of life...the whole infinite diversity of the universe is created and maintained and kept self-referral. (p. 62)

The "unified field" of pure intelligence sequentially giving rise to the "innumerable streams of intelligence in creation" reveals both the unified and the diversified nature of intelligence.

*The Sequential Unfoldment of the Veda and Whole Vedic Literature*

The explanation of the sequence of transformation within the dynamics of the three-in-one structure responsible for the sequential emergence of all the phenomena of nature also reveals the supreme intelligence of Maharishi as a great seer. In contrast to the common understanding in the West that the Veda and the Vedic literature are ancient texts written at different times by different individuals, of great mind's creation, Maharishi has brought to light that the true nature of the expressions contained in the Vedic texts: they are the complete expression of the most fundamental dynamics of Natural Law itself. Veda is the field of pure intelligence of its own self-interacting dynamics. Since these dynamics form sequences of vibration, the ancient Vedic seers who had raised their consciousness or intelligence to that level of pure intelligence can cognize or "heard" these sequences of vibration. The Veda and Vedic literature are simply the records of these sequences of sound by the Vedic seers.

In addition, the Veda is a sequential, self-expressed commentary (*Apaurusheya Bhashya*) of its own expressions of intelligence by which the unified field of pure intelligence gives rise to the multiplicities of modes of intelligence in an orderly way. This self-referral, sequential development of the Veda and Vedic Literature: Maharishi (1985a) describes:

Sequential development means that the whole tree is found in the seed. The whole tree is found in the first stage of sprouting of the seed, and in the second stage of sprouting, and in the third stage of sprouting. As the tree grows, the total tree is contained at every level. This is Vedic literature. It unfolds as Natural Law unfolds,

from its total basis in the unified field to its specific expressions. Like that, sequentially developing, the whole infinite diversity of the universe is created and maintained and kept self-referral. (p. 62)

Maharishi explains that the Veda and the entire Vedic Literature describe the dynamics of Natural Law as a further sequential unfoldment of the self-interacting dynamics of the unified field of pure intelligence. Maharishi (1985a) identifies the sequence of transformations as the sequence of vibration by which one aspect of the Vedic literature give rise to another as follows:

The whole Vedic literature is dedicated to bringing out these three values in terms of Rishi, Devata, and Chhandas. There is one Veda, called Rig Veda, which is the totality of all knowledge. Knowledge means knowledge of the three. There are three Vedas basically attributed to the three values of Rishi, Devata, and Chhandas. They are Sama Veda, Yajur Veda, and Atharva Veda. These three values of Rishi, Devata, and Chhandas have been expounded as three aspects of the Vedic literature: Upanishads, Aranyakas, and Brahmanas. (pp. 67-68)

Maharishi describes the Rig Veda as the holistic structure of intelligence which then gives rise to the differentiated structures of the modes of intelligence, such as Sama Veda, Yajur Veda, and Atharva Veda, expressed in the Vedic literature as the *Sutra*, or verses, of the Vedic literature. Maharishi explains the principle by which one aspect of the Samhita of Rishi, Devata, and Chhandas is transformed into another. Maharishi (1985b) further explains that the other parts of the Vedic literature are also expressed in sequence:

Perfect precision and order in perfect sequence is available in the arrangement of the Vedic literature: the Samhitas [the four Vedas], the Upanishads, the Aranyakas and Brahmanas; the Shiksha, Kalpa, Vyakaran, Nirukta, Chhandas, and Jyotish; the Nyaya, Vaisheshika, sankhya, Yoga, Karma Mimansa, and Vedanta; the

Itihasa, Puranas and Smritis; and the Upavedas--Ayur-Veda, Gandharva-Veda, Dhanur-Veda, and Sthapatya-Veda. These are the different aspects of the Vedic literature, which organized in this sequence, give us the sequential progression of the whole body and behavior and the whole universal creation--all well regulated in the evolutionary direction. (p.136)

As explained by Maharishi, the sequential expressions of the different aspects of the Veda and Vedic literature give us the "sequential progression of the whole body and behavior and the whole universal creation--all well regulated in the evolutionary direction." This shows the holistic nature of intelligence from cosmic life to individual life. The following will further illustrate how this totality of intelligence sequentially unfolds itself into both subjective life and objective existence.

#### *The Sequential Manifestation of Subjective and Objective Existence*

Since pure consciousness is awake to its own nature and then sequentially unfolds itself into numerous values, pure consciousness can be viewed as pure subjectivity within its own structure of the cosmic psyche. There are different levels within the structure. These levels range from pure intelligence, the cosmic psyche as Self, to intellect, mind, and senses, and finally the manifest material existence. As universal expression of pure intelligence, all the qualities associated with these different levels can be found in the functioning of all aspects of Natural Law (see Dillbeck, 1988, pp. 258-261).

*Subjective expression of creative intelligence in individual life.* In individual life, Maharishi explains that the same creative intelligence creates and expresses itself sequentially from subtle to gross through different levels of mind or subjectivity. The different levels of mind include ego ("small" self), feelings, intellect, mind (thinking mind), and senses, the microcosm reflects the macrocosm (see Dillbeck, pp. 262-

266). Creative intelligence can be seen and assessed in the functions of these different mental structures.

Whereas the Self, pure intelligence, is universality at the basis of the individual mind, the ego is the deepest level of individuality. The Ego is the experiencer, responsible for integration and synthesis of experience. It provides the internal "reference point" and "organizing power" necessary for synthesis of information derived from all the levels of mind; its role is to sustain the integrity and evolution of the individual. Maharishi (1972) describes these functions of the ego as follows:

The ego is that value of life which is most refined in its character. The ego experiences; it is the experiencer in the individual life. The ego feels; the ego enjoys--feeling touches the ego, understanding touches the ego. Ego understands; ego feels; ego thinks. That faculty of the ego which thinks is called the mind. That faculty of the ego which understands, discriminates, and decides is called the intellect. (pp. 19:11-12).

When the consciousness of an individual becomes fully developed, however, one's ego, small self of an individual realized its universal stature as the cosmic Self, pure creative intelligence. Maharishi explains (1972) that the individual ego is only the reality of the restricted value of the infinite creative intelligence:

When we say "I," we mean the inner value of the speaker, and that is an expressed value, a wave of cosmic life. Individual life, individual ego, is a wave of cosmic life. Just as a wave on the ocean is an expression of the ocean, the individual is an expression of the infinite value of life. (p. 19:8)

Next after ego, feelings in the broad sense operate at and interconnect all levels of mind. As such, feelings are not a fixed mental

structure. However, they can be located between ego and intellect and function as delicate carriers of information, linking the intellect back to the intrinsic evolutionary motivation of the ego and ultimately to pure intelligence, the Self. Feelings involve a more *holistic*, intuitive mode of functioning (see Alexander et al., 1990).

After feelings, the intellect is responsible for the functions of discrimination, logical evaluation, decision making, bringing direction and order (and hence understanding) and controlling the allocation of attention in an individual life. The intellect could be described as a grosser level of individual personality than the ego (Maharishi, 1969, pp. 242-243, 422).

When the consciousness of an individual is fully developed, however, one will realize that both ego and intellect have their foundation in the universal field of pure intelligence. The ego in the very existence of the Self as pure intelligence, and the intellect in the intelligence of the same pure intelligence. The developed intellect is capable of discriminating both knower and known within the self-referral structure of pure consciousness (Maharishi, 1969, pp. 206, 423). "It is the fineness of the intellect which maintains the self-referral state. In this state the intellect is completely coordinated with the Self..." (pp. 112-113).

As the next unfoldment of creative intelligence, the individual (thinking) mind is more active or expressed than the intellect. It is concerned with remembering, apprehending relationships, conceptually organizing the multiplicity of perceptions. Therefore, Maharishi (1972) comments the role of the mind as "The instrumentality through which creative intelligence expresses itself into the outer world of activity, into the gross fields of existence..." (p. 19:3)

In relation to the intellect, Maharishi (1972) explains the role of the mind as follows:

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The intellect filters the information which comes to it through the mind. Useful things are accepted, useless things are rejected. The mind is like an open camera; it receives all the impulses from everywhere. The mind takes in everything that comes in through the senses. We see so many things. The vision gets drawn to one thing which seems to be more enjoyable, more useful, and then the intellect evaluates: it decides whether it is good or bad, and then accepts the good and rejects the bad. On the basis of that, we act for greater achievement and fulfillment. (p. 19:10)

As also mentioned by Maharishi in the quotation, the senses as the next extension of the mind serve as an intermediary between the mind and the manifest outer environment. The function of the five senses is to process information from the environment appropriate to each sense (see Orme-Johnson, 1988 & Alexander et al., 1990). Maharishi (1972) explains their holistic relationship with the mind and creative intelligence as follows:

The sense are the projection of the mind, and they are also the organs through which the mind expresses itself. Creative intelligence, expressing itself in different layers, one within the other, manifests in the entire diversity of the universe: the mind, and then the senses, and then the entire creation to serve as the objects of the senses. (p. 19:4)

To summarize the whole range of mental activity and structure presented above, Maharishi (1972, p. 19:3) also uses the term "mind" in the context of individual life in a larger sense. In this context, the mind is described as an instrument of pure intelligence in contrast to pure intelligence on the one hand or the body on the other. Maharishi concludes the relationship between creative intelligence and the mind as follows:

In one word, mind, we can include the entire range of expression of creative intelligence from that universal, unbounded eternal to the individual ego, to feelings, to the thinking ability, and to the

senses. the value of creative intelligence is appreciated on all these different levels...(p. 19:4)

The mind, therefore, serves as an instrument of creative intelligence through which the universal field of pure intelligence functions in human experience. In order for subjective experience to take place in time and space in human life, however, a material expression of human physiology is necessary. Pure intelligence also creates the "vehicle" of physiology through which it can express itself and function fully (Maharishi, 1969).

*Objective expression of creative intelligence in individual life.* A human physiology is the most "intelligent" structure among the numerous material expressions of pure intelligence. It is the most intelligent material expression in that it can reflect the totality of the self-referral dynamics of pure intelligence in one holistic structure of consciousness when it is fully developed (see Wallace, Fagan, and Pasco, 1988). This is simply because the creation of the body, the vehicle of pure intelligence, despite its grosser expression, is also a part of the unbroken wholeness of the cosmic intelligence in its sequential unfoldment of itself. Maharishi explains this self-referral process as follows:

Through sequential development consciousness unfolds itself into the value of matter; consciousness becomes matter. The Self becomes mind, and the mind becomes matter. We see this in modern physiology, when the DNA and RNA give rise to all the proteins, which in turn structure the body systems. This transformation of the field of pure knowledge [intelligence] rising from DNA as the impulse of information in RNA, to RNA becoming protein and protein becoming the whole material system is the description of consciousness becoming matter. This transformation is sequential but always remains self-referral...This performance is self-referral because consciousness, intelligence, is developing itself into different expressions of its own nature and there is a *continuity* between matter and pure



consciousness--the Self, the mind, and the body. (pp. 68-69, italic added)

The significance of what Maharishi says is that intelligence can be seen not only in the mind, but also in the physiology.

*The discovery of the Veda and Vedic Literature in human physiology.* The previous section explained, that the holistic structure of intelligence is Rig Veda, the holistic structure of intelligence which gives rise to the differentiated structures of the modes of intelligence, such as Sama Veda, Yajur Veda, and Atharva Veda, expressed in the Vedic literature as the *Sutra*, or verses, of the Vedic literature. Neurophysiologist Dr. Tong Nader, under Maharishi's inspiration and guidance, has announced the discovery (Nader, 1994) that this unified and holistic structure of intelligence, and these diversified and differentiated structures of intelligence, are the fundamental basis and essential ingredient of the human physiology.

Precisely, the thirty-seven aspects of the unified values of intelligence in the Rig Veda and the diversified values of modes of intelligence in the Vedic literature are found to be structuring intelligence at the basis of the thirty-seven areas of the structure and function of the human physiology. This can be understood as the two expressions of intelligence--one on the level of intelligence in the form of sound, vibration (Veda), as available in the Vedic literature, and the other on the level of the form of matter (physiology).

To illustrate this point, the following takes the Rig Veda and Nyaya aspects of the Vedic Literature as two examples.

First, Rig Veda structures the entire human physiology. This can be seen in the 192 Suktas of the first Mandala of Rig Veda as they correlate with the structure and function of nervous system and the entire physiology as follows:

Sukta 1 corresponds to layer 1 of the cerebral cortex; complementary Sukta 97 to the silent filum terminale; Sukta 2-4 and Sukta 98-100 to the excitatory and to the inhibitory stimuli of corpus callosum and corona radiata; Sukta 5-28 and 101-124 to excitatory and inhibitory stimuli of the cranial nerves; Sukta 29-96 and 125-192 to the excitatory and inhibitory stimuli of the spinal nerves. (Maharishi, 1994b. In Maharishi's Absolute Theory of Defence, p. 120)

The second example is that Nyaya corresponds to the structure and function of the thalamus in the human physiology. In terms of structure, there are 16 nuclei of the thalamus corresponding to the 16 aspects of Nyaya. These are grouped in 5 sections corresponding to the 5 chapters of Nyaya. Functionally, Nyaya expounds on the quality of logic and discrimination of intelligence which also corresponds to the function of control, such as planning and decision-making, which is carried out by the thalamus in human physiology. Like these two examples, the other thirty-five aspects of the Vedic literature correspond precisely with the structure and function of human physiology, which thus displays the totality of intelligence on the physiological level.

In fact, it is through the intelligent structure of the human nervous system that a man can experience the universal field of pure intelligence. Individual intelligence is simply the reflection of cosmic intelligence through the "reflector" of the human nervous system. Depending on the quality of the human nervous system, pure intelligence is reflected in various degrees which determine the level of individual intelligence. Accordingly, in addition to the development of consciousness as a direct means of developing intelligence, it is also essential to cultivate the health and achieve optimal functioning of the human physiology as well (see Maharishi, 1969, p. 166; 1963, pp. 188-189; also see Wallace, 1986, 1993).

### *Development of Human Intelligence*

In the course of human development, the *Life-span Model of Development of Consciousness* (Alexander et al., 1991) based on Maharishi's Vedic Psychology postulates that mental potential primarily unfolds through a spontaneous shift of awareness to functioning at the progressively deeper levels of mind; and the different levels of mind develop to become more differentiated in their specific functions while becoming hierarchically more integrated with each other and with the Self.

Maharishi (1972) also describes each of the more subtle levels of mind as organizing the activity of the more superficial levels. The ultimate expression of this principle is that by regular daily experience of pure creative intelligence through Maharishi's Transcendental Meditation program (see next section), all the levels of subjectivity expand in their functioning to become increasingly attuned to the full range of the laws of nature; the ego, feelings, intellect, mind, and senses express progressively fuller values of pure creative intelligence.

As the structures of mind and body represent one integrated system of the unbroken wholeness of the cosmic psyche (Maharishi, 1963, pp. 188-189), the unfoldment of mind will always involve a corresponding physiological reorganization. Maharishi (1963, 1969, 1972) explains that *stress* and strain in the physiology "overload" the functioning of the nervous system, and thereby obstruct the corresponding full expressions of creative intelligence in the psychophysiology. As consciousness is enlivened in the mind, intelligence grows in the body also. The growing intelligence in the physiology will then "normalize" the stress and strain in the physiology. The physiology will become more orderly, more intelligence. Creative intelligence in turn gets expressed more fully in the body. As a result, the body becomes more healthy, creative, and mind-body coordination also improves (see Maharishi, 1963; Nader, 1994).

## **The Technology for Developing Intelligence**

The Transcendental Meditation (TM) technique is Maharishi's technology of consciousness to unfold the full creative potential of human intelligence. TM is a simple, natural process which enables an individual to directly experience the finer levels of thinking processes; until the finest thought is transcended, the source of thought, the field of pure intelligence, is reached (Maharishi, 1969). With regular twice-daily practice, creative intelligence is enlivened more and more and "infused" into the conscious mind of an individual. The different levels of the mind then become more and more integrated with the reservoir of infinite creative intelligence. Consequently, total mental potential is gradually unfolded (Please refer to Appendix showing how the TM technique enlivens pure consciousness and sequentially unfolds different modes of intelligence).

## **Scientific Studies on the Unfoldment of Creative Intelligence**

The theory and practice of Maharishi's Vedic Psychology in the unfoldment of creative intelligence is evidenced in scientific research studies by an increased fluid intelligence (Aron et al., 1981; Dillbeck et al., 1986; Jedrczak et al., 1985; Kotchabhakdi, et al., 1982; Tjoa, 1975), increased intelligence longitudinally in students (Aron et al., 1981; Cranson, 1989; Dillbeck et al., 1986). The practice of the TM program also: increases creativity (Jedrczak et al., 1986; Shecter, 1978); increases the flexibility of figural creativity as well as the fluency of verbal creativity (Travis, 1979); reduces choice reaction time, a correlate of intelligence (Cranson, 1989; Holt et al., 1978); shortens latency of cortical evoked potentials (Kobal, Wandhofer, & Platting, 1975; Wandhofer, Kobal, & Patting, 1976). The TM program also induces higher levels of EEG coherence which is significantly correlated with creativity (Orme-Johnson & Haynes, 1981; Haynes,

Hebert, Reber, & Orme-Johnson, 1977), and IQ (Orme-Johnson, 1982).

In addition to these cognitive related studies on intelligence, the TM program has also been shown to improve the unfoldment of creative intelligence on the levels of ego, feelings, and physiology. Chandler (1990), for example, shows that the TM program induces a holistic self development, affective functioning, and cognitive development in the moral domain; Rest (1975), Nidich (1975), and Nidich, Ryncarz, Abrams, Orme-Johnson, and Wallace (1983) also show that the TM program increases principled moral reasoning. In addition, the TM program also enhances a younger biological age (Wallace, Dillbeck, Jacobe, and Harrington, 1982); increases alpha EEG coherence (Orme-Johnson and Haynes, 1981); blood flow to the brain (Jevning, Wilson, Smith, and Morton, 1978); and efficiency of neuroendocrine, cardiovascular, and certain cognitive functions (e.g. Cooper and Aygen, 1979; Dillbeck, 1982; Glaser et al., 1987; Werner, Wallace, Charles, Janssen, and Chalmers, 1986).

This is only a very brief review of research studies on the Transcendental Meditation program which are more directly related to the study of intelligence. There are, however, over five hundred scientific studies on the beneficial effects of the TM program on physiology, psychology, sociology, and ecology. Many of these research studies employed the most rigorous research methodology such as meta-analysis, time-series analysis, and have been published in such most prestigious journals as *Science* and *Journal of Conflict Resolution*. All the five hundred scientific studies on the TM program can be reviewed on the six volumes of *Collected papers* (Orme-Johnson and Farrow, 1977; Chalmer, Clements, Schenkluhn, and Weinless, 1989a, 1989b, 1991; Wallace, Orme-Johnson, and Dillbeck, 1994; Vol. 6, in preparation).

These over five hundred scientific studies on the TM program taken together have suggested that Maharishi's Vedic Psychology could provide a complete knowledge to unfold full human creative

intelligence. This full development of human intelligence can be seen in terms of the growth of higher states of human consciousness presented in the next chapter.

## CHAPTER 8

### DEVELOPING HIGHER STATES OF CONSCIOUSNESS FROM MAHARISHI'S VEDIC PSYCHOLOGY AS GROWTH OF HUMAN INTELLIGENCE

As the most holistic knowledge of intelligence, Maharishi's Vedic Psychology explains that intelligence develops systematically in an invariant and sequential manner through higher states of consciousness. As explained in the previous chapter, the terms pure intelligence and pure consciousness are interchangeable in Maharishi's Vedic Psychology.

Beyond the three ordinary changing states of consciousness, namely, waking, dreaming, and sleeping, Maharishi's Vedic Psychology delineates four more major states of consciousness as the full range of human intelligence. These higher states of intelligence or consciousness, namely, Transcendental (pure) Consciousness, Cosmic Consciousness, God Consciousness, and Unity Consciousness, are universally attainable, and thus verifiable, through the regular experience of pure intelligence. (Maharishi, 1972).

Transcendental, Cosmic, God, and Unity Consciousness are described as the fourth, fifth, sixth, and seventh different states of consciousness because they are qualitatively distinct from one another. Furthermore, the higher the state of consciousness, the more integrative and universal of experience it becomes; in other words, when a progressively higher state of consciousness is developed, one will live progressively more of the total existence of life, and thereby is in command of progressively more of total intelligence of nature.

## Transcendental Consciousness

Transcendental experience has not been uncommon among many individuals from both the Eastern and Western cultures (e.g., see Alexander and Boyer, 1989; Pearson, in press; Smith, in press). However transitory or difficult to attain the experience transcendence may have been considered in the past (e.g. see James, 1890; Maslow, 1964), even the rarity of experiences from a few individuals suggests that beyond the ordinary waking, dreaming, and sleeping states of consciousness there lies another field of consciousness.

Maharishi's Vedic Psychology, however, provides a systematic means--the TM technology--to reliably experience this pure field of intelligence through the process of shifting conscious awareness to finer levels of mind. Maharishi (1976) describes systematic experience of Transcendental Consciousness during the TM technique as follows:

The Transcendental Meditation technique is an effortless procedure for allowing the excitations of the mind to gradually settle down until the least excited state of mind is reached. This is a state of inner wakefulness with no object of thought or perception, just pure consciousness awake of its own unbounded nature. It is wholeness, aware of itself, devoid of differences, beyond the division of subject and object--Transcendental Consciousness. (p.123)

In the transcendental state, Maharishi (1986a) describes that awareness becomes completely "self-referral" when "pure consciousness [is] aware of its own unbounded nature" or "has nothing other than itself in its structure" (p.27). In this "self-referral" state, "...consciousness knows itself to be the knower, the known, and the process of gaining knowledge--all three values simultaneously in one" (p. 40). This undivided wholeness of awareness or pure knowledge of



the knower, the known, and the process of knowing is the unmanifest source and infinite reservoir of creative intelligence which gives rise to all the manifestations of Natural Law. Maharishi (1986a) summarizes this creative process as follows:

Pure knowledge we know from our own daily experience during Transcendental Meditation and TM-Sidhi program. Pure knowledge is when consciousness has nothing other than itself in its structure, when the awareness is completely self-referral, when the awareness knows itself. When we say "pure knowledge," we mean that all that there is knowledge, a solid mass of knowledge... The knower, the known, and the process of knowledge which connects the knower, the known, and the process of knowing--when these three aspects of knowledge are seated one within the other, that is called samhita...This state of pure knowledge, where knower, known, and knowledge are in the self-referral state, is that all-powerful, immortal, infinite dynamism at the unmanifest basis of creation. (pp. 26-27)

Since Maharishi (1966) states that pure intelligence always underlies thought and behavior, pure intelligence can be directly experienced when the conscious mind is transcended through the practice of the TM technique. When one repeatedly experiences pure intelligence in meditation, pure intelligence will be stabilized in the conscious mind resulting in the fifth state of Cosmic Consciousness.

### Cosmic Consciousness

Cosmic Consciousness is characterized by a permanent stabilization of pure intelligence in daily life. In this first stage of enlightenment, pure self-referral awareness is spontaneously experienced in the midst of waking activity during the day, while dreaming and deep sleep during the night.

In other words, under the new light of unbounded pure creative intelligence of Transcendental Consciousness, the localized expression

of individual intelligence is fully expanded to and supported by the cosmic level of intelligence. In alliance with this unbounded creative intelligence, an individual in Cosmic Consciousness, as explained by Maharishi (1969), gains freedom from the boundaries of individual life:

The state of Cosmic Consciousness is inclusive of Transcendental Consciousness as well as of consciousness of the relative order; it brings cosmic status to the individual life. When the individual consciousness achieves the status of cosmic existence...a man is ever free, unbounded by any aspect of time, space or causation, ever out of bondage. This state of eternal freedom, set out here in principle, is a result of establishing the mind in the state of Transcendental Consciousness. (p.145)

This state of eternal freedom in Cosmic Consciousness provides the true basis to live an "intelligent life." This can be logically seen from two aspects. First, Maharishi (1969) explains that this natural state of enlightenment is brought about by a new style of stress-free mental and physiological functioning. Second, a man in Cosmic Consciousness lives an integrated life for maximum fulfillment in daily life in accord with Natural Law.

For the first aspect of stress-free psychophysiological functioning, Maharishi (1972) states that in order for the absolute state of Transcendental Consciousness to be lived along with the relative waking, dreaming and sleeping states, the neurophysiological functioning has to be refined (through the normalization of stress) to a specific style so that the style of functioning corresponding to Transcendental Consciousness can coexist with that of these other states. Through the alternations of deep rest in transcendental experience during meditation with daily activity after meditation, one can gradually and systematically culture the nervous system to spontaneously integrate and maintain both styles of functioning simultaneously. A stress-free life, therefore, displays the intelligence of integration and adaptability of the human neurophysiology which

leads to an infinite flexibility for mental functioning and success in life.

The second aspect of integration can be seen in fulfillment on the level of everyday living. Maharishi (1969) of pure intelligence as the field of pure bliss. When activity of everyday living is performed on a platform of unbounded bliss in the integrated life of Cosmic Consciousness, an unshakable equanimity and fulfillment begin to be displayed in everyday behavior. The experience of bliss the basis of intelligent living can be seen in Maharishi's (1969) comment:

The intensity of happiness is beyond the superlative. The bliss of this state eliminates the possibility of any sorrow, great or small...*No* sorrow can enter bliss-consciousness, nor can bliss-consciousness know any gain greater than itself. This state of self-sufficiency leaves one steadfast in oneself, fulfilled in eternal contentment. (p.424)

In this self-sufficient, blissful, and fulfilled state of enlightenment, described by Maharishi (1972), a person for the first time begins to live 200% of integrated life: 100% absolute pure intelligence, inner bliss, and 100% outer joy of relative success. Such an enlightenment man is described as performing "skill in action"-- activity is performed with maximum efficiency and effectiveness with least effort.

Furthermore, the person in Cosmic Consciousness will always *spontaneously* perform right action according to the absolute laws of nature, the total potential of creative intelligence residing in his own fully-awake consciousness (Maharishi, 1969). All these exalted qualities displayed in the full development of the subjective aspect of life make the enlightened in Cosmic Consciousness a truly wise person!

When the subjective aspect of life is fully developed, the next stage of enlightenment will naturally be the further refinement of the objective aspect of life which results in God Consciousness (Maharishi, 1969).

## God Consciousness

God Consciousness is characterized by the capability of perceiving and thus appreciating the most refined value of the creative impulses of intelligence at the junction point between creation and its unmanifest source of pure intelligence. This expansion of intelligence of an individual in Cosmic Consciousness results from the *further* development of the inner self-referral pure intelligence to the outer perceptions of the environment with maximum value.

In other words, this is the *objective* aspect of growth of intelligence which extends one's self-referral intelligence to include the entire range of manifest creation through the progressive refinement of experience of the senses and feelings. Hence, the full value of pure intelligence is growing from inside to outside. This objective growth of intelligence can also be understood from the subjective experience of God Consciousness to which Maharishi (1969) contrasts with that of Cosmic Consciousness:

In the state of Cosmic Consciousness, the Self is experienced as separated from activity. This state of life in perfect non-attachment is based on bliss-consciousness, by virtue of which the qualities of the heart have gained their most complete development. Universal love then dominates the heart...the silent ocean of bliss, the silent ocean of love, begins to rise in waves of devotion. The heart in its state of eternal contentment begins to move, and this begins to draw everything together and eliminate the gulf of separation between the Self and activity. The Union of all diversity in the Self begins to grow. (p.307)

To put this in terms of development of intelligence, a man in Cosmic Consciousness who has developed the full value of creative intelligence within his own Self begins to extend his own Self to appreciate the maximum value of creative intelligence that structures

all the activities of the environment. Therefore, "the Union of all diversity in the Self begins to grow" in God Consciousness.

Maharishi (1969) explains that God Consciousness *develops through* a process of increased purity and refinement of mind and body until the individual perceives and appreciates increasingly refined levels of creation and then the subtlest, most refined level of creation. On the basis of this profound refinement of feeling and perception, one experiences an upsurge of waves of love and devotion for the harmony, diversity, grandeur, and perfect orderliness of the creator of nature, God. Maharishi (1966) describes:

Perfect mental and physical health is natural in this state of fulfillment of life where intelligence speaks in all phases, where God-consciousness permeates all daily experiences and activities, where universal love flows in and overflows from the heart and where intelligence fills the mind. In such a state of integrated life where behavior is in perfect harmony and where all phases of living are infused with consciousness, universal love for everything overflows...

Every perception, the sound of every word, the touch of every little particle and the smell of whatever may be, brings a tidal wave from the ocean of eternal bliss. Every rising thought, word or action is a rising of the tide of bliss. (p.250)

To explain the transition from Cosmic Consciousness to God Consciousness, Maharishi (1986a) describes the corresponding expression of intelligence from the biochemical level of the human physiology. He explains that the stress-free state of Cosmic Consciousness provides the basis for a more refined mode of functioning of the digestive system, which produces a very chemical substance referred to as Soma in the Vedic tradition. This biochemical foundation for the refined perception in God Consciousness is described by Maharishi as follows:

...a normally functioning nervous system, free from stress and strain and any abnormality, produces a chemical called soma...If there are no restrictions, no inhibitions, then awareness is unbounded; and when this unbounded awareness is maintained spontaneously at all times, then the nervous system is functioning normally...Now, the best product of such a normally functioning digestive system is soma...

So soma is that which helps all the fundamentals of individual consciousness rise above boundaries, and have an unbounded status...in that unbounded self-awareness the perception is very rich--the perception is richest! (Wallace, 1986, p. 153)

In supplement to the intelligence of the physiology, Maharishi (1969) also points that "intelligent activities" of refined qualities can help to foster the transition from Cosmic Consciousness to God Consciousness. Feelings of service, reverence, and love are such refined qualities that naturally integrate the independent styles of physiological functioning which correspond to the Self and activity in God Consciousness.

This integration of functions on the physiological level is brought about by a mental activity of ultimate refinement. In order to define activity of this quality, we must analyze the whole range of activity. The activity of the organs of action is the most gross, the activity of the senses of perception is more refined, the mental activity of thought is finer still, and the *activity of feeling and emotion* is the finest of all...

The activity of devotion comprises the feelings of service, reverence and love, which are the most refined qualities of feelings. It is through the activity of devotion that Cosmic Consciousness develops into God-consciousness.

When the nervous system is constantly exposed to this refined activity of devotion, the physiological integration of functions that has been described takes place. And it is the permanent state of this condition of the nervous system that enables a man to live God-consciousness in his daily life; acting in the midst of all sorts of circumstances, fulfilling the purpose of cosmic life...(p.315)

This is how the intelligence of outer behavior, inner psychology, and physiology influence and reinforce one another to bring about a holistic expansion of intelligence to a higher state of consciousness.

When God Consciousness is fully gained, only the finest separation remains between the unboundedness of pure creative intelligence and the boundaries of the different modes of intelligence of the object to be known. Naturally, this finest separation still produces a gap between the infinite, universal intelligence and the finite modes of intelligence of individual life. As the intelligence of an individual continues to develop from God Consciousness, the gap between universal and individual intelligence will be filled and a man will culminate in the universal intelligence of Unity Consciousness.

### Unity Consciousness

Unity Consciousness is the seventh state of consciousness described by Maharishi (1972). As the final stage of human development, an individual in Unity Consciousness enjoys the supreme value of creative intelligence not only as his or her subjective Self, but also sees the same infinite value of universal intelligence in every object. This unity of pure creative intelligence of the Self and object is explained by Maharishi (1972) as follows:

This seventh state of consciousness could very well be called the unified state of consciousness because in that state, the ultimate value of the object, infinite and unmanifest, is made lively when the conscious mind, being lively in the unbounded value of awareness, falls on the object. The object is cognized in terms of the pure subjective value of unbounded, unmanifest awareness... In this unified state of consciousness, the experiencer and the object of experience have both been brought to the same level of infinite value, and this encompasses the entire phenomenon of perception and action as well. The gulf between the knower and the object of his knowing has been bridged. When the unbounded

perceiver is able to cognize the object in its total reality, cognizing the infinite value of the object which was hitherto unseen, then the perception can be called total, or of supreme value. In this state, the full value of knowledge has been gained, and we can finally speak of complete knowledge. (Lesson 23, p.9, italic added)

This unity of subject and object on the "level of infinite value," or gaining "the full value of knowledge" raises a person to live life supported by the total intelligence available in nature. Compared to Transcendental Consciousness, Unity Consciousness brings the infinite value of pure creative intelligence from the experience of the individual alone to every aspect of subjective and objective existence. In reference to Cosmic Consciousness, Maharishi (1969) states: "...the Self, which held Its identity as separate from all activity in the state of Cosmic Consciousness, finds everything in Itself [in Unity Consciousness]" (p.307).

To bring fulfillment to God Consciousness, a person in Unity Consciousness further refines his or her appreciation of the subtlest value of objects of perception to appreciation of the transcendental, infinite value of the objects of perception. The highest value of self-referral universal intelligence is experienced. The infinite value of creative intelligence, the Self, is located at every point in creation, and every point in creation is raised to the infinite status of the Self. The gap between the relative and absolute is eliminated, and the entire cosmic life is realized to be nothing other than the Self functioning from within Itself; omnipresent cosmic intelligence playing within Itself.

There are, however, also phases of growth in the experience of wholeness moving within the Self. In the beginning phase of Unity Consciousness, only the primary object of perception is experienced in terms of the Self. Then the secondary and tertiary objects of perception is also included as



the experience of the Self. Gradually like that, every value and object, even in the farthest galaxy, is ultimately experienced as nothing other than the Self, cosmic intelligence. This is the ripened state of Unity Consciousness called *Brahman Consciousness*. The ultimate wholeness of oneness of intelligence is then achieved (see Alexander and Boyer, 1989).

Maharishi (1969) explains that on the basis of the profound intimacy gained between the knower and known in God Consciousness, it is a matter of time to bridge the gap of the relative and absolute value of intelligence. Therefore, living the highest value of creative intelligence in Brahman Consciousness is natural, spontaneous, and inevitable.

## Conclusion

It is seen from the higher states of consciousness that the development of full potential of human intelligence is sequential. For the individual consciousness permanently to display the supreme value of the creative intelligence of nature, every "vehicle"--the mind and body--through which pure creative intelligence expresses itself must attain a level of perfect purity, refinement, and integration. This shows that intelligence is a holistic phenomenon. To capture the fullness of creative intelligence thus needs multiple or holistic measures as proposed in this dissertation.

This holistic expression of intelligence can also be directly confirmed through the TM-Sidhi program, an extension of the TM technique. Through the advanced TM-Sidhi program different modes of creative intelligence are unfolded that connect mind, body, and environment with their unmanifest source of infinite pure creative intelligence. The ability of the mind to command the body to lift up off the ground, for example, is concrete evidence of the unity of diversities

of intelligence displayed in the "Yogic Flying" technique of the TM-Sidhi program (refer to Gelderloos & Berg, 1989).

## CHAPTER 9

### INTELLIGENCE AND CREATIVITY IN CHINESE TRADITION

Redding (1990), a professor from the University of Hong Kong, seems to have made an intelligent observation on the holistic nature of intelligence of the Chinese tradition. He states, "How things were traditionally 'understood' in China began with the idea of a *cosmic order*" (p. 73, italics added).

Intelligence has been defined as orderliness in the introduction of this dissertation, and the idea of a cosmic order will be the starting point in understanding the holistic concept of intelligence in the Chinese tradition. This holistic concept of intelligence, however, can be summarized as this: the Chinese see that there are many levels of intelligence originating from one universal "cosmic order," namely the *Tao*, that governs and gives rise to every aspect of life and creation. In order to make sense of this process of intelligence whereby one becomes many, it is essential to understand the naturalistic philosophy on which all psychological and cosmological premises of the Chinese tradition are based.

#### **The Psychological and Cosmological Premises of the Chinese Tradition**

The most fundamental premise of the Chinese tradition is that the cosmos and man, in the last analysis, obey the same law, the same

intelligence. Man is a microcosm of the macrocosm of the universe; man is not separate from the cosmos, and the very same laws govern for the one as for the other, the very same intelligence rules from the one a way leads into the other.

In terms of human life, the individual psyche and the cosmic psyche are essentially one, but they are to each other like the inner world and the outer world. Therefore, "man participates by nature in all cosmic events, and is inwardly as well as outwardly interwoven with them" (Wilhelm and Jung, 1962, p. 11; also see Redding, 1990; Legge, 1969). Both the individual psyche and cosmic psyche are subject to the universal order of the *Tao*.

*The Tao: One Undivided Source of Intelligence of Nature and Man*

The *Tao* has been conceived by the Chinese as the source of infinite creative potential manifesting all the material existence and displaying all intelligence seen in the orderly evolution of the whole universe, including man. It governs nature, invisible and visible or it governs heaven and earth, just as it does man. Unlike Taoism, Confucianism uses the term *T'ai-chi*, the Supreme Ultimate, to represent this final principle of an undivided One of reality, but both of them share the same fundamental idea that "the *Tao*, though itself motionless, is the means of all movement and gives it law" (Wilhelm and Jung, 1962, p. 11). Hence, silent intelligence is at the same time seen lively in the realm of phenomena. This can be seen in the most renowned scripture of Lao-tzu, the founder of Taoism, the only naturalistic philosophy (or religion, as some people in the West call it) originating from China.

...[*Tao*] As the **origin** of heaven-and-earth, it is nameless; As "the Mother" of all things, it is namable..." "Tao gave **birth** to One, One gave birth to Two, Two gave birth to Three, Three gave birth to **all** the myriad things. All the myriad things carry the *Yin* on their backs and hold the *Yang* in their embrace. Deriving their

harmony from the proper blending of the two vital Breaths. (Tao Teh Ching, Ch.1 & 42, translated by Dr. John C.H. WU, 1974, bold types added)

*Yin and Yang: Two Intelligence Principles of One Reality*

Lao-tzu describes the development of Yin and Yang, two poles of reality, out of the one primal law of the *Tao*. *Yang* represents the light or active principle, while *Yin* represents the dark or passive principle. Starting from light and dark, all polar opposites of nature are then developed; *Yin* and *Yang* therefore denote the two extremes of total creation; "all the myriad things" result from their interactions, "the proper blending of the two vital Breaths."

In addition, the same view is also found in the most important literature of the five Confucian Classics called *I Ching* (The Book of Change), which has to do with the fundamental intelligence of transformations, invariability, and simplicity of nature.

One *Yin* and one *Yang* constitute what is called *Tao*. That which is **perpetuated** by it is good. That which is completed by it is the **natures** (of men and things)...How prolific is its *Te* (Power/Virtue) and how great its achievement! The abundance of it is what is meant by "great achievement" and the daily **renewal** of it is what is meant by "prolific *Te*. (Sec. 1, Ch. 5, translated by James Legge, 1969)

*I Ching* equates the *Yang* and the *Yin* physically with *Heaven* and *Earth*, which together denotes the totality of the universe and leads to all the transformations and evolution of nature. Symbolically, *Yang* and *Yin*, Heaven and Earth, are represented by the concepts of *Ch'ien* and *K'un*, the Creative and the Intelligent or Receptive principles. Through the union of heaven and earth, the interactions of the Creative and the Receptive, the efficacy of the dual primal forces within the field of activity, there develop what *I Ching* calls the 'ten thousand things', the whole creation. It is stated in the *Hsu Kua* that:

Following the existence of Heaven and Earth, there is the production of all things. The space between Heaven and Earth is full of these things. Hence the *Ch'ien* and the *K'un* are followed by the *Tun*, which symbolizes *fullness*...(Sec.II, italics added)

The 'ten thousand things' created from the unceasing movement of the *Yin* and *Yang* corresponds to the *Tao* of Taoism. Yet, in the midst of *unceasing* "daily renewal" and "achievement of abundance," the evolution of nature is "perpetuated" in a *constant order*.

The *Tao* of Heaven and Earth is *constantly* to manifest themselves. The *Tao* of the sun and moon is *constantly* to emit their light. All *movements* of the world are constantly subject to one and the *same rule*. (Sec. II, Ch.1)

In addition, the *T'uan*, one of the sixty-four symbols of *I Ching*, states: "Heaven and Earth move in concord, and hence the sun and moon do not err (in time), and the four seasons do not deviate (from their order)." The *Tao* of Heaven and Earth, therefore, clearly reveals the creativity (unceasing renewal, movements) and intelligence (constant order, same rule) of nature.

Nevertheless, *Yang* appears as the active principle and conditions, and *Yin* the passive principle and conditions, only in the realm of phenomena of creation. The idea of dualism *Yin* and *Yang* in fact have their common origin in *Tao*, the undivided One. Since *Yin* and *Yang* complement each other to bring about creation and evolution originating from the unity of *Tao*, creativity and intelligence are simply two aspects of the same nature. For this reason, one may simply call the creative and orderly impulses of nature *creative intelligence*, from the perspective of Maharishi's Science of Creative Intelligence (see Chapter 7).

*From Universal Intelligence to Human Intelligence*

These universal principles of nature's intelligence are also to be found in man in all his aspects of physical existence. Man is simply a small universe (*hsiao t'ien-ti*, in Chinese). The Taoists explain that just as all the myriad things are only phenomenal forms of the *Tao*, the nature of man is also the intelligence of *Tao*. In addition, according to the *I* Appendices, "all that happens in the universe, natural and human, is a continuous whole like a chain of natural sequences (Legge, 1969, p. 1xxxvi).

Hence, according to the Confucians, the inner nature of man comes from heaven and is governed by the *Tao* of Heaven (Wilhelm and Jung, 1962; *I* Ching, in Legge, 1969). "The *Tao* of Heaven is to benefit." (Lao-tzu, Ch. 81). Hsi Tz'u also says: "The great virtue/power (*Te*) of Heaven is to produce." (Sec. II, Ch. 1). Accordingly, the inner nature of man is creative and evolutionary.

*In tune with nature.* From the *Tao* of Heaven, the *Tao* of Man is derived (see *I* Ching, in Legge, 1962). In other words, the orders or intelligence of heaven are supposed to give rise to the orders or intelligence of man. If, as stated, the inner nature of man comes from the intelligence of heaven, then it is natural that man should follow the laws of nature in order to be creative and evolutionary.

Hence, in the Chinese tradition, it has been emphasized that an intelligent man should always be in tune with the laws of nature, which in Confucius' term, is "union of man and heaven" (see Li & Yang, 1971, pp. 278-9, p. 306). In modern scientific investigation, this traditional thinking of the Chinese is still well reflected in a "Ways to live Questionnaire" survey conducted by Morris in 1948 on 743 Chinese university students. Among the 13 different kinds of lifestyle of preferences, the item on "in tune with the will of nature" scores the highest in both men and women (Morris, 1956).

Being in tune with the creative intelligence of nature, an intelligent man will naturally display two exalted aspects of the wisdom or virtues of man. In chapter II of *I* Appendice, Shuo Kua nicely describes the sequential unfoldment of intelligence in layers as follows:

In ancient times when the Sages made the *I*, their aim was conformity with the principles (*li*) of the natures (with things possess) and of the different lots (with Heaven decrees). Therefore they established the *Tao* of Heaven designated as the *Yin* and the *Yang*, and the *Tao* of Earth designated as the soft and the hard, and the *Tao* of Man designated as *jen* (humanity/compassion) and *yi* (righteousness)...(p.1xxxvii, translated by Legge, 1969).

According to *Shuo Kua*, it was the desire of the ancient Chinese Sages to guide man to live life according to the laws of nature that motivated them to create *I* Ching. In the *Hsi Tz'u* it also says, "The sages, fully understanding the *Tao* of Heaven and knowing the needs of the people, thus made these mysterious things [of the symbolic meanings of the hexagrams of *I* Ching] for the use of the people." (Sec. I. Ch. 11). Thus, *I* Ching, the common source of wisdom of Taoism and Confucianism, is the knowledge of the creative intelligence of nature. It is, "so far as we know, was first of all a book of divination. To divine is to resolve doubts of the mind or mysteries of the universe" (Legge, 1969, p. xxix).

Accordingly, *I* Ching the book itself is the wisdom of life of everything in creation. The *Tao* of the *I* not only tells the people how to find the right path amid the complexity of the universe, so that they will act in accordance with the laws of nature, it expresses also principles of social structure and social control which delimit one's status and defines one's relationship with others. That is why Lao-tzu states: "Man follows the ways of Earth, Earth follows the ways of



Heaven, Heaven follows the ways of Tao, Tao follows the ways of Nature." (Ch.25)

*An intelligent man.* "Nature" means the nature of Tao. Therefore, one who is capable of displaying more of the creative and intelligent potential of nature or simply living more *in tune* with the spontaneous tendencies of nature, the nature of Tao, is considered to be intelligent or wise. A wise man who has been called a "Sage" or "Great Man" is one who lives in tune with Natural Law; he knows and lives the creative intelligence of the universe in an individual life. That is why only "the Sage" had the ability to "make the *I*", the creative intelligence of nature; and "their aim was conformity with the principles of natures (which things possess) and of the different lots (with heaven decrees)" to guide human behavior.

This ideal of "union of heaven and man," no matter how it is termed, has always been the highest ideal of the traditional Chinese, whether he or she is a Confucian, or Taoist, or Buddhist. Furthermore, a truly "Great Man," as described by the *Hsi Tz'u*, is also a practical man by nature; "...By the *I*...the Sages were able to exalt their power and extend the scope of their achievements..." (Sec. I, Ch. 7).

*Skill in action.* Being in tune with the spontaneously evolutionary force of creative intelligence of nature, the Sage as revealed in the first of the Four Books of Confucius, "Doctrine of the Mean," at the same time naturally applies his or her creative intelligence to effectively *accomplish* things in daily activity. This is explicit stated in the *Wen Yen's* remarks on the *Ch'ien* hexagram, a symbolic expression of a Sage:

The Great Man, in his attributes, is in harmony with Heaven and Earth; in his brightness, with the sun and the moon; in his orderly procedure, with the four seasons; and in his relation to the good and bad issues, in harmony with the manes and the

spirits. When he acts before Heaven, Heaven does not go counter to him; when he acts after Heaven, he serves the timeliness of Heaven. Since Heaven does not go counter to him, how much less do his fellow men! How much less do the manes and the spirits! (Sec. I, Ch. 6)

Therefore, it is said that the *I* Appendices aim at a specific style of highest life. This kind of highest life is "not divorced from daily regular activity," and yet at the same time "it goes straight to what is beyond the heavens." The significance of the *I* Appendices as a divine knowledge of the Chinese tradition lies in their attempt to "attain to the sublime and yet perform the common task." As Shuo Kua says:

(The Sages) contemplated the changes in the *Yin* and the *Yang* and established the *kua* (in accordance with them). They brought about movements in the hard and the soft, and thus produced the *hsiao* (lines). They put themselves in accord with the *Tao* and its power/virtue (*te*), and in conformity with the principles of what is right. Then they made an exhaustion of the principle (*li*) and effected the *full* development of (every) nature with a view to arriving at an understanding of (Heaven's) decrees.

Also, the *Hsi Tz'u* says, "In preparing things for practical use and in inventing instruments for the benefit of the world, there are none greater than the Sages." (Ibid.)

*Inner enlightenment for outer fulfillment.* Indeed, the embodiment of "Inner enlightenment for outer fulfillment" has been the highest ideal of a royal personality of an emperor of China. An emperor in the Chinese culture literally means the "Son of Heaven," and is considered to be a personification of Heaven, setting an ideal example for all his fellow people to follow. Such emperors as *Yao* and *Shun* dating back 4000 years ago were good examples of "enlightened" men of "great accomplishments" who brought their fellow Chinese and the country to

a period of highest fulfillment as recorded in the most ancient Chinese scriptures, such as *Shu Ching*, (see Wei, 1971, pp. 1-45).

This ideal of royal personality is cultivated by developing one's own *self* or refining one's personality. Then one will naturally flow with the creative intelligence of nature; consequently an enlightened person spontaneously knows how to best handle all their worldly affairs effortlessly, and brings about achievement and fulfillment for themselves, the family, the nation, and ultimately the whole mankind. This wisdom of life is beautifully described in the "*Great Learning*," the second of the Four Books of Confucius and the most treasured classic of Chinese civilization as follows:

...Knowledge being complete, their minds are brought in accord with *inner truth* ; their minds being brought in accord with inner truth; their hearts are *purified* ; their hearts being purified, their persons are *cultivated* ; their persons being cultivated, their families are regulated; when the families are regulated, their nations are rightly governed; their nations being rightly governed, there was peace throughout the world. Therefore, from the emperor to the common man, all must take *self-cultivation* to be the root of everything else in life.  
(v. 1, ch. 1)

*Psychological perspective of self-cultivation.* Accordingly, from the perspective of psychology, self-cultivation is simply the cultivation of one's own self, one's own personality, or the refinement of heart and mind, or termed *jen* and *yi*, of the *Tao* of Man. The fuller development of intelligence and creativity depends on a more refinement of heart and mind; the purer that heart and mind are (inner enlightenment), the more they are capable of reflecting their own essential nature (inner truth) which is the very creative intelligence of nature itself (*Tao* of Heaven and Earth). As a result of this self-cultivation, one will

also naturally develop harmonious interpersonal relationships, and be more efficient and effective in daily living (outer fulfillment).

That is why the most outstanding student of Confucius, Mencius, the "second holy man" of the ancient Chinese culture, states, "He who has fully developed his *mind* knows his nature. Knowing his nature, he knows Heaven" (Mencius, VII, A, Ch.1; see Legge, p. lxxxviii).

Therefore, to be in tune with nature is nothing other than developing the mind fully. As to the full development of nature, the "*Doctrine of the Mean*", offers a good illustration:

It is only he who is most *perfect* (*cheng*) that can fully develop his own nature. Being able fully to develop his own nature, he can fully develop the nature of others. Being able fully to develop the nature of others, he can fully develop the nature of all things. Being able fully to develop the nature of all things, he can assist the transforming and forming and nourishing powers of Heaven and Earth, he may, with Heaven and Earth, form a triad" (Ch. 22).

Legge explains that the word "perfect" is the translation of the word *cheng* in Chinese which literally means "sincerity," "realness," or "truth." After all, *cheng* represents the fullness of wisdom or virtue corresponding to the Confucius' concept of humanity/compassion (*jen*). "The perfection of the self lies in the quality of *jen*" (Ch.25). Hence, from the confucianist view, developing the most exalted quality of feeling, humanity, is closest to the "truth," the infinite source of creative intelligence of the *Tao*. This is the *Tao* of Man.

The *Tao* of Man, however, is seen from the relative point of view. The Hsi tz'u says: "It (i.e., the *Tao*) is manifested in *jen*, and conceals its functioning. It stimulates all creatures..." (Sec. I, Ch. 5). Although *Tao* manifests itself as the force of *jen* to nourish all creatures, it remains in secret in regard to its functioning. Accordingly, "As seen by the man of *jen*, the *Tao* is called *jen*, as seen by the wise man, the *Tao* is called wisdom." This is the Taoist view.

A fully developed (*cheng*) man, therefore, could be seen from at least two attributes--refined heart and mind--of creative intelligence which in itself is nothing other than the "unceasing movement" of endless evolution in the universe, the *Tao*. It is this continuous, everlasting manifestation of the whole creation through creative intelligence that makes the *Tao*, and thereby the own nature of the Sage, most perfect (*cheng*) (refer to Legge, 1969).

Therefore, the "*Doctrine of the Mean*" also states that when *cheng* is applied in the *Tao* of Man, it becomes the source of all knowledge and virtues. As such, *cheng* described in the "*Doctrine of the Mean*" has been compared to the attributes of God described in the Bible and there are striking parallels between the two concepts. For examples, *Cheng/God* is faith, wisdom, love, strength, truth, great, power, almighty...*Cheng/God* is the way/*Tao*. Most importantly, however, *cheng* has been stated as the "unity" of three fundamental exalted qualities of wisdom or virtues of Heaven and Earth; namely, *intelligence, compassion, and fearlessness*; or the most developed qualities of mind, feelings, and self (refer to *The World by Heaven's Rule*, 1991, p. 5). These three virtues are simply the expression of the same creative intelligence of nature when the mind of the Sages become in tune with the *Tao*.

#### *From Cosmic Intelligence to Human Intelligence and Intelligence of Physiology*

The *Tao* not only gives birth to *Yang* and *Yin*, *Ch'ien* and *K'un*, but its further unfoldment of creative intelligence also gives birth to *Hsing* and *Ming*, as well as *hun* and *p'o*. *Hsing* may be translated as Essential Nature or simply Consciousness, and *Ming* into Life. According to the Chinese thought, the *Tao* expresses itself as the life-principle in the very center of every individual. At the moment of conception, the life-principle bi-polarizes itself into *Hsing* and *Ming*.

Essential Nature is made up of those for *hsin* (soul) of man. *Hsin* is the seat of affective consciousness, which is awakened by the five senses through unreflecting reactions to impressions received from the external world. When no feelings are being expressed, *hsin* remains in a transcendental condition as *hsing*, Essential Nature.

Essential Nature when entering the material world appears intimately knit with *Ming*, Life. Life signifies the duration of the life-span, the measure of vital energy at one's disposal. Both principles, however, are still supranatural. By virtue of Essential Nature, man becomes a spiritual being. Man possesses it, but is beyond the his or her limits. Life is a heaven-made law of an individual's destiny that man must simply accept according to Confucianism; Taoism sees it as the play of the *Tao* in multi-colored forms; and Chinese Buddhism takes it as the working out of one's past actions (karma) within the phenomenal world of illusion.

The whole teaching of unfolding full creative potential lies in the *Dual Cultivation of Essential Nature and Life*, consciousness and physical body. In the corporeal man, these dualities correspond to *hun* and *p'o*. The body is activated by the interaction of these two psychic structures. Again, *hun* belongs to the *Yang* principle, and *p'o* the *Yin* principle. *Hun* is the higher soul, and *p'o* is responsible for the bodily processes in an individual life.

Since the body is the physical entity for the evolution of an individual, it is essential to keep the body healthy and creative (immortal). What makes the body decay is due to the loss of contact with *Tao*, the infinite source of creative intelligence. This can be seen in terms of the imbalance of *Yang* and *Yin*, the two modes of intelligence. *Hun*, the *Yang* or creative principle, and *p'o*, the *Yin* or earth-bound principle, constantly enter into relations of bipolar tensions like the intellectual and animal factors. The *p'o* is the indiscriminating will, goaded by desires and passion, and is constantly forcing *hun*, the intellect, outward to the phenomenal world; in this

manner the self becomes farther away from the source of life, or the *Tao*.

If, on the other hand, *hun* subdues *p'ò* by turning inward to *Tao*, the intellect is interiorized to the undivided One, the self becomes liberated from the polar duality of all phenomena and becomes independent of bodily existence. Such a self is a god, (*deus, shen*) which means to extend, to *create*, in Chinese character; such an individual is then truly intelligent.

Therefore, Master Lu-tzu, the fourth pillar of Taoism and one of the eight Taoist immortals, reveals the secret of life cultivation in his teaching of *T'ai I Chin Hua Tsung Chih* (The Secret of Golden Flower): "...The holy and wise men have no other way of cultivating their lives except by destroying lusts and safeguarding the seed. The accumulated seed is transformed into energy, and the energy, when there is enough of it, makes the creatively strong body..." (p. 63, translated by Wilhelm, 1969).

"By destroying lusts" is *hun* subduing *p'ò* by directing the intellect inward to *Tao*. Then the seed, the essence of the physical body, will be transformed into life energy. Enough life energy will in turn make a "creatively strong body." This is how Master P'eng grew to be eight hundred years old because he knew how to turn to *Tao* to nourish life. This is the triumph of the Sage by putting himself in the center of infinite creative intelligence of nature, becomes a perfect man (refer to *T'ai I Chin Hua Tsung Chih*, translated by Wilhelm with a commentary by Jung, 1962).

### **The Mental Practices of Developing Intelligence in the Chinese Tradition**

From the above discussions, Chinese intelligence has been seen to be very practical. Hence, in the Chinese tradition, the theoretical understanding of the intelligence of nature and life will not be

completed without some practical techniques to unfold the full creative potential of *Tao*. Throughout Chinese history, there have been recorded numerous Sages who themselves cognized and realized *Tao* and taught their fellow Chinese to regain this source of creative intelligence of life (e.g. see *I Ching*, translated by Legge, 1969; Lee and Tan, 1991; T'ai I Chin Hua Tsung Chih, translated by Wilhelm with a commentary by Jung, 1962; *The World by Heaven's Rule*, 1991; Chuang-tzu, translated by Watson, 1968).

In the writings of Chuang-tzu, another pillar of Taoism after Lao-tzu, for example, there are a few stories about how to locate *Tao* and through which the Sages can enliven creative intelligence for the benefits of mankind. There was a fable about the Yellow Emperor, a culture hero of the 2700 B.C., who asks the Sage Kuang Ch'eng-tzu for the *Tao* of government to bring about world peace. Yellow Emperor asks: 'I have heard that you are well acquainted with the *Tao*. I venture to ask how I should rule my person in order that it may continue for a long time.' The Sage replies: 'The state of Transcendental Being is unmanifest and silent; there is no seeing and no hearing. When we enfold the mind in stillness, the body will naturally become correct; you must be still, you must be pure, not subjecting your body to toil (no physical effort), not agitating your vital force (no mental straining), and close your avenues to the external; with too much [externally directed] perception you will lose [*Tao*]' (Ch. 11, 4).

The Sage's teaching was the inward transcending process of effortlessly directing the mind inward in "stillness" where *Tao* can be reached. Chuang-tzu describes the experience of the *Tao* as "Blissful" (Ch. 18).

In Chuang-tzu's writings about meditation process, the most famous one is Confucius' "mental fasting." The transcending process of meditation can be identified in three successive processes. First, "To make your thoughts one-pointed, do not hear it with your ears (i.e., sense of hearing is turned inward from gross sound), but hear it with your mind (intellect becomes collected to the finer and finer levels of



thought)." Second, "Do not hear it with your mind, but hear it with your Vitality (contact finest life principle)." Third, "Gross hearing stops with verifying. The Vitality is empty, but the supporter of all objects of perception (contact the *Tao* in which all the dualistic mental processes converge in One). Only contact with Being (*Tao*) accumulates emptiness. Becoming empty is Mental Fasting" (Ch. 4, 2).

Chuang-tzu describes that a Confucius' student, Yen Hui, derives remarkable results quickly from practicing this mental fasting technique; and then he also discusses many other practical benefits.

## Summary

With a deeper understanding of the Chinese tradition, it can be concluded that the meaning of intelligence and creativity of the Chinese culture is *holistic*. To the Chinese, intelligence and creativity are universal: they have their *unified* basis in nature itself and at the same time have their *sequential, multiplefold* expressions in different spheres of life--from everything in material nature, including sun, moon, and seasons to human life, which includes soul, mind, body, and behavior.

A fully developed mind is naturally brought in tune with the creative intelligence of nature (the *Tao*), and as a result his self (personality), feelings (heart), intellect (mind), body (nervous system), and behavior (daily activity) will also be spontaneously refined by the "nourishing power of Heaven and Earth" or creative intelligence. As a result, the various manifestations of creative intelligence in terms of exalted virtues or wisdom, including creativity, fearlessness, compassion, righteousness, creative body, and effective behavior, will naturally displayed.

This unified, and at the same time diversified, nature of creative intelligence reconciles the various approaches to intelligence and creativity in modern psychology (e.g. *g* being the unified aspect of

intelligence underlying diversified specific abilities, or multiple intelligences, as well as the outer expressions of practical intelligence) and also forms the very basis of studying the intelligence and creativity of the Chinese in a broader and more complete manner in this dissertation.

### **Conclusion: Three Main Points in the Study of Creative Intelligence in the Chinese Culture**

From the holistic understanding of the Chinese culture, a more complete assessment of creative intelligence of the Chinese can be concluded as follows: First, it is necessary to go beyond evaluating the *intellectual* aspect of the human faculty, as most of the standardized intelligence tests do; in addition to cognitive abilities, it is necessary to measure the full range of mental faculties, including the self and feelings as well. This will get closer to measuring the Chinese meaning of "inner enlightenment."

Second, in order to study one's "inner truth," or one's "own nature," it is also necessary to have a means to enliven the source or the unified basis of creative intelligence so that the improvement of the diverse expressions of intelligence can be assessed.

Third, in addition to assessing "inner enlightenment," it is also necessary to look into "everyday intelligence" and "intelligence of the physiology" so that "outer fulfillment" or behavioral success in daily living is also considered at the same time.

In considering these three main points to study the intelligence of the Chinese culture, the first two points also seem important to study intelligence and creativity in everyone anywhere, if the constructs of intelligence and creativity are to be made complete. The third point on "everyday intelligence," however, seems particularly important to the Chinese culture. All the evidence cited in the aforementioned discussions should have justified this assertion. In

addition, Morris (1948) in his lifestyle-preferences study on Chinese students further supports this; out of the 13 different kinds of lifestyle preferences, the item on "the integration of action, enjoyment and thinking" is valued as the third highest. Yang (1971) comments that this is consistent with the *pragmatic* nature of the Chinese and is highly influenced by "*Doctrine of the Mean*." Legge (1969) also comments (from the *I Ching*) that "Chinese philosophy as well as Chinese art and literature is predominantly *practical*, and yet at the same time it tends to be simple and penetrating. This is a significant characteristic of the Chinese character as well as of Chinese civilization." Accordingly, the assessment of "pragmatic intelligence" seems necessary in order to make the concept of intelligence sufficient and meaningful in studying Chinese intelligence.

In addition to these general points in understanding and investigating Chinese intelligence, the next chapter will confirm that the meaning of intelligence is holistic from the angle of Chinese language. In addition, two specific characteristics of Chinese thinking that shape the expressions of intelligence will also be clarified.

## CHAPTER 10

### FROM CHINESE LANGUAGE TO CHINESE INTELLIGENCE

The greatest accomplishments of the human species are perhaps the ability to entertain complex thoughts and to communicate them. The ability to think and to use language are thus considered as critical aspects of human intelligence. In fact, almost all of the designs of psychometric ability tests so far have focused on the cognitive abilities, such as logic and reasoning, and many of them are related to language ability (see Atkinson, Atkinson, Smith, and Hilgard, 1985, pp. 383-413).

For the distinctiveness of the Chinese culture, the study of Chinese intelligence cannot be complete without taking into account the way the Chinese think and the language they use. This assertion is reflected in Redding's (1990) observation of the forms of cognition of the Chinese culture:

No discussion of a culture should ignore the deepest and possibly the most significant layer to which it permeates. This is invisible construction of reality which takes place in people's minds and which almost imperceptibly operates with thought processes which are themselves culturally conditioned. Given the radically different nature of the *Chinese language* from those of the West, and give the isolation in which *China's cosmology* emerged as well as the all pervasive impact of such a paradigm on Chinese life, it should come as no surprise that Chinese people "*see the world*" differently from others... (p. 72, italics added)

Redding brings out two important points in the study of Chinese intelligence. The first point is the Chinese form of cognition, which is exemplified in *I Ching*, and briefly presented in the introduction, that things are seen and understood as groups of relations or in *context* (Needham, 1956, Redding, 1990).

The second point is the form of language that influences the form of cognition of the Chinese. These two points, however, are intimately related. In order to illustrate these points, the following will present some key words in the Chinese language that are related to the holistic perspective of intelligence. On the one hand, they will serve as examples to understand the meaning of intelligence in the Chinese culture. On the other hand, they will help to understand the implications of how the Chinese pictorial language structures mind in terms of "context-oriented thinking" as well as the "sense-dependent immediacy" of thought processes.

### Meaning of Intelligence in Chinese Language

Five Chinese characters--*Tao*, Intelligence/Wisdom, *I* (Change), Enlightenment--will be analyzed in order to understand the meaning of intelligence in the Chinese tradition.

#### *Tao*

*Tao*, in Chinese (道), has been conceived as both the source and functionings of intelligence, as discussed in the previous chapter. Wilhelm (1969) interprets the character for the *Tao* as follows:

The character for *Tao* consists of a head (首), which probably must be interpreted as 'beginning', and then the character for 'going' (辵) in its dual form in which it also means 'track' and underneath, the character for 'standing still' (止), which is omitted in the later way of writing. The original meaning, then, is

that of a 'track, though fixed itself, leads from a beginning directly to the goal'. The fundamental idea is that the Tao, though itself motionless, is the means of all movement and gives it law...(p. 11)

Holistic enough, the meaning of the *Tao* in Chinese implies the source ('beginning') of eternal ('motionless') intelligence in its purest form that leads to creation of all the laws of nature ('track'), to changes and to evolution ('going'). Both intelligence and also its own nature also as creativity are implied in the character. This can be clarified further by analyzing the sub-script 'head' ( 耂 ) within the character of the *Tao*:

The first dot [on the left] ( 丶 ) represents "yin;" The second dot [on the right] ( 丶 ) represents "yang;" the straight line right beneath the two dots is the unity of yin and yang. Further down the unity is [another character] "Self," meaning according to the laws of nature. (Chinese Cultural and Philosophical Foundation, p. 14)

The further analysis of the sub-script 'head' confirms that the "beginning" of creation is spontaneous, by its own "Self" of laws. In addition, the Self is the unity state of the two primordial modes of intelligence, *Yin* and *Yang*, one representing intelligence and the other creativity.

In summary, the Chinese character for the *Tao* explains that intelligence, by nature is both silent and dynamic, and has its universal source in unity that manifests itself into dualities (*Yin* and *Yang*, intelligence and creativity) and multiplicities of laws of nature. The unceasing creativity of intelligence is the source, course, and goal of the whole creation.

### *Intelligence/Wisdom*

The Chinese characters for intelligence or wisdom consists of two words (智) and (慧). The first word (智) is made up of two parts: the upper part (知) means knowing or knowledge and the lower part (日) means the sun. The sun is the physical embodiment of the Yang principle which symbolizes creativity and the discriminative quality of the intellect. Therefore, the first Chinese character for intelligence implies both creativity and intellectual knowledge.

The second Chinese character for intelligence is also made up of two parts: the upper part (慧) represents the eye, seeing, or knowing; the lower part (心) means the spirit or consciousness. Hence, intelligence/wisdom simply means to use the eye of spirit to see or to know. It implies a holistic knowledge of the Self.

In summary, it is said that the first character of intelligence has to do with the cognitive or relative aspects of knowledge while the second character of intelligence implies the spiritual and intuitive knowledge of the Self (see *Awakening Consciousness*, 1991, p. 75). Again, intelligence to the Chinese culture means both the knowledge of the relative and the absolute. It is complete and holistic.

### *I (Changes) and Enlightenment*

Both the Chinese characters for *I* (易) and enlightenment (明) are made up of two sub-characters: sun (日) and moon (月). For *I*, the sun is on the top of the moon; for enlightenment, the sun is on the left of the moon. The Sun and the moon are the physical representations of *Yang* and *Yin*, heaven and earth, which constitute the two poles of creation. Therefore, the interplay of the two modes of creative intelligence leads to all the changes and evolution displayed in the whole universe. This is the symbolic meaning of *I* as explained in *I Ching*.

In addition, both the sun and the moon are illuminaries of our phenomenal world. Therefore, the Chinese character for enlightenment also means "brightness." But the deeper meaning of brightness is caused by the light of consciousness, for the sun and the moon are just *Yin* and *Yang*, the creative intelligence of the *Tao*. For one who owns the total knowledge of heaven and earth, the whole of creation, he or she is naturally shining inside and out. This is a state of enlightenment!

### Implications of Chinese Language in Studying Chinese Intelligence

With these few examples from the Chinese language, which has been developed over thousands of years as the representations of thoughts or expressions of intelligence for the Chinese, it is not difficult to imagine that the Chinese "see" and "understand" the world differently than the Western cultures. The significance of this in terms of studying Chinese intelligence can be understood in Redding's (1990) words:

Like Egyptian hieroglyphics which developed at roughly the same time, Chinese script is ideographic...A language which is essentially graphic may be contrasted with a phonetic language in one particularly important aspect. The graphic language relies for the creation of its components on the medium of the *senses*. To draw a picture of something requires that it has some tangibility, that it can be "seen." The emergence of purely abstract and non-tangible notions is thus hindered. In the case of a phonetic language, the direct link with the "real" world is broken by the interposing of a shorthand for sound, i.e. the alphabet, from which selections are made and taken, as it were, to a higher level for use in expression. Although this does not in itself foster abstraction, it does not handicap it in any way.

The relative lack of *abstracts* in Chinese was noted many years ago by Granet in a study of classical Chinese literature (Granet 1920). Nakamura (1964) extended this by noting that the lack of "universals" whereby a notion could be transferred as it were to a different level of thinking--the move, for instance, from "sincere"



to sincerity." I would, however, appear to have wider implications than the limitations it might place on abstract theorizing, and to enter everyday conversation as an intriguing sign of the *sense-dependent immediacy* of Chinese thought processes (pp. 75-76, italics added).

Hence, it is hypothesized that owing to the symbolic language of the Chinese tradition, the thought processes of the Chinese may rely more on the concrete level of the senses. This provides an important hint in assessing the cognitive aspects of Chinese intelligence. But the "wider implications than the limitations" that Redding refers to is the *holistic, contextual* way of interpreting things in the Chinese. This is also brought out in the following analysis:

Further to this, and possibly reinforced by a view of the world perceived essentially through the senses, the Chinese notion of reality tends to be one in which situations are perceived as a *whole*...This "holism" has been remarked on by a number of scholars, as having certain likely effects.

Northrop (1946: 375) described the world perceived through Chinese eyes as an "undifferentiated esthetic *continuum*" in which "methods of intuition and contemplation become the sole trustworthy modes of enquiry"...

...Although there is no Cartesian rationality in Chinese science, and although Chinese thinking is *holistic*, there is nevertheless great value in being able to think about problems as deeply *embedded in a context*. To be able to assess an *entire situation* and to learn how to *accommodate* the nuances of influence of many forces, is often far superior to the naive extraction of supposedly key variables and the attempt to link them causally especially in the social world. For the Chinese, "reasonableness" is superior to "reason" (Lin 1977: 86). A nice example occurs in the context of business planning. Western-type corporate planning has been notoriously unsuccessful the more it attempted to be scientifically rational (Ansoff 1976). Economics generally suffers the same fate from being unable, or unwilling, to include enough factors in the equations it lives by. The Chinese businessman, thinking in Chinese, does not look for simple explanations torn out of *context*. Denying the usefulness of formal planning, he prefers to absorb information and to use his *intuition* to process it. There is evidence

from their business success to suggest that this allows for a better match with the complexities of this world (pp. 76-77).

Redding (1990) analyzes the phenomenal economic successes of the Asian Chinese communities and one of his important attributions is due to "pragmatic intelligence," as cited in the quotation, in seeing things from a holistic vision. The Chinese evaluate things and make decisions from a deep and holistic level of "intuition" rather than from pure analytical rationale. Accordingly, the "lack of abstracts" in the Chinese thinking means not depending on theoretical, analytical mode of thinking. This holistic thinking in terms of context is ultimately shaped by the "intelligence" of the Chinese tradition. This distinct expression of Chinese intelligence related to the symbolic representations of things and language can be traced to its root in the intelligence of symbolic structure, exemplified in *I Ching*, from the Chinese tradition which will be considered in detail in the next chapter (Redding, 1990; Needham, 1956).

### **Three Significant Implications in Scientific Study of Chinese Intelligence**

From the discussion, three implications are important for the study of Chinese intelligence in this dissertation. First, Redding's intelligence-based analysis of the business success of the Chinese shows that being intelligent is the underlying cause of success and that being intelligent is more than an intellectual reality; it is practical and fulfilling. This also implies that the study of "practical intelligence" is necessary for a complete theory of intelligence.

Second, as the Chinese "see" and "think" in a more holistic way and also appear to be lacking abstracts, it seems indispensable to go beyond the psychometric IQ tests, which mainly assess the partial

value of analytical, abstract thinking, and to use more holistic measures to capture the depth of Chinese intelligence.

Third, as the Chinese are hypothesized to display what may be called "contextual" thinking, it seems essential to assess the ability to "disembed" information from a "context" or measure the ability of simultaneity of broad comprehension and sharp focus, which is called "field independence" in psychology. Accordingly, the Group Embedded Figures Test is used in this dissertation research as it has been known to be the most reliable measure in field independence (see Chapter 15).

Furthermore, the Chinese are also suggested to display what is called "the sense-dependent immediacy" of thought processes. The senses of perception, especially the sense of sight, is supposed to be the main channel to express intelligence for them. Based on this understanding, it will be important to adopt those intelligence measures which are primarily visual-oriented. Accordingly, four of the seven measures selected for the research studies fulfill this purpose. Group Embedded Figures Test, for example, is a visual perceptual test of field independence. Cattell's Cultural Fair Intelligence Test is a visual test of figural reasoning. The Inspection Time measure is a test of visual discrimination. Finally, the Test for Creative Thinking--Drawing Production also involves expressions of creativity from the level of visual perception in drawing. Chapter 15 will have in-depth discussions of all these different tests. As will be discussed in detail later in Chapter 15, these tests should make appropriate tools to access intelligence of the Chinese on the sensory level.

## **Conclusion**

The final conclusion of studying Chinese intelligence would have to jointly considers the holistic expressions of intelligence discussed in the last chapter as well as the specific expressions of intelligence

discussed in this chapter. This simply means that a more complete evaluation of Chinese intelligence has to account for the holistic expressions of "inner enlightenment" and "outer fulfillment" in terms of the improvements of intelligence on the levels of ego, feelings, intellect, mind, senses, physiology, and behavior. At the same time, the specific expressions of Chinese intelligence in terms of "contextual thinking" ability as well as "sense-dependent immediacy" are also to be considered as important parts of the measures.

In the light of the complete knowledge of intelligence from Maharishi's Vedic Psychology presented in Chapter seven, the holistic expressions of Chinese intelligence have been made more clear in this chapter. Similarly, the holistic knowledge of the development of higher states of consciousness from Maharishi's Vedic Psychology presented in Chapter eight also made clear the development of higher intelligence in the Chinese tradition which will be presented in the next chapter.

## CHAPTER 11

### HIGHER STAGES OF CONSCIOUSNESS AS GROWTH OF INTELLIGENCE FROM THE CHINESE TRADITION

*I Ching*, the Book of Changes, has been described as "the book of everything." It is a simplified replica of the functioning of all the laws of nature and thus "nothing in the universe cannot be known if one knows *I Ching*." If consciousness is the ultimate reality of both mind and physical existence as explained by Maharishi's Vedic Science in the previous chapter, then knowledge of *I Ching* is a pre-requisite when considering the evolution of consciousness in the Chinese culture.

As seen in Chapter 9, much of the understanding of intelligence in the Chinese tradition derives from *I Ching*. Throughout the Chinese tradition, *I Ching* has been considered the most important Classic by the Chinese scholars. In fact, the origin of the Chinese culture can be traced back to the first existence of *I Ching*; the evolution of the whole Chinese tradition as well as all its greatest knowledge and achievements are directly and indirectly inspired by the "intelligence" delineated in *I Ching*.

Specifically, no one great man in Chinese history was found to be ignorant of *I Ching* or did not gain insight from the knowledge of *I Ching* to apply to their field of specialty. Accordingly, in order to know the psychology of the Chinese and their culture, understanding of *I Ching* is considered primary, followed by understanding of the *Doctrine of the Mean*. Even the *Doctrine of the Mean* and *Great Learning* of Confucius brought out in Chapter 9, however, are ultimately only further elaborations of the knowledge of the "Great Man" derived from

*I Ching* and place it directly in the context of humanity (see Nan, 1994).

More significantly, both the thought of Tao-tzu and Confucius, as well as all the "hundred schools of thoughts" of the Chinese tradition are rooted in *I Ching* (see *The World by Heaven's Rule*, 1991; Nan, 1994). Confucius made a remark in his old age: "If I could live another fifty years, I would spend all my effort in studying *I Ching*" (see Tan and Lee, 1991). Without a doubt, all these instances reveal the importance of *I Ching* to the Chinese and the Chinese tradition.

White (1992) sees the importance of *I Ching* as being a map of consciousness; it systematically maps out the mechanics of the evolution of the creative intelligence of life. The author certainly agrees with this view. Based on this insight, the following presents and interprets the sequential development of intelligence in higher stages of consciousness contained in the first symbol of the holistic wisdom of *I Ching* in the light of Maharishi's Science of Creative Intelligence.

### **The Total Knowledge of the Sequential Unfoldment of Creative Intelligence**

In order to understand the evolution of higher stages of consciousness revealed in *I Ching*, the first two primal hexagrams of *I Ching*, namely, *Ch'ien* and *K'un*, are most important. They capture the wholeness of knowledge in a seed form: the former denoting the transcendental principle of Creativity, *Yang*, and the latter the transcendental principle of Intelligence, *Yin*, which both together represent Heaven and Earth, the *totality* of the universe.

In addition, the hexagram *Ch'ien* is the signification of the *Sage* who, as understood in Chapter 9, lives life in tune with the full potential of creative intelligence. *Ch'ien* is the symbol of highest knowledge and consciousness.

Furthermore, from *Ch'ien* and *K'un*, all the other sixty-two hexagrams that represent *all* other possible transformations of nature are derived. In order to understand how *Ch'ien* and *K'un* hexagrams come about, however, it is essential to first have a more thorough understanding of the creative intelligence of *I Ching*.

*I Ching: the Book of Simplicity, Transformation, and Invariability Change.* *I Ching* means the "Book of *I*." The word *I* primarily means change; it however, contains at least three meanings: (1) transformation and change, (2) invariability, and (3) ease and simplicity. Firstly, the meaning of transformation and change come from the very meaning of the word *I*, which is used interchangeably with the word *Tao*. Since "*Tao* is life, spontaneity, evolution, or, in one word, change itself" (*I Ching*, translated by Legge, p. ), all changes and transformations are the result of movements brought about by the two primal forces of *Yin* and *Yang* of nature, the two modes of intelligence of *Tao*. *I Ching* equates *Yang* and *Yin* with the two Trigrams *Ch'ien* and the *K'un* (which are equivalent to the two Hexagrams *Kh'ien* and *Kw'ang* respectively, by doubling their lines), as physically represented by Heaven and Earth. Because of the union of *Ch'ien* and *K'un*, all things come into existence, and hence come all changes and transformations. The meaning of changes that bring about the evolution of nature implies the quality of *Creativity* of nature.

*Invariability.* Secondly, the meaning of invariability is paradoxically derived from the definite *order* of changes and transformations of *I* aforementioned. Despite things in the universe are ever in a state of flux and change, they all obey the *Tao* of Heaven and Earth. This can be seen in the following passage from the *Hsi Tz'u* of *I Ching*:

Good fortune and misfortune are constantly overcoming one another (by an exact rule). The *Tao* of Heaven and Earth is constantly to manifest themselves. The *Tao* of the sun and moon is

constantly to emit their light. All movements of the world are constantly subject to *one* and the *same rule*. (Sec. II, Ch. 1, translated by Legge, p. xlvii, italics added)

This constant order of the laws of nature reveals that there is *Intelligence* in every point of creation.

*Simplicity*. The final aspect of the *I*-concept is simplicity or easiness. As seen, all the transformations and permutations of nature are enormously complex. Yet, the *I* expressed in some basic symbols can reveal the simplicity of nature. These symbols are derived sequentially from the *simplest* undivided One, *Tao*. In the *Hsi Tz'u*, there is the statement:

Therefore, in (the system of) the *I*, there is the Supreme Ultimate (*T'ai Chi*), which produced the Two Modes (*Yi*). The Two Modes produced the Four Symbols (*Hsiang*), which in turn produced the Eight Trigrams (*Kua*). [A similar passage is found in Ch. 42 of Tao Te Ching of Lao Tzu]...

The [simple] Eight Trigrams [can easily be use to] determine good fortune and misfortune, from which comes great achievement." (*I Ching*, Sec. I, Ch. 11, translated by Legge, p. xliii)

The simplicity of the Eight Trigrams mentioned by the *Hsi Tz'u* is seen in their simple structures of various combinations of straight lines (*hsiao*) and arranged in a circle as seen in Figure 1.

These straight lines shown in the Trigrams simply consist of two primary forms: a continuous undivided line ( \_\_\_ ) called *yang-hsiao*, the symbol of the positive, creative principle; and a divided line ( \_ \_ ) called *yin-hsiao*, the symbol of the negative, receptive principle. They are the Two Modes mentioned in the quotation. Two Modes, however, have their origin in the Supreme Ultimate (*T'ai Chi*), which is represented by a simple straight line symbolizing the



positing of Oneness ( \_\_\_\_\_ ). This symbol of the straight line can be understood by the Chinese character *Chi* which means the ridgepole, or the horizontal beam along the ridge of a roof. Therefore, in *T'ai Chi*, Two Modes are inherent. Two Modes then give rise to Four Symbols as shown in Figure 2.

Through the Four Symbols, there arise the Eight Trigrams, each made up of combinations of three divided or undivided lines as shown in Figure 3.

The Trigrams were conceived to symbolize different objects, creatures, parts of the body, various qualities or situations, as well as relationships. For example, the *Ch'ien* Trigram represents strength, horse, head, father, and Heaven, while *K'un* Trigram symbolizes docility, ox, belly, mother, Earth, so on and so forth.

The objects or attributes as symbolized by the Eight Trigrams are made the basic constituents of the universe, which form the basis of a cosmological system elaborated by the *Han* scholars of China in connection with the *Theory of Five Elements*.

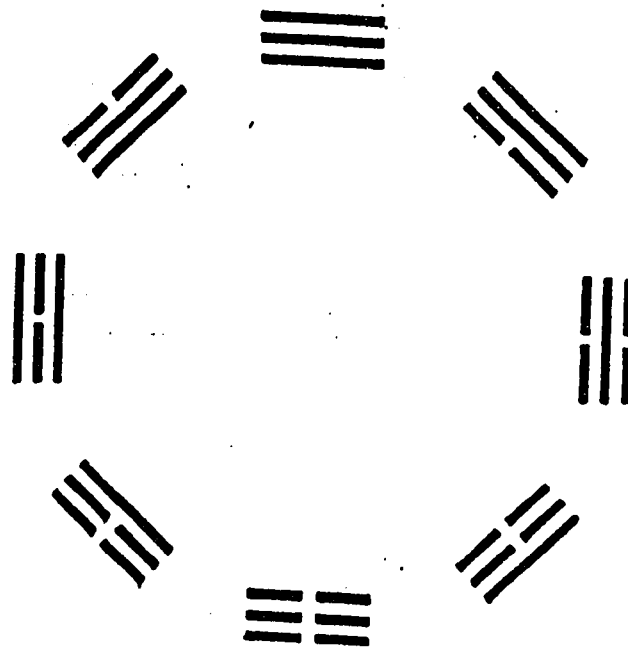
By combining any two of these Trigrams to form a diagram of six lines, a total of sixty-four combinations is obtained, known as the Sixty-four Hexagrams, as shown in Figure 4.

The individual lines of the hexagrams are regarded as the symbols of the various events or things in the universe. The Eight Trigrams, together with the Six-four Hexagrams, and 384 lines formed by their combinations, therefore, represent all the possible situations and mutations of creation, a universe in miniature. This offers a holistic illustration of the sequential transformation from simplicity to complexity in a seed form. The *I* makes *Ch'ien* and *K'un* represent what is easy and simple; for only from what is easy and simple can there be "complex phenomena" and "great dynamism." As the *Hsi Tz'u* puts it:

**Figure 1****Eight Trigrams Arranged in a Circle**

Figure 1

Eight Trigrams Arranged in a Circle



**Figure 2**

**Four Symbols Derived from Two Modes**

The Yang in its major



and minor phases.



The Yin in its major



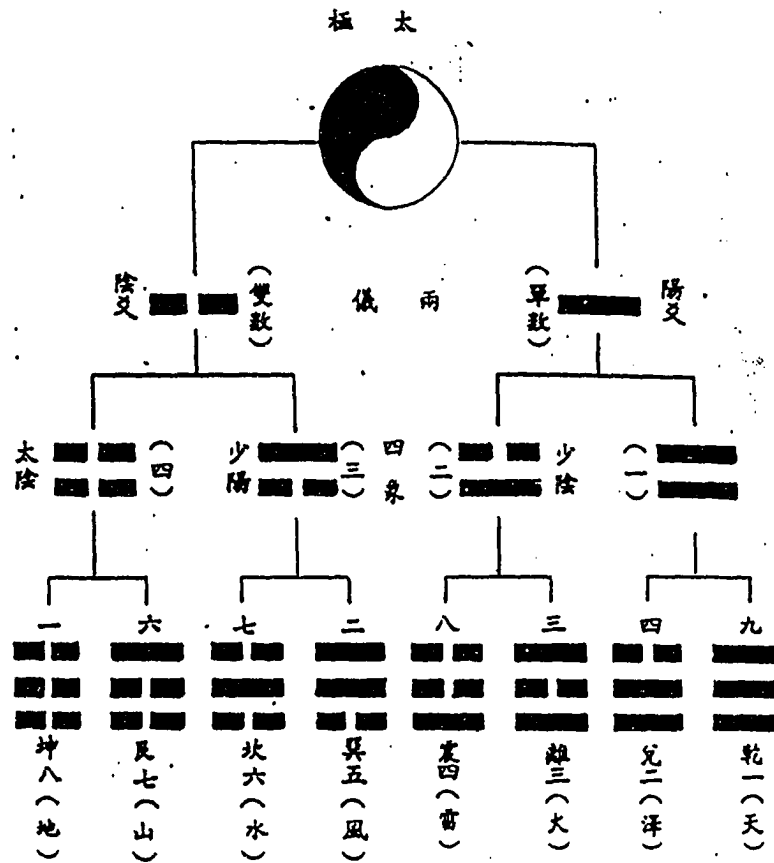
and minor phases.



**Figure 3****Eight Trigrams Derived from Four Symbols**

Figure 3

Eight Trigrams Derived from Four Symbols



**Figure 4**

**The Sixty-four Hexagrams Derived from Combining  
Any Two of the Trigrams**

Figure 4

The Sixty-four Hexagrams Derived from Combining Any Two of the Trigrams

THE HEXAGRAMS, in the order in which they appear in the Yi, and were arranged by king Wán.

8  pi	7  sze	6  sung	5  hsi	4  ming	3  sun	2  khwán	1  qian
16  yü	15  shien	14  tê yü	13  thung sên	12  phí	11  thsi	10  í	9  hsiao k'ao
24  fú	23  po	22  pi	21  shih ho	20  kwán	19  lin	18  k'ü	17  sui
32  hsing	31  hsien	30  í	29  khan	28  tê kwo	27  í	26  tê k'ao	25  wú wang
40  shih	39  shien	38  khwéi	37  shih sên	36  ming í	35  jin	34  tê kwang	33  thun
48  jing	47  khwán	46  shing	45  jhui	44  k'ü	43  kwán	42  yí	41  san
56  í	55  í tang	54  kwéi mei	53  shien	52  k'án	51  shien	50  í tang	49  ho
64  wéi í	63  shí í	62  hsiao kwo	61  hung fú	60  shih	59  kwán	58  tsi	57  sun



The Ch'ien by its easiness is knowable, the K'un by its simplicity is doable. What is easy, is easy to know; what is simple, is simply to follow...With ease and simplicity, then all the principles in the world are successfully obtained. (Sec. I, Ch. 1, translated by Legge, p. x1vi)

The *Ch'ien* represents the strongest of all things in the world. The expression of its *Te* [virtue/power] is invariably the easy, so as to know dangers. The *K'un* represents the most docile of all things in the world. The expression of its *Te* [virtue/power] is invariably the simple, so as to know obstructions. (Sec. II, Ch. XII, translated by Legge, p. x1vi)

To summarize, *I Ching* is the intelligence of the invariant laws of change and evolution of everything in the universe expressed in easy symbolic forms. The sixty-four hexagrams are simply the orderly sequential unfoldment of the impulses of the creative intelligence of nature. As such, *I Ching* has been considered divine by the Chinese; it has been used by the Chinese from all walks of life to help to live life in fulfillment.

*Divination.* According to Legge (1969), *I Ching* was "first of all a book of divination. To divine is to resolve doubts of the mind or mysteries of the universe" (p. xxix). In other words, *I Ching* seems to contain the total intelligence and knowledge that are responsible for the transformations and evolution of the universe to help man to live life in fulfillment. This can be seen in *I-wen Chih*, the catalogue of the imperial library of the *Han* dynasty, now found in the *Ch'ien Han Shu* (ch. 30), which speaks of the following two methods of divination that the Sages used as follows:

The milfoil stalks and the tortoise shell are used by the Sages. the *Shu* says: 'When you have doubts about great matters, consult the tortoise shell and milfoil stalks.' And the *I* says: 'For making certain of good and bad fortune, and accomplishing things requiring strenuous effort, there is nothing better than the milfoil stalks and tortoise shell. Therefore the Superior Man,

whenever he is about to do something or to carry out some action, asks [the *I*] and makes his inquiry in words. It receives his order, and the answer comes as the echo's response. Be the subject remote or near, mysterious or deep, the forthwith knows what will be the coming result. [If the *I*] were not the exquisite thing under Heaven, would it be concerned in such an operation as this? (p. 47, translated by Legge, p. xxix-xxx)

## ***I* Ching: Intelligence of Consciousness**

As just presented, *I* Ching delineates the total knowledge of the sequential unfoldment of creative intelligence of the universe. As also presented in the previous chapters, consciousness is intelligence and man is the microcosm of the macrocosm. *I* Ching then must also contain the intelligence of developing higher stages of human consciousness as well.

In addition to the Taoist and Confucian wisdom of *I* Ching presented so far, the discussion of the intelligence of the Chinese tradition will not be complete without incorporating the wisdom of Chinese Buddhism. There has been a common saying in China that every Chinese wears a Confucius cap, a Taoist robe, and Buddhist sandals (see Wu, 1974). Despite the fact that Buddhism was brought into China from India around the 1st Century A.D., Buddhist cosmogony has been absorbed into Chinese thought; Confucianism, Taoism, and Buddhism have all enriched each other.

As a result of this mutual assimilations, Chinese Buddhism, using *I* Ching as its philosophical basis, led in the *Sung* dynasty (10 Century A.D.) to a reevaluation of Confucian thought from a cosmic perspective. Chinese Buddhism has therefore become a distinct wisdom of the Chinese culture that has separated itself from India. Despite its extinction in India, Buddhism in China has become Chinese Buddhism and has exerted great influence in Chinese culture until day.

Taoism, Confucianism, and Chinese Buddhism, though using different terminology's, by and large share the same fundamental understanding of reality. This, for example, can be seen in White's (1992) writings:

Accordingly to the Avatamsaka (Hua-yen) School of Buddhism, all dharmas [Natural Law] and phenomena arise from an Absolute, referred to as the Dharmadhaatu, the Buddha-nature, or Universal Principle (*li*). All phenomena are also infused with this [Universal] Principle and mutually identified with each other as well. This suggested to Cheng-kuan and Tsung-mi a correspondence with the *I-Ching*. The Hua-yen idea of [Universal] Principle seemed equivalent to T'ai-Chi. Tsung-mi developed a set of diagrams of pure and defiled awareness that remind us of the trigram arrangements and Wei Po-yang's lunar phases, and certainly seem to presage the famous T'ai-Chi diagram of Chou Tun-i. The Ch'an master Ts'ao-shan Pen-chi also developed a set of disc-like symbols representing stages in the development of higher consciousness (probably corresponding to dhyana, samaadhi, arhatship, bodhisattvahood, and buddhahood) and connected them to specific hexagrams [of *I-Ching*]. (pp. 8-9)

Based on what is said in the quotation, the following will present some of the interpretations of higher stages of development of consciousness in terms of *I Ching* and Chinese Buddhism.

The most ingenious interpretation of higher stages of consciousness by using *I Ching* as the philosophical basis came from the Chinese Buddhist T'ien-t'ai master, Ou-i Chih-hsu. In his cognition of the hexagram *K'un*, Intelligence, and hexagram *Ch'ien*, Creativity, of *I Ching*, he locates six Transcendental Virtues in the six lines of hexagram *K'un* with six major stages of the evolution of consciousness denoted in the stages of the dragon in the six lines of hexagram *Ch'ien* according to the Buddhist system. In order to understand the correspondence between the Transcendental Virtues and the evolution of consciousness, it is necessary first to understand the meanings of the lines of hexagrams *Kh'ien* and *Khwan*.

*Structural meanings of hexagram Kh'ien.* The Kh'ien hexagram of the entire figure was explained by King Wen, one of the founders of the Chou dynasty (1150-249 B.C.) in Chinese history. The Chinese tradition believes that the sixty-four hexagrams of the *I Ching* were formulated by either King Wen or Emperor Fu Hsi who lived over 6400 years ago. The eight Trigrams, however, were invented by Emperor Fu Hsi who is said to have invented writing, fishing, and trapping, representing a mixture of supernatural features and mock reality.

The Kh'ien hexagram, which denotes Heaven and Creativity, is represented by six undivided lines called the *Yang* lines. "Kh'ien (represents) what is great and originating, penetrating, advantageous, correct and firm." Figure 5 presents the symbols and explanation of the six separate lines of the Kh'ien hexagram.

The first (or lowest) line is undivided. It signifies a dragon lying hidden (in the deep), unused. It is not time for active doing.

The second line is also undivided. It signifies the dragon in the field, meaning that it will be advantageous to see the great man who is also a master.

The third line is again undivided. It signifies that the superior man is creative all day long, but in the evening he seems cautious. The position of "this line is dangerous, but there will be no mistake."

The fourth line is also undivided. It signifies that the dragon sometimes leaps up in the sky, though he is still in the deep. "There, however, will be no mistake."







The fifth line is also undivided. It signifies that the flying dragon is in the sky. It's position will be advantageous to meet with the great man/master."

Finally, the sixth (or topmost) line is also undivided again. It means that the indomitable dragon may have repentance.

As a whole (1 to 6 lines), King Wan explains that "(the lines of this hexagram are all strong and undivided)...If the host of dragons

**Figure 5**

**The symbol and explanation of the six separate lines by the Duke of Kau, the son of King Wan (translated by Legge, 1969; and White, 1992)**

<u>Line</u>	<u>Six Major Stages of the Evolution of Consciousness</u>
6	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  </div> <div> <p>"The indomitable dragon has repentance."</p> </div> </div>
5	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  </div> <div> <p>"The flying dragon is in the sky. It will be advantageous to meet with the great man/master."</p> </div> </div>
4	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  </div> <div> <p>"The dragon sometimes leaps up, but he is still in the deep..."</p> </div> </div>
3	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  </div> <div> <p>"The superior man is creative all day long, and in the evening he seems cautious..."</p> </div> </div>
2	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  </div> <div> <p>"He sees the dragon appearing in the field. It will be advantageous to see the great man/master."</p> </div> </div>
1	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  </div> <div> <p>"A dragon lying hid (in the deep) unused. It is not time for active doing."</p> </div> </div>

(thus) appearing were to divest themselves of their heads, there would be good fortune" (p. 58, translated by Legge, 1969).

*Attributes and significance of hexagram Kh'ien.* King Wan ascribed four attributes to Kh'ien, according to Appendix IV, pertaining to Confucius. The four attributes are the principles of benevolence, righteousness, propriety, and knowledge of man's nature.

The Duke of Kau employed "The dragon" as the symbol to represent "the superior man" and especially "the great man." It is simply because the dragon is supposed to be a heavenly creature in the Chinese tradition. The origin of this belief can be traced back to very ancient times when the sages cognized all the laws of nature and observed the heavenly bodies in the eastern horizon bearing resemblance to a "dragon." This is how *I Ching* came about and, based on *I Ching*, the Chinese tradition began. Since then, the Chinese tradition shares the belief that the Chinese are the descendants of the dragon. Throughout Chinese dynastic history, the dragon emblem had appeared in all the national flags which represented all the Chinese as a whole.

In contrast to the West, the dragon implies the sublime quality which in ancient times led the Chinese to address the physiology of their emperor (literally means "the son of heaven") as the "dragon body"; only the Chinese emperors were supposed to wear clothes with the "dragon emblem" on it.

Although the dragon's proper home is in the water, it can soar aloft in the sky as well as disport itself on the land. The symbol of dragon thus exhibits the virtues or attributes of infinite creative potential. Since very ancient times, the dragon has been the emblem with the Chinese of the "highest dignity and wisdom, of sovereignty and sagehood, the combination of which constitutes the great man." (see Legge, 1969, p. 59).

Accordingly, from the lines in hexagram Kh'ien, the higher stages of the development of consciousness can be interpreted according to the different conditions of the dragon and their correspondence to particular lines. This will be presented after another review of a similar six-major-stage evolution of consciousness expressed in the six lines of Kh'ien hexagram, from the interpretation of the Chinese Buddhist system. This Chinese Buddhist view is presented in Figure 6.

*The Buddhist view in Chinese tradition.* The first (lowest) line represents the ignorant mortal who has untapped immanent potential.

The second line represents the sraavaka who first hears the name and description of enlightenment.

The third line corresponds to the srotaappana who has begun practicing right meditation and action.

The fourth line represents the arhat-pratyeka who has a semblance of enlightenment.

The fifth line signifies the bodhisattva who has developed a discriminative proof of enlightenment.

The six (topmost) line represents the Buddha who has gained final nirvana or liberation.







### **An Integrated Interpretation of Higher Stages of Consciousness Development from Taoism, Confucianism and Chinese Buddhism**

On the basis these two separate understandings of the hexagram Kh'ien from both the *I-Ching* (Taoism and Confucianism) and Chinese Buddhism, the following will integrate both analyses of the six lines of hexagram Kh'ien in interpreting the development of higher stages of consciousness.

Figure 6

The symbol and explanation of the six separate lines of  
 hexagram Kh'ien by Buddhist T'ien-t'ai master,  
 Ou-i Chih-hsu (see White, 1992, p. 10)

Line                      Six Major Stages of the Evolution of  
Consciousness

6		Buddha
5		Bodhisattva
4		Arhat-pratyeka
3		Srotaappana
2		Sraavaka
1		Ignorant mortal



Line 1: "A dragon lying hid in the deep unused, it is not time for active doing." // "The ignorant mortal"

Since "the dragon" is the symbol representing "the virtues of heaven," "the highest dignity and wisdom, of sovereignty and sagehood, the combination of which constitutes the great man," "the dragon lying hid in the deep" means that the dragon is in the "dark," or of lack of "light," or knowledge (see Wilhelm and Jung, 1969). In other words, his pure infinite intelligence is immanent and he is unaware of it; and the wisdom of the Tao of Heaven is "unused." This is thus a state of ignorant mortal. The individual has not realized his own nature as the *Tao* and is unable to take advantage of his inner potential of infinite creative intelligence.

When the *Tao* is not lively in his awareness, the ignorant mortal is cut off from the infinite source of intelligence and is only living limited streams of intelligence in the relative waking, dreaming, and sleeping states of consciousness. His thinking and action are not in tune with nature such as the Sage exemplifies.

The greatness of the infinite intelligence and creativity of the "dragon" is untouched in this first stage of the evolution of consciousness. Therefore, it is the time to first "cultivate oneself" (see Tan and Lee, 1991); "it is not time for active doing" because action without the support of infinite creativity and intelligence of nature will not bring fulfillment.

The first line in any hexagram is the line of beginning; and therefore in the beginning stage, rest dominates over activity.

Line 2: "He sees a dragon in a field. It will be advantageous to see the great man (master)." // "A sraavaka hears that name and description of enlightenment."

The second line is the line of students. This line describes the first time an individual hears the knowledge of the *Tao*, which is transcendental to his various relative experiences, and the infinite value of unbounded creative potential of which underlies and supports the relative phases of life. Therefore, the student "sees a dragon;" or "a sraavaka hears that name and description of enlightenment."

This expansion of awareness of knowing the knowledge of enlightenment is symbolized in the phrase that the dragon is "in the field," and so he can see more; or he is no longer "in the deep" in which he sees no light and is totally lost.

Hearing the name and description of enlightenment alone will bring about some spiritual awakening on the intellectual level. But from the perspective of Maharishi's Vedic Psychology, what is even more "advantageous" is to be given the direct experience of Transcendental Consciousness under the teaching and guidance of the "master" or "great man" who is himself a living embodiment of this infinite value of life. Hence, it is beneficial "to see the Master." With the first taste of the transcendent, the "dragon" of creative intelligence in its pure state is directly perceived, but it is motionless, or still "in the field," and is a foundation for potential nourishment, cultivation, and growth.

Line 3:           " The superior man is active and creative all the  
                      day long, and in the evening he seems cautious" //  
                      "A srotaappana practices right meditation  
                      and right action."

The third line is the line of followers. With the intellectual and experiential knowledge of the *Tao*, the sraavaka has advanced to be a "srotaappana," a stream winner, "the superior man." Once the superior man has become aware of, and gained access to, his full inner creativity and intelligence of transcendental awareness

through a "right meditation," creativity and intelligence begin to grow in his daily life as he engages in various activities associated with his relative states of consciousness. As a result, "the superior man is active and creative all the day." He derives the support of infinite creative potential from the *Tao* and spontaneously applies it in his daily activities.

In addition to practicing "right meditation," the superior man has also to be "cautious" about "right action" in his daily routine. From the perspective of Maharishi's Vedic Psychology, this could be taken to mean that it is not only important to experience pure creative intelligence, it is also important to be active and creative and at the same time to take rest in the evening, at the proper time.

The evening is the time to rest according to the cycle of Yin and Yang, the two primal forces of intelligence of nature. Yang is the time of the day when the sun appears and when creativity is prevailing; Yin is the time to take rest, starting from the evening when the sun sets and the moon takes over. In order to tune in the laws of nature, the superior man thus has to be cautious in the evening and know to maintain the right routine of taking rest after a whole day's activity.

Another form of right action and routine is the regular practice of meditation to experience the *Tao*. The usual program of meditation consists of practice in the morning, creative activity during the day, then another meditation period in the evening. The morning meditation will prepare for activity and develop creativity for the day; and the evening meditation will get rid of the day's excess fatigue and prevent buildup of stress.

Hence, this also means that the superior man should also be cautious to take proper rest in the evening meditation. This is why "in the evening he seems cautious." The alternation of deep rest, through the experience of pure creative intelligence, and dynamic activity and proper rest in the relative awareness will cultivate the silent transcendental state (dragon in the field) in mind and body

while the individual is engaged in his daily routine. This will prepare for "the dragon to leap" in the next stage, when the Transcendental Consciousness is permanently maintained.

Line 4:            "Sometimes [the dragon] leaps, but he is in the depths. There will be no mistake." //  
                       "An arhat-pratyeka has a semblance of enlightenment."

The fourth line is the line of close disciples. After some regular experience of Tao through right meditation and right activity, the superior man proceeds to a critical stage of transition in the development of consciousness. He has achieved the first stage of enlightenment in which his transcendental awareness no longer gets overshadowed by the relative states of consciousness.

This is denoted by the fourth line of the hexagram in I Ching. The first three lines of a hexagram form the inner trigram, which represents the development of the inner or subjective aspect of the Self-- pure consciousness. Lines four through six form the outer trigram, which represents the development of the outer or objective aspect of the world. Only if one's own Self is established in the non-changing ground of Tao, will there be true objectivity. In other words, only an enlightened man can be truly objective. Therefore, lines four through six deal with the three main stages of permanent enlightenment.

Line 4 may be considered the first stage of enlightenment because the superior man has established his Self in a background of unboundedness, the undivided One. Even in the midst of waking, dreaming, and the deepest sleep, the Tao of cosmic intelligence of his own nature persists at all times; the light of pure intelligence is ever-shining.

Nevertheless, despite the Self being illumined in the light of cosmic intelligence, the objective realm of life is still opaque. Therefore, this first stage of enlightenment, good as it may be, is only "a semblance of the [true] enlightenment" that is yet to be attained.

Having been fully established in subjective, transcendental intelligence, however, the "dragon" is now on a firm foundation to begin "leaping" up or expanding his territory of activity to conquer the realm of the objective, material expressions of intelligence. This interpretation is based on the Chinese conception that Heaven and Earth form a continuum of material creation from subtle and celestial to gross and terrestrial respectively (see Legge, 1969). Even in a mature stage of meditation, the feeling of transcending the gross body on "earth" to attain the celestial "heaven" can be experienced. For example, great Taoist Master Lu-tsu describes such an experience as follows:

...When one sits in meditation, the fleshly body becomes quite shining like silk or jade. It seems difficult to remain sitting; one feels as if drawn upward. This is called: 'The spirit returns and touches heaven.' In time, one can experience it in such a way that one really floats upward...(p. 51, translated by Wilhelm with commentary by Jung, 1969).

"Leaping" is the first stage of "flying," and it symbolizes a progressive development to the finer and finer realms of material creation.

"Sometimes the dragon leaps" means that he may begin to have momentary experiences of refined, celestial perception of the outer world. But since the superior man's machinery of sensation that enables him to relate to the environment is still "in the depths" of the ordinary, gross material world, it takes further development for a permanent experience of the refined material world.

But on the basis of the self-sufficiency of cosmic intelligence of his own Self, the superior man will spontaneously nourish his environment; "there will be no mistake" in his thinking and behavior for he is in tune with nature. As a result, his quality of feelings and relative perception will continue to improve and develop. The "dragon" is ready to fly and soar high in the sky!

Line 5: "the flying dragon is in the sky. It will be advantageous to meet with the great man/master." // "A bodhisattva has discriminative proof of enlightenment"

The leaping dragon of line 4 evolves to a mature state of flying of line 5 and represents the process of refining the perception of material existence. This progression of refined perception is made possible by the permanent unbounded awareness of the subjective Self, on the basis of which the superior man can further fine tune his discriminative abilities of every relationship of the objects of the outer world. This most refined discriminative ability of the intellect is the basis of appreciation, and thereby love, of everything in creation.

Through various refined activities performed in the relative states of consciousness the superior man may refine his relative perceptions to the most subtle and refined degree. This is equivalent to a bodhisattva who devotes his life to uplift the quality of life in the relative world to a sublime celestial level, as described in the Buddhist terminology.

"The flying dragon is in the sky," because the "sky" which is the physical Heaven, is supposed to be the most refined celestial quality of life. Heaven also means creativity. The dragon flying in Heaven is thus a symbol of creative potential in its most sublime relative manifestation. In other words, the bodhisattva himself is in fact the "great man" or "master" of enlightenment. He benefits everyone,

including his students denoted in line two, followers in line three, and close disciples in line four, and encourages them to meet him. "Meeting" means both actual physical seeing and meeting, and also the direct experience of the essential nature of pure creative intelligence which is the Self of the great man or master. After all, line 5 itself is the line of the Master, or King in the hexagram.

Line 6: "The indomitable dragon has repentance." //  
 "A Buddha realizes Final Nirvana."

A Buddha is one with a fully-awake intellect who cognizes the ultimate truth of reality as the totality of life. This is the final stage in the evolution of consciousness by piercing the veil of the infinite diversities of the relative to realize that the ultimate reality of life is nothing other than One undivided wholeness of the Tao. This is the unity of consciousness of the subject and object of one big wholeness of life. The "flying dragon" becomes "indomitable" from the illusory nature of the relative. This is the final "Nirvana," or life in absolute freedom from the ignorance of duality.

The Self of the superior man as unbounded cosmic intelligence is, however, already established in "arhat-pratyeka." But a Buddha realizes the two constituents of the Self: the silent transcendental Self and the discriminative intelligence that creates the infinite value of the diversities of the relative. As the Self becomes more awake, the discriminative quality of the intellect of the superior man becomes sharper and able to fathom a farther extent of diversity with increased appreciation and richness. This is what is happening in the "flying dragon" and "bodhisattva in line 5.

But when the intellect has fathomed the farthest extent of diversity, the superior man realizes that nothing remains to be known. Everything is the sameness of infinite diversity; the whole field of infinite diversity is found to be nothing other than the One undivided wholeness, the Tao, his own Self. This final realization of

the full value of Unity expressed in the sixth line, that everything can be attained by complete effortlessness and no-doing, brings "repentance" of the "ignorance" of the previous stages.

All activities and qualities of relative experiences, such as suffering and even happiness, are now realized to be only transient illusions without permanent reality, and thereby not necessary. This "creative efficiency" reminds us of Tao-tzu's description of the man of "virtue (Te):" "does nothing and accomplish everything," or "Wu-wei er Wu-pu-wei" (Tao Te Ching, translated by Legge, 1969).

It also reminds us of an anecdote that in his first visit to Lao-tzu, Confucius was enlightened on the true nature of life. Confucius was highly amazed and commented on Lao-tzu to his student as a "resting dragon" (refer to Tan and Lee, 1991), implying that Lao-tzu was a man of supreme intelligence who can "does nothing and accomplish everything." Line 6 of an hexagram is the end of development of activity, and thereby back to rest.

Line six is the line of the Patriarch, the Master's Master. Supreme Masterhood can be seen in this highest stage of development of intelligence.

From another perspective, however, White (1992) translates line six as "A *stubborn* dragon has regret." Based on this translation, he comments that the dragon has regret because the remains of ignorance makes a dragon miss out on the full value of Unity expressed in the sixth line. In his words:

...In Unity all relative perceptions are experienced in terms of the Self, which is already established as pure unbounded consciousness beyond all limits of time and space. This is equivalent to the fulfillment of the bodhisattva path in the sense that all other sentient beings are directly perceived in terms of one's own status--i.e. buddhahood. All Buddhas are equally Buddhas; all Masters are equally Masters of Creation. However, the remains of ignorance always put one Master before the other. Each Master has his Master, to whom he owes an immeasurable debt of gratitude, and whom he therefore glorifies as special. For example, line five might be Maha-Kashyapa; then line six is



Sakyamuni. If line five is Maharishi, then line six is his Master, Guru Dev, the Swami Brahmananada Saraswati, Jagadguru of Jyotir Math. Unity also means that all qualities of relative experience, such as suffering, are revealed to be temporary illusions without any ultimate basis in reality. The 'stubborn dragon' is someone who imagines that he can become a supreme Master by holding onto any particular means--whether it be a technology, an administrative position, political power, or whatever. This brings regret because such a dragon misses out on the full value of Unity expressed in the sixth line, that can only be attained by complete effortlessness and Nondoing...." (p. 14)

All six lines (throughout): "To see a pack of dragons  
without heads brings fortune."

The sixth line is the topmost and thus represents the final development of human consciousness. It is possible, however, to consider all the six lines together. This will give rise to an even more holistic stage of consciousness than the sum of the individual stages denoted by the six lines independently. This greater whole is symbolized in the hexagram by the dynamism of all the lines simultaneously instead of one line at a time. This is total or infinite dynamism. "Without heads" means that no particular being or object of perception is the first ("head") or chief; everyone and everything that exist plays an equally important part to make up the whole. This is a state of perfect balance and grand harmony, and thus "fortunate!"

*The Development of Higher Stages of Consciousness from Another Integrated Approach of I Ching and Buddhism*

In addition to the integrated interpretation of I Ching on the development of higher stages of consciousness in the Chinese tradition, there is another similar interpretation on the *Yellow River*

*Chart* from which I Ching was originated. Ou-i interprets the Chart in terms of the evolution of consciousness through the ten realms of sentient beings described in Buddhism as follows:

- 1) Evil hell dwellers
- 2) Deluded animals
- 3) Suffering hungry ghosts
- 4) Angry assures
- 5) Impure men
- 6) Good heaven dwellers
- 7) Understanding sravakas
- 8) Enjoying pratyekabuddhas
- 9) Compassionate bodhisattvas
- 10) Pure buddhas

The ten stages of evolution of consciousness can be understood in terms of two categories. The first five classes of sentient beings can be viewed as the category of the ignorant beings represented by line one of the hexagram. They are just a more elaborated analysis of the stages of the ignorant mortal.

The sixth to tenth classes of sentient beings of the second category correspond to the second to sixth lines of the hexagram respectively. In the sixth class, the good heaven dwellers are those who have discovered the Buddha Dharma, Tao, and become sravakas. They take advantage of past good actions and seek to go on to a higher plane of evolution. The seventh class, understanding sravakas, are srotaappanas who have advanced to the level of stream winner and who are steady on the path of enlightenment. The eighth, ninth, and tenth classes are the same three levels of enlightenment described in lines 4, 5, and 6 above.

## **Six Transcendental Virtues and Six Stages of the Evolution of Consciousness**

Ou-i Chih-hsu, in his cognition, also interprets the correspondence between hexagram Khwang, Intelligence, and hexagram Ch'ien, Creativity, of *I-Ching*. He locates six Transcendental Virtues in the six lines of hexagram Khwang (Figure 7) with six major stages of the evolution of consciousness denoted in the stages of the dragon in the six lines of hexagram Kh'ien (Figure 6) according to the Buddhist system.

The six Transcendental Virtues fit well with the six stages of consciousness.

Line 1: The best way for an ignorant seeker to advance is by building good karma (deeds) through charitable acts.

Line 2: Once the sraavaka hears about the path to enlightenment, he must have the self-discipline to start on the path, and not simply listen and then continue in his old habits.

Line 3: The srotaappana, or stream winner, must guard against becoming impatient with his own progress on the one hand, and intolerant of others as ignorant and unenlightened just because they do not follow his path on the other.

Line 4: The arhat-pratyeka must guard against self-satisfaction with the enlightenment that he has achieved. Rather than rest on his laurels and enjoy bliss, he must go out into the world and zealously uplift others.

Line 5: The Bodhisattva is the master of meditation: he teaches others, and by that means refines his own level of experience to the highest level--thus bringing the path of meditation to 200% fulfillment.

Line 6: The Buddha enters the Unity state of final nirvana only by means of transcendental wisdom--a perfect self-referral state that is beyond the reach of any skill in thought and action.

Figure 7

The symbol and explanation of the six separate lines of  
 hexagram Khwan by Buddhist T'ien-t'ai master,  
 Ou-i Chih-hsu (see White, 1992, p. 10)

<u>Line</u>		<u>Six Transcendental Virtues</u>
6	--- ---	wisdom
5	--- ---	meditation
4	--- ---	zeal
3	--- ---	tolerance
2	--- ---	discipline
1	--- ---	charity

*Significance of the Interpretation*

The major significance of the interpretation of the six stages of the evolution of consciousness from the six Transcendental Virtues is brought out in the fifth and sixth lines, meditation and wisdom, in the study and development of intelligence in this dissertation. On the one hand, it explains that higher intelligence is gained through a direct contact with the , the Self of infinite creative intelligence, through meditation--line five. It illustrates that the valuable heritage of knowledge of higher stages of "intelligence" in Chinese culture has been lost in the modern world.

On the other hand, highest wisdom or intelligence is the Unity state of subjectivity and objectivity, absolute and relative, at the same time--line six. Intelligence in its most holistic sense includes both the Tao and at the same time its multiple expressions in different spheres of life and creation. These two points again confirm the theoretical basis for studying Chinese intelligence in a holistic way in this dissertation.

## CHAPTER 12

### AN INTEGRATED APPROACH TO INTELLIGENCE: CHINESE AND VEDIC PERSPECTIVES

This chapter will begin with integrating the many parallels between the perspectives on intelligence from Chinese wisdom and Maharishi's Vedic Science that have been discussed previously. This will prepare the ground for formulating a holistic study of Chinese intelligence in the light of the five conditions presented in the introduction of this dissertation. In addition to the five conditions, however, a simple way of presenting a complete theory of intelligence may simply include the source, course, and goal of intelligence. This full range of intelligence development will serve as a framework for the presentation of an integrated approach to intelligence. Many of the parallels between the traditional Chinese and Maharishi's Vedic Psychology on intelligence presented have been discussed earlier separately. The following will just briefly integrate the two approaches in terms of the source, course, and goal of intelligence development. More details of the presentation can be referred back to in Chapters 7 and 9.

#### **Integrated Approach to the Source of Creative Intelligence**

##### *Unified Field of Intelligence*

Both the Chinese tradition and Maharishi's Vedic Psychology state that intelligence originates from a unified source which is transcendental to space, time, causations, and mental processes. This

undivided Oneness of intelligence is called *Tao*, *Tai Chi*, *I*, or *Heaven* in the Chinese tradition, or pure intelligence, pure consciousness, cosmic psyche, Self, or Being in Maharishi's Vedic Psychology.

Both the *Tao* and pure intelligence have been described as a non-changing, eternal, unbounded field which spontaneously gives rise to the creation of all the orderly changes and evolution of nature and life.

#### *Two Modes of Intelligence in One Unbroken Whole*

The unified source of intelligence at the same time contains the seed of duality. The Chinese tradition describes the coexistence of two opposite primal forces, namely Yin and Yang, silence and dynamism, intelligence and creativity, in the unity of Tao. Through their interactions, the multiplicity of creation springs from that oneness of duality.

Maharishi's Vedic Psychology explains that the two intrinsic forces of nature--both silence and dynamism--are at all time inherent in the unity of pure intelligence. The two opposite qualities of nature are termed pure existence and pure intelligence. When intelligence is awake of its own nature as also pure existence, numerous values of creation spring from that unity of duality (see Dillbeck, 1988, and Chapter 7).

#### *Intelligence and Creativity Simultaneously*

From the dynamism of Yang acting upon the receptive principle of Yin, creativity of nature is expressed as the very intrinsic quality of Tao. This is the beginning point of creation and all creativity. Hsi Tz'u of I Ching describes "The great attribute of Heaven and Earth [Yang and Yin] is to produce," and "Production and reproduction are what the *I* represents." This is how the "unceasing dynamism" of the

creativity of nature begins and gives rise to the ever-expanding universe.

In Maharishi's Vedic Psychology, a similar dynamic principle of creativity is expressed from the intelligent aspect of pure intelligence being awake of its own nature as also silent existence: Numerous values of creation spring from that unity of pure intelligence and pure existence (see Dillbeck, 1988, and Chapter 7).

### *Self-referral as the Mechanics of Creation*

When the interplay of Yin and Yang begins the "unceasing dynamism" of creativity displayed in creation, evolution revolves in an endless cycle according to the cosmic cycle of Tao. This cycle can be represented by a circle which means reversing back to the origin, Tao or Self. Therefore, in the judgment of the twenty-fourth hexagram, Fu, we find: "Its Tao is one of reversion (fan) and return (fu)...This is the course of Heaven [Creativity]...Does not the Fu hexagram reveal the mind of Heaven and Earth?"

"The meaning of fu is a reverse movement back to origin, and the reference to the mind of Heaven and Earth is to the original root." Similar passages are also found in the Lao Tzu:

While all things are together in action,  
I only look into their Return:  
For all things have been flourishing,  
And yet each returns to its Root. (Ch. 16)  
Reversion (fan) is the motion of the Tao. (Ch. 40)

Similar self-referral mechanics of creation are described in the *Bhagavad Gita*, the practical science of Maharishi's Vedic Psychology, as: "Curving back on my own nature, I create again and again" (IX.8). Here "my own nature" and "I" mean the Cosmic Self. This "...self-referral state of consciousness is that one element in nature on the



ground of which the infinite variety of creation is continuously emerging, growing, and dissolving..."(Maharishi, 1986a, pp. 25-26).

### *Sequential Unfoldment of Creative Intelligence*

In the self-referral process of creativity, creation emerges in a sequential way. This orderliness is intelligence. Maharishi (1985) describes this orderliness of nature as follows:

Sequential development means that the whole tree is found in the seed. The whole tree is found in the first stage of sprouting of the seed, and in the second stage of sprouting, and in the third stage of sprouting. As the tree grows, the total tree is contained at every level...Like that, sequentially developing, the whole infinite diversity of the universe is created and maintained and kept self-referral. (p. 62)

What is explained by Maharishi as the sequential development of the universe is echoed in the sequential unfoldment of creative intelligence mentioned in I Ching: "Therefore, in the *I*, there is the Supreme Ultimate, which produced the Two Modes. The Two modes produced the Four Hsiang, which in turn produced the Eight Trigrams." (Sec I, Ch. 11)

In addition, as we have discussed, the Eight Trigrams will further unfold into sixty-four hexagrams. With their 356 hsiaos, the hexagrams symbolizes all things and transformations in an sequential way (refer to Chapter 8 and figure 4 for details).

This is the description of  $2^n$  of Tao sequentially unfolding itself from unity into duality, which splits into a quadruple, which splits into an octuple...etc. This is the sequential process of what is called a bifurcation cascade as shown in the mitotic division of cells. In

addition, the discovery of the 64 genetic code of DNA that structures the whole human physiology was considered to be based on the creative intelligence of the 64 hexagrams' sequential unfoldment of *I Ching* as well (see Schouberger, 1992; Yan, 1991; Tan and Lee, 1991, p. 16).

Interesting enough, Maharishi's Vedic Physiology also explains that DNA is the blueprint of creation which is also based on the invariant law of the sequential unfoldment of pure intelligence (see Wallace, Fagan, and Pasco, 1988).

The quotation, according to Legge (1969), however, does not refer to the manifestation of the universe as such, but rather to the symbols, along with which go a number of formulae to which the Tao corresponds. After all, the symbols and formulae have their counterparts in the universe itself. This symbolic process of sequential creation is the basis of the binary mathematical system that subsequently inspired the development of modern computer science (see Tan and Lee, 1991, p.16). Nevertheless, binary is only the simplest example exemplified in *I Ching*; the splits could be any form other than binary.

Maharishi's description of the sequential unfoldment of creative intelligence is in terms of three values-- observer, observed, and the process of observation--instead of two. But when the two values of the observer-observed relationship are created by the pure wakefulness of intelligence of itself as also existence, the third value of the "process of observation" is automatically implied in the unified structure of pure intelligence (see Dillbeck, 1988, p. 249). Through these three modes of primal intelligence, numerous other modes of intelligence on the subjective and objective levels are sequentially derived (see Dillbeck, 1988).

Similarly, we find a passage in the Lao-tzu describing the three-in-one aspect of sequential unfoldment of creation:

Out of the Tao, One is born;  
 Out of One, Two;  
 Out of Two, Three;  
 Out of Three, the myriad things.  
 (Ch. XLII, translated by Legge,  
 1969, p. 1xxii)

According to Legge, the one to three, or one to two to four, unfoldments are essentially the same description of the cosmic force of the universe, but from different perspectives. He explains that: "From the interaction of the Yin and Yang springs *life*, as symbolized by Three, or the Four *Forms*, out which arise all things, as symbolized by the Eight Trigrams" (p. 1xxiii, bold letters added).

As explained from Maharishi's Vedic Psychology, the third value of the "process of observation" is "attention," or "flow of consciousness." Through observation, the observer *enlivens* or gives life to the observed. As such, life or the process of observation springs from the interaction of the observer and observed.

### **An Integrated Approach to the Course of Development of Intelligence**

When transcendental pure intelligence becomes lively within itself, creative intelligence *manifests* itself into different modes of intelligence that constitute both subjective life and objective creation. The results of the manifestation of the unified source of intelligence is also described by Lao-tzu: "The Tao is invariable, unnamable--the Uncarved Block" (Ch.32) and "When the Block *diversifies*, it becomes vessels" (Ch.28, italic added).

*Hsi Tz'u* further explains the difference between Tao and vessels: "That which is above shapes and features is called the Tao; that which is within shapes and features is called the vessel." Hence, the shapes and features of the "vessels" are simply the attributes of the

manifest world springing from attributeless transcendental pure creative intelligence. Maharishi (1966, 1969) also explains that from the unmanifest, transcendental pure intelligence manifests the infinite diversities of phenomenal existence.

The *I* Appendices explains that the play of creative intelligence in the universe, natural and human, is a continuous whole like a chain of natural sequences. Maharishi's Vedic Psychology also describes the sequential development of consciousness as one unbroken wholeness of the cosmic psyche (see Dillbeck, 1988, pp. 268-272). Accordingly, all these infinite manifestations of pure intelligence are simply the course of the development of pure intelligence.

The great blessing about human life in the midst of the comprehensiveness of I or Tao is that man is in the center of the universe; the individual who attains to the transcendent is on a par with the cosmic forces of Heaven and Earth. This is what Confucius means by "The Union of Man and Heaven." Similarly, Maharishi (1969) asserts that "the individual is the center of divine [cosmic] intelligence" (p. 262); the uniqueness of human beings, "in contrast to that of lower organisms, is that when fully developed it can experience the innumerable possibility inherent in the infinite dynamism of pure consciousness." (Dillbeck, 1988, p. 263).

To reach that cosmic intelligence, both the Chinese tradition and Vedic tradition apply meditation or technology of consciousness to tune the human mind into the Tao or pure intelligence, so as to harness the infinite creative intelligence of nature for human life.

### *Expressions of Creative Intelligence in Individual Life*

*Subjective life.* Maharishi's Vedic Psychology explains that creative intelligence expresses itself sequentially through ego, feelings, intellect, mind, senses of subjectivity, and physiology and behavior of objectivity in human life. These different levels of subjectivity and

objectivity through which intelligence expresses itself are ultimately coordinated by their source in pure intelligence. Hence, a truly intelligent man is one who is able to tune his conscious mind into the cosmic intelligence of the cosmic psyche. In Maharishi's (1969) words:

...A close study of Lord Krishna's discourse reveals a great depth of psychological insight; it shows that the individual mind, however, *intelligent* it may be on the superficial conscious level, can be overcome by its failure to understand and encompass a situation which obviously lies beyond its control, unless it is *in tune with* the unlimited *cosmic mind*...(pp. 263-264, italics added).

This quotation of Maharishi taken from the *Bhagavad-Gita*, the "wisdom of life," "presents the study of the development of the mind from a pitiable state of anxiety and depression [state of unintelligent] to that most highly developed state in which the intelligence is established in the consciousness of eternal Being [pure intelligence embodied by Lord Krishna], the most evolved [intelligent] state of human evolution" (p. 263).

The "pitiable state of anxiety" that gives rise to all sufferings in life, however, stems from duality of heart and mind: "Fear is born of duality" (*Upanishad*, see Maharishi, 1969, p. 50). Fundamentally, "ego feels" and "ego thinks;" fear is caused by the sense of separation between the individual self and cosmic Self. On this fundamental point, Maharishi goes on to explain that:

Within man there is mind and there is heart...At their best, the heart is full of feeling, saturated with love; the mind is completely alert, full of the sense of righteousness...But when there is a lack of coordination or a conflict between them, suffering automatically results. (p. 50)

The solution lies in the infusion into the field of duality of a non-dual element [Transcendental Consciousness] which blesses man's

life with a status unaffected by suffering, even while he remains in the field where suffering is possible. (p. 52)

Transcendental Consciousness is bliss consciousness. When bliss consciousness comes within the range of the conscious mind, the mind is contented. On the platform of contentment, based on the positive experience of bliss, all the *virtues* flourish. Love, kindness, compassion, tolerance, appreciation of others, all naturally take hold of the mind and the individual is the center of divine intelligence...The field of pure consciousness is the *source* of all *intelligence*, all *creativity*, all peace and happiness. (p. 262, italics added)

A similar perspective to the creative intelligence of a truly intelligent man, the "Great Man," is found in the Chinese tradition. Confucius uses the terms "Union of Man and Heaven" to describe the *virtues* of the Great Man. From the *Tao* of Heaven, the *Tao* of Man is derived; Jen and Yi of Man develop compassion and righteousness from the creative intelligence of Yang and Yin of Heaven.

In the *Tao* of Man, Jen and Yi, two modes of intelligence of the exalted qualities of heart and mind, are derived from Yin and Yang, which are in turn manifested from *Tao*, pure intelligence. Since Yin and Yang are the two primal complementary modes of intelligence of nature which manifest and complete all things, then Jen and Yi are just the same two complementary modes of intelligence, corresponding to Yin and Yang, that constitute the life of man. By complementary, Yin and Yang as well as Jen and Yi have to be *integrated*. A great man of wisdom therefore must have developed heart and mind, or affect and cognition at the same time through the direct enlivenment of their common source of *Tao*.

In addition to the virtues of feelings and intellect, the *Doctrine of the Mean* also brings out the virtue of "fearlessness." These three exalted qualities together constitute a great man of virtue (refer to Chapter 9). Virtue (Te) is simply the manifestation of the *Tao* (*Tao Te Ching*, see Legge, 1969), pure creative intelligence.

In summary, both Maharishi's Vedic Psychology and Chinese tradition explain that an intelligent man identifies himself with

cosmic intelligence. As a result, his heart, and mind, and whole personality become naturally integrated in the center of creative intelligence.

*Objective life.* The Tao not only gives birth to Yang and Yin, Ch'ien (Creativity) and K'un (Intelligence), but its further unfoldment of creative intelligence also gives birth to *Hsing* (Consciousness) and *Ming* (Life), as well as *hun* and *p'o*, corresponding to the corporeal man (refer to Chapter 9).

The whole teaching of unfolding full creative potential lies in the Dual Cultivation of Consciousness and Physical Body, both *hun* and *p'o*. It is seen in the *Hui Ming Ching* that the ancient sages knew how to bridge the gap between Consciousness and Body because they cultivated both. In order to cultivate both consciousness and body, "There is no better way of cultivating consciousness and body than to bring both back to unity, to Tao" (see Wilhelm and Jung, 1962).

Accordingly, when the intellect turns back to its source of cosmic intelligence, the physiology is simultaneously cultivated. The stronger body in turn supports the growth of consciousness. This reciprocal relationship between consciousness and body is inherent in the complementary nature of Yin and Yang from which *hun* and *p'o* are derived. This intelligence of physiology can also be seen in the 64 hexagrams, from the combined interactions of Yin and Yang, that give rise to the 64 genetic codes that structure the whole human physiology.

Similarly, Maharishi's Vedic Psychology explains that consciousness sequentially unfolds itself into matter. The human nervous system is created in the process of unfoldment to reflect pure intelligence for the evolution of human life. The sequential unfoldment of the totality of intelligence is found precisely in the structure and functioning of human physiology (Nader, 1994; see Chapter 7).

There is a mutual relationship between consciousness and physiology in the course of unfoldment of human potential. When pure intelligence is enlivened, the stress and strain of the nervous system that plagues the reflection of pure intelligence will be dissolved; when the physiology is purer, the light of pure intelligence will be reflected more brightly (Maharishi, 1968a).

Moreover, this can be understood as the two expressions of intelligence--one on the level of intelligence in the form of sound, vibration (Veda), as available in the Vedic literature, and the other on the level of form of matter (physiology).

In addition, the same mechanics of cultivating both mind and body is also described by Maharishi Ayur-Veda, the Science of Life. Maharishi (1986a) uses the "mistake of the intellect" to describe the state of ignorance and mortality. "Mistake of the intellect" is described as the intellect which is not constantly in contact with its transcendental source. Thus, in order to correct the mistake, the intellect simply has to turn back to pure intelligence. As a result, both mind and body will be nourished and cultivated in the infinite reservoir of creative intelligence.

In addition, having created the vehicle of the physiology, creative intelligence can further express itself in the activity and behavior of human living. Both the Chinese tradition and Maharishi's Vedic Psychology consider that the practical value of developing intelligence is in the success and fulfillment of daily life. According to the Chinese tradition, *I Appendices* aim at a particular kind of highest life. This kind of highest life is "not divorced from daily regular activity," and yet at the same time "it goes straight to what is beyond the heavens." That is an integrated life in the state of enlightenment. Tao of Man is concerned with human affairs; Tao of Heaven reaches up to the sublime. In the *Appendices*, the man who attains to this kind of highest life is termed "the Sage" or "the Great Man."



The Sage attains to this sphere because he has the highest form of knowledge. According to the *I* Appendices, the *I* contains that by which man can attain to this kind of knowledge. As the Hsi Tz'u says: "How sublime is the *I*! It was by the *I* that the Sages were able to exalt their power and extend the scope of their achievements. Their knowledge was exalted, and their code of manners was yielding: being exalted after the pattern of Heaven; being yielding after the pattern of Earth." (Sec. I, Ch. 7) This practicality and balance of life is also seen and considered important even in the course of cultivating full intelligence potential. In the teaching of the living manner, for example, Master Lu-Tzu said:

When there is a gradual success in producing the circulation of the light [of consciousness], a man must not give up his ordinary occupation in doing it. The ancients said, When occupations come to us, we must accept them; when things come to us, we must understand them from the ground up. If the occupations are properly handled by correct thoughts, the light [of consciousness] is not scattered by outside things, but circulates according to its own law. Even the still invisible circulation of the light [of consciousness] gets started this way; how much more, then, is it the case with the true circulation of the light [of consciousness] which has already manifested itself clearly. (p. 51, translated by Wilhelm, 1969)

The teaching of balancing meditation and activity described in the quotation is essentially the same process of stabilization of pure intelligence in daily life that is taught by Maharishi (1966, 1969). This is how pure intelligence gets infused into the conscious mind and how it can become a living reality capable of enriching all of the daily activities toward fulfillment. Ultimately, the integration of inner spiritual development and outer material fulfillment is the ideal of development of intelligence. The Chinese tradition terms it "Inner Enlightenment for Outer Fulfillment; while "Maharishi (1963,

1967) calls it an "Integrated Life," or 200% of life. This can be seen in Maharishi's description of the beneficial results of meditation:

In one word, mind, we can include the entire range of expression of creative intelligence from that universal, unbounded eternal to the individual ego, to feelings, to the thinking ability, and to the senses. The value of creative intelligence is appreciated on all these different levels. And when that universal value of life which we experience at the source of thought during meditation is appreciated on the basis of one's own personal experience, we find that the ego, the emotions, the intellect, the mind, the senses, all begin to breathe a richer life. We experience greater comprehension and richer, sharper perception [Inner Enlightenment]. *Activity is strengthened, resulting in greater achievement and a higher level of fulfillment* [Outer Fulfillment]. We think more precisely, more exactly, and more effectively [Inner Enlightenment]....  
This upsurge of life comes spontaneously through TM. When the mind begins to lose its restrictions, life as a whole is improved....(1972, pp. 19:4-5)

This ideal form of integrated living finds its ultimate goal in complete fulfillment in the state of enlightenment.

### **An Integrated Approach to the Goal of Development of Intelligence**

The goal of development of intelligence is to live life in fullness which is the state of enlightenment. There is a sequence of development which leads to the total unfoldment of intelligence in the highest state of enlightenment. Maharishi's Vedic Psychology describes the development of seven states of consciousness which can be roughly related to the six stages development of consciousness from the Chinese tradition, as shown in Figure 8.

**Figure 8**

**Relating Maharishi's Seven States of Consciousness to the  
Chinese Six Stages of Development of Consciousness**

Maharishi's 7 States  
of Consciousness

I Ching's and Chinese Buddhism's 6  
Stages of Consciousness

Sleeping

Line 1: "Hidden dragon"/ "Ignorant,"

Immanent  
Dreaming

Line 2 "Dragon in a field"/ Sraavaka

Waking

-----

Transcendental

Line 3 "Superior man is creative"/  
"Srotaappana"

Cosmic

Line 4 "Dragon leaps" / "Arhat-  
pratyeka"

God

Line 5 "Flying dragon soars"/  
"Bodhisattva"

Unity

Line 6 "Indomitable dragon regrets"/  
"Buddha"

(Brahman)

(All 6) "Pack of dragons without  
heads"

*Seven States and Six Stages of Development of Consciousness*

The different states correspondence are briefly explained as follows:

*Line 1.* Line 1 corresponds to a person who only experiences waking, sleeping and dreaming states of consciousness because the pure intelligence of the "dragon" is overshadowed by these three relative modes of intelligence. He is not aware of his immanent principle and is ignorant of his own Self as unbounded infinite creative potential. Being unaware of the absolute field of life, the intelligence of the "dragon" is hidden and unused, and trapped in the cycle of the three relative experiences.

*Line 2.* Line 2 corresponds to a person first hearing and then aspiring to experience transcendental value of pure intelligence. When the "name and description of enlightenment," the knowledge of the Absolute, one's own Self, is described, the "sraavaka" becomes intellectually awake, "he sees a dragon in a field," the dragon is no more "hidden." The inspired student will aspire to find a teacher (line 5) to learn and study, and will even experience this infinite field of creative intelligence directly. Thus "it benefits to see the Master."

This resembles one who begins the process of Transcendental Meditation in the Vedic tradition. Maharishi has systematically designed seven steps to impart the knowledge of transcendence to the whole world (see Roth, 1987). The first step is to "introduce" the "name" and benefits of the TM program; the second step is to "prepare" the students for direct experience; and the three step is to "see the teacher" who will impart the knowledge of direct wisdom of life to him in the next step.

*Line 3.* Line 3 corresponds to one who has gained access to, and thus has direct experience of, his full inner creative potential; he is in a position to enjoy creative intelligence in his daily life. The "ignorant mortal" has transformed himself into a "superior man" for he can enjoy and apply his "creative [intelligence] all day long" from the practice of "right meditation," which is capable of giving transcendental experience.

Maharishi (1966) talks about the "infusion of Being" into the conscious mind once the superior man can experience pure intelligence (Being) regularly through alternation of meditation and activity. Creative activity during the day will stabilize pure intelligence infused into the conscious mind during meditation. As a result, the superior man's "action" will be more "right" when creative intelligence cultures the personality more and more over time. The full stabilization of creative intelligence, however, takes time. It also requires regular practice and regular routine, which are also considered to be "right actions."

The regular practice of the TM program usually consists of morning and evening meditations and creative activity during the day. The evening meditation will get rid of the fatigue and stress accumulated during daily activity and will prepare for activity thereafter. Therefore, "in the evening he seems cautious" for not missing the evening TM program after a day's activity.

Furthermore, the superior man should also be cautious of not over-exerting himself in dynamic activity from the extra creative intelligence gained from meditation; and he should know to maintain the right routine of taking enough rest in the evening.

Through alternations of deep rest in pure intelligence and dynamic activity, the mind and body become habituated to maintain both styles of functioning simultaneously. The superior man eventually cultivates his nervous system to a point that even in the most dynamic activity and deep sleep, pure intelligence remains a silent witness to all that happens.

*Line 4.* Line 4 corresponds to a person in the first stage of enlightenment in Cosmic Consciousness. "The arhat-pratyeka has a semblance of enlightenment;" sometimes [the dragon] leaps." Cosmic Consciousness, as understood from Maharishi's Vedic Psychology, is a state in which the Self, pure intelligence, of the individual is fully realized while the different modes of intelligence in the relative are not fully perceived as the value of his own Self. Therefore, an individual has only a "semblance" of enlightenment or the dragon "sometimes leaps."

Only the flying dragon can always perceive the most refined relative which continue to develop in the next stage; in the meantime, however, his sensations are generally still "in the depths" of the ordinary gross material world. But with the full development of pure creative intelligence in his own Self, the leaping dragon will begin to overflow his creative intelligence to the environment. Since the senses relate the inner self to the relative world, this expansion of creative intelligence from within will in turn improve his quality of relative perception. As a result, the senses get refined and the heart blossoms.

Furthermore, as elaborated in the last chapter, the first three lines form the inner trigram while the last three form the outer trigram. The former symbolizes the development of the subject and the latter represents the development of the object, the relative world. Only if the Self is established in the non-changing ground of pure intelligence can the enlightened individual be objective in the truest sense. According to Maharishi's Vedic Psychology, this clearly indicates that the leaping dragon has embarked on the first stage of enlightenment in Cosmic Consciousness.

*Line 5.* Line 5 corresponds to the enlightened individual in God Consciousness. Maharishi's Vedic Psychology describes one in God Consciousness as having the most sublime perception of the relative

and refined feeling of love. The "flying dragon in the sky" is the symbol of this most sublime perception of the relative because the sky, the physical representation of Heaven, is the realm of the most refined celestial quality of life in the Chinese tradition. Only the flying dragon can experience the creative potential in the most sublime manifestation of Heaven.

In addition, a bodhisattva in the Buddhist tradition is one of supreme compassion who delays his chance to gain the highest enlightenment for the sake of uplifting the quality of life of the masses in the relative world to a sublime celestial level. This is equivalent to the enlightened in Cosmic Consciousness who refines his relative perceptions and feelings by engaging in some very refined activities during the relative states of consciousness described in Maharishi's Vedic Science.

The bodhisattva is thus a Master of Enlightenment himself symbolized in line 5. It therefore "benefits to see the Master" so that the bodhisattva fulfills his duty and thereby advances to the highest level of enlightenment; and at the same time the students (line 2), followers (line 3), and close disciples (line 4) can understand and experience the essential nature of pure creative intelligence which is simply the Self of the Master.

*Line 6.* Line 6 corresponds to a Buddha in Unity Consciousness. This is the final Nirvana described in the Buddhist tradition; the dragon gains the highest status and becomes "indomitable."

Maharishi's Vedic Psychology describes that after living in the state of God Consciousness for a period of time, the enlightened will naturally realize Unity Consciousness. This final stage in the evolution of consciousness is the realization of the ultimate nature of life and creation as one continuous whole of the expression of one's own Self. All the diversity of activities and creation are just notions created by the discriminative faculty of the intellect. Even the most refined qualities of creation discriminated by the intellect come to be

realized as nothing but his own Self. This "return" of the intellect from diversities back to unity is described by Maharishi as follows:

The differentiated values of Rishi, Devata, and Chhandas display the discriminative value of intelligence, while the Samhita upholds the undifferentiated, holistic value of the Self..

It is on the ground of the intellect that the infinitely vast and varied expanded state of Natural Law [creative intelligence] is structured...

As the intellect experiences greater richness at every step of probing deeper into the mechanics of transformation sequentially unfolding more and more expressed levels of the self-referral dynamism, the individual intellect expands and ultimately finds itself expanded into the unbounded ocean of pure intelligence. With this phenomenon of the expansion of consciousness, at every stage of increased appreciation, the richness grows in the corresponding levels of the physiology, enlivening the Chhandas--predominant physical structure in the values of Devata, Rishi, and ultimately the Samhita itself. This awakening of Samhita in human awareness is the restoration of the unified source of all the innumerable values of transformation in the infinite diversity of the universe...

It is the completeness of Vedic Science that opens to human awareness the full range of knowledge, from the state of unity to infinite diversity and back to unity again. Vedic Science reveals how the intellect transforms the state of unity into the distinction between intelligence and Being and then into infinite diversity, and having fathomed the farthest extent of diversity, turns back in the direct of the original unity.

As the intellect proceeds in the direction of infinite diversity, it finds itself in a deadlock of sameness--the sameness of infinite diversity; and this monotonous sameness of infinite diversity ceases to satisfy the intellect's basic tendency to evolve. Having fathomed the full range of infinite diversity, the progressive nature of the intellect can be satisfied only by reversing the direction and synthesizing all diversity into the original state of unity. This takes the awareness in a natural way to increasing levels of synthesis, until there is nothing further to synthesize and nothing further remains to be known. In this state of unity, the enigma of the duality between intelligence and Being [existence] is resolved, and the whole field of diversity is found to be nothing other than the expression of one's own Self. (Maharishi Vedic University, 1985b, pp. 6-7).



What Maharishi describes is the final realization of the "discriminative proof of enlightenment" of a bodhisattva. The discriminative ability of the intellect expands outwards to reach the richest and deepest levels of transformation and creation, and ultimately returns back to the same unbounded ocean of pure intelligence of his own Self. This is the final Nirvana--the final veil of illusion of boundaries is pierced and enjoys the ultimate freedom of experiencing one big wholeness of intelligence moving within itself, his own Self, Tao.

This has also created a repentance to the dragon, as the dynamic expansion of the "dragon" finally realizes that the ultimate satisfaction to his intellect is to reverse the direction so as to synthesize all the diversity into the original state of unity. Every transformation and activity is nothing outside of his own Self. He, while remaining within his own Self, can accomplish everything without doing. This is the state of "do nothing and accomplish everything" as mentioned by Maharishi (1966) and Lao-tzu, the "resting dragon" (see Chapter 11).

*All Six..* All the six lines together correspond to Brahman Consciousness, the most mature state of Unity Consciousness. In Unity Consciousness, an individual can only experience a single objection of perception at a time as the Self, while in Brahman Consciousness an individual can perceive all objects simultaneously in terms of one's own Self. Thus, Brahman means great; Brahman Consciousness is an experience of the Great Whole of diversities moving within one's own Self.

In I Ching the Great Whole of total dynamism is represented by all the six lines instead of just one changing simultaneously. This is a state of all possibilities at any particular point of time and place of creation, or "To see a pack of dragons without heads." A pack of dragons means more than just one; without heads is a experience of any object of perception or no chief object of being. However, all

possibilities do not produce chaos since all beings live and evolve in one Great Whole in perfect harmony. This result of "the Supreme Harmony in unison," mentioned in I Ching, will naturally "bring fortune."

## **Conclusion**

To conclude this section of the goal of development of intelligence, both Maharishi's Vedic Psychology and the Chinese tradition have the ideal vision of living heavenly life on earth. Maharishi (1986) describes this as life in peace, freedom, and happiness, Heaven on Earth. To Maharishi, this is achieved through creating an indomitable influence of coherence in world consciousness, which is in turn achieved by unfolding the full creative intelligence in every individual. Heaven on Earth is the natural result of cultivating enlightened citizens on earth who spontaneously live life according to Natural Law and make use of the skillful hand of cosmic intelligence to accomplish everything in life. As seen, it is also the highest ideal of the sages in the Chinese tradition that life on earth is lived in "the Supreme Harmony in unison" described in the I Appendices.

## **An Integrated Approach to the Technology of Consciousness**

As presented above, both Maharishi's Vedic Psychology and the Chinese Tradition apply technology of consciousness or meditation to unfold full human potential. Unlike the previous presentations, however, it is emphasized here that both Maharishi and the Chinese tradition see the process of right meditation as the process of transcending the small self in order to reach the ultimate, pure

intelligence, or Tao. This is why the TM program is called the "Transcendental" Meditation technique. That the Chinese tradition also shares the same truth is seen in enlightened Master Lu-tzu's teaching as follows:

If for a day you do not practise meditation, this light streams out, who knows whither? If you only meditate for a quarter of an hour, by it you can do away with the ten thousand aeons and a thousand births. All methods end in quietness. This marvelous magic cannot be fathomed.

But when the practice is started, one must press on from the obvious to the profound, from the coarse to the fine...All holy men have bequeathed this to one another; nothing is possible without contemplation (*fan-chao*, reflection). When Confucius says: 'Perceiving brings one to the goal; or when the Buddha calls it: 'The vision of the heart'; or Lao-tse says: 'Inner vision', it is all the same.

"Anyone can talk about reflection, but he cannot master it if he does not know what the word means. What has to be reversed by reflection is the self-conscious heart, which has to direct itself towards that point where the formative spirit is not yet manifest. Within our six-foot body we must strive for the form which existed before the laying down of heaven and earth. If today people sit and meditate only one or two hours, looking only at their own *egos*, and call this reflection, how can anything come of it?" (*T'ai Chin Hua Tsung Chin*, Ch. 3, translated by Wilhelm, 1962).

As implied, the goal of meditation (or contemplation, depending on the translation) is to go from "the coarse to the fine," to go beyond the "ego," to reach the "unmanifest," and to "strive for the form which existed before the laying down of heaven and earth," pure intelligence. This is the transcending process taken by the individual in order to arrive at the Tao shared by the teachings of Confucius, Buddha, and Lao-tse.

## Summary and Conclusion for Scientific Research

It can be summarized that both Maharishi's Vedic Psychology and the Chinese tradition of knowledge have shared many parallel understandings of the holistic nature of intelligence in terms of the source, course, and goal of intelligence development. It is clear from the theories and practices of the Chinese tradition and Maharishi's Vedic Psychology that there is both a *universal* source of pure intelligence as well as *multiple* expressions of intelligence on different levels of subjectivity and objectivity. When an individual is in tune with the unified source of cosmic intelligence, the different modes of intelligence are expressed as exalted virtues of both heart and mind. The physiology and daily behavior will also function more efficiently and effectively.

Hence, when the Tao of pure intelligence is enlivened through the TM program, it is predicted that intelligence will develop in the corresponding levels of subjectivity and objectivity at the same time. These levels include ego, feelings, intellect, mind, senses, physiology, and behavior. The formulation of a scientific research project will be presented in the next chapter based on these multiple expressions of intelligence on different levels of subjectivity and objectivity.

## Shedding Light on the Dilemma of the Theory and Research on Intelligence

The holistic theories of the Chinese tradition and Maharishi's Vedic Psychology also clarify the two basic dilemmas of the theory and research on intelligence throughout the history of western science. First, the dilemma of whether there is a single intelligence or multiple intelligences is resolved by the fact that there is a single source of intelligence manifesting itself as multiple intelligences. The Tao or pure intelligence is the universal field of pure wakefulness

and, by virtue of that, it sequentially unfolds itself into the multiplicities of the laws of nature. Intelligence is both single and multiple at the same time.

Second, intelligence is also both hereditary and environmentally determined. Everyone is born with a certain level of "intelligence" that is inherent in the genetic structure of the human physiology. This level of hereditary "determined" intelligence, however, can be *cultured* by the direct experience of pure intelligence at the source of thought. Given the most perfect physiological structure and combined with the most enriching experience of one's own essential nature, the full potential of infinite cosmic intelligence can be unfolded in human life.

### **Fulfilling the Five Necessary Conditions of a Comprehensive Study of Intelligence**

As presented from the integrated approach to intelligence in this chapter, both the Chinese tradition and Maharishi's Vedic Psychology provide a holistic perspective to the nature of intelligence. This holistic perspective will meet the five necessary conditions of a comprehensive study of intelligence proposed in the introduction of this dissertation.

First, both the Chinese tradition and Maharishi's Vedic Psychology explain that the *source* of intelligence is the unmanifest Tao or pure intelligence. Its very *essence* is pure consciousness with the quality of pure wakefulness. This self-referral quality of pure wakefulness is self-sufficient and thereby manifests the full spectrum of intelligence seen in both man and nature.

Second, as man is in the center of the cosmic intelligence explained by both the Chinese tradition and Maharishi's Vedic Psychology, pure intelligence can fully express itself sequentially in different layers of subjectivity and objectivity of the individual.

This constitutes the *conscious* mind of the individual experienced as different mental processes and psychological phenomena, including thought and feelings.

Third, as pure intelligence sequentially unfolds itself from consciousness to matter, from inner subjectivity to outer environment, it is then manifested in the activity and behavior of daily life. Hence, intelligence is not separate from *everyday activity*; being intelligence is also practical in handling and accomplishing daily affairs as seen in both the Chinese tradition and Maharishi's Vedic Psychology.

Fourth, since intelligence is a practical reality of man's own nature, both the Chinese tradition and Maharishi's Vedic Psychology have known how to apply mind and body, our own instrument of creative intelligence, to unfold our own nature as infinite creative intelligence. Maharishi's TM program, for example, has been adopted to unfold the intelligence of the Chinese students in the current research studies. A Contemplation technique has also been used to improve the intelligence of the Chinese students in the second study of this dissertation. It is a pity, however, because much of the purity of the Chinese knowledge has been lost. This can be seen from *The Hui Ming Ching* (The Book of Consciousness and Life):

...The holy men of ancient times, and the great sages, set forth their thoughts about the unification of human nature (consciousness) and life (body) by means of images from the external world; they were reluctant to speak of it openly without allegories. Therefore the secret of how to cultivate both simultaneously was lost on earth...(translated by Wilhelm, 1969, p.69)

Due to "The long lapse of time," the Vedic wisdom has suffered from the same fate over time. It is fortunate in our time that His Holiness Maharishi Mahesh Yogi has revived the Vedic wisdom to its

full purity and effectiveness. Through the TM program, the full potential of human intelligence can be unfolded (see Maharishi, 1966, 1969).

The fifth condition of a comprehensive study of human intelligence is *testability*. Based on the holistic understanding of intelligence set forth, some testable research hypotheses will be formulated in the next chapter.

## **PART FOUR: SCIENTIFIC STUDIES OF THE CHINESE CONCEPT OF HOLISTIC INTELLIGENCE**

This part of the dissertation attempts to integrate what has been discussed in the last three parts and define a system of measures which, taken together, constitute a holistic measure of Chinese intelligence. This operationalization will be presented in Chapter 13. The justification of the measures in terms of cultural-fairness, theoretical basis, and appropriateness will also be made. Chapter 14 will present the current research, including three research questions and hypotheses. Chapter 15 and 16 will discuss the methodology and results of the dissertation research. Part Four and the whole dissertation will be concluded in the discussion presented in Chapter 17.



## CHAPTER 13

### OPERATIONALIZATION AND MEASURES

As has been presented over the last few chapters, the concept of intelligence in the Chinese tradition is holistic; and there are some distinct expressions of intelligence due to the unique characteristics of the Chinese culture. A holistic study of the intelligence of the Chinese would therefore involve multiples measures which, taken together, constitute a holistic measure of Chinese intelligence and at the same time maintain their distinctiveness. Ideally, the measure itself should be holistic too. The following will first recapitulate the holistic nature of the Chinese intelligence which will be operationally defined in terms of multiple measures. These different measures will then be considered according to their appropriateness.

#### **Operationalization for Holistic Assessment**

The Chinese tradition and Maharishi's Vedic Psychology both propose that there is a *universal* source of pure intelligence which manifests into *multiple* expressions of intelligence on different levels of subjectivity and objectivity in an *integrated* manner. Hence, when the *Tao* or pure intelligence is enlivened through the technology of consciousness, the TM program, it is predicted that intelligence will be enlivened and thus improved intelligence will be observed on the levels of ego, feelings, intellect, mind, senses, physiology, and behavior.

To borrow some terms from modern psychology, the multiple expressions of improved intelligence on these different levels may be named as experiential intelligence (ego and feelings), intellectual intelligence (intellect, mind, and senses), physiological intelligence (the nervous system), and practical intelligence (behavior). As proposed in Chapter 5, a broader perspective on intelligence was discussed from the perspective of modern social science. With these terminologies of multiple intelligences, the operationalization of the intelligence of Chinese is as follows:

Firstly, one way to operationalize of "Inner Enlightenment," or "Self-Cultivation" more holistically would be to enliven the unified source of the *Tao*, the Self, and then measure the improved values of "heart" and "mind." In other words, there will be *simultaneous* improvements of multiple intelligences on both affective and cognitive factors, as expressed in creativity, experiential intelligence, and intellectual intelligence.

For experiential intelligence, in addition to the improved value of ego and feelings, the wisdom or virtue of fearlessness that is intimately tied to ego and feelings should be one major focus of assessment. Since fearlessness is too big a concept to be measured, it could be operationalized as reduction of fear or anxiety which was understood as the first fundamental element to develop holistic intelligence (see Chapter 5, 9, and 12).

For intellectual intelligence, in addition to abstract thinking, the ability to think of the parts in the context of the whole (contextual intelligence) is even more important for the assessment of the intelligence of the Chinese.

Secondly, a still more holistic study on the full unfoldment of creative intelligence, in addition to "Inner Enlightenment," is to verify the highest ideal of "Outer Fulfillment" also. This means that "practical intelligence," and intelligence related to the physiology are two other crucial measures in order to make the study of intelligence comprehensive when applied to the Chinese culture.

To conclude, based on the understanding of the full expressions of intelligence from the Chinese tradition and Maharishi's Vedic Psychology, a holistic assessment of intelligence and creativity is summarized in Figure 9 and Figure 10.

When the *Tao* or pure intelligence is enlivened through the TM program, the full range of expressions of intelligence in terms of experiential intelligence, intellectual intelligence, physiological intelligence, and practical intelligence can be broadly assessed on the levels of mind, body, and behavior. Toward this end, the holistic evaluation of the intelligence of the Chinese in the research will incorporate multiple measures so as to assess these different aspects. This holistic assessment will not only broaden the concept of intelligence and creativity, but also make the study of intelligence and creativity meaningful when applied to the Chinese culture.

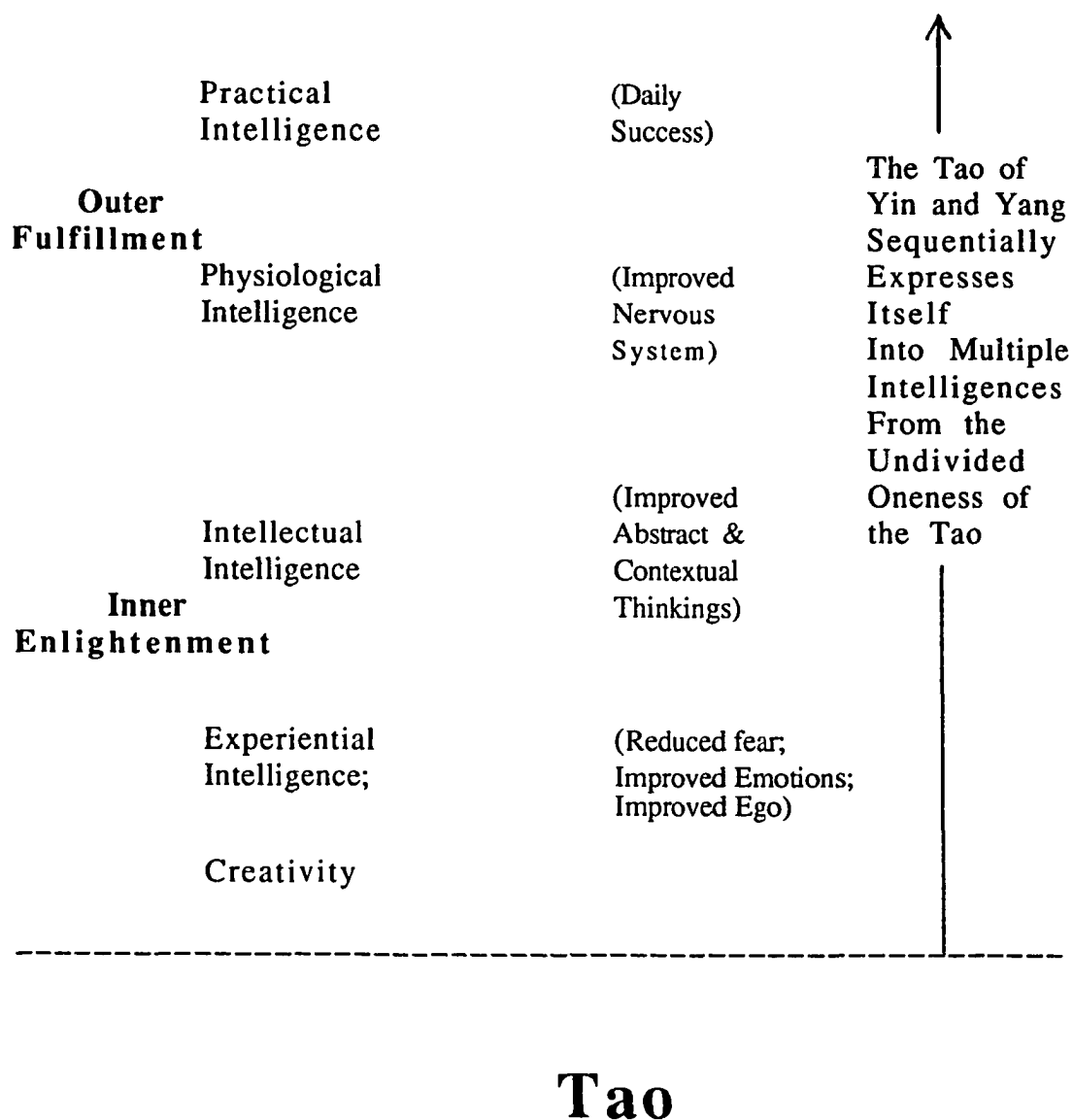
### **Operationalization of a Holistic Assessment of Intelligence in Terms of Six Measures**

The current research study adopted six different measures in order to holistically assess the multiple intelligences of the Chinese. The six testing instruments include the Test for Creative Thinking--Drawing Production (TCT-DP); Spielberger's State-Trait Anxiety Inventory (STAI); Group Embedded Figures Test (GEFT); Cattell's Culture Fair Intelligence Test (CFIT); Inspection Time (IT); and Constructive Thinking Inventory (CTI). These six measures associated with different aspects of Chinese concept of intelligence is summarized in Table 1.

Except for TCT-DP, the association of the measures with different aspects of Chinese intelligence are organized according to the associated levels of subjectivity and objectivity of Maharishi's Vedic Psychology from less expressed to more expressed or manifest.

**Figure 9**

**Summary of the Chinese Perspective on Holistic Expressions of Intelligence**



**Figure 10**

**Summary of Maharishi's Vedic Perspective on Holistic Expressions of Intelligence**

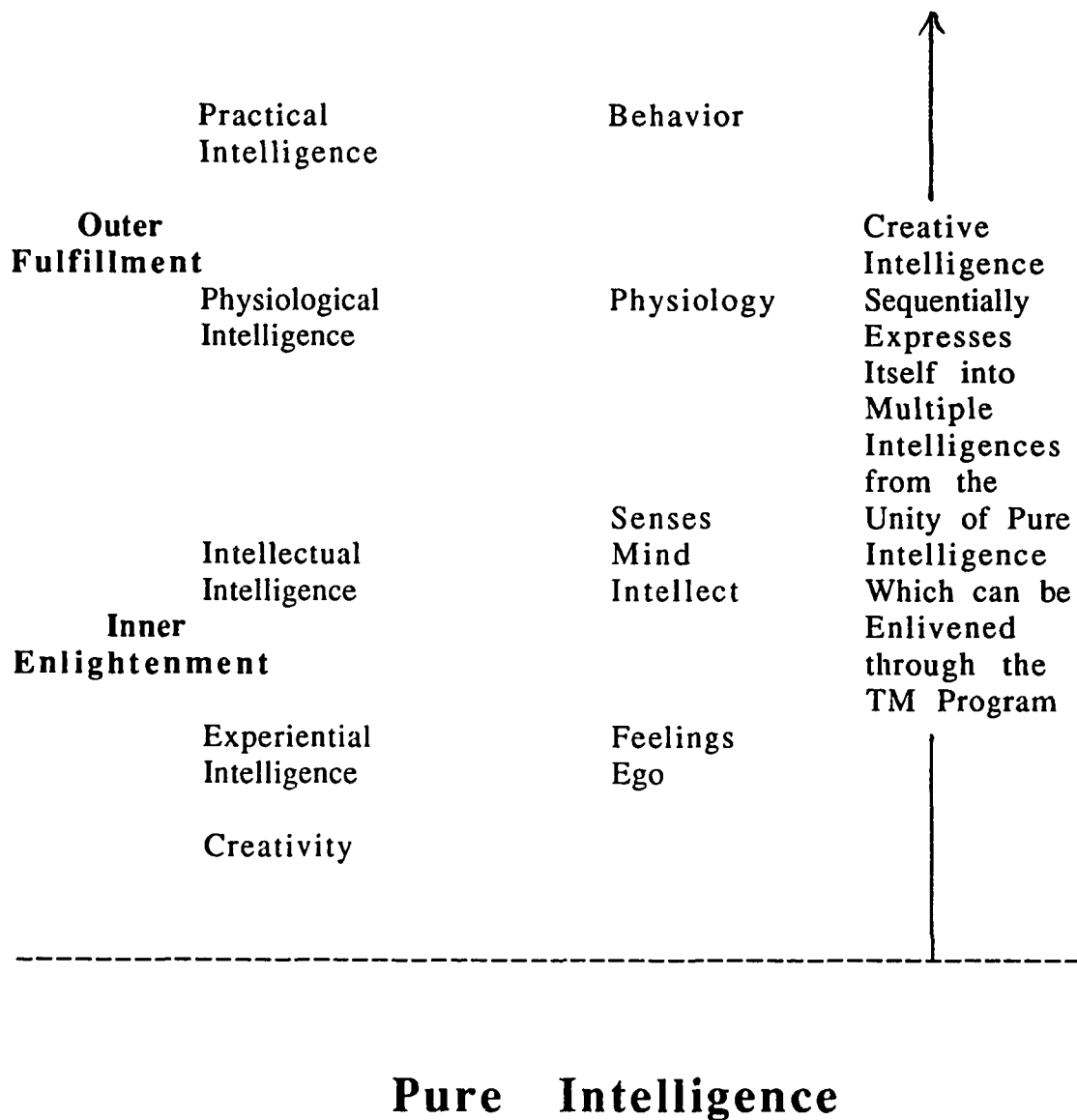


TABLE 1

Summary of the Six Measures Associated with Different Aspects of  
Chinese Concept of Holistic Intelligence

<u>Different Aspects of Chinese Concept of Intelligence</u>		<u>Intelligence Test</u>	
		Primary	(Secondary)
<b>Practical Intelligence</b>		<b>CTI</b>	<b>(GEFT)</b>
<b>Physiological Intelligence</b>		<b>IT</b>	
<b>Intellectual Intelligence</b>	(Perceptual Intelligence) (Abstract Reasoning) (Contextual Thinking)	<b>CFIT</b> <b>GEFT</b>	<b>(IT)</b>
<b>Experiential Intelligence</b>	(Improved Emotions) (Reduced Fear) (Improved Ego)	<b>STAI</b> <b>STAI</b> <b>STAI</b>	<b>(CTI, TCT-DP)</b> <b>(CTI, GEFT, T</b>
<b>Creativity</b>		<b>TCT-DP</b>	

The associations of the measures are briefly explained in sequence as follows:

TCT-DP is a test of creative potential which, as will be discussed later, involves the faculty of volition, affects, and cognition. As such, it can assess the whole range of subjectivity, including ego and feelings, and is thereby placed in the subtlest level of individuality.

STAI is a State and Trait anxiety test. It is used here to assess the Chinese notion of "fearlessness" which is operationalized as reduction of fear and anxiety. Trait-anxiety has to do with the personality or the ego, while State-anxiety measures may mainly assess the negative emotion of the individual. STAI is therefore considered as a measure for the improved ego and emotions. Since ego and feelings are the two subtlest aspects of personality according to Maharishi's Vedic Psychology, STAI is placed the first in the list after TCT-DP.

GEFT is a measure of field independence as well as broad comprehension and sharp focus. It is used in this research study to assess the contextual thinking of the Chinese. Contextual thinking means not only the ability to disembed information from the background, but it also means the ability to think holistically of the relationship between the part and the whole. Although GEFT seems only capable of assessing the former ability, the ability to disembed part of the information from the whole is certainly the basis of developing the ability to consider part-whole relationship. Accordingly, GEFT, like STAI, though fails to capture the full value of holistic intelligence, could be considered as the fundamental element to develop holistic intelligence.

In addition, GEFT also assesses the ability of "internal frame of reference" which may be related to the Chinese concept of "enlightenment" or being in tune with nature. Hence, it relates to do with the mind and intellect on the one hand and ego on the other. Therefore, GEFT is placed after STAI.

CFIT is a test of fluid intelligence, which is mainly the ability of abstract, analytical thinking. Complementary to the GEFT, it is used here to assess intellectual intelligence which mainly corresponds to the level of the intellect.

IT is a test of visual information processing mainly related to the senses and mind. As explained later, the speed and accuracy of the IT performance reflects the "determinant and general neural characteristics of mental speed," or the efficiency and effectiveness of the nervous system as a whole. A faster speed and better accuracy in information processing means less "noise" in the nervous system. In other words, the physiology is more refined. Although IT has to do with senses and mind, the senses, however, is closely related to the intelligence of physiology. Accordingly, IT could also be a measure of perceptual intelligence, which could be another potential assessment of the Chinese unique thought processes of "sense (visual)-dependent immediacy" as explained earlier.

CTI is an assessment of practical intelligence. Hence, it mainly measures successful behavior. Nevertheless, as will be explained later, constructive thinking has important implications from the level of ego and emotions. It is also related to experiential intelligence.

These six measures will be discussed in detail in terms of their appropriateness in assessing the multiple intelligences of the Chinese. One concern is the issue of cultural-fairness because these measures, which are developed in the Western culture, are being used to measure the intelligence of the Chinese. This concern is discussed in the following section.

### **The Issue of Cultural-Fair Measures of Intelligence & Creativity**

Obviously, it is important to measure validly intelligence and creativity according to the meaning of these concepts in the Chinese



culture. It is also essential, however, to measure intelligence and creativity fairly, especially if some testing instruments developed from one culture are to be applied in another culture, as in this case. Hence, it seems necessary to logically understand the nature of cultural-fair assessment of intelligence, and the rationale for using these Western intelligence measures in this dissertation research.

However, it is in principle probably impossible to design a completely culture-fair test; an individual's performance will always be affected by his or her cultural background. The abilities that a society considers important are the ones it will take time and effort to test. If writing and quantitative skills are valued in a society, then these skills will be viewed as predictive of success. If social skills and the use of complex riddles in storytelling are valued (as they are among the Kpelle people of Liberia), these skills will be considered the important ones to test (Cole, 1981).

Although psychologists have made a number of attempts to develop tests that are "truly" culture-fair, for example, Cattell's Cultural Fair Intelligent Test, the results have not been promising. For one thing, the culture-fair tests do not predict scholastic performance (or, in some instances, performance on the job) as well as do more conventional ability tests. This finding is not surprising, since what is considered a good performance in school or on the job is also culture-dependent. Secondly, group differences on culture-fair tests are often as large as the differences on the tests they have been designed to replace (see Atkinson, et al., 1987).

In the absence of satisfactory culture-fair tests, the best that can be done at present may be to recognize the cultural basis of the standard intelligence tests and interpret the scores with caution, always keeping in mind the individual's background--the language spoken in the home and the kinds of learning experiences provided. Several tests, for example, have been developed that are based on black culture and language (see Williams, 1972; Boone & Adesso, 1974). The vocabulary and idioms used in these tests are more or

less characteristic of Black English. These tests emphasize the extent to which cultural factors can influence test scores; blacks may score 20 IQ points higher than whites on such tests. But the test scores apparently bear little relationship to other measures of intelligence or achievement for members of either race (Matarazzo & Wiens, 1977).

As suggested, the present research study has also taken the uniqueness of the Chinese culture and language into account. This will insure as much as possible that, even in the absence of truly cultural-fair tests, what is measured is what is intended to be measured.

Olsen (1986) further argues that there is no value in trying to invent a test that is universally applicable (or cultural-fair) if the test do not assess "underlying ability." The intelligence tests in use today, he argues, only sample a particular domain of knowledge, measuring "competence with the specialized language tied to literacy--competence in carefully analyzing linguistic form...and in generally treating language as autonomous representation of meaning..." "...These are not universal operations of the mind. They are operations required for dealing with a human-made artifact--written language." "...Intelligence tests are [then] misused only when test scores are overinterpreted to mean 'quality of mind'..."(p.357).

In light of these cautions, the best attempt made in culture-fair tests seems to occur when the assessment does not rely on knowledge consumption (i.e., memory), knowledge regurgitation (i.e., scholastic achievement), and/or knowledge utilization (i.e., problem solving), as these are recognized as the key elements heavily tied to cultural and school experiences that can influence one's performance on intelligence and creativity. These three considerations are the basis of choosing the measures for this dissertation.

In addition, a complementary approach could be used to simply evaluate the efficiency of the general functioning of the

neurophysiology in simple cognitive processes, such as reaction time. The fact that cognitive processes are very likely to be universal is a view now widely espoused in cross-cultural psychology, and one based on a considerable amount of research (Berry & Irvine, 1986). To both Levi-Strauss (1966) and Vernon, (1969) cognitive activity is viewed as a shared, species-wide characteristic (a psychological universal) but one that is used in differing ways and for different purposes across groups. Accordingly, by simply looking at the psychophysiological measure of speed and efficiency of data processing, it could be a more universal way to assess the "quality of mind" rather than to sample a particular "domain of competence."

In the present research studies, five testing instruments being used are believed to be reasonably cultural-fair. This will be explained in detail in the next section. In addition, although the distinct expressions of the intelligence of the Chinese are considered, the emphasis has been from the perspective of the universal structures of human mind in expressing intelligence according to Maharishi's Vedic Psychology which also happens to be similar to the Chinese culture. This should be able to minimize the influence of cultural bias on the assessment of intelligence.

In addition, the "creative intelligence enhancing technology"--the TM program--adopted in this research is also a natural and universal technique that is neither language-based, nor designed to improve specific aspects of learning or problem-solving per se. Rather, it is for promoting general neurophysiological development, and thereby unfolding general intellectual ability, and creative potential, as well as other abilities (Maharishi, 1966, 1969; Wallace, 1986).

With this general understanding, the following section will discuss each of the six tests for appropriateness in relation to this dissertation. Both cultural-fairness and broader assessment of the Chinese intelligence will be discussed.

## Rationale for Choice of the Six Intelligence Measures

### (1) *Test for Creative Thinking--Drawing Production (TCT-DP)*

*Cultural fair.* The TCT-DP is a drawing production test. It transcends most cognitive (convergent) tests that assess knowledge consumption, regurgitation and/or utilization, and are applied to the screening procedures of potentially gifted students . It liberates the innovative mind from factual, problematic and/or punctilious reproduction of (academic) reality. It allows potentially gifted students of most ages and ability groups to interpret and to complete what *they* conceive to be significant for the development of a creative product. This permission to interpret and to associate freely given fragments of possible "Gestalt" is called by Arieti (1976) *image-production*, the true building block for innovative and productive thinking. The open-ended, productive, divergent, and unconventional approach to mental testing is seen as an important addition to the culture-fair assessment of creative potential in being gifted.

There was a pilot study first assessing creative potential cross-culturally using the TCT-DP (Jellen and Urban, 1989). The study on eleven cultural samples world-wide, including China, coming from distinctly different political, economic, and educational systems verifies that the instrument is sensitive; it is also culture-fair, culture-sensitive, and gender-fair.

The present study on the Chinese students from Taiwan can serve as replications of the first pilot study. It will be interesting to see how the Chinese students from Taiwan, which is undergoing rapid economic changes, are different from the Chinese students from the Mainland; and how the older age groups in the studies differ from the elementary-school-aged students in the pilot study.

Another pilot study trying to establish psychometric characteristics for the TCT-DP in reference to Polish population

concludes that the TCT-DP is a good instrument to fulfill the purpose within all school settings investigated (Wolanska and Necka, 1990).

*Theoretical basis and previous research.* The TCT-DP in the contexts of "Ganzheit"-Psychology and "Gestalt"- Theory evaluates creativity potential in holistic terms. Creative thinking is conceived as a mental act that involves mind on the whole; that is on the cognitive, affective, and volitional aspects of mental life. This subject matter is expressed in the continuation and completion of six basic fragmentary drawings. It is a subjective experience with an emphasis on perception, detection, risk-taking, and creative thinking. Creative thinking is then operationalized into eleven key elements which also serve as evaluation criteria for the TCT-DP: Completion, Additions, New Elements, Connections --with a line, Connections--with a theme, Boundary-breaking (fragment-dependent), Boundary-breaking (fragment-independent), Perspective, Humor, Unconventionality, and Speed.

Moreover, the TCT-DP construct is also supported by those components of creative thought--fluency, flexibility, originality, and elaboration--that can be found throughout the existing literature on creativity and creativity testing. These components are applied either exclusively as a set (Torrance, 1966) or in combination with additional components (Guilford, 1967). The researchers, however, also found it necessary to include such additional components as risk-taking (i.e. boundary-breaking), composition (i.e. "coherence of organization" accordingly to Lowenfeld (1962), and humor as a cognitive-affective ability capable of freeing the mind from concrete or unpleasant realities.

So far, no previous research has ever been done on the TM program with TCT-DP. One study, however, that used the Torrance Tests of Creative Thinking (TTCT) to measure figural and verbal creativity in a control group and in a group that subsequently learned the TM program, has shown that figural originality,

flexibility, and verbal fluency significantly improved in five months in the TM group (Travis, 1979).

Another study based on Guilford's criterion of figural transformations of divergent thinking measured by the Match Problem Test showed significant improvement after practicing the TM program for 14 weeks (Shecter, 1978). Since TCT-DP is understood to be more holistic than other existing creativity tests, and since the TM program is capable of enlivening the deeper and more holistic level of creative intelligence, it is predicted that the TM program would produce a more profound improvement on creativity among the Chinese students as measured by TCT-DP in these research studies.

*Appropriateness for the proposed research.* As discussed above, the traditional Chinese culture views creativity as inherent in the intelligence of nature, and that a more developed mind ("inner enlightenment") can naturally live more of that infinite creativity. A more developed mind, as explained before, means a more integrated development of the different (and especially the more abstract) levels of mental activities according to Maharishi's Vedic Psychology. A broader assessment of creativity, therefore, requires a holistic assessment of different levels of mental activity (or the whole brain) simultaneously. For this purpose of holistic assessment, TCT-DP seems show promising results.

Furthermore, since the subject matter of TCT-DP is expressed in the continuation and completion of six basic fragmentary drawings and is a subjective experience in which "perception" is one of the main emphases, it is thus also suitable for accessing the intelligence of the Chinese whose thought processes have been described as mainly relying on the medium of the senses (see Chapter 8).

In addition, as brought out in the introduction of this dissertation, Cranson (1989) suggests that "the more subtle functioning of creativity rather than a function of mental speed"

should be considered. TCT-DP, as discussed, seems to fulfill this purpose by assessing both ego and feelings. The TCT-DP, therefore, is a good assessment for creative intelligence in the research. The 11 evaluative criteria go beyond cognition and deliberately include affective as well as conative/volitional variables essential to creative and unconventional thought. This comprehensive approach to "whole-brained creativity" (Torrance & Rockenstein, in press) makes the TCT-DP an indispensable instrument for the present research study particularly. For most age and ability groups, including students of different majors, the instrument is designed to assess creative potential in ways that are not only holistic, but also cultural-fair and cultural-sensitive.

After a brief survey of available tests, which claim to, and are used to assess divergent and/or creative thinking processes, it seems that none of them can assess the holistic concept of creativity defined in this proposal. Several conceptual, evaluative, and economic shortcomings are apparent.

In conceptual terms, the German TDK 4-6 ("Test for Divergent Thinking," Meinberger, 1977), for example, does not incorporate all 24 factors of Guilford's (1956) divergent thinking scheme. Only two content areas (i.e., the semantic and the figural) were selected, seemingly by chance and interchangeably, as being relevant to an assessment of divergent thinking which is understood to be synonymous with creativity. Also, no reasons were given for the selection of certain Guilford, Torrance, Wallach, and Kogan test items. It therefore is not holistic enough to assess the different levels of mind.

Some other instruments which are occasionally used as creativity tests, for example, "The Man-Drawing-Test" (Goodenough, 1963) or its German version called the "Mann-Zeichen-Test" (Ziler, 1971), display not only a high loading of cultural bias but also, and more specifically, has a sexually-biased character.

Torrance's (1968) "Circle Test" is hard to evaluate on unconventional grounds since the drawings are based on a predetermined and highly conventional circle-pattern. Such conventional patterns do not allow for a variety of unconventional solutions to emerge. This critique is based on the experience of a researcher who has worked with the Torrance test for a number of years.

Guilford's (1976) "Creativity Tests for Children" (CTC) are elaborate and time-consuming batteries which are neither economical nor easy to score when administered to large groups.

(2) *Spielberger's State-Trait Anxiety Inventory (STAI)*

*Cultural fair.* The STAI is self-report scales for measuring state and trait anxiety. Over the past 15 years, The STAI has been used in more than 3,000 studies. It has also been adapted in more than forty languages and dialects for cross-cultural research and clinical practice (Spielberger & Diaz-Guerrero, 1976, 1983). Spielberger and Krasner (1988, ch. 2), however, caution that the translation of psychological inventory from the original language to a second language raises many complex theoretical and methodological issues. Test translators must understand the conceptual framework where necessary in order to incorporate relevant aspects of the new culture. Only then will adapting a psychological scale for another language permit meaningful cross-cultural comparisons. Other than that, evidence of the cross-language equivalence of the Spanish and English forms, for example, is demonstrated by the high correlations, ranging from 0.83 to 0.94. Since the STAI in Chinese has not been validated--it is still in a preliminary adaptation state--the author decided to translate the STAI with the help of some native Chinese school teachers. This was done to insure that it was well translated and understood before it was used with the Chinese students. This



translation will be submitted for helping to formulate the official Chinese form.

*Theoretical basis and previous research.* The STAI is supposed to assess anxiety related both to an unpleasant emotional state or condition (state anxiety) and the relatively stable individual differences in anxiety-proneness as a personality trait (trait anxiety). Personality traits have the characteristics of a class of constructs that Atkinson (1964) calls "motives", and state-anxiety is defined as a transitory emotional reaction that consists of feelings of tension, apprehension, nervousness, and worry; and activation (arousal) of the autonomic nervous system. Accordingly, the STAI seems to be able to assess both the *ego* and *feelings* levels of mind.

The theoretical framework for evaluating anxiety has involved a complex *psychobiological* process that involves external and internal stressors, cognitive appraisal of threat, and coping and psychological defenses. The whole process encompasses a variety of mental processes, which include perception, thought, memory, and judgment. As such, it is a reasonably holistic measure.

Large correlations exist between anxiety as measured by these instruments and as measured by clinical and behavioral evaluations. The test-retest and between-instrument correlations for the trait anxiety instruments are among the highest found for psychological measures (Spielburger and Krasner, 1988).

It is a well-known fact that stress and anxiety are detrimental to creativity and intelligence (see Swanson & Oates, 1988). A significant negative correlation was found between Trait-anxiety and verbal performance. Trait-anxiety was also higher in children from lower socioeconomic backgrounds than in middle class children. An inverse relationship was also found between STAIC (for children), Trait-anxiety scores, and academic achievement for boys at all grade levels. Higher anxiety with poorer achievement for younger children in Spielburger and Krasner's (1988) study was consistent with

similar results that have been reported for disturbed children and college students.

In reducing State and Trait anxiety, the TM program, however, has found to be twice as effective as other meditations or relaxation techniques (Eppley et al., 1989; Dillbeck, 1977; also see Alexander et al., 1987; Dillbeck and Orme-Johnson, 1987). Accordingly, it is logical to infer that the TM technique can enhance the growth of intelligence and creativity through the normalization of psychophysiology from stress and anxiety.

*Appropriateness for the dissertation research.* According to Spielberg and Krasner, "...fear is widely regarded as a fundamental human emotion that has evolved over countless generations as an adaptive mechanism for coping with danger" (p. 31). Both Darwin and Freud also considered fear, which Freud called objective anxiety, to be an emotional state that was universally experienced (see Spielberg and Krasner, 1988). For such a "universal," "adaptive" mechanism, it seems obvious that this unpleasant emotion of fear or threat has huge impact on the development of intelligence as Caine and Caine (1991) has suggested in Chapter 6 of this dissertation. Hence, the evaluation of anxiety reduction as an indicator of growth of intelligence is appropriate.

In addition, the STAI evaluates the psychological "state" and "dispositional" tendencies to stressful and threatening situations which, according to Maharishi's Vedic Psychology, would cause stress in the nervous system; and the distorted (stressed) physiological structure in turn restricts the growth of creative intelligence. If this is the case, it is predicted that an unfoldment of creative intelligence will produce a corresponding normalization of the physiology and a corresponding reduction in experiences of anxiety and fear. Hence, the STAI is employed in this research to assess the "fearlessness" of experiential intelligence in the Chinese tradition which should

develop when intelligence is enlivened and unfolds itself at the deepest level of subjectivity.

*(3) Group Embedded Figures Test (GEFT)*

*Cultural fair.* The GEFT requires a subject to locate a previously seen simple figure within a larger complex figure which has been so organized as to obscure or embed the sought-after simple figure (disembedding). The perceptual function of disembedding featured in the GEFT is a universal one in human experience, and the task itself may be made meaningful to groups of different mental levels and of widely varied socioeducational backgrounds. The GEFT is also a non-verbal test and may be applied to groups with different native languages and differing verbal facility. Moreover, it is also relatively free of specific associative content. These characteristics have made the GEFT useful over a wide age range and with a variety of subject populations, and have made possible GEFT's successful application in cross-cultural studies, including cultures as radically different from American as the Temne and Mende of Sierra Leone, Africa (Dawson, 1967a, 1967b; Berry, 1966); the Arunta of Australia (Dawson, 1969); the Eskimo of Baffin Bay, Canada (Berry, 1966; MacArthur, 1968); the Ibo of Nigeria (Okonji, 1969); Ghanaians (Jahoda, 1970) and Canadian Indians (Vernon, 1965).

*Theoretical basis and previous research.* Extensive research application of the GEFT over the twenty years during which it has been in use (Witkin, 1950; Witkin, Dyk, Faterson, Goodenough and Karp, 1962, 1974; Witkin, Lewis, Hertzman, Machover, Meissner and Wapner, 1954) has revealed that the GEFT assesses broad dimensions of personal functioning, including the ability to use one's internal frame of reference. These broad dimensions cut across diverse psychological areas to show a more integrated, holistic view of personality. Although scores on the GEFT, in the strictest

interpretation, only reflect the extent of competence at perceptual disembedding, the conceptual meaning of individual differences in performance on the GEFT has evolved over the years from the cognitive styles of "global vs. analytical functioning" (Witkin, 1948), to "field-dependence vs. field-independence" (Witkin, 1950).

Witkin defines field-independence as an analytic style of perception, being able to experience items as distinct from their background, whereas field dependence refers to a more undifferentiated, diffuse, global style of perception. Field-independent persons are found to have a greater ability to structure experience, to have greater cognitive clarity, and thus, to remember experience more clearly. Their ability to differentiate experience apparently arises from a clear, stable internal frame of reference for interpreting and reacting to the external world.

Studies show that field-independent persons possess a stable *self*-view despite variations in social context and that they need only a limited amount of guidance and support from others. They are able to establish and maintain stable attitudes, judgments, and sentiments without continuous referral to external standards (Werner, 1957). Moreover, they have been found to be more creative as a group (e.g., Steven, 1969). They have also been found to be markedly superior on the Wechsler analytic triad (Goodenough and Karp, 1961; Karp, 1963). Field independence is also positively correlated with *g* and various measures of both verbal and performance intelligence (Goldstein & Blackman, 1978; Hulfish, 1978; Mckenna, 1984). Like fluid intelligence, field independence usually increases developmentally up to age 17, then level off (Witkin, Goodenough, & Karp, 1967), and then decreases as age reaches the upper end of the scale (Lee & Pollack, 1978; Markus, 1971; Schwarz & Karp, 1967). In general, field independence correlates with such developmental measures as Piaget's formal operations stage (Rubenstein, 1980) and Piaget's and Kohlberg's moral reasoning stages (Arbuthnot, 1971; Caring, 1971; Schleifer, 1971). These results taken together seem to

suggest that GEFT can assess a basic dimension that underlies a wide spectrum of mental abilities. This understanding could be clarified further by probing more deeply into the theory of the GEFT.

Behind the GEFT performance, the theory for developing the GEFT was based on Werner's (1940, 1957) organismic-developmental theory of cognitive styles. Accordingly to Werner's theory, all development, specifically that of cognition and perception, proceeds from an initial state of concrete, intuitive globality, through an intermediate phase of increasing differentiation, to a final stage of abstract, analytic differentiation and hierarchic integration. Greater differentiation or achievement of complex structure, as in ontogenetic development, means moving toward "fulfillment of the organism's potential." In the GEFT, psychological differentiation is the highest-order construct that integrates quality of experience across many domains. Higher GEFT scores thus imply a more holistic development of the full mental potential of the individual.

In terms of TM research on GEFT, studies consistently report significant increases in field independence, as measured by GEFT, among practitioners of the TM and TM-Sidhi program (Pelletier, 1977; Dillbeck et al., 1986; Jedrczak and Clements, 1984; Gelderloos et al., 1987).

*Appropriateness for the proposed research.* The proposed research has defined intelligence (of the Chinese culture) in terms of the full expression of the total creative intelligence of nature into different abilities that go beyond intellectual intelligence. Since GEFT measures very broad dimensions of personal functioning, not only in terms of broad comprehension and sharp focus but also in terms of the stability of internal frame of reference, it should be an ideal measure for assessing the "contextual thinking" of the Chinese. This is an especially anticipation because the Chinese thinking is said to be in terms of "context" and lacking abstracts.

Accordingly, if it is really the case that GEFT fail to assess "general intelligence" of an individual, as studies have suggested (Goodenough and Karp, 1961; Karp, 1963), it can also serve as a more appropriate measure on the level of the mind and intellect, which are mainly associated with the ability to think of parts in context of the whole.

Furthermore, GEFT is also a perceptual task requiring the ability of disembedding figures from the context. As such, it seems to be a reasonably good testing instrument suitable for the "sense (visual)-dependent immediacy" of the Chinese thought processes, which have also been asserted to reinforce the holistic nature of the Chinese contextual thinking.

In addition, it is particularly interesting that GEFT has been theorized to be able to assess field independence or an inner frame of reference. From the perspective of Maharishi's Vedic Psychology, the ability to form an inner frame of reference, is to some extent, equivalent to an ability to maintain a stable sense of self. A stable sense of self can be described as the motivation of the human nervous system to experience pure intelligence throughout the cycle of waking, dreaming, and sleeping in the development of cosmic consciousness (Maharishi, 1969).

Perhaps field independence in its ultimate sense is the development of cosmic consciousness, the first stage of enlightenment according Maharishi's Vedic Psychology. Since the Chinese tradition regards the higher development of intelligence is toward enlightenment, GEFT seems to offer a very interesting measure of intelligence in the Chinese. Complementary to CFIT of g, for example, the GEFT could be another valuable tool to make the assessment of intelligence more reliable and holistic on the levels of senses, mind, intellect, and ego.

*(4) Cattell's Culture Fair Intelligence Test (CFIT)*

*Cultural fair.* As the title reveals, CFIT is a culture fair intelligence test that has been widely used in many cultures. Over the years, different cultural norms for different age groups have been established, and the scores of the test can be directly converted into a standard intelligent score, IQ, for cross-culture comparisons. Apart from some weaknesses already mentioned, the test is reasonably well designed involving varieties of simple geometrical figures so as to be relatively independent of cultural and educational influences.

*Theoretical basis and previous research.* CFIT is a measure of *g* or an abstract field of overall global ability that underlies and is common to different specific abilities. The general intelligence factor is only a mathematical construct that describes the relationship between specific variables. The broad nature of *g* can thus be seen as the general intelligence factor going beyond many intelligent behaviors in the sense that its existence is inferred from the correlation between many mental abilities. This broad nature of *g* is important for the fact that *g* constitutes the largest component of total variance in all standard tests of IQ, and the very same *g* is by far the largest component of variance in scholastic achievement. IQ jointly with scholastic performance predicts more of the variance among persons in adult occupational status and income than any other known combination of variables, including race and social class of origin (Jensen, 1979).

Moreover, since the essential features of mental tests designed for humans most manifesting *g* are found also in various tests of animal intelligence, *g* is suggested to be not only a concept with relevance to individual differences in humans but also to understanding species differences in behavioral capacity (Viaud, 1960, Ch. 2). The idea that *g* can be viewed as an inter-species concept with a broad biological and evolutionary basis further

suggests that *g* is a reasonably important measure of intelligence, though no one really knows what *g* is!

*Appropriateness for the dissertation research.* Since CFIT is a measure of "fluid Intelligence", or "g" (Horn and Cattell, 1966; Jensen, 1978, 1984), it is associated with the ability to perceive complex relations, to effectively use short-term memory, form concepts, and perform abstract reasoning. From the perspective of a universal measurement of intellectual intelligence, CFIT seems to be, from what has been discussed above, one of the best in this category. Although it is said that the Chinese may relatively lack abstractions in their thinking (Redding, 1990, p. 75), the assessment of fluid intelligence or abstract reasoning is still very important in today's science-based world.

In addition, CFIT is also a test of figural reasoning. Thus it is also a good test for the Chinese distinct thought processes which mainly rely on the sense of sight.

Maharishi's Vedic Psychology sheds light on the most profound nature of *g* as the general expression of pure intelligence which can be located at the deepest level of personality, the source of thought. *g*, as it is considered in psychology, however, appears to be mainly an expression of the level of intellect, which CFIT assesses in the human mind as logical thinking. Maharishi's Vedic Psychology further brings fulfillment to psychology's quest for a deeper understanding of *g* by unfolding the most general and abstract field of pure intelligence with a practical technique, the TM program, and providing direct experience and enlivenment of pure consciousness--called the *Tao* in Chinese tradition.

Two longitudinal studies on university students in the U.S. who practiced the TM program (and the TM-Sidhi Program, a more advanced practice) have shown that scores on Cattell's CFIT rose 8 points and 9 points respectively over four years (Aron, Orme-Johnson, & Brubaker, 1981; Dillbeck, Assimakis, Raimondi, Orme-



Johnson, & Rowe, 1986). These results are also confirmed by another longitudinal study on international students studying in the U.S. A similar four-points gain on the CFIT was found with the practice of the TM program over 2 years (Cranson, 1989). Although there has never been a research study on intelligence or any other cognitive and affective factors in the Chinese (or East Asians in general) with the practice of TM program, based on the universal nature of the TM program and *g*, the author predicts that a similar effect would be seen in the Chinese subjects for this research study.

*(5) Inspection Time (IT)*

*Culture fair.* IT is a construct concerned with the accuracy of a subject in a perceptual discrimination task. It has been defined as the shortest duration of a stimulus that can be responded to with near perfect accuracy in a simple decision task (Nettelbeck, 1982). For a better understanding of this simple discrimination task, the following description is offered of an improved version of Dr. Zhang's (1990) IT being used in this research:

The discriminative stimulus in the IT task was a 3 cm by 3 cm square with one side missing. Which side of the square was missing was randomized for each presentation. After a brief exposure, the discriminative stimulus was masked. Stimuli were presented at eye level approx. 50 cm from the subject. The subject's task was to point out the missing side by pressing a corresponding key in the computer keyboard (A for left, S for top, K for right, and L for bottom. After the masking stimulus, the four letters were then presented on their corresponding side of the filled square so that the subject could make a response without trying to memorize the link between a letter and a side of the square. A small cross (6mm), which acted as a cue, occurred 800 msec before the onset of the discriminative stimulus and lasted for 300 msec. The screen was cleaned up for the next presentation as soon as one of the four keys was pressed by the subject. The inter-trial interval was randomized in the range of 1.5-2.5 sec. (p. 218)

From Dr. Zhang's IT example, IT indexes a determinant and general neural characteristic of mental speed (see Juhel, 1991). The IT paradigm could thus be used to "test fluid intelligence in a way that is transparently fair to people of varying socioeconomic, psychopathological, ethnic, national and racial groups [and] (...) to indicate mental speed levels precisely..." (Brand and Deary, 1982, p. 146).

Since cognitive processes are believed to be a universal phenomena (e.g. Berry & Irvine, 1986; Levi-Strauss, 1966; Vernon, 1969), the speed of processing simple stimuli would reflect the efficiency of the neurophysiology. Therefore, Brand and Deary (1982) are optimistic that IT provides a cultural fair measure of intelligence.

Zhang (1990) questions the validity of IT as a cultural fair measure of intelligence based on the ground that "there had no published report on the IT-IQ relation among those subjects who have a different cultural background rather than from English speaking societies and the IT measure is still in the development stage." Zhang (1990), however, replicates the typical IT studies that have been conducted, for example, by Brand and Deary (1982), Nettelbeck & Lally (1976), Nettelbeck & Young (1989), and Zhang et al. (1989), on forty Chinese students in Peking University, China, with the improved version of the IT test cited above. He confirms that IT both reflects the "speed of (sensory) information processing" and provides "a cultural fair measure of intelligence" with even a stronger IT-IQ correlation at .70 in the Chinese.

*Theoretical basis and previous research:* IT was first developed within the framework of a "cumulative processing model of discrimination" (Vickers, 1970, 1979; Vickers, Nettelbeck and Wilson, 1972). Nettelbeck (1982) explains the model as follows:

This model assumes that, following sensory registration, representations of each alternative stimulus are encoded into short-term memory. The accumulation of a critical amount of evidence in support of one of the possible alternatives determines when a response is made. Further encoding is required to translate the decision outcome into a response. Some minimal time is required to complete even the simplest task since the rate at which information is sampled is assumed to be limited. The minimum time required to take one sample is termed "inspection time" (p. 299-300)

IT thus gives an estimate of the speed of information processing at which the stimulus is encoded or transferred into short-term memory from a *sensory* register (Brand, 1984; Nettelbeck, 1982; Saccuzzo, Kerr, Marcus & Brown, 1979; Zhang, Caryl & Deary, 1989). "...IT as it is currently measured may be more appropriately be regarded as an index of the *efficiency* of the activity associated with early central stages of perception rather than as speed of apprehension." (Nettelbeck, 1987, p. 339). Raz et al. (1987) also suggest that efficiency of this activity could be at least as closely connected with decision time or quality of sensory information representation as it is with processing speed. Hence, IT is believed to be an indirect measurement of a perceptual speed factor (see Juhel, 1991).

The time required in performing the task, therefore, is a simple reflection of the efficiency of the underlying processing system, or it is also a reflection of the general efficiency of the *neurophysiology*. If the neurophysiology has "noise" (or is not refined), sensory input will be slower and/or less accurate. In this light, IT can potentially assess the physiological aspect of intelligence in anyone anywhere. Since IT also assesses visual perceptual processing, it may be the very test for the Chinese distinct thought processes of "sense-dependent immediacy."

Previous research studies have indicated that subject's IT scores are related to their intelligence, as measured by conventional

psychometric procedures, such as Raven's Standard Progressive Matrices, with less intelligence subjects showing slower speed (Brand and Deary, 1982; Nettelbeck & Lally, 1976; Nettelbeck & Young, 1989; Zhang et al., 1989; Zhang, 1990). It has been calculated that the value of the IT-IQ correlation, corrected for restriction of ability range, is about -0.50 (Nettelbeck, 1987), and -0.713 (Zhang, 1990) with the Parameter Estimate Sequential Test, an improved IT test. An adjusted correlation of -.45 to -.55 seems to be a reasonable estimate of the strength of the association between IT and *g*, as recent results tend to suggest (Deary et al., 1989; Juhel, 1991, Nettelbeck and Young, 1989).

In addition, as expected, comparing normal and intellectually disabled young adults on IT and responding time has shown that the intellectually disabled are relatively slower in both (Kirby & McConaghy, 1986; Kirby & Thomas, 1989).

Regarding study on IT with the TM program, no research has been done before. Some previous research, however, indicates a relationship between choice reaction time, intra-individual standard deviation of choice reaction time, and *g*, considered by some investigators to be a measure of general intelligence (Barett, Eysenck, & Lucking, 1986; Eysenck 1982, 1986, 1987, 1988; Frearson & Eysenck, 1986; Vernon, 1983, 1987). Research consistently shows that practice of the TM program improves various physiological and psychophysiological correlates of more efficient and effective information processing: such as faster choice reaction time (correlated with higher IQ); EEG coherence (also correlated with higher IQ); shorter latencies and higher amplitudes of auditory evoked potentials (Dillbeck & Bronson, 1981; Gaylord et al., 1988, Travis & Orme-Johnson, 1990; Cranson, et al., 1990; Goddard, 1989; Kobal et al., 1975; Wandhofer et al., 1976). It may then be reasonably hypothesized that the TM program will improve performance on IT also.

*Appropriateness for the proposed research.* Although IT is a relatively new correlate of intelligence, it seems to have shown promising results as a cultural fair and convenient measures of intelligence (see Brand & Deary, 1982).

Similar to choice reaction time measures that have been used in previous TM research, IT can be a good alternative to measure "noise" in the information processing system (Jensen, 1987, pp. 134-136; Eysenck, 1987, p. 38). As explained earlier, IT also accesses sensory processing and seems to show even stronger correlation with intelligence. For this reason, it provides a more holistic evaluation of intelligence.

In addition, this dissertation study will adopt Zhang's (1990) improved version of the IT test, which has shown an even stronger correlation with IQ among the Chinese subjects. Zhang's IT test has replaced the typical IT task. Rather than using two lines of markedly different length as the stimulus to be discriminated by the subject, the improved version uses the discriminative stimulus of a square with one side missing. As far as the structure of the IT stimulus is concerned, it is believed that the square IT task may show less effects of the apparent-motion on performance than does the two-line IT task (Egan, 1986; Mackenzie & Cumming, 1986; Mackenzie & Bingham, 1985).

Since IT can assess "the efficiency of the activity associated with early central stages of perception." it seems to be a reasonably good measure of the Chinese sense-dependent immediacy of mental processing. Furthermore, IT can also be understood as a measure of intelligence on the physiological level in terms of absence of "noise" and general efficiency of the neurophysiology. This physiological intelligence can be seen in the motor coordination associated with the underlying neural activity of sensory processing and mental speed. This is why Juhel (1991) states that "IT indexes a determinant and general neural characteristic of mental speed." As such, it makes an

appropriate measure for physiological intelligence in this research study.

*(6) Constructive Thinking Inventory (CTI)*

*Culture fair?* CTI is a self-report measure of intelligence of the experiential system, of automatic constructive and destructive thinking, developed by Epstein and Meler (1989). It is a measure of a broad factor of coping (of "everyday" or "practical" intelligence) that effects one's effectiveness in living, rather than of "intellective" (academic) form of intelligence, such as IQ. As a measure of "experiential" intelligence, CTI might *not* be cultural fair. However, as it is understood and explained below, CTI tries to assess the habitual thoughts, beyond the rational analytical mind, from the experiential system of an individual. Cross-cultural applications and even comparisons might be possible if CTI has been carefully translated according to the cultural context in which it is being used.

*Theoretical basis and previous research.* The theorists of CTI were stimulated by a theory of personality called cognitive-experiential self-theory (CEST; Epstein 1973, 1980a, in press) in order to understand the nature of practical intelligence. CEST assumes that everyday perception and behavior which is largely automated, is mainly organized and directed by the experiential conceptual system, which operates primarily at the preconscious level. In contrast to the rational system which operates mainly at the conscious level according to socially established rules of logic and consideration of evidence, the experiential system is more *holistic*, more loosely organized, more categorical, employs metaphor and imagery to a large extent, and is experienced with *emotions*. Overall, it is oriented toward immediate action and processes information rapidly and more crudely than the rational system.

CTI was developed to assess this experiential intelligence that determined behavior in everyday life by asking the subjects to report their conscious awareness of the consequences of their preconscious thinking, or habitual thoughts of which they are aware. Therefore, CTI seems to be able to assess a deeper and more holistic level of intelligence that has been found to be associated with all major nonintellectual aspects of success in living, including success in work, in love, in social relationships, and in achieving and maintaining emotional and physical well-being (Epstein & Meler, 1989; also see Vaillant, 1977; Felsman & Vaillant, 1987).

CTI includes sub-scales on Emotional Coping, Behavioral Coping, Categorical Thinking, Superstitious Thinking, and Naive Optimism. In addition, a Global Scale is made up from the items of the first four sub-scales except Naive Optimism. Emotional Coping refers to a tendency not to take things personally, not to be sensitive to disapproval and not to worry excessively about failure and disapproval. Behavioral Coping refers to thinking in ways that promote effective action, maintaining an optimistic approach to life. Categorical Thinking refers to thinking in extreme or rigid ways, and to being judgmental and intolerant of others. Superstitious Thinking refers to personal and conventional superstitions, as well as belief in esoteric and questionable phenomena. Naive Optimism refers to gross over-generalization following positive outcomes, as well as simplistic and stereotypical beliefs.

Previous research suggests that CTI is a more adequate instrument for measuring destructive thinking as viewed from the perspective of CEST than from other instruments dealing with coping styles. The Attributional Style Questionnaire (ASQ), for example, is described as a measure of pessimistic style (Peterson et al., 1982). Although both CTI and ASQ were similarly correlated with social relationships and love relationships, CTI global scale was significantly and positively correlated with work success, and negatively

correlated with psychological symptoms, physical symptoms, self-discipline problems, and alcohol and drug problems.

In addition, both Primary Emotions and Traits Scales (PETS) and CTI produce similar correlations with work success (.18 vs. .19), academic achievement (.10 Vs .14), and psychological symptoms (-.33 vs. -.39). CTI, however, is more highly correlated with physical symptoms (-.09 Vs -.2), self-discipline problems (-.09 Vs -.25), and alcohol and drug problems (-.12 vs. -.22). The CTI scales produced more widespread and stronger relations with the criterion variables than any of the other inventories, including ASQ, Social Support Questionnaire (SSQ) (Sarason et al., 1983), and (Internal and External Locus of Control Scale (I-E scale) (Rotter, 1966), all of which have established a record of being significantly associated with different aspects of nonintellectual measures of coping style relevant to successful living (Epstein and Meler, 1989).

The fact that study of practical intelligence (as measured by CTI) is capable of making the concept of intelligence more holistic is well presented in Sternberg and Wagner's editors (1986) book, *Practical Intelligence: Nature and Origins of Competency in the Everyday World*. The evidence presented in it clearly indicates that intelligence, as conventionally measured, is often unrelated to practical problem-solving or to success in many important life endeavors. The results uniformly suggest that various kinds of practical knowledge and abilities, such as the ability to get along with others, and tacit knowledge about what is expected, are often more important for success than intellectual ability as measured by IQ test (see also Cantor & Kihlarom, 1987, for an analysis of this issue from a social-cognitive perspective).

It has been found that Constructive Thinking and Behavioral Coping are the only scales that are significantly associated with eight criteria of success in living--work, love, social relationships, psychological symptoms, physical symptoms, self-discipline problems, alcohol and drug problem. It is not associated with



academic achievement, whereas, as noted earlier, total IQ, Vocabulary IQ, and abstract thinking IQ measures are highly reliably correlated with academic achievement. Emotional coping is significantly correlated with six of the criteria. Emotional coping and behavioral coping produce considerably higher correlations with psychological and physical symptoms than the other scales. They also produce the only significant correlations with work history (Epstein and Meler, 1989).

*Appropriateness for the proposed research.* CTI assesses pragmatic intelligence to predict effectiveness and success in everyday life. It thus can shed light on the "outer fulfillment" of intelligence resulting from the full expression of creative intelligence of "inner enlightenment." This will make the evaluation of intelligence of the Chinese more complete and holistic.

In the CTI, Epstein & Meler also integrate the scale of emotions coping with life's problems that has been missing among the many studies and analyses of practical intelligence presented in Sternberg and Wagner's book. Negative emotions are found to be the mediating link between constructive thinking and physical symptoms; the correlation of emotional coping with emotional symptoms = .56;  $r^2=.19$ ; significance of overall F: ( $p <.00001$ ). Epstein and Meler (1986) considered that "...emotional coping is largely focused on *personalization* and concern over evaluation, it accounted for more variance than any other specific scale..." Moreover, "...these and other findings suggest that *ego involvement* has extremely broad implications for psychological adjustment, broader than any of the other processes investigated." (p.344)

If this is the case, CTI is not only able to predict behavioral success of practical intelligence, but can also assess experiential intelligence from the levels of feelings and ego. Accordingly, it is one of the most important measures in assessing the holistic intelligence of the Chinese in this research. In short, CTI has been found to be a

most inclusive, and thus holistic, measure--more so than any other measures of pragmatic intelligence.

When the author asked Professor Epstein over the phone about the appropriateness of using CTI to access the practical intelligence in the Chinese culture, his answer was "I don't see why not!" Obviously, he was very positive that the issue of culture-fairness is not a concern in the present study.

## CHAPTER 14

### THE CURRENT RESEARCH: RESEARCH QUESTIONS AND HYPOTHESES

#### Research Questions

The proposed research clarifies intelligence and creativity in the context of the traditional Chinese culture as well as Maharishi's Vedic Psychology, both of which view the creative intelligence of nature, the *Tao*, as also being the source of creative intelligence expressed in the human mind. Since pure intelligence is said to be the basis of the mind and body, enlivening pure intelligence is predicted to produce broad global improvements, which taken together define "intelligence or wisdom" or life in accord with Natural Law. Maharishi's Transcendental Meditation program is a mental technique which is said to enliven the source of the pure creative intelligence of nature in the human mind. Therefore, the first research question asks:

(1) Does the practice of the TM program promote multiple improvements of creative intelligence in the Chinese assessed by the multiple measures related to the different expressions of intelligence?

Based on the past experience of similar previous research on creativity and intelligence with TM, the investigator believes that changes can be seen in at least two of the dependent measures in the present research in 6 months. Previous studies on TM with STAI and

GEFT have shown that improvements can be seen in as short as 3 months (e.g. Pelletier, 1974; Alexander et al, 1987).

On creative thinking, no previous research on TCT-DP with TM has been conducted. However, TM has shown to be able to increase figural originality, flexibility, and verbal fluency in as short as 5 months (Travis, 1979), as well as to improve Match Problem creativity in 14 weeks (Shecter, 1978).

On practical intelligence, Cranson (in press) examined 299 practitioners of the TM and TM-Sidhi program and found significant correlation with the frequency of the experience of higher states of consciousness. Furthermore, the TM program has been shown to be able to improve creative intelligence related to the self (e.g. self-actualization) in as short as 2 months (Nidich et al, 1973).

On fluid intelligence, previous studies from Cranson (1989) showed that the TM program may not induce change in CFIT in less than 2 years' time. Aron, Orme-Johnson, Brubaker (1981) and Dillbeck, Assimakis, Raimondi, Orme-Johnson, Rowe (1986) also found that it took four years in long-term meditators to gain 8 points and 9 points on CFIT respectively. But similar to the present three studies, a study on high school students who were new TM meditators showed an increased non-verbal fluid intelligence over only a 14-week period (Shecter, 1978). Another study on university students and adults who were also new practitioners of the TM program showed improvement on figural reasoning over a 16-month period (Tjoa, 1975).

On efficiency of information processing, no previous study on IT with TM has ever been done. Cranson (1988), however, has shown that TM can induce a *highly* significantly faster choice reaction time in college students in 2 years. Due to the fact that the subjects in the proposed research studies are *mainly* teenagers, the investigator speculates that the change could be quicker than the college students and adults due to greater flexibility of subjects' nervous systems.

Secondly, if intelligence and creativity have the same origin in the *Tao* or pure intelligence, then the enlivenment of their common source through the TM program should induce a mutual development of intelligence and creativity simultaneously. The second research question, therefore, asks:

2) Does intelligence (as measured by GEFT, CFIT, IT, CTI, STAI) and creativity (as measured by TCT-DP) develop simultaneously through practicing the TM program?

Thirdly, if there is a holistic basis of creative intelligence common to everything and everyone, and the TM program is a holistic program that is able to fully unfold this holistic human potential at the subtle levels of mind, then the TM program should show more holistic benefits associated with the deeper levels of mind than other techniques that are not as holistic in nature. If this is the case, then the third research question asks:

(3) Is the TM program more holistic than another technique in enhancing the growth of creative intelligence by showing more or greater improvements in different aspects of intelligence, especially on the deeper levels of mind, assessed by the different tests as well as their effect sizes being used in the research?

### **Null-Hypotheses**

(1) The TM program will not promote the growth of creative intelligence in the Chinese students; no significant change will be shown in the six tests (indicated by multivariates) being used in the studies.

(2) The practice of the TM program will not promote a mutual growth of intelligence and creativity; no simultaneously improved performance on the TCT-DP and any of the other two intelligence tests, such as GEFT and STAI, will be shown.

(3) TM is not different from the Contemplation technique in promoting a holistic growth of creative intelligence and the TM group does not show significantly greater improvements in different tests than the Contemplation technique group.

Before these hypotheses will be tested, Factor Analysis of the six dependent measures will be performed in order to explore the possibility that different components emerge. The emergence of different factors will indicate that multiple intelligences exist.

In addition, meta-analytic procedure of effect size will also be conducted in order to see the size of effect of the TM program on different measures which are hypothesized to be associated with different levels of mind. The analysis of effect size will thus also give information on the holistic nature of the TM program if it produces larger effects on deeper levels of mind. This analysis will at the same time give another perspective on testing the holistic nature of the TM program related to the third hypothesis of the research.

## CHAPTER 15

### METHOD

#### Subjects

This research includes a series of three studies on three different age groups of Chinese students at three different schools in three different locations of Taiwan. The variety of designs in three replications at three different locations would strengthen both the internal validity and external validity of the studies. This set up is partly in response to the critiques (e.g. Hang, 1971) on some previous research on the same area as discussed, and partly with an idea to create more rigorous studies needed on TM research in this area. The Chinese students from Taiwan (but not from Mainland China or other Chinese communities) were chosen because, from the consensus of most Chinese, Taiwan seems to have preserved more traditional Chinese culture than any other place (Mainland China, for example, has been influenced by the communist ideology which opposes some traditional Chinese values; Hong Kong has integrated some values from the West). Hang (1971) also suggests that the Chinese from Taiwan (especially from different locations in this research study) will make better representative subjects because they come from diverse provinces of mainland China.

Table 2 summarizes some important demographic information of the three research studies.

TABLE 2

## A Summary of Demography of the Three Studies

	<u>Subject</u>	<u>Mean Age</u>	<u>School Level</u>	<u>Curriculum</u>	<u>Location</u>	<u>Acad. Level</u>	<u>Soc.eco Level</u>
<u>Study</u>							
1.	79M 76F	16.5	Sr. High Private	Various	Central Taiwan	Below Ave.	Middle lower
2.	118 Female	14.5	Jr. High Public	Various	North Taipei	Above Ave.	Middle level
3.	99 Male	17.5	Vocation Private	Various	South Tainam	Aver- age	Lower



*First study*

The first study included 155 students (79 boys and 76 girls), 16 to 17 years old, senior-high school level (from all the first year in four different classes) in Chun-Chow High School, Toa-Yuan, in central-northern Taiwan. It is a small private school and the quality of the students in general was low in terms of grades; most of them could not gain entry into public school and were forced to continue their studies in this private school. 116 students who were willing to learn the TM program were randomly assigned to either the experimental group learning the TM program, or taking a nap in the control group. The remaining 40 students who were not willing to learn the TM program made up the third no-treatment comparison group. The students who were willing to learn the TM technique paid a small fee and the school subsidized a part of it. The students study different majors--computer science, art, and general subjects--and each group included some students from each major, randomly assigned. In general, these students are similar in their backgrounds and most of them come from middle-lower socio-economic levels of society.

*Second study*

The second study included 118 girls, mean age 14.5 years old, junior-high school level (from 3 different classes) in Yang-Ming National School, Taipei, in northern Taiwan. Yang-Ming was a large public school and thus the quality of the students was considered to be above average. Two classes were randomly assigned to either the experimental group learning the TM program, or the control group without any treatment. Another class in which the students were instructed another kind of meditation, namely, Contemplation technique, was chosen as a comparison with the TM group. This class was chosen because the classmaster is an instructor of the

Contemplation technique and agreed to conduct the experiment on her students.

As aforementioned, the TM program is a simple, natural mental technique which gives the experience of pure consciousness through an effortless process of transcending different levels of mind. Similarly, the Contemplation technique was said to be a simple, effortless meditation practiced with eyes closed. It involves some sorts of recitation of sound with meaning involved on the mental level without concentration needed. Every practice lasts from ten to twenty minutes depending on the feeling of the practitioner. This Contemplation technique is supposed to induce a state of deep relaxation and comfort in the mind and body. According to the instructor, it eventually will lead the mind to experience unbounded awareness or the Tao.

The students paid a small fee from their class budget to learn the TM program. All the students study general subjects but the experimental group happened by chance to have a slight emphasis on art. Other than that, the students from the three classes have similar backgrounds according to their teachers; most of them come from the middle socioeconomic level.

### *Third study*

The third study included 99 male students, 17 to 18 years old, from a vocational training school (from 2 different classes), called Nam-Ing Commerce and Industry, Tainan, in southern Taiwan. Nam-Ing is a large private school and the students are considered to be average in academic achievements. Two classes, with 44 and 48 boys respectively, were randomly assigned (on a class basis) to either an experimental group learning the TM program, or to the control group without treatment. All the students knew that the school principal donated money to support their learning of the TM technique. The

students were majoring in technical drawing. According to their dean, the two classes are comparable and similar in backgrounds. Most of these students come from a family of lower socioeconomic level.

### **Materials & Apparatus**

As discussed in detail before, six different tests were used in order to measure intelligence and creativity broadly to cover the entire range of expressions of intelligence. They include the TCT-DP; Cattell's CFIT, both Forms A and B; the CTI, the 18 items of Global scale of the 52 items short form; the IT; GEFT, sections A, B, and C; and the STAI, the most recent 40 items Forms Y-1 and Y-2.

For the IT measure, the Parameter Estimate Sequential Test (PEST) (Taylor & Creelman, 1967) computer program written in BASICA was used to control the IT task and measure subjects' IT performance. The program was developed and provided by courtesy of Dr. Yuxin Zhang, a faculty member of University of Maryland, Department of Psychology. IBM PC/486 computers or their compatibles were used to run the PEST program to measure the IT performance. Some computer experts and programmers were employed to help to adjust the equipment in order to run the program appropriately. These computers had been provided by different schools in which the studies were conducted on their Chinese students.

Since all of these test instruments are in English, they were translated into Chinese before testing the Chinese students. Most of the translations were done by the investigator with at least three teachers from two schools. Except the investigator, the translators' native tongue is Mandarin. They ensured that the translations were

correct and well-understood by native Chinese students. Moreover, for the CTI which, as stated, is perhaps not a cultural-fair test, some wording had been changed, but their meanings were preserved, in order to fit into the context of the Chinese culture. For example, the item "I have never seen anyone with blue eyes," "blue" eyes had been changed into "brown" eyes according to the principle of familiarity of the Chinese in the Chinese culture. Since this is one of the questions making up the validity scale to evaluate whether the testees do the scale seriously, this change in wording will make sure that the purpose of the scale is preserved but in the light of the Chinese cultural background.

### **Variables**

The independent variables had two levels in the first study: TM technique and Rest; also two levels in the second study: TM technique and Contemplation technique; and one level in the third study: TM. The dependent variables were TCT-DP, CFIT, CTI, GEFT, IT, and STAI.

### **Designs**

Table 3 summarize the designs and number of subjects in the groups in each of the three studies.

The first study was randomized (by student), pretest-posttest, between-subjects, control group design.

Due to the rigorous design of random assignment to group, the author recognizes that it is not necessary to have a third control group composed of no-interest subjects in order to control for the possible confound of self-selection. A third group was included to

assess the differences in the intelligence and creativity between the motivated and non-motivated students.

The second study used a randomized (by class) assignment, pretest-posttest, between-subjects, control group design, with a non-equivalent comparison group practicing the Contemplation technique. The Contemplation technique could also serve as a control for the plausible "Hawthorn" effect. It was also used for comparison with the holistic nature of the TM program.

The third study used two groups, randomized (by class), pretest-posttest, between-subjects, control group design. Figure 11 summarizes the design notation for each of the three studies.

## **Procedure**

The procedure in conducting the studies varied slightly from study to study. But the typical procedure is as follows. First, the subjects (students) were identified by the school teachers with the investigator to make sure that the students were suitable for the studies. Basically, the subjects were chosen based on two criteria: feasibility and comparability. For comparability, only students with similar background on age level, education level, academic standard, and socioeconomic level were chosen in any one given study.

Then the subjects were tested at school in a set sequence of measures--(GEFT, CTI), (CFIT, STAI), (TCT-DP, and IT)--with two tests maximum per day. Ideally, the two tests were taken one in the morning and one in the afternoon. But in some cases, the school schedule could not accommodate this and the two tests were taken at the same time with a rest break in between. In addition, it was thought that this sequence would let students work on tests of a different nature in one test sitting, which, along with a maximum of two tests per day, would prevent "fatigue effect" and "carry-over effect" that might confound their true performance.

TABLE 3

**A Summary of Designs and Number of subjects in Groups of the  
Three Studies**

<u>Study</u>	<u>Design</u>	<u>No. of Subject in Group</u>
1.	3 groups; Blind; Randomize TM vs Nap (by student) vs No-interest No-treatment; Pre-Posttest	TM: 57 Nap: 58 No-int: 40
2.	3 groups; Blind; Randomize TM vs Control (by class) vs Self-selected Contemplation technique; Pre-Posttest	TM: 37 Con: 40 CT: 41
3.	2 groups, Blind, Randomize TM vs Control (by class); Pre-Posttest	TM: 51 Con: 48

**FIGURE 11****Design Notation for the Three Studies****Study 1**

<b>R O</b>	<b>X<sub>T</sub>M</b>	<b>O</b>
<b>R O</b>	<b>X<sub>Nap</sub></b>	<b>O</b>
<b>O</b>		<b>O</b>

**Study 2**

<b>R O</b>	<b>X<sub>T</sub>M</b>	<b>O</b>
<b>O</b>	<b>X<sub>C</sub>T</b>	<b>O</b>
<b>R O</b>		<b>O</b>

**Study 3**

<b>R O</b>	<b>X<sub>T</sub>M</b>	<b>O</b>
<b>R O</b>		<b>O</b>

After all the pretests were finished, the subjects were randomly assigned to either the experimental or control group by student (first study) or by class (last two studies). The students in the experimental groups learned the TM program in the same systematic procedure as learned anywhere in the world. According to the book "*Maharishi Mahesh Yogi's Transcendental Meditation*," "The whole course includes two lectures, which provide the necessary intellectual understanding to start the technique, and four consecutive days of actual instruction--about two hours each day" (Roth, 1987, p. 98). The seven steps to learn TM are as follows:

Step 1 is an introductory lecture. It includes the definition, benefits, and how to start the technique. Step 2 is a preparatory lecture. It introduces the methods of TM as different from other techniques, as well as explaining its origin. Step 3 is a personal interview with the trained teacher. Step 4 is an actual personal instruction of TM on a one-to-one basis. Step 5 is the first day of checking, a seminar to verify and validate the correctness of practice. Step 6 is the second day of checking, a seminar to discuss the mechanics of stabilizing the benefits of the TM technique. Step 7 is the third day of checking which gives a vision of the goal of the TM program--the development of full human potential in higher states of consciousness.

Other than the TM technique, in the second study, the students in another comparison group also learned the Contemplation technique. The Contemplation technique is a combination of some traditional Chinese methods of meditation commonly practiced in the Chinese culture which involves recitation of sounds with meaning involved on the mental level. The students were taught the Contemplation technique by their classmaster who also presented all the necessary intellectual knowledge about the technique for the students. The classmaster described the technique as a kind of meditation with no effort or concentration needed. The whole course



took around 4-5 days, about the same amount of time as the TM technique, to complete. The teaching process, however, was not as systematic as the TM technique.

The students in the first study all met in a hall to meditate together in the morning. The control group took a nap in the same hall. The students in the second and third studies practiced their respective programs everyday in their classroom led by their teacher in the morning. Six months later in the first two studies, and twelve months later in the third study, the subjects were posttested again in exactly the same way and sequence as the pretests were conducted.

To prevent "practice effect," the "Form A" of Cattell's CFIT, and "Section C" of GEFT were used for the pretest, while "Form B" and "Section B" were used for the posttest in the first and second studies; and vice versa for the third study. The alternation of the tests was also randomly determined.

Before the students were tested, two to three school teachers were selected to administer the tests to their students. The school teachers were thoroughly instructed by the investigator on how to administer the tests in a standardized way to make sure that the tests were conducted under a similar condition. However, the school teachers who administered the tests were blind to the purpose of the experiment in order to avoid any testing bias from the administrators. Moreover, the students were also blind to the purposes of the testing and they were told by their school teachers that the testing was just a normal assessment procedure of their respective schools.

The GEFT, CTI, CFIT, STAI and TCT-DP were administered according to the standardized procedure given in the test instructions. The IT test is self-explanatory from the computer. Also, a few minutes' warm-up section was structured in the program to ensure that the subjects understood it before the measure began. The time for taking the IT test varies from 15 to 20 minutes depending

on the accuracy rate of the subjects. The students took the IT test in the computer rooms of their respective schools.

The teachers of the TM program were from the local TM centers, and the author himself instructed students in the TM program. They were all qualified TM teachers. The TM teachers then gave checking to the students regularly every month to make sure that they did it correctly and without any problems. In the three studies, the students of their respective schools were guided by their teachers, who had also learned the TM program, to meditate in their classrooms every morning at least once a day. Then the students were told to meditate on their own after school. (The investigator was told that some of the students missed the second program in the evening due to time and place constraints). Overall, the teachers' surveys showed that over 85% of the students meditated regularly in the evening.

Finally, the pretests and posttests were scored by the same school teachers who were also blind to the purposes of the tests as well as blind to the groups of the subjects. These teachers were instructed by the investigator to score the tests according to the standardized scoring system of the respective tests in order that objectivity was ensured.

## CHAPTER 16

### RESULTS

#### First Experiment

##### *Factor Analyses of Dependent Variables*

Before testing the significance of the six dependent measures on intelligence, the statistical procedure of Factor Analysis was conducted in order to assess the independence of the different tests. Principal Components Analysis will show if multiple intelligences associated with the six different measures exist in different studies or not.

For this purpose, pretest scores on all the six measures were submitted to principal components analysis: Loading on six rotated principal components are presented in Table 4.

As can be seen from the table, five distinct components (over .7 to .9) emerged from the factor analyses of the seven dependent measures. The IT and CFIT scores loaded on the first principal component; STAI, both trait and state anxiety, scores loaded on the second principal component; the CTI score loaded on the third component; TCT-DP loaded on the fourth principal component; GEFT loaded on the fifth component.

Whereas the first and second components accounted 22.55% and 25.51% of the variance, respectively, the third, fourth, and fifth principal components each also accounted for significant amounts of variance--14.29%, 14.34%, and 14.80% respectively. Thus, the variance is distributed across all the components.

**TABLE 4**

**Loadings for Pretest Scores, Eigen Values, and Percentage of  
Total Variance Explained by First Five Principal Components**

	<b>Component</b>		
<b>Loading</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>IT</b>	<b>-.987</b>	<b>-.068</b>	<b>-.071</b>
<b>CFIT</b>	<b>.761</b>	<b>-.043</b>	<b>.018</b>
<b>STAI (State)</b>	<b>.022</b>	<b>.952</b>	<b>.020</b>
<b>STAI (Trait)</b>	<b>.032</b>	<b>.927</b>	<b>.009</b>
<b>CTI</b>	<b>-.028</b>	<b>-.022</b>	<b>-.998</b>
<b>TCT-DP</b>	<b>-.041</b>	<b>.083</b>	<b>.001</b>
<b>GEFT</b>	<b>.145</b>	<b>.078</b>	<b>-.059</b>
<b>Eigen Values</b>	<b>1.579</b>	<b>1.785</b>	<b>1.001</b>
<b>Percentage of Total Variance Explained by Components</b>	<b>22.55%</b>	<b>25.51%</b>	<b>14.29%</b>

TABLE 4 (Continued)

**Loadings for Pretest Scores, Eigen Values, and Percentage of Total Variance Explained by First Five Principal Components**

	Component	
Loading	4	5
<b>IT</b>	.016	-.071
<b>CFIT</b>	-.071	.231
<b>STAI (State)</b>	.030	-.010
<b>STAI (Trait)</b>	.083	.112
<b>CTI</b>	-.001	.055
<b>TCT-DP</b>	.995	.012
<b>GEFT</b>	.014	.981
<b>Eigen Values</b>	1.004	1.036
<b>Percentage of Total Variance Explained by Components</b>	14.34%	14.80%

An examination of Table 4 suggests that the five principal components may be related to six different aspects of intelligence. The first component appears to be related to the physiological and cognitive aspects of intelligence, since the IT and CFIT scores both loaded on it. Since IT has a heavier loading (over .9) than CFIT (over .7) and was hypothesized to be related to the neural efficiency of intelligence, it may be labeled as *physiological* intelligence. However, since IT was also hypothesized to be related to information processing, its loading with CFIT may also suggest a kind of *intellectual* intelligence as well. The results also suggest that neural efficiency plays a critical role in intellectual intelligence.

The second component appears to be related purely to anxiety or fear associated with the levels of feelings and ego, since STAI (both state and trait) loaded on it. This component may be labeled as *experiential* intelligence according to the proposed theory because reduction of anxiety has been considered as the first fundamental element in the direction of developing holistic intelligence from Maharishi's Vedic Psychology, the Chinese tradition, and modern Psychology (refer to Chapter 13).

The third component appears to be related to constructive thinking as indicated by the CTI loading and had low loadings on other tests. Thus it may be labeled as *practical* intelligence and is predicted by CTI. The fourth component appears to be related to creative thinking, since TCT-DP loaded on it. It seems obvious that this component reflects *creativity*.

The fifth component appears to be related to field independence, since GEFT loaded on it and low loadings on other tests. This may be labeled as *contextual* intelligence because the GEFT requires seeing the part within the context of the whole contextual field.

As indicated by the factor analysis, the selection of tests in the

research studies was successful in capturing a broad range of different abilities expressed by the unified source of pure intelligence. It should be mentioned that these labelings may be somewhat arbitrary. But factor analysis did suggest and confirm that there are multiple aspects of mental ability being measured, as originally designed in order to test the theory of the research study.

### *Test of the First Hypothesis*

As described earlier, this experiment compared 155 students (79 boys and 76 girls), mean age 16.5 years old, over a 6-month period in a senior-high private school in mid-northern Taiwan. 116 students who were willing to learn the TM program were randomly assigned to either the experimental group learning the TM program, or taking a nap in the control group. The remaining 39 students who were not willing to learn the TM program made up the third comparison group. In general, these students were similar in their backgrounds and most of them come from middle-lower levels of society and had low academic achievement.

The test scores of the six dependent variables were simultaneously analyzed by Multivariate Analysis of Covariance (MANCOVA). Analysis of Covariance (ANCOVA) allows adjustment for effects of covariates on the dependent variables among the groups between the pretest and posttest; and MANCOVA prevents the possibility of an inflated significant value due to multiple testings of different dependent measures.

There were significant multivariate differences among the TM group, control group, and no-interest comparison group: Wilks' Lambda = 0.743,  $F(7, 105) = 5.20$ ,  $p < .0002$ .

There was also significant multivariate difference between the TM group and the control group: Wilks' Lambda = 0.740,  $F(7, 105) = 5.16$ ,  $p < .000045$ .

There was also significant multivariate difference between the TM group and the no-interest group: Wilks' Lambda = 0.76,  $F(7, 105) = 4.76$ ,  $p < .0001$ .

There was, however, no significant difference between the control group and the no-interest group as shown in Wilks' lambda 0.97,  $F = 0.39$ ,  $p = .90$ .

Hence, the null hypothesis of no effect of the grouping variable on the six dependent variables was rejected. The effect was in the direction of improvement on the six dependent measures in the experimental group. The first hypothesis, that enlivening pure intelligence will bring about a simultaneous growth of multiple intelligences as measured by six dependent variables, was supported in experiment one.

#### *Test of the Second Hypothesis*

The second hypothesis, that enlivening pure intelligence will induce the mutual development of creativity and intelligence, was also supported. The results of the experimental group showed significant change in scores over the control group on the TCT-DP,  $F$ -statistic 6.42 ( $p < .01$ ,  $DF = 1, 111$ ), which was stated in the design section as a test for creativity.

In addition, there were also significant changes in scores on four other independent measures of mental ability--IT, STAI, CTI, GEFT--at the same time. The  $F$ -statistic of the four results were 4.03 ( $p < .05$ ) for IT; 4.37 ( $p < .04$ ,  $DF = 1, 111$ ) for state-anxiety, 6.07 ( $p < .02$ ,  $DF = 1, 111$ ) for trait-anxiety; 4.07 ( $p < .05$ ,  $DF = 1, 111$ ) for CTI; 8.2 ( $p < .005$ ,  $DF = 1, 111$ ) for GEFT.

Table 5 presents the complete results of univariate analyzes of covariance for the effect of the experimental, control, and no-interest groups on TCT-DP, STAI, GEFT, CFIT, IT, and CTI. An examination of Table 5, which presented univariate differences of individual



measures, showed that the strength of effect was mainly caused by GEFT.

CFIT was close to significance  $F = 3.5$  ( $p = .06$ ,  $DF = 1, 111$ ). There were no significant changes on these scores for the control group, however.

Figures 12, 13, 14, 15, 16, and 17 further present changes in scores on the TCT-DP, STAI, CTI, GEFT, IT, and CFIT respectively for the TM group, the control group, and the no-interest group. As shown in the figures, except for STAI and TCT-DP, all the groups improved in all the measures. In general, the control groups showed increased anxiety and decreased creativity in the posttest in relation to the pretest. The fact that the control groups also large improvements on GEFT, CFIT, and IT seem to suggest that there were "practice effect."

TABLE 5

**UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON  
TCT-DP, STAI, GEFT, CFIT, IT, AND CTI--STUDY 1**

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj.x post	df	F	p
<b>TCT-DP</b>									
	Exper.	18.77	7.38	20.91	7.74	20.93			
	Control	18.00	6.23	17.55	4.68	17.56	1	6.42	<.01
	Exper.	18.77		20.91		20.93			
	No Inter.	20.35	6.80	18.32	6.23	18.29	1	3.61	.06
	No Inter.	20.35		18.32		18.29			
	Control	18.00		17.55		17.56	1	.27	.61
<b>STAI (State)</b>									
	Exper.	46.33	5.14	44.09	6.62	44.20			
	Control	45.74	6.00	47.05	5.98	47.07	1	4.37	<.04
	Exper.	46.33		44.09		44.20			
	No Inter.	45.12	6.09	46.29	6.45	46.13	1	1.81	.18
	No Inter.	45.12		46.29		46.13			
	Control	45.74		47.05		47.07	1	.41	.5

TABLE 5 (Continued)

**UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON T  
DP, STAI, GEFT, CFIT, IT, AND CTI--STUDY 1**

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj.x post	df	F	p
<b>STAI (Trait)</b>									
	Exper.	48.28	6.31	46.67	5.58	46.80			
	Control	47.89	6.75	50.18	6.94	50.71	1	6.07	<.02
	Exper.	48.28		46.67		46.80			
	No Inter.	48.06	7.51	50.32	6.70	50.13	1	5.34	<.02
	No Inter.	48.06		50.32		50.13			
	Control	47.89		50.18		50.71	1	.00	.96
<b>GEFT</b>									
	Exper.	3.70	2.30	6.84	1.88	7.00			
	Control	4.00	1.87	5.68	2.63	5.71	1	8.21	<.005
	Exper.	3.70		6.84		7.00			
	No Inter.	4.59	2.56	5.68	2.21	5.44	1	11.07	<.001
	No Inter.	3.70		5.68		5.44			
	Control	4.00		5.68		5.71	1	.32	.57

TABLE 5 (Continued)

**UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON  
TCT-DP, STAI, GEFT, CFIT, IT, AND CTI--STUDY 1**

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj.x post	df	F	p
<b>CFIT</b>									
	Exper.	22.30	4.48	24.14	3.73	24.31			
	Control	21.92	4.32	22.84	3.83	22.87	1	3.51	.06
	Exper.	22.30		24.14		24.31			
	No Inter.	23.68	3.94	23.88	3.66	23.64	1	.70	.40
	No Inter.	23.68		23.88		23.64			
	Control	21.92		22.84		22.87	1	.88	.35
<b>IT</b>									
	Exper.	69.17	11.2	57.56	9.05	56.97			
	Control	68.82	12.3	61.66	10.7	61.61	1	4.04	<.05
	Exper.	69.17		57.56		56.97			
	No Inter.	67.24	13.4	60.88	12.91	61.33	1	3.28	.07
	No Inter.	67.24		60.88		61.33			
	Control	68.82		61.66		61.61	1	.01	.61

TABLE 5 (Continued)

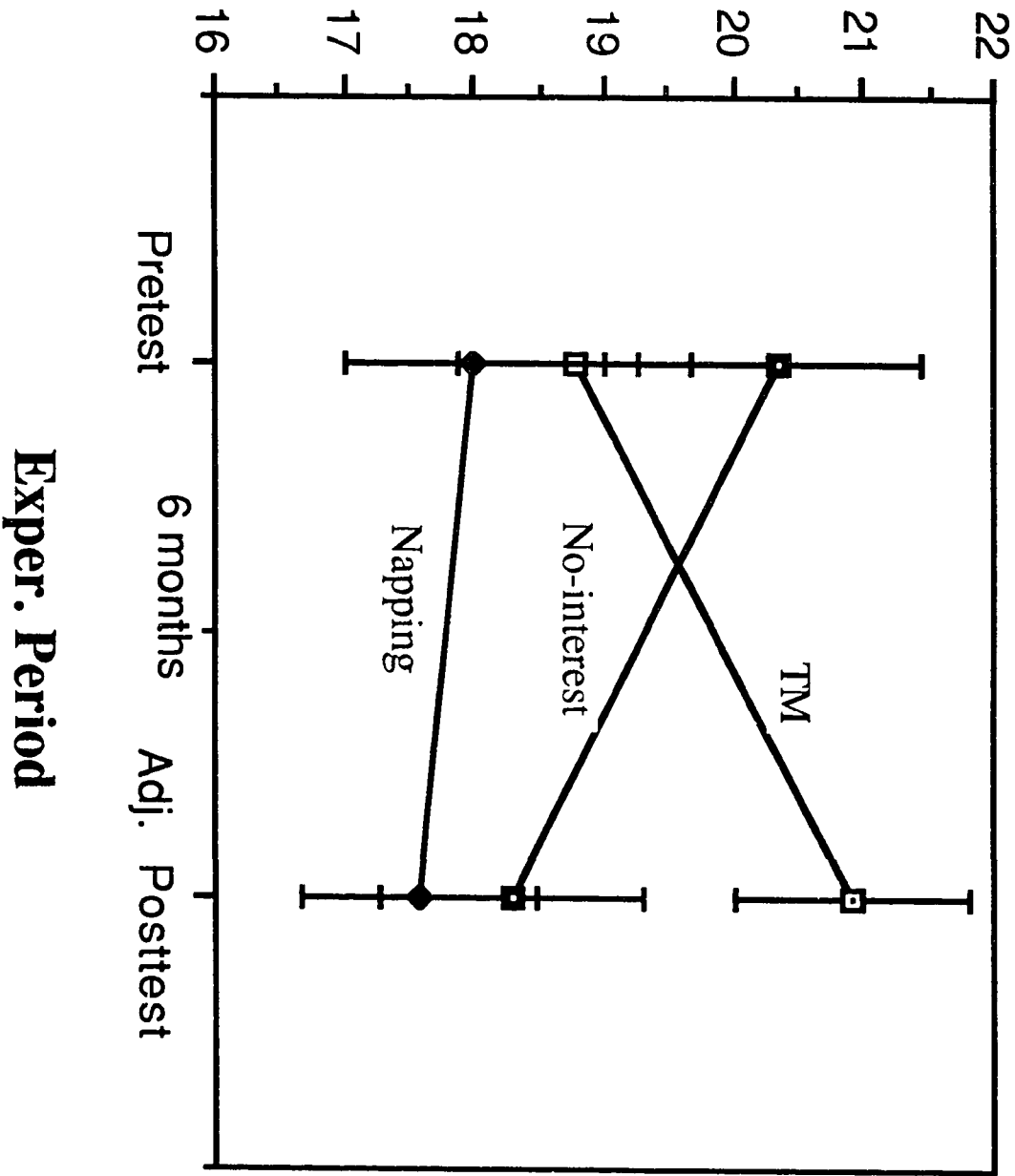
UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON  
TCT-DP, STAI, GEFT, CFIT, IT, AND CTI--STUDY 1

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj.x post	df	F	p
<b>CTI</b>									
	Exper.	57.02	5.57	60.28	6.10	60.39			
	Control	56.84	5.87	58.00	5.45	58.02	1	4.07	.05
	Exper.	57.02		60.28		60.39			
	No Inter.	56.26	5.11	57.65	4.65	57.49	1	5.60	<.02
	No Inter.	56.26		57.65		57.49			
	Control	56.84		58.00		58.02	1	.18	.67

**Figure 12**

**Change in Scores on Creative Thinking over 6 Months--  
Study 1**

# Mean Scores (TCT-DP)

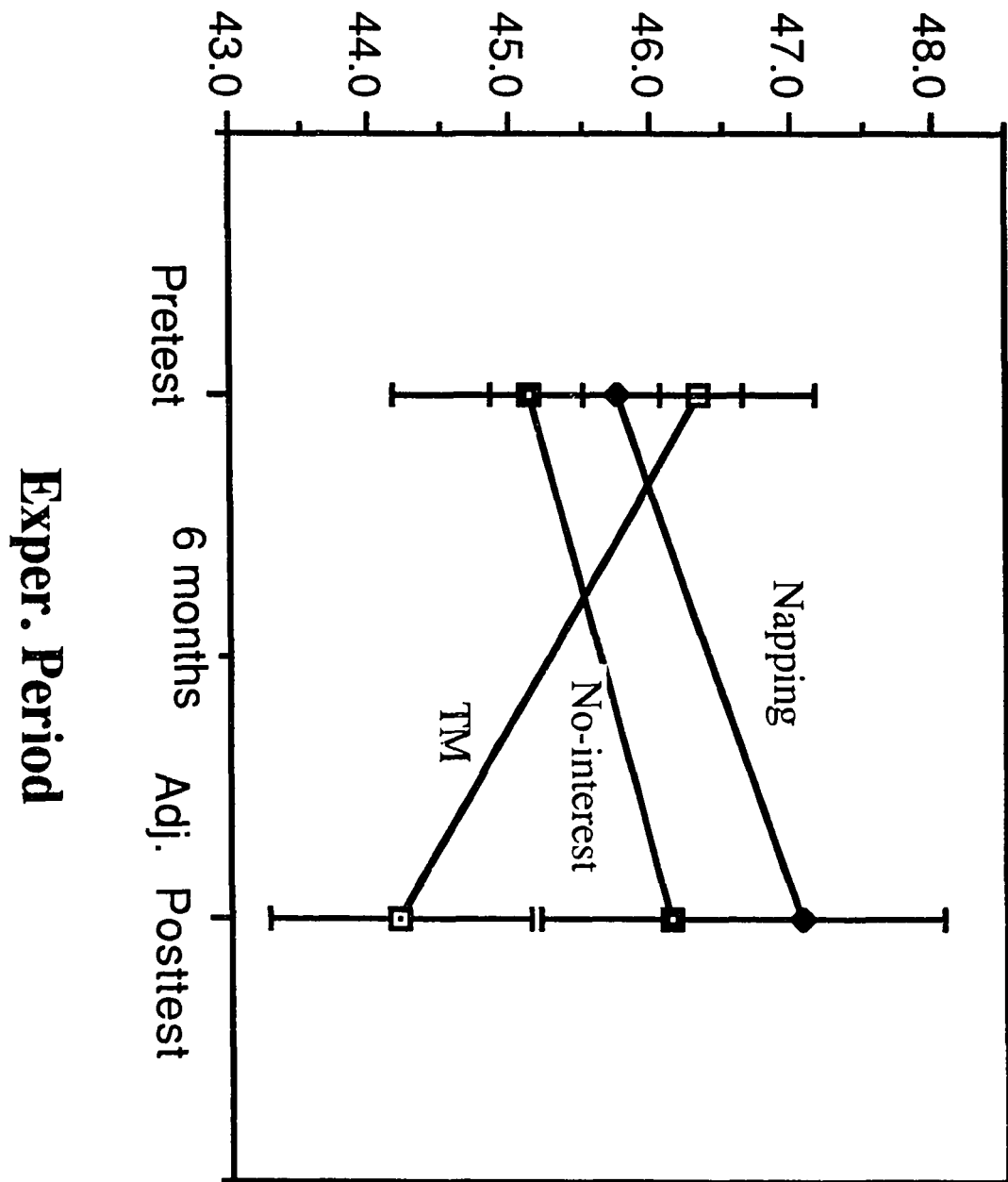


**Figure 13**

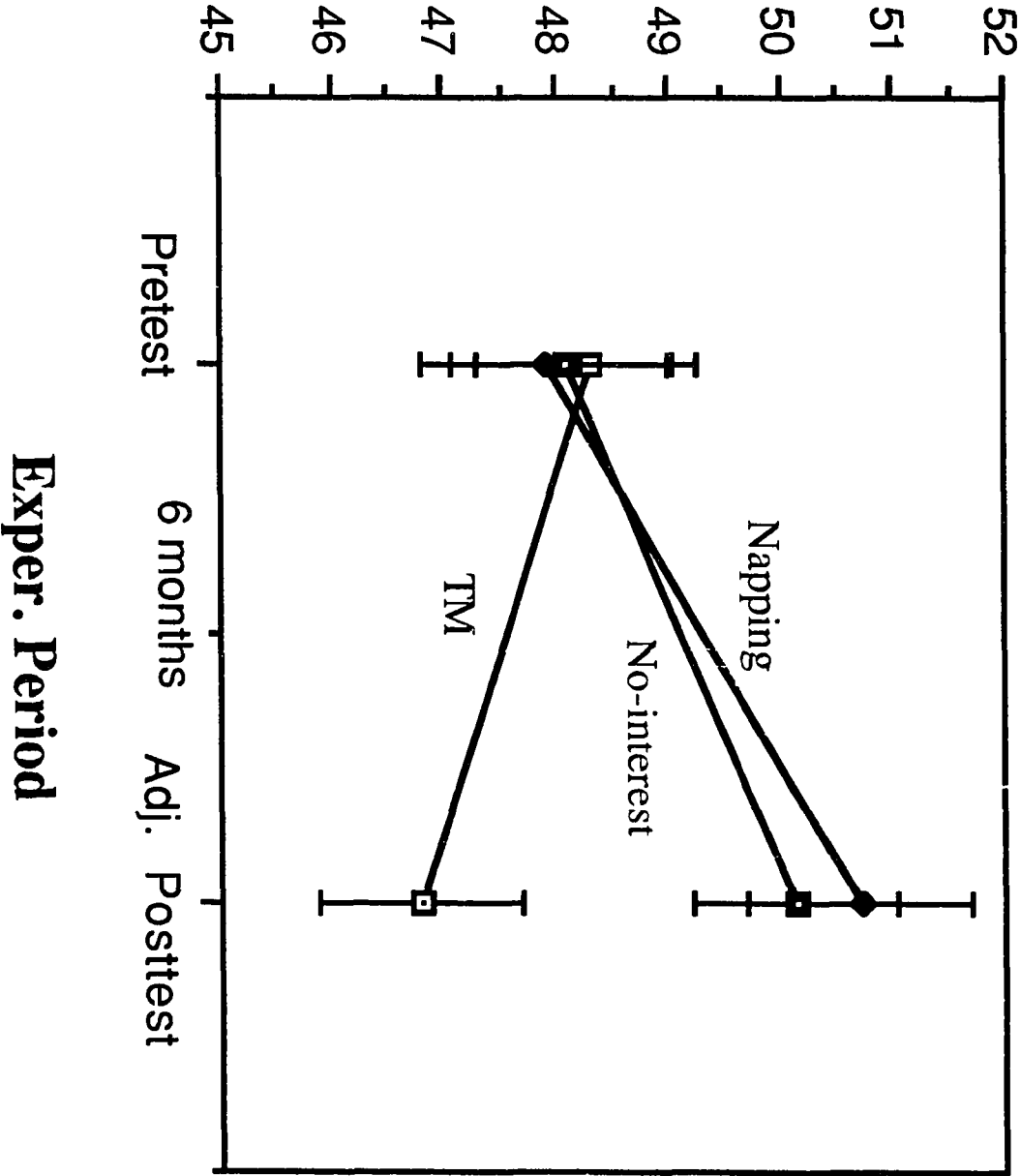
**Change in Scores on State and Trait Anxiety over 6 Month--  
Study 1**



# Mean Scores (State AI)



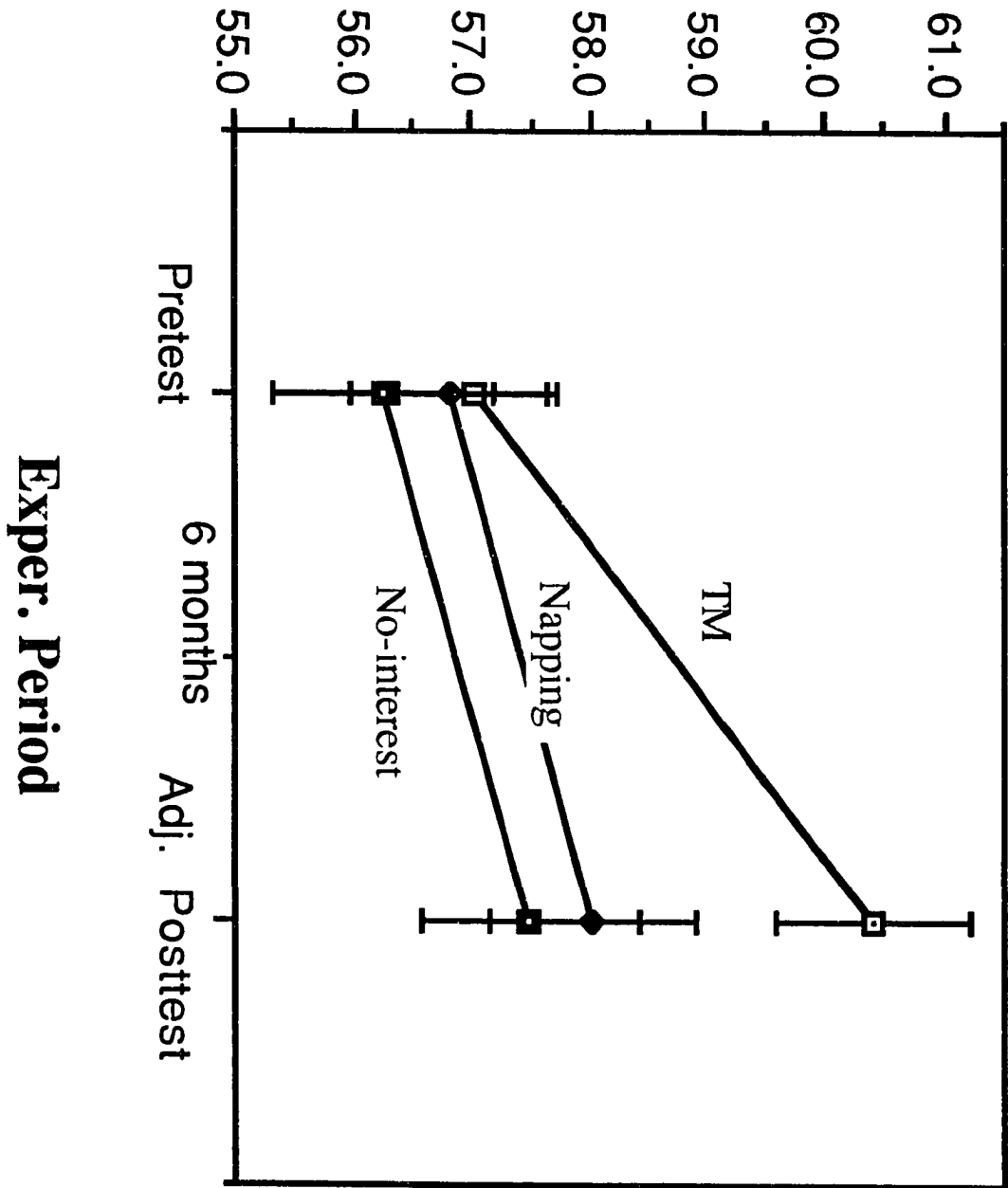
# Mean Scores (Trait AI)



**Figure 14**

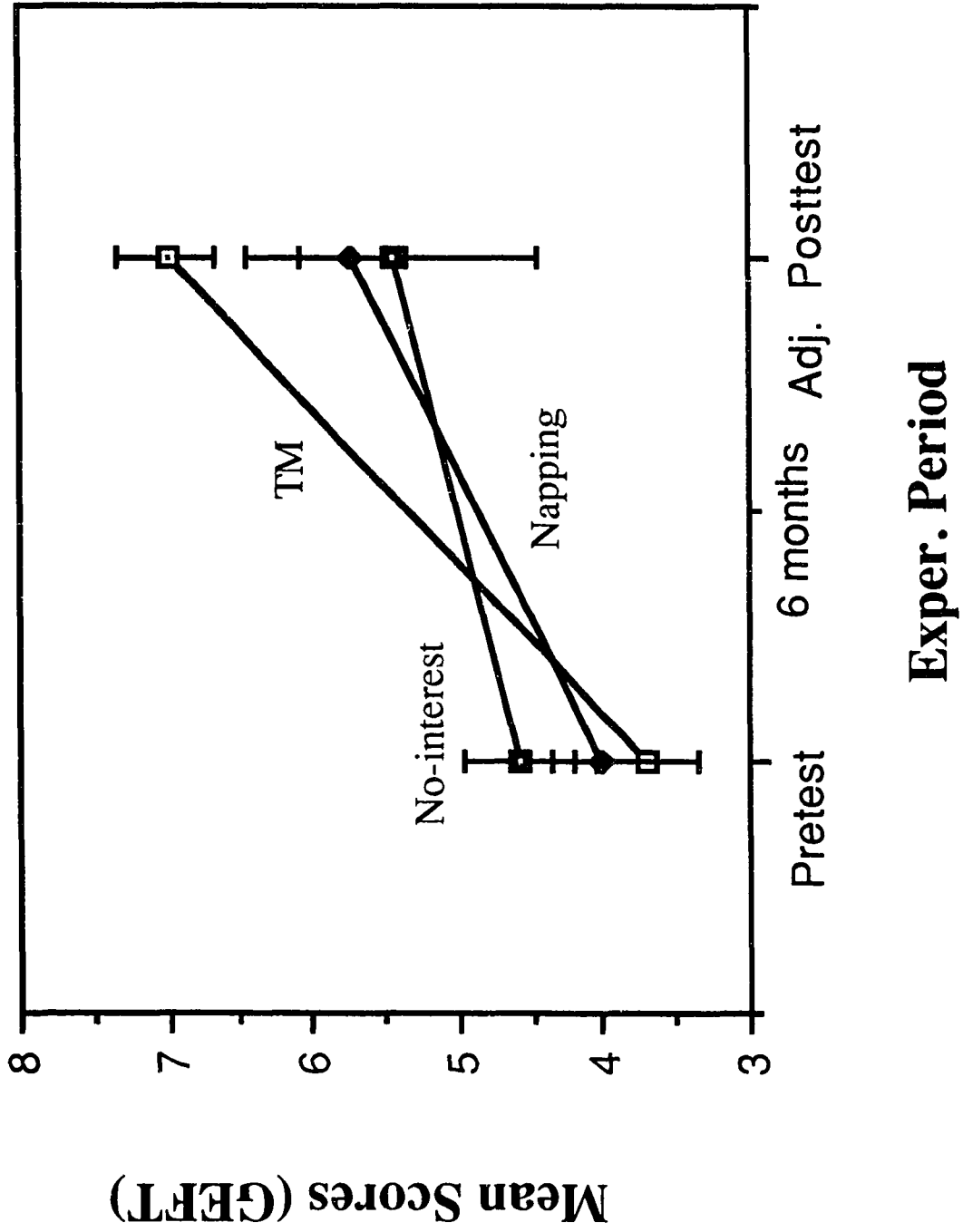
**Change in Scores on Practical Intelligence over 6 Months--  
Study 1**

# Mean Scores (CTI)



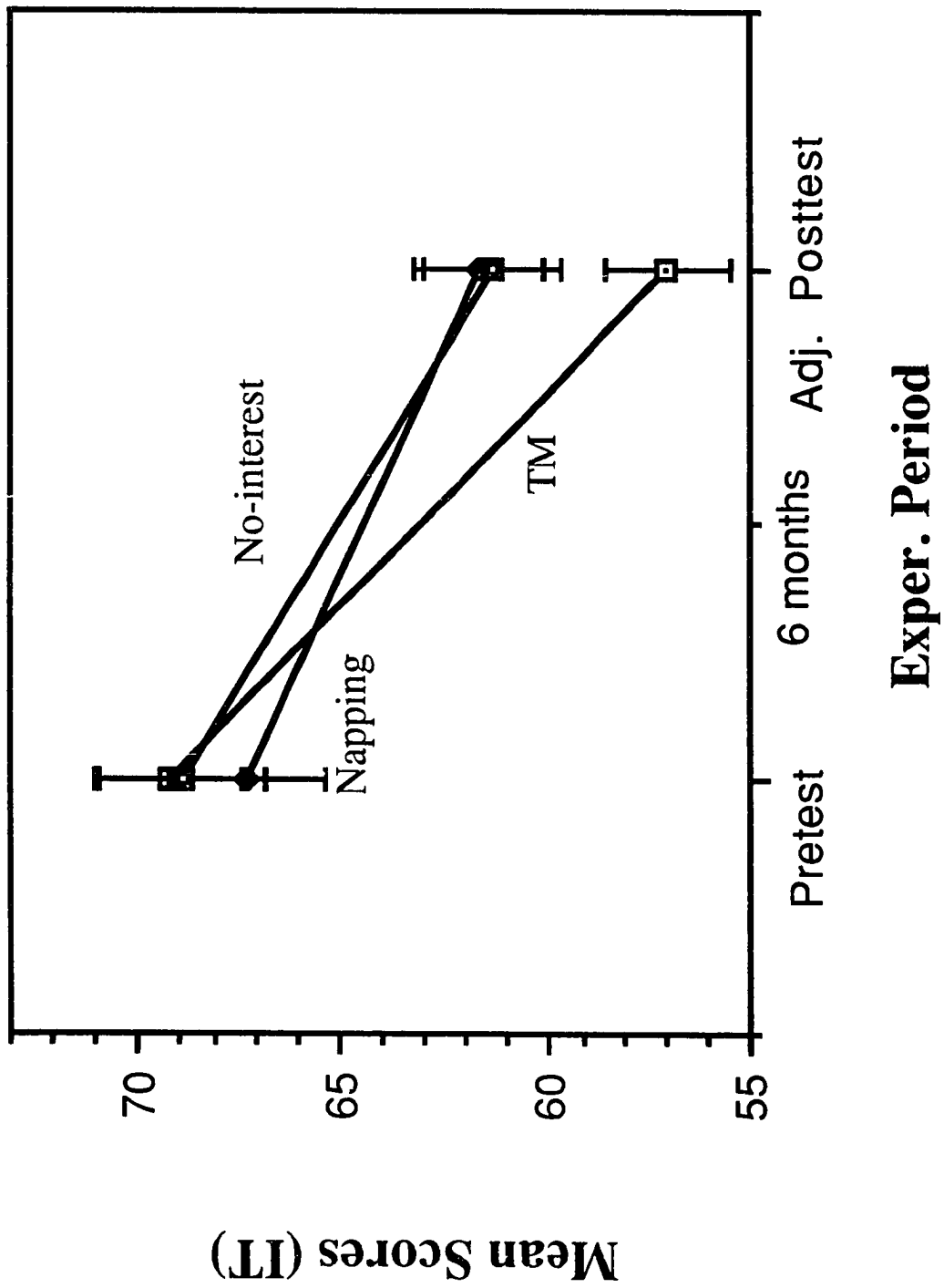
**Figure 15**

**Change in Scores on Field Independence over 6 Months--  
Study 1**



**Figure 16**

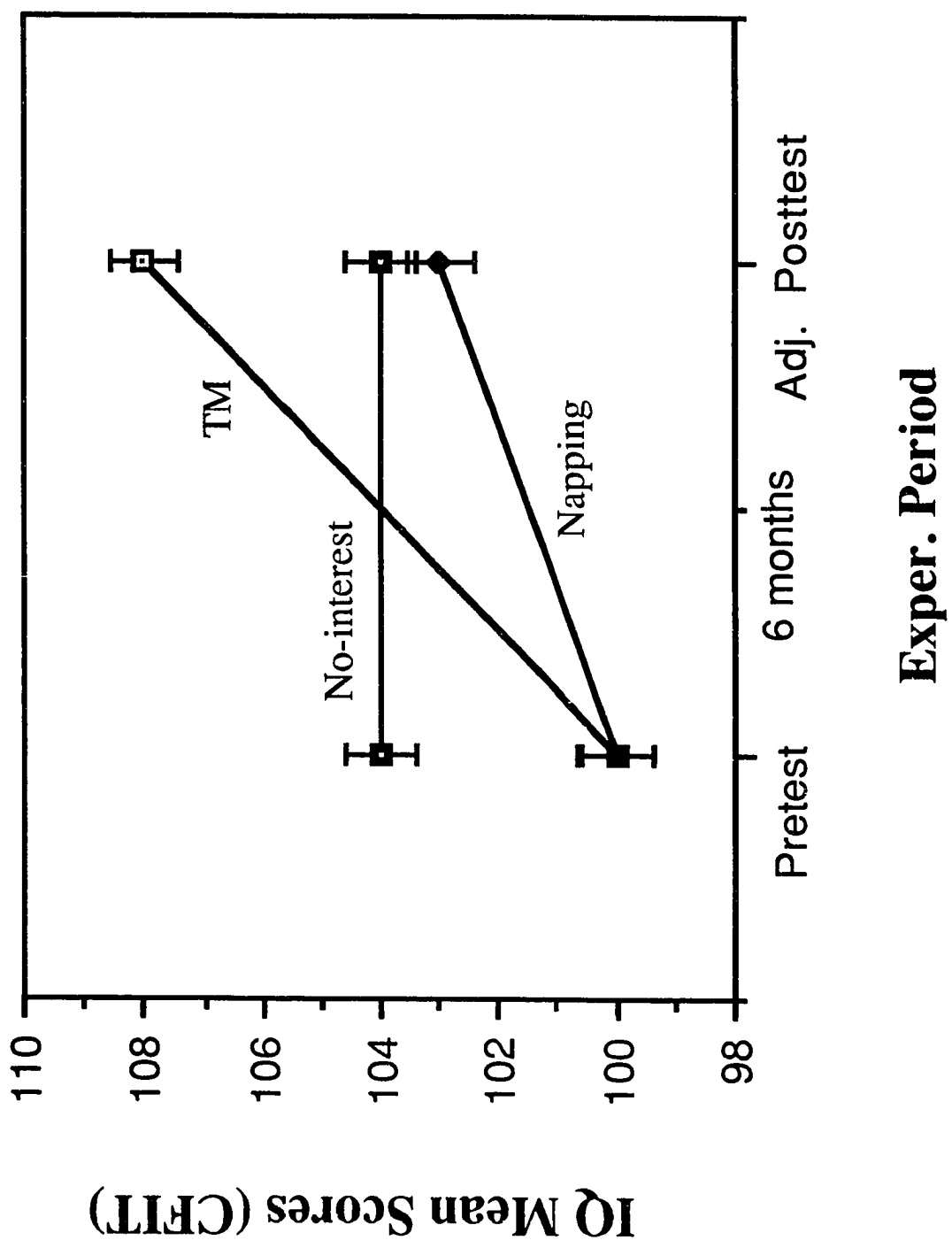
**Change in Scores on Inspection Time over 6 Months--  
Study 1**





**Figure 17**

**Change in Scores on Fluid Intelligence over 6 Months--  
Study 1**



## Second Experiment

### *Factor Analyses of Dependent Variables*

Same as study one, pretest scores on all the six measures were submitted to principal components analysis to assess the independence of the different tests which might be related to the proposed multiple intelligences of the research. Loadings on six rotated principal components are presented in Table 6.

Unlike Table 4 of the first study, Table 6 shows that six distinct components (over .8 to .9) emerged from factor analysis of the six dependent measures. The STAI, both trait and state anxiety scores loaded on the first principal component; the IT score loaded on the second principal component; TCT-DP loaded on the third principal component; the CTI score loaded on the fourth component; GEFT loaded on the fifth component, and finally, CFIT loaded on the sixth component. CFIT showed as an independent factor in this study.

Although the first component accounted for more of the variance--22.27%, the second, third, fourth, fifth, and sixth principal components each alone accounted for a more significant amount of variance--14.31%, 14.47%, 14.91%, 14.52% and 14.33% respectively. Thus, the variance is distributed across all the components.

An examination of Table 6 suggests that the six principal components may be related to six different aspects of intelligence. The first component appears to be related to fear associated with the levels of feelings and ego, since STAI loaded on it. This component may be labeled as *experiential* intelligence, as it was in the first study according to the proposed theory.

The second component appears to be related to psycho-physiological functions, since the IT score loaded on it, and IT

TABLE 6

**Loadings for Pretest Scores, Eigen Values, and Percentage of Total Variance Explained by First Six Principal Components**

	<b>Component</b>		
<b>Loading</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>STAI (State)</b>	<b>-.919</b>	<b>.030</b>	<b>-.138</b>
<b>STAI (Trait)</b>	<b>-.827</b>	<b>.068</b>	<b>.117</b>
<b>IT</b>	<b>.072</b>	<b>-.970</b>	<b>-.021</b>
<b>TCT-DP</b>	<b>.033</b>	<b>.021</b>	<b>.955</b>
<b>CTI</b>	<b>.129</b>	<b>.010</b>	<b>.132</b>
<b>GEFT</b>	<b>.081</b>	<b>.114</b>	<b>.200</b>
<b>CFIT</b>	<b>-.033</b>	<b>.204</b>	<b>.103</b>
<b>Eigen Values</b>	<b>1.559</b>	<b>1.002</b>	<b>1.013</b>
<b>Percentage of Total Variance Explained by Components</b>	<b>22.27%</b>	<b>14.32%</b>	<b>14.47%</b>

TABLE 6 (Continued)

Loadings for Pretest Scores, Eigen Values, and Percentage of Total Variance Explained by First Six Principal Components

	Component		
Loading	4	5	6
STAI (State)	.047	.066	.090
STAI (Trait)	-.280	-.208	-.062
IT	-.008	-.105	-.198
TCT-DP	.129	.189	.102
CTI	<b>.962</b>	.118	-.062
GEFT	.127	<b>.945</b>	.123
CFIT	-.062	.119	<b>.960</b>
<b>Eigen Values</b>	1.044	1.016	1.003
<b>Percentage of Total Variance Explained by Components</b>	14.91%	14.52%	14.33%

was hypothesized to be related to the neural efficiency of intelligence, it may be labeled as *physiological* intelligence. Unlike the previous study, CFIT did not show a heavy loading with IT in this study. Thus, the physiological aspect of intellectual intelligence was not salient in this study.

The third component appears to be related purely to constructive thinking as indicated by the CTI loading and low loadings on other tests. Thus it may be labeled as *practical* intelligence, predicted by the CTI.

The fourth component appears to be related to creative thinking, since TCT-DP loaded on it and the other tests had low loadings in it. This component naturally reflects *creativity*.

The fifth component appears to be related to field independence, since GEFT loaded on it and had low loadings on other tests. This may be labeled as *contextual* intelligence, according to the Chinese theory of intelligence.

Finally, the sixth component appears to be related to abstract thinking, since CFIT loaded on it. This may be labeled as *intellectual* intelligence according to the Chinese theory of intelligence.

As mentioned in the first study, the factor analysis indicates that the selection of tests in the research studies was successful in capturing a broad range of different abilities expressed by the unified source of pure intelligence. Again, these labelings may be considered somewhat arbitrary. But factor analysis in this second study again suggested and confirmed that there are multiple aspects of mental ability being measured, as originally designed in order to test the theory of the research study.

### *Test of the First Hypothesis*

As described earlier, this experiment compared 118 girls from 3 different classes, mean age 14.5 years old, in a junior-high public

school in the northern part of Taiwan over a six-month period. Two classes were randomly assigned to either the experimental group learning the TM program, or the control group without any treatment. Another class in which the students were instructed in a Contemplation meditation technique was chosen on purpose as another comparison group.

The test scores of the six dependent variables which loaded on all the six principal components were simultaneously analyzed by Multivariate Analysis of Covariance (MANCOVA).

There were significant multivariate differences among the TM group, the control group, and the Contemplation technique group: Wilks' Lambda = 0.61,  $F(7, 77) = 6.9$ ,  $p < .000005$ .

There was also significant multivariate difference between the TM group and the control group: Wilks' Lambda = 0.73,  $F(7, 77) = 4.14$ ,  $p < .0007$ .

There was also significant multivariate difference between the TM group and the Contemplation group: Wilks' Lambda = 0.60,  $F(7, 77) = 7.35$ ,  $p < .000001$ .

There was also significant multivariate difference between the Contemplation group and the control group as shown in Wilks' lambda = 0.84,  $F(7, 77) = 2.13$ ,  $p = .05$ .

Hence, the null hypothesis of no effect of the grouping variable on the six dependent variables was rejected. The effect was in the direction of improvement on the six dependent measures taken together in the experimental group. The first hypothesis, that enlivening pure intelligence will bring about a simultaneous growth of the different aspects of intelligence, as measured by the multivariates of the six dependent variables, was supported in experiment two.

### *Test of the Second Hypothesis*

The second hypothesis, that enlivening pure intelligence will induce the mutual development of creativity and intelligence, was also strongly supported. The results of the experimental group showed significant change in scores over the control group on TCT-DP,  $F = 20.79$  ( $p < .00001$ ,  $DF = 1, 83$ ), which was stated in the design section as a test for creativity.

In addition, there were also significant changes in scores on four other independent measures of mental ability--STAI, CTI, GEFT, IT--at the same time. The F-statistic of the four results were 5.54 ( $p < .02$ ,  $DF = 1, 83$ ) for trait-anxiety; 5.60 ( $p < .02$ ,  $DF = 1, 83$ ) for CTI; 5.38 ( $p < .02$ ,  $DF = 1, 83$ ) for GEFT; 4.04 ( $p < .05$ ,  $DF = 1, 83$ ) for IT. There were no significant changes on these scores for the control group.

Table 7 presents the complete results of univariate analyzes of covariance for the effect of the experimental, control, and Contemplation technique groups on TCT-DP, STAI, GEFT, CFIT, IT, and CTI. An examination of Table 7 showed that the strength of effect was mainly caused by TCT-DP.

CFIT was in the direction to significance:  $F = 1.49$  ( $p = .22$ ,  $DF = 1, 83$ ). There were no significant changes on these scores for the control group, however.

Figures 18, 19, 20, 21, 22, and 23 present changes in scores on the TCT-DP, STAI, CTI, GEFT, IT and CFIT respectively for the TM group, the control group, and the Contemplation technique group. Similar to the first study, the figures showed improvements in almost all groups in all the measures, except STAI. The control groups showed increased anxiety in the posttest in relation to the pretest. In addition, subjects in this study also showed larger improvements on CFIT than the first study in all groups. Like the first study, the fact that the control groups also showed large improvements on GEFT, CFIT, and IT seem to suggest that there were "practice effect."



**TABLE 7**  
**UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON**  
**GEFT, CFIT, IT, TCT-DP, STAI, AND CTI--STUDY 2**

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj. x post	df	F	p
<b>GEFT</b>									
	Exper.	3.00	1.59	4.23	3.04	3.91			
	Control	2.35	1.38	2.23	1.92	2.63	1	5.38	<.02
	Exper.	3.00		4.23		3.91			
	Con Tech.	2.73	1.11	3.77	2.19	3.74	1	.10	.75
	Con Tech.	2.73		3.77		3.74			
	Control	2.35		2.23		2.63	1	4.10	<.05
<b>CFIT</b>									
	Exper.	19.16	4.50	24.10	4.69	23.90			
	Control	19.77	3.36	22.23	4.52	22.50	1	1.49	.22
	Exper.	19.16		24.10		23.90			
	Con Tech.	18.53	3.75	23.67	4.05	23.65	1	.05	.82
	Con Tech.	18.53		23.67		23.65			
	Control	19.77		22.23		22.50	1	1.04	.31

TABLE 7 (Continued)

UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON  
GEFT, CFIT, IT, TCT-DP, STAI, AND CTI--STUDY 2

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj. x post	df	F	p
<b>IT</b>									
	Exper.	62.55	14.6	47.45	12.4	48.22			
	Control	65.08	14.1	56.38	12.1	55.40	1	4.04	<.05
	Exper.	62.55		47.45		48.22			
	Con Tech.	62.80	14.9	50.53	15.0	50.59	1	.49	.49
	Con Tech.	62.80		50.53		50.59			
	Control	65.08		56.38		55.40	1	1.83	.18
<b>TCT-DP</b>									
	Exper.	31.13	10.7	39.45	11.0	38.92			
	Control	28.65	7.69	28.50	5.11	29.17	1	20.80	<.00002
	Exper.	31.13		39.45		38.92			
	Con Tech.	25.30	7.50	26.27	6.06	26.23	1	39.18	<.0000001
	Con Tech.	25.30		26.27		26.23			
	Control	28.65		28.50		29.17	1	1.91	.17

TABLE 7 (Continued)

**UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON  
GEFT, CFIT, IT, TCT-DP, STAI, AND CTI--STUDY 2**

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj. x post	df	F	p
<b>STAI(State)</b>									
	Exper.	43.84	7.82	41.06	8.06	41.50			
	Control	44.12	10.4	46.42	9.49	45.87	1	3.39	.07
	Exper.	43.84		41.06		41.50			
	Con Tech.	47.20	9.34	49.70	9.75	49.73	1	13.33	<.0005
	Con Tech.	47.20		49.70		49.73			
	Control	44.12		46.42		45.87	1	2.66	.11
<b>STAI(Trait)</b>									
	Exper.	47.23	7.26	44.23	8.99	44.71			
	Control	51.27	9.75	51.88	8.67	51.27	1	5.54	<.02
	Exper.	47.23		44.23		44.71			
	Con Tech.	50.20	8.73	53.93	12.5	53.97	1	12.27	<.0007
	Con Tech.	50.20		53.93		53.97			
	Control	51.27		51.88		51.27	1	.95	.33

TABLE 7 (Continued)

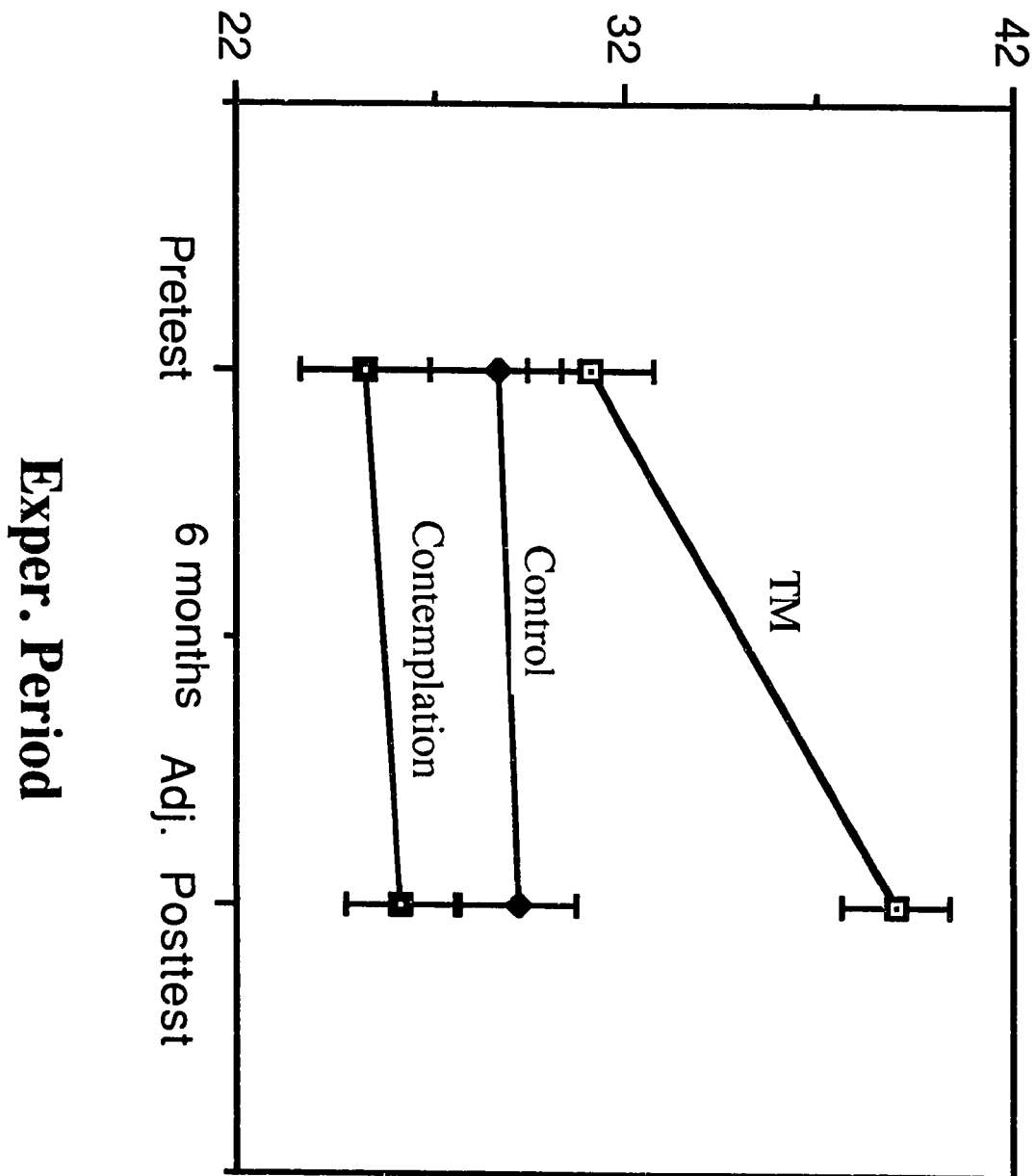
**UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON  
GEFT, CFIT, IT, TCT-DP, STAI, AND CTI--STUDY 2**

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj. x post	df	F	p
<b>CTI</b>									
	Exper.	57.06	6.07	59.97	5.85	59.68			
	Control	55.65	5.67	56.31	5.28	56.67	1	5.60	<.02
	Exper.	57.06		59.97		59.68			
	Con Tech.	56.67	5.05	58.40	3.67	58.38	1	1.17	.28
	Con Tech.	56.67		58.40		58.38			
	Control	55.65		56.31		56.67	1	1.82	.18

**Figure 18**

**Change in Scores on Creative Thinking over 6 Months--  
Study 2**

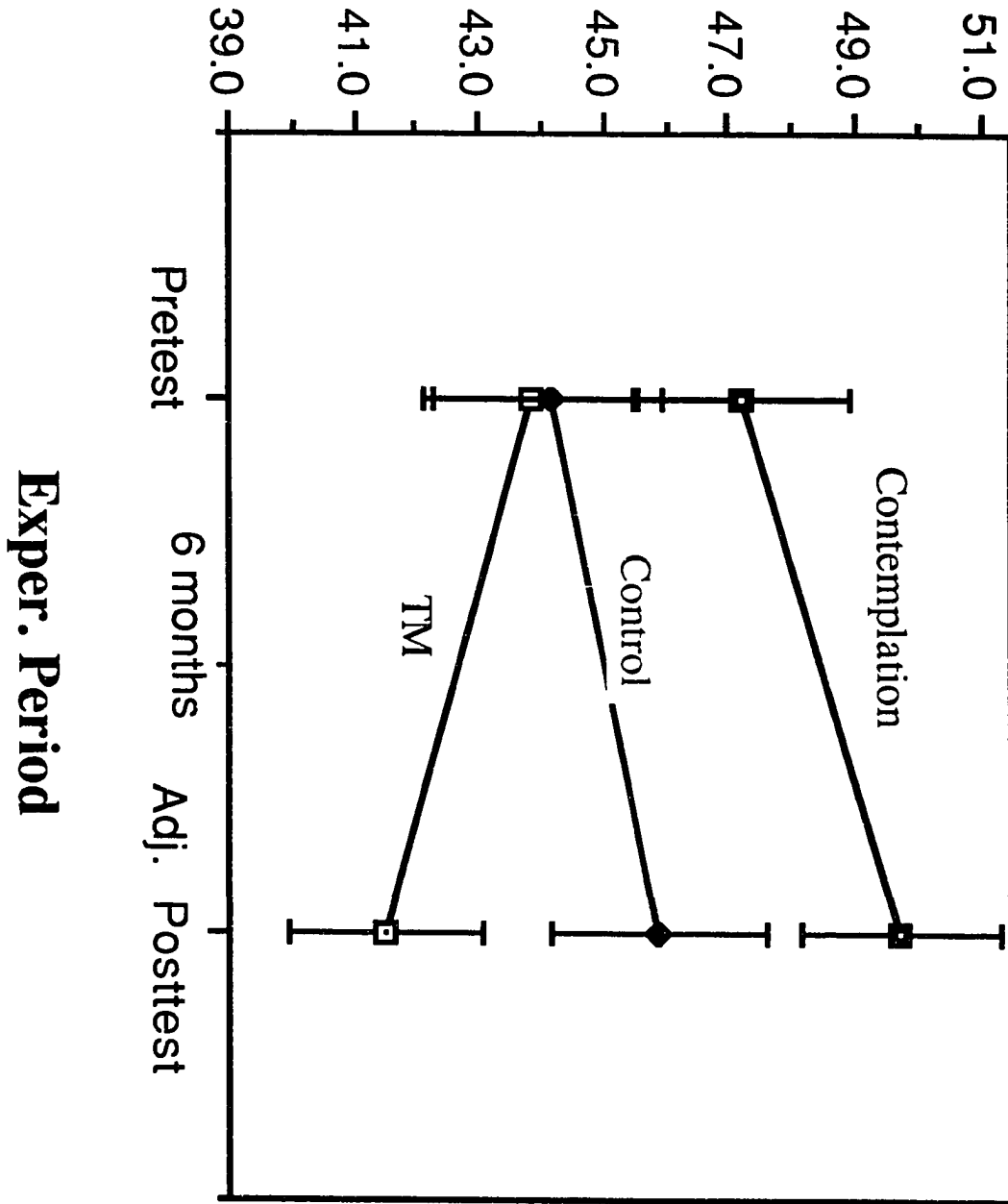
# Mean Scores (TCT-DP)



**Figure 19**

**Change in Scores on State and Trait Anxiety over 6 Month--  
Study 2**

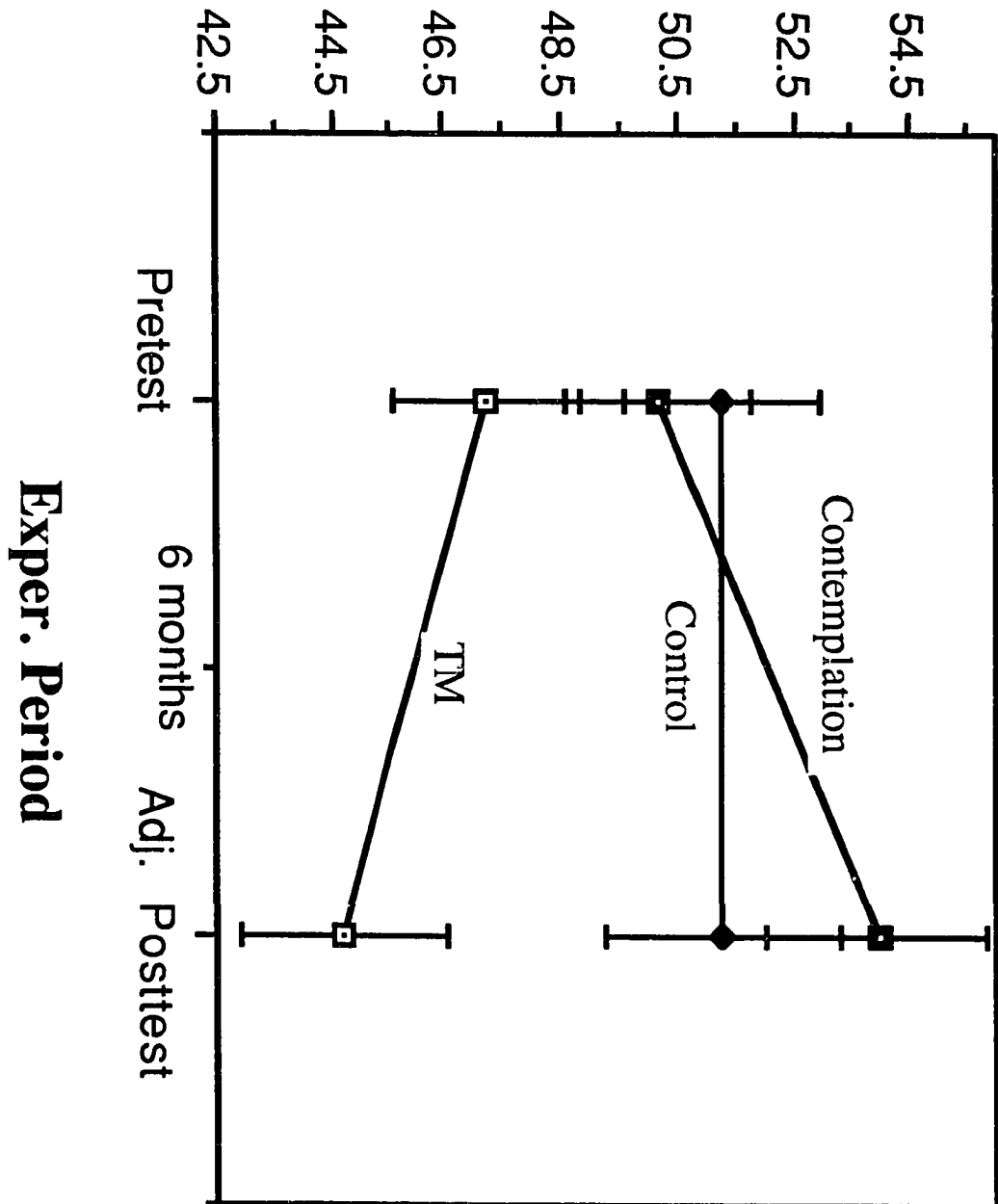
# Mean Scores (State AI)



**Exper. Period**



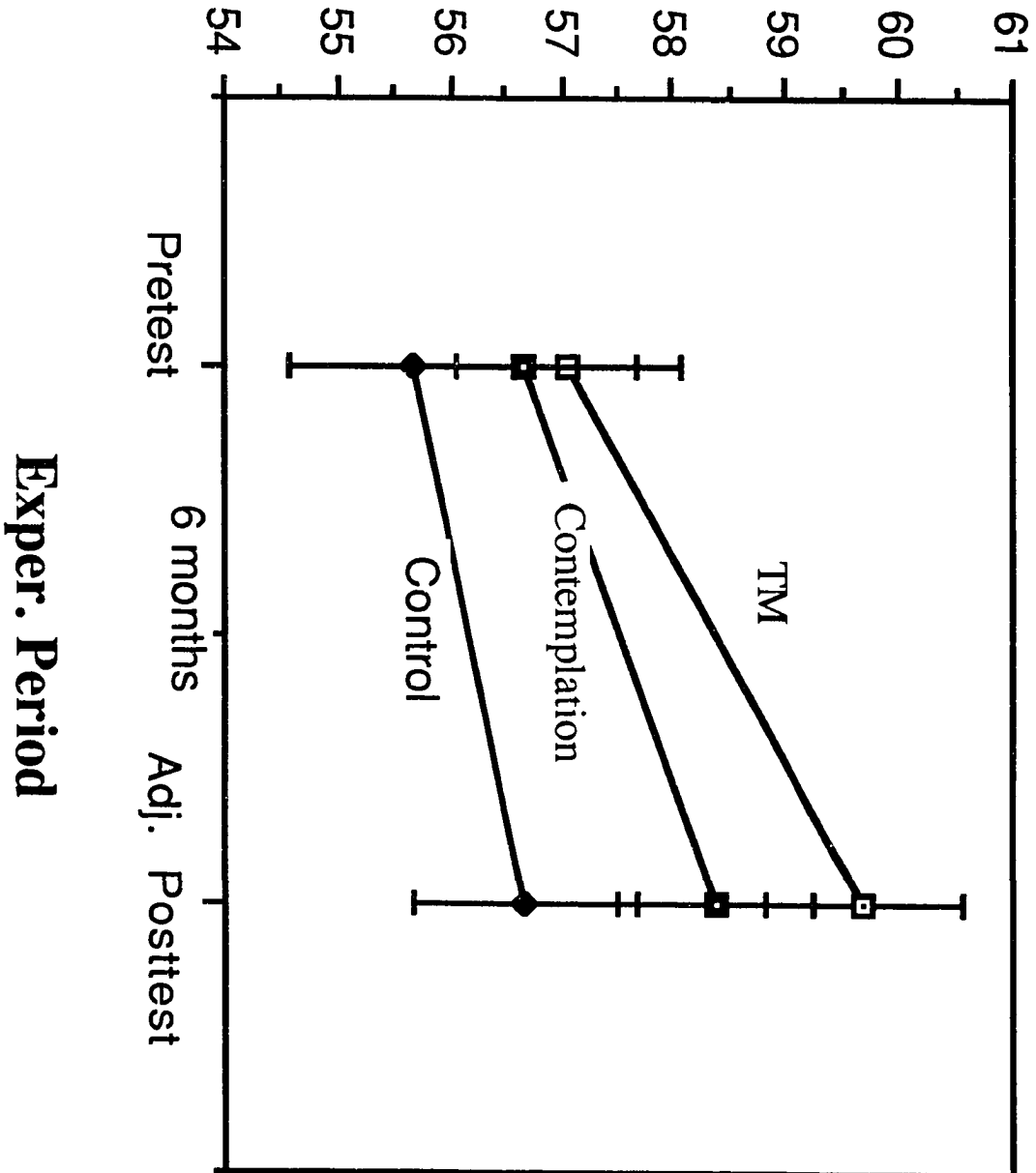
## Mean Scores (Trait AI)



**Figure 20**

**Change in Scores on Practical Intelligence over 6 Months--  
Study 2**

# Mean Scores (CTI)

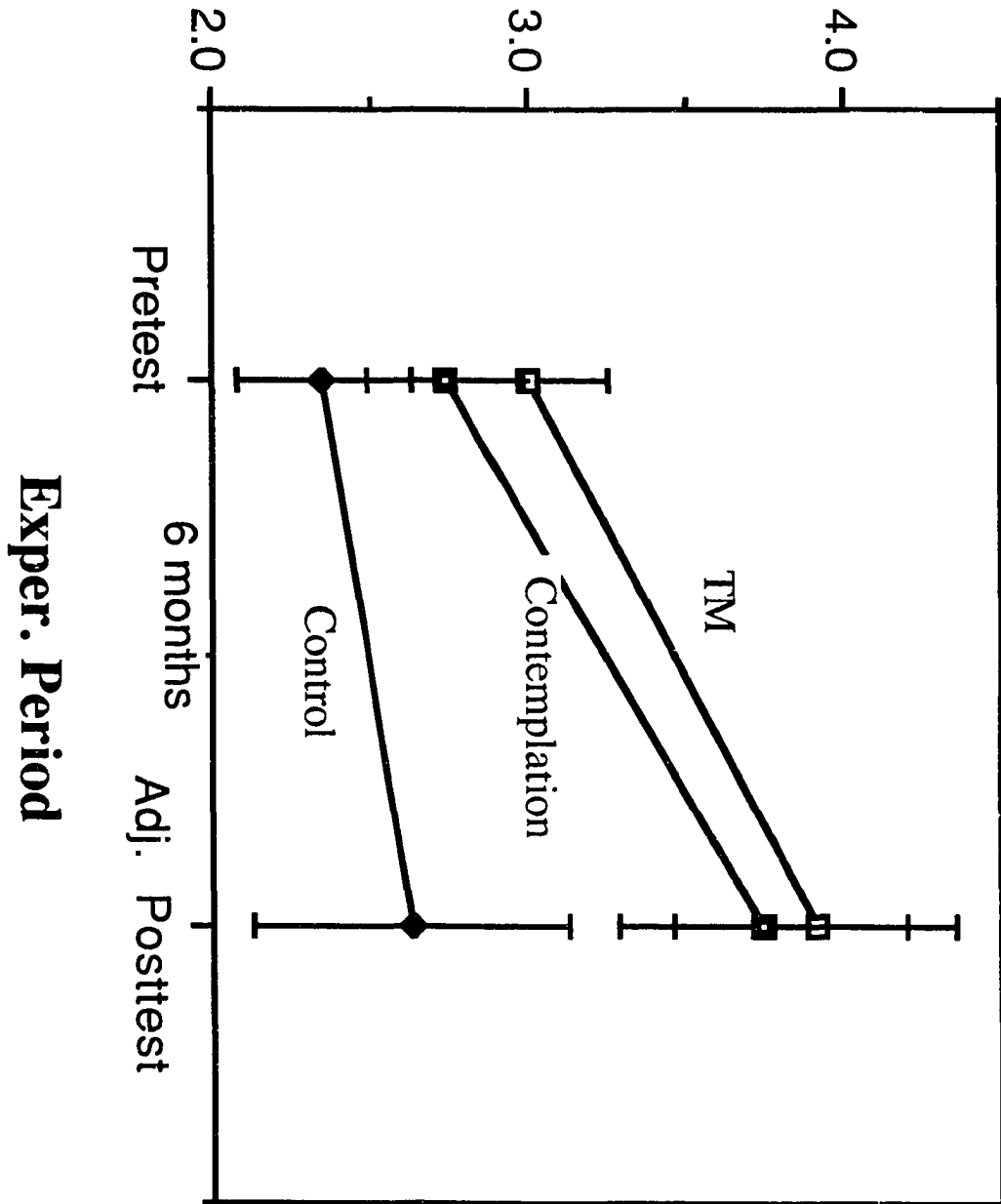


**Exper. Period**

**Figure 21**

**Change in Scores on Field Independence over 6 Months--  
Study 2**

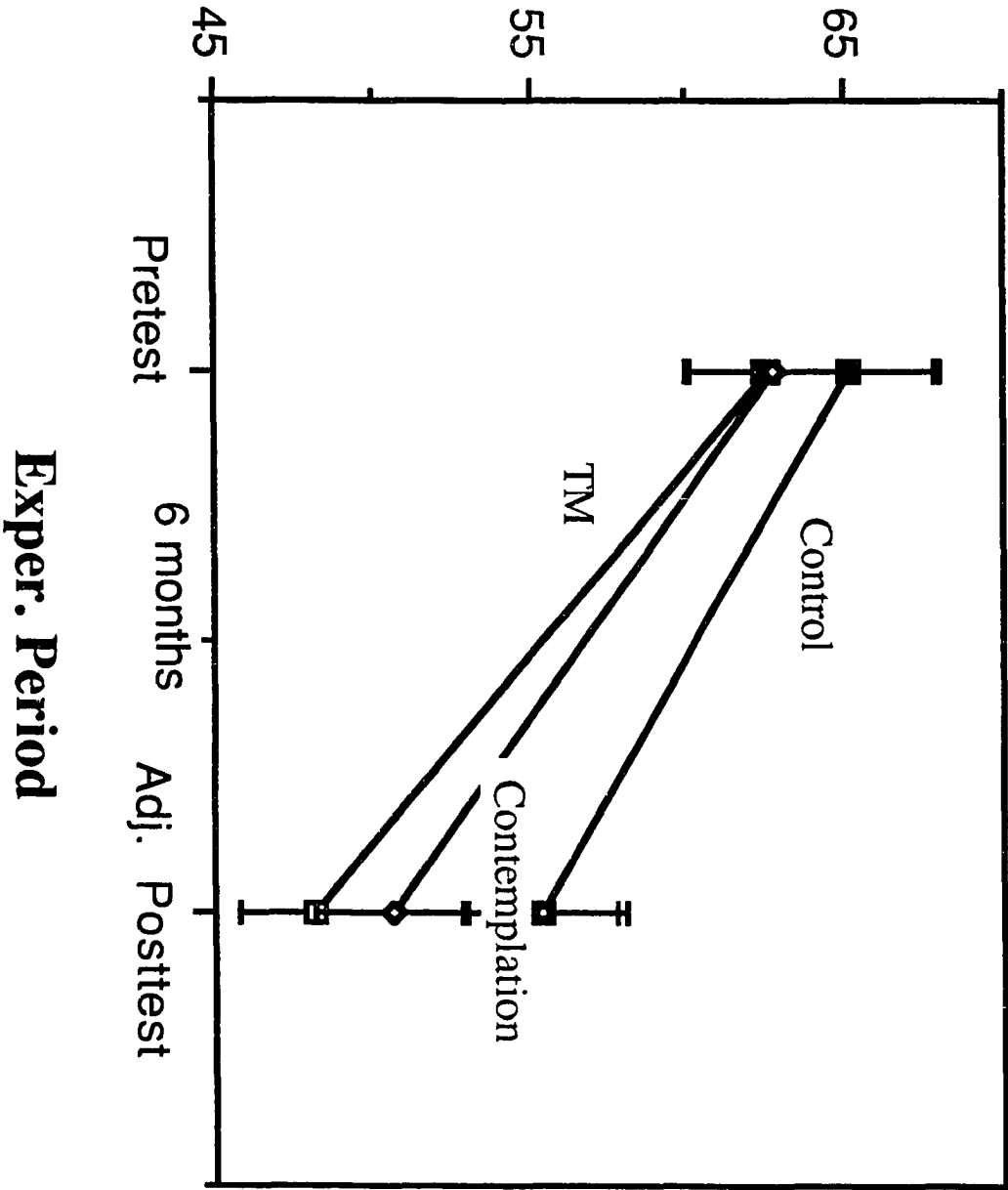
# Mean Scores (GEFT)



**Figure 22**

**Change in Scores on Inspection Time over 6 Months--  
Study 2**

# Mean Scores (IT)

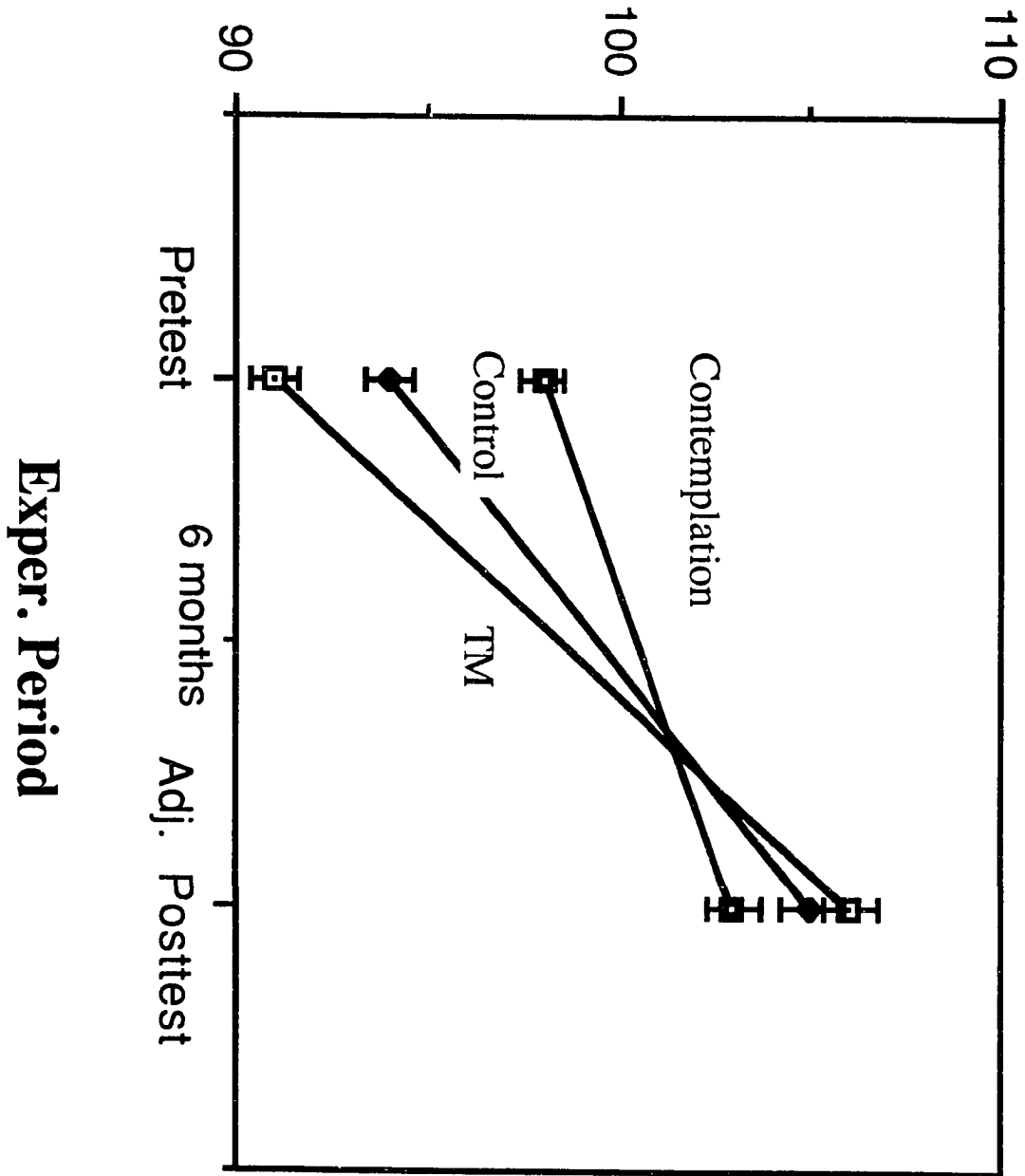


**Figure 23**

**Change in Scores on Fluid Intelligence over 6 Months--  
Study 2**



# IQ Mean Scores (CFIT)



*Test of the Third Hypothesis*

The third hypothesis, that the TM program is a more holistic intelligence-enhancing technique, than the Contemplation technique was also supported. This can be justified from two comparisons of results. First, by comparing the TM group with the Contemplation technique group, the TM group showed significant improvements on TCT-DP,  $F = 39.18$  ( $p < .000001$ ,  $DF = 1, 83$ ); STAI,  $F = 13.33$  ( $p < .0005$ ,  $DF = 1, 83$ ) for state-anxiety, and  $F = 12.27$  ( $p < .0007$ ,  $DF = 1, 83$ ) for trait-anxiety. Figures 18 and 19 present changes in scores on the TCT-DP and STAI respectively for the TM group, the control group, and the Contemplation technique group.

Second, by comparing the TM group and the Contemplation technique group with the control group, the TM group showed more significant improvements over the six dependent measures than the Contemplation technique group. In the TM group, all the six dependent measures, except CFIT and State-anxiety, were significant, while the Contemplation technique group only showed significance in GEFT,  $F = 4.10$  ( $p < .05$ ,  $DF = 1, 83$ ). Figures 19, 20, 21, 22, and 23 present changes in scores on the STAI, CTI, GEFT, IT, and CFIT respectively for the three groups.

The results that the TM group show greater improvements over both the Contemplation technique group and over the control group thus suggest that the TM program may be more holistic in enhancing intelligence development than the Contemplation technique.

### Third Experiment

#### *Factor Analyses of Dependent Variables*

As in studies one and two, pretest scores on all the six measures were submitted to principal components analysis to assess the possibility of the existence of multiple intelligences. Loadings on six rotated principal components are presented in Table 8.

More similar to Table 4 in study one than Table 6 in study two, Table 8 shows that five distinct components (over .6 to .9 loadings) emerged from factor analysis of the seven dependent measures. The IT and CFIT scores loaded on the first principal component; STAI, both trait and state anxiety, scores loaded on the second principal component; the CTI score loaded on the third component; TCT-DP loaded on the fourth principal component; GEFT loaded on the fifth component.

Although the first and second components accounted for more of the variance--20.07% and 26.66% respectively, the third, fourth, and fifth principal components each also accounted for significant amounts of variance--14.42%, 14.39%, and 14.82% respectively. Thus, the variance is distributed across all the components.

An examination of Table 8 suggests that the five principal components may be related to five different aspects of intelligence. Similar to the first study, the first component appears to be related to the physiological and cognitive aspects of intelligence, since the IT and CFIT scores both loaded on it. Since IT has a heavier loading (over .9) than CFIT (over .6), and was hypothesized to be related to the neural efficiency of intelligence, it may be labeled as *physiological intelligence*. As stated in the first study, since IT was also hypothesized to be related to sensory information processing of

TABLE 8

**Loadings for Pretest Scores, Eigen Values, and Percentage of Total Variance Explained by First Five Principal Components**

	<b>Component</b>		
<b>Loading</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>IT</b>	<b>-.976</b>	<b>-.019</b>	<b>-.021</b>
<b>CFIT</b>	<b>.637</b>	<b>.001</b>	<b>.017</b>
<b>STAI (State)</b>	<b>-.019</b>	<b>.964</b>	<b>-.040</b>
<b>STAI (Trait)</b>	<b>.043</b>	<b>.961</b>	<b>.103</b>
<b>CTI</b>	<b>-.021</b>	<b>.047</b>	<b>.995</b>
<b>TCT-DP</b>	<b>.095</b>	<b>-.000</b>	<b>.076</b>
<b>GEFT</b>	<b>.186</b>	<b>.107</b>	<b>-.020</b>
<b>Eigen Values</b>	<b>1.405</b>	<b>1.866</b>	<b>1.010</b>
<b>Percentage of Total Variance Explained by Components</b>	<b>20.07%</b>	<b>26.66%</b>	<b>14.42%</b>

TABLE 8 (Continued)

**Loadings for Pretest Scores, Eigen Values, and Percentage of  
Total Variance Explained by First Five Principal Components**

	Component	
Loading	4	5
<b>IT</b>	-.094	-.138
<b>CFIT</b>	.066	.274
<b>STAI (Trait)</b>	-.002	.086
<b>STAI (State)</b>	.005	.037
<b>CTI</b>	.073	-.017
<b>TCT-DP</b>	.983	.130
<b>GEFT</b>	.141	.958
<b>Eigen Values</b>	1.006	1.037
<b>Percentage of Total Variance Explained by Components</b>	14.37%	14.82%

cognitive functioning, its loading with CFIT may also suggest that it is related to *intellectual* intelligence as well. These results again suggest that neural efficiency plays a role in intellectual intelligence as measured by these tests.

The second component appears to be related purely to anxiety or fear associated with the levels of feelings and ego, since STAI loaded on it. This component may be labeled as *experiential* intelligence according to the proposed theory.

The third component appears to be related purely to constructive thinking as indicated by the CTI loading and low loadings on other tests. Thus it may be labeled as *practical* intelligence, and is predicted by CTI.

The fourth component appears to be related to creative thinking, since TCT-DP loaded on it. It seems obvious that this component reflects *creativity*.

The fifth component appears to be related to field independence, since GEFT loaded on it and had low loadings on other tests. This may be labeled as *contextual* intelligence.

As indicated by the factor analysis, the selection of tests in the research studies was successful in capturing a broad range of different abilities expressed by the unified source of pure intelligence. It should be mentioned again that these labelings may be somewhat arbitrary. However, factor analysis of this study is again consistent with the findings of the previous two studies that there were multiple aspects of mental ability being measured by these tests in order to test the hypothesis of holistic development of intelligence derived from the theory.

### *Test of the First Hypothesis*

As described earlier, this experiment compared 99 male students, mean age 17.5 years old, in a large private school in southern part of Taiwan. Two classes of students, 51 and 48 boys respectively, were randomly assigned by class to either the experimental group learning the TM program or the control group without treatment. The two classes were comparable and similar in backgrounds. Most of these students come from a family of lower socioeconomic level. The test scores of the six dependent variables which loaded on all the six principal components and were simultaneously analyzed by Multivariate Analysis of Covariance (MANCOVA).

There was significant multivariate difference between the TM group and control group: Wilks' Lambda = 0.70,  $F(7, 90) = 5.481$ ,  $p < .00003$ . Hence, the null hypothesis of no effect of the grouping variable on the six dependent variables was rejected. The effect was in the direction of improvement on the six dependent measures in the experimental group. The first hypothesis, that enlivening pure intelligence will bring about a simultaneous growth of the different aspects of intelligence, as measured by the multivariates of the six dependent variables, was supported in experiment three.

### *Test of the Second Hypothesis.*

The second hypothesis, that enlivening pure intelligence will induce the mutual development of creativity and intelligence, was also supported. The results of the experimental group showed a significant change in scores over the control group on the TCT-DP,  $F = 7.37$  ( $p < .008$ ,  $DF = 1, 96$ ), which was stated in the design section as a test for creativity.

In addition, there were also significant changes in scores on all other five independent measures of mental ability--STAI, CTI, GEFT, IT, and CFIT--at the same time. The F-statistic of the five results were 11.30 ( $p < .001$ ,  $DF = 1, 96$ ) for state-anxiety and 6.36 ( $p < .01$ ,  $DF = 1, 96$ ) for trait-anxiety; 4.45 ( $p < .04$ ,  $DF = 1, 96$ ) for CTI; 17.21 ( $p < .00007$ ,  $DF = 1, 96$ ) for GEFT; 4.05 ( $p < .05$ ,  $DF = 1, 96$ ) for IT; and 4.65 ( $p < .03$ ,  $DF = 1, 96$ ) for CFIT.

Table 9 presents complete result findings of univariate analyzes of covariance for the effect of the experimental and the control groups on TCT-DP, STAI, GEFT, CFIT, IT, and CTI. An examination of Table 9 showed that the strength of effect was mainly caused by GEFT and TCT-DP.

Figures 24, 25, 26, 27, 28, and 29 present changes in scores on the TCT-DP, STAI, CTI, GEFT, IT, and CFIT respectively for the TM group and the control group. Similar to the first and second studies, the figures showed improvements in almost all groups in all the measures, except Trait-Anxiety. The control group showed increased trait anxiety in the posttest in relation to the pretest. Unlike the previous two studies, the subjects in the experiment in this study also showed significant improvement on CFIT. Like the other two studies, the fact that the control groups also showed large improvements on GEFT, CFIT, and IT seem to suggest that there were "practice effect."



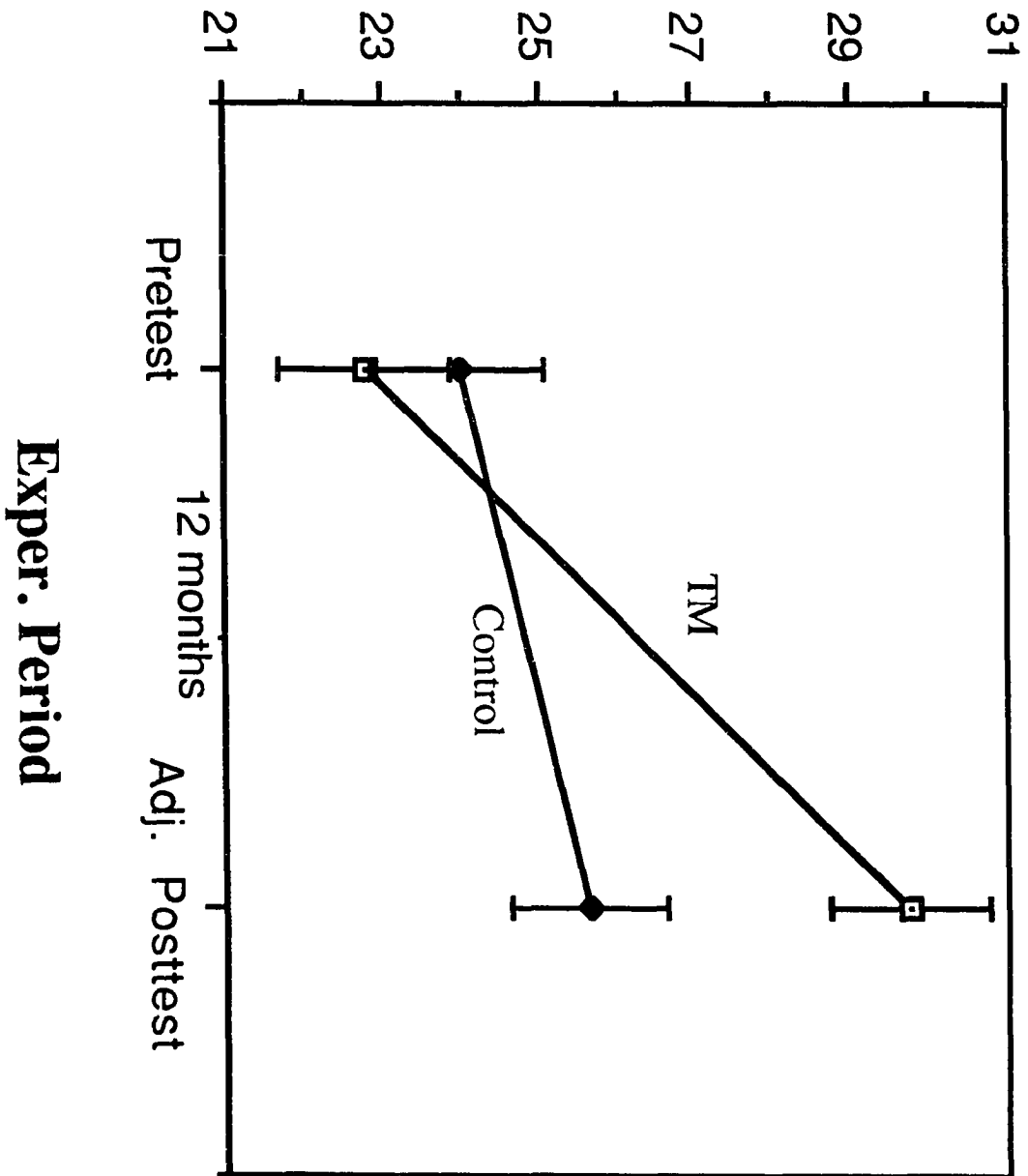
**TABLE 9**  
**UNIVARIATE ANALYSES OF COVARIANCE FOR EFFECT OF GROUP ON**  
**TCT-DP, STAI, GEFT, CFIT, IT, AND CTI--STUDY 3**

Variable/ Covariate	Group	xpre	SDpre	xpost	SDpost	Adj. x post	df	t	p																																																																																												
<b>TCT-DP</b>	Exper.	22.82	7.50	29.61	7.21	29.72	1	7.37	<.008																																																																																												
	Control	24.00	9.18	25.75	7.95	25.63				<b>STAI (State)</b>	Exper.	50.02	9.06	45.88	7.09	46.00	1	11.30	<.001	Control	51.21	8.89	50.81	7.08	50.68	<b>STAI (Trait)</b>	Exper.	53.57	9.64	50.29	8.47	50.41	1	6.36	<.01	Control	52.79	8.03	54.60	7.76	54.48	<b>GEFT</b>	Exper.	3.57	2.30	5.84	2.03	5.95	1	17.21	<.00007	Control	3.90	2.27	4.71	2.33	5.00	<b>CFIT</b>	Exper.	18.35	3.65	25.12	3.78	25.25	1	4.65	<.03	Control	18.93	5.18	23.69	4.93	23.54	<b>IT</b>	Exper.	73.33	11.51	64.90	10.99	64.60	1	4.05	<.05	Control	73.20	10.52	68.08	9.47	68.40	<b>CTI</b>	Exper.	58.22	5.23	63.14	5.28	63.14	1	4.45	<.04	Control	59.81
<b>STAI (State)</b>	Exper.	50.02	9.06	45.88	7.09	46.00	1	11.30	<.001																																																																																												
	Control	51.21	8.89	50.81	7.08	50.68				<b>STAI (Trait)</b>	Exper.	53.57	9.64	50.29	8.47	50.41	1	6.36	<.01	Control	52.79	8.03	54.60	7.76	54.48	<b>GEFT</b>	Exper.	3.57	2.30	5.84	2.03	5.95	1	17.21	<.00007	Control	3.90	2.27	4.71	2.33	5.00	<b>CFIT</b>	Exper.	18.35	3.65	25.12	3.78	25.25	1	4.65	<.03	Control	18.93	5.18	23.69	4.93	23.54	<b>IT</b>	Exper.	73.33	11.51	64.90	10.99	64.60	1	4.05	<.05	Control	73.20	10.52	68.08	9.47	68.40	<b>CTI</b>	Exper.	58.22	5.23	63.14	5.28	63.14	1	4.45	<.04	Control	59.81	6.32	60.85	5.45	60.85												
<b>STAI (Trait)</b>	Exper.	53.57	9.64	50.29	8.47	50.41	1	6.36	<.01																																																																																												
	Control	52.79	8.03	54.60	7.76	54.48				<b>GEFT</b>	Exper.	3.57	2.30	5.84	2.03	5.95	1	17.21	<.00007	Control	3.90	2.27	4.71	2.33	5.00	<b>CFIT</b>	Exper.	18.35	3.65	25.12	3.78	25.25	1	4.65	<.03	Control	18.93	5.18	23.69	4.93	23.54	<b>IT</b>	Exper.	73.33	11.51	64.90	10.99	64.60	1	4.05	<.05	Control	73.20	10.52	68.08	9.47	68.40	<b>CTI</b>	Exper.	58.22	5.23	63.14	5.28	63.14	1	4.45	<.04	Control	59.81	6.32	60.85	5.45	60.85																												
<b>GEFT</b>	Exper.	3.57	2.30	5.84	2.03	5.95	1	17.21	<.00007																																																																																												
	Control	3.90	2.27	4.71	2.33	5.00				<b>CFIT</b>	Exper.	18.35	3.65	25.12	3.78	25.25	1	4.65	<.03	Control	18.93	5.18	23.69	4.93	23.54	<b>IT</b>	Exper.	73.33	11.51	64.90	10.99	64.60	1	4.05	<.05	Control	73.20	10.52	68.08	9.47	68.40	<b>CTI</b>	Exper.	58.22	5.23	63.14	5.28	63.14	1	4.45	<.04	Control	59.81	6.32	60.85	5.45	60.85																																												
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	Control	18.93	5.18	23.69	4.93	23.54				<b>IT</b>	Exper.	73.33	11.51	64.90	10.99	64.60	1	4.05	<.05	Control	73.20	10.52	68.08	9.47	68.40	<b>CTI</b>	Exper.	58.22	5.23	63.14	5.28	63.14	1	4.45	<.04	Control	59.81	6.32	60.85	5.45	60.85																																																												
<b>IT</b>	Exper.	73.33	11.51	64.90	10.99	64.60	1	4.05	<.05																																																																																												
	Control	73.20	10.52	68.08	9.47	68.40				<b>CTI</b>	Exper.	58.22	5.23	63.14	5.28	63.14	1	4.45	<.04	Control	59.81	6.32	60.85	5.45	60.85																																																																												
<b>CTI</b>	Exper.	58.22	5.23	63.14	5.28	63.14	1	4.45	<.04																																																																																												
	Control	59.81	6.32	60.85	5.45	60.85																																																																																															

**Figure 24**

**Change in Scores on Creative Thinking over 12 Months--  
Study 3**

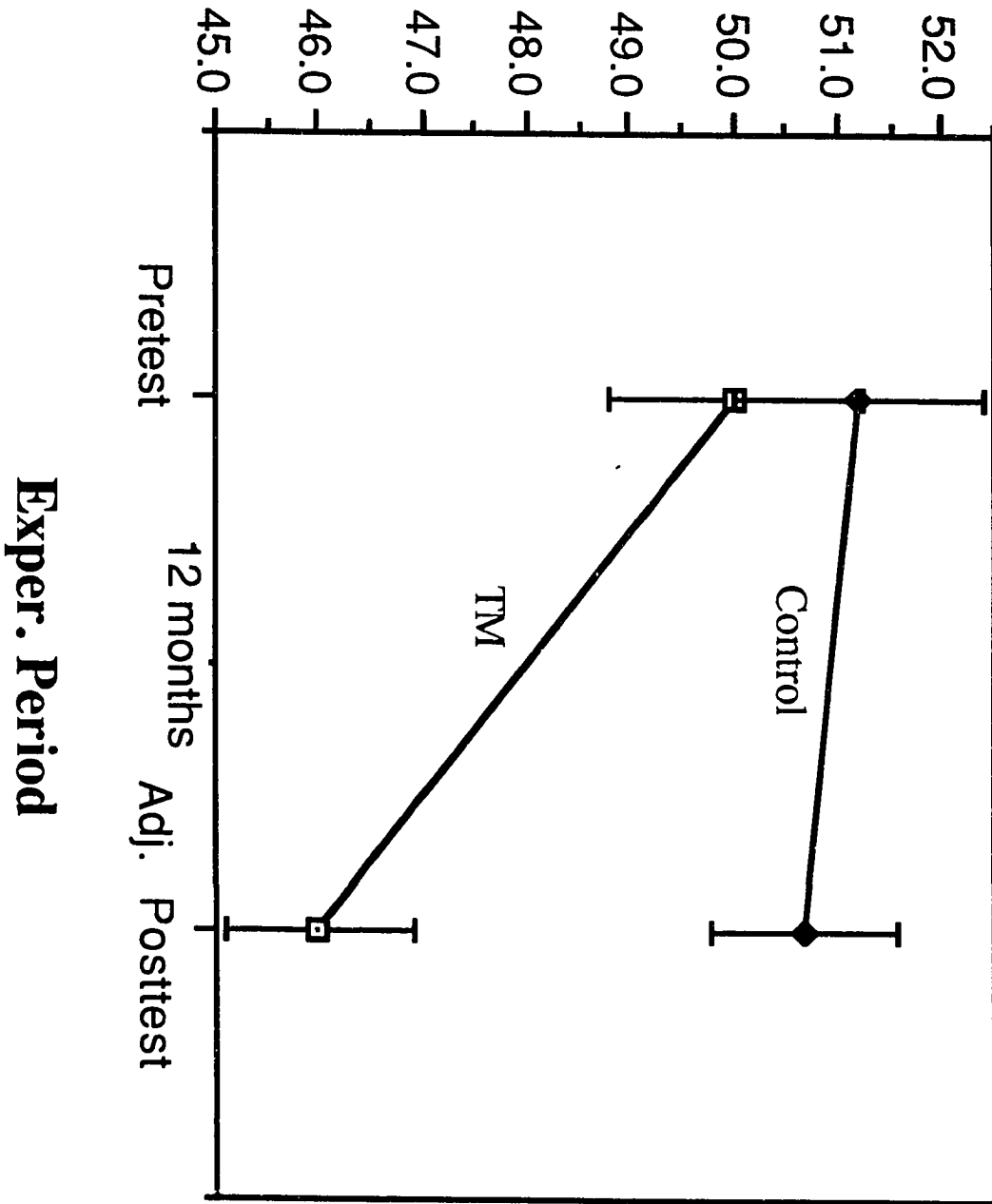
# Mean Scores (TCT-DP)



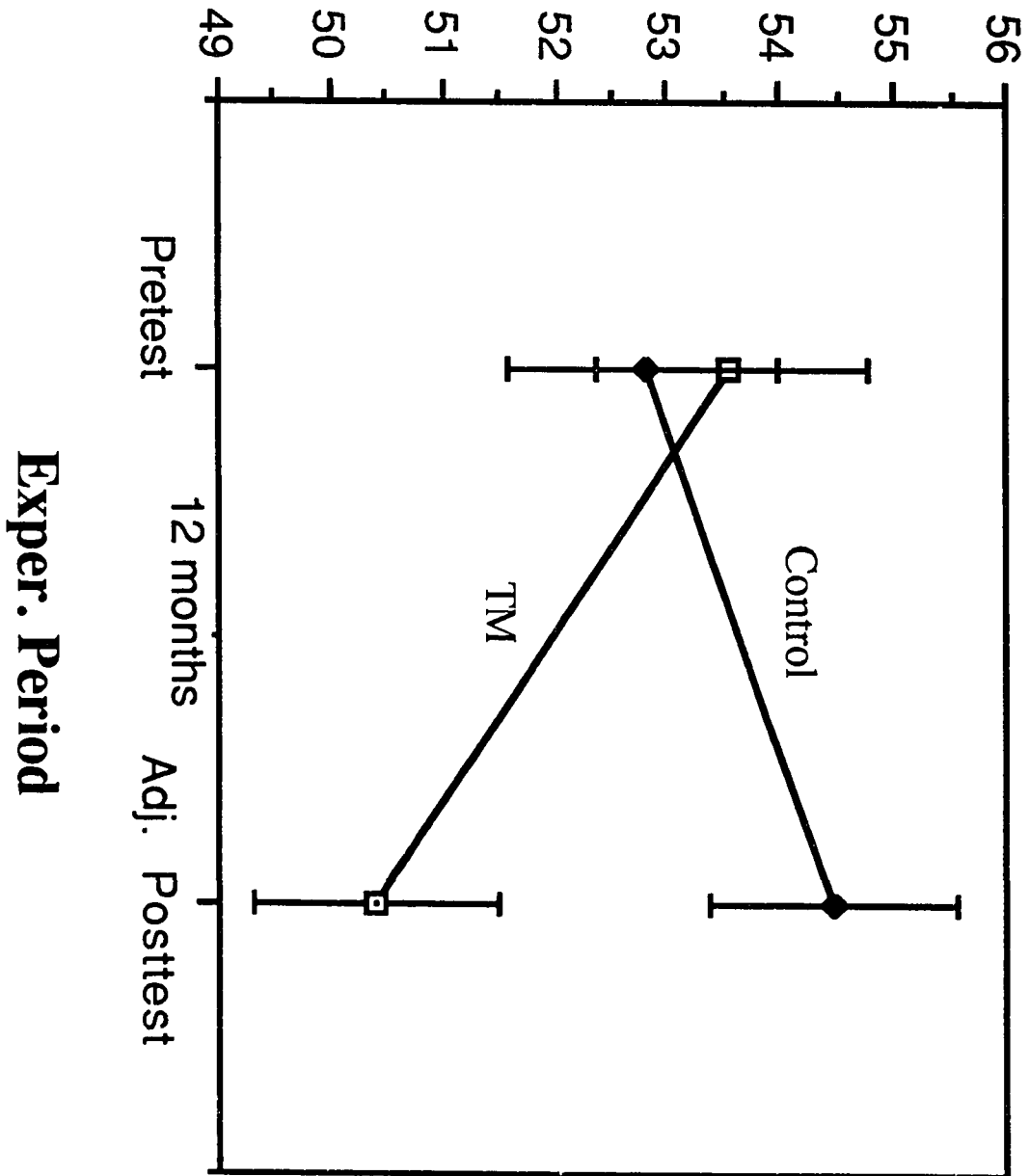
**Figure 25**

**Change in Scores on State and Trait Anxiety over 12 Month  
--Study 3**

## Mean Scores (State AI)



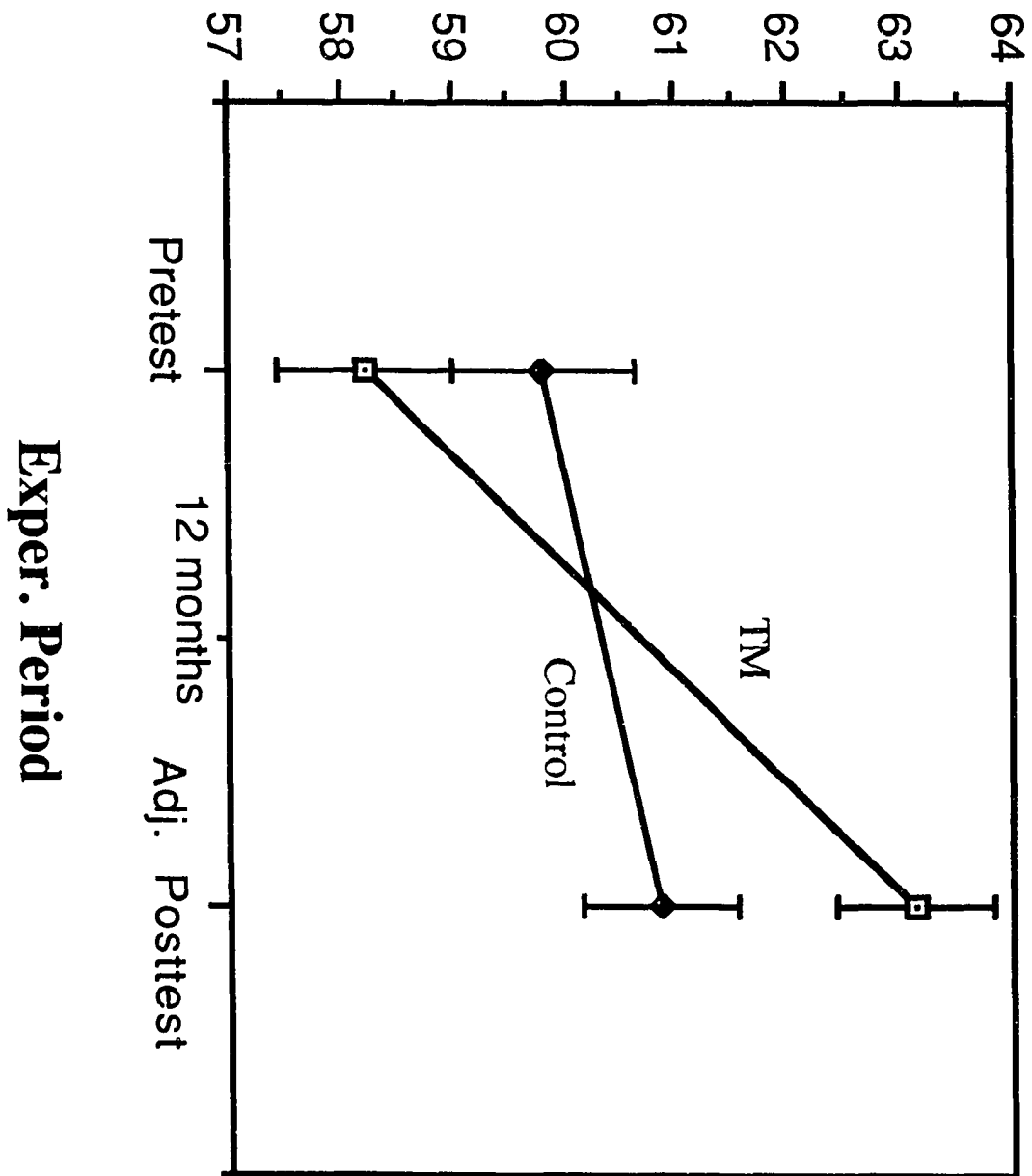
## Mean Scores (Trait AI)



**Figure 26**

**Change in Scores on Practical Intelligence over 12 Months--  
Study 3**

# Mean Scores (CTI)



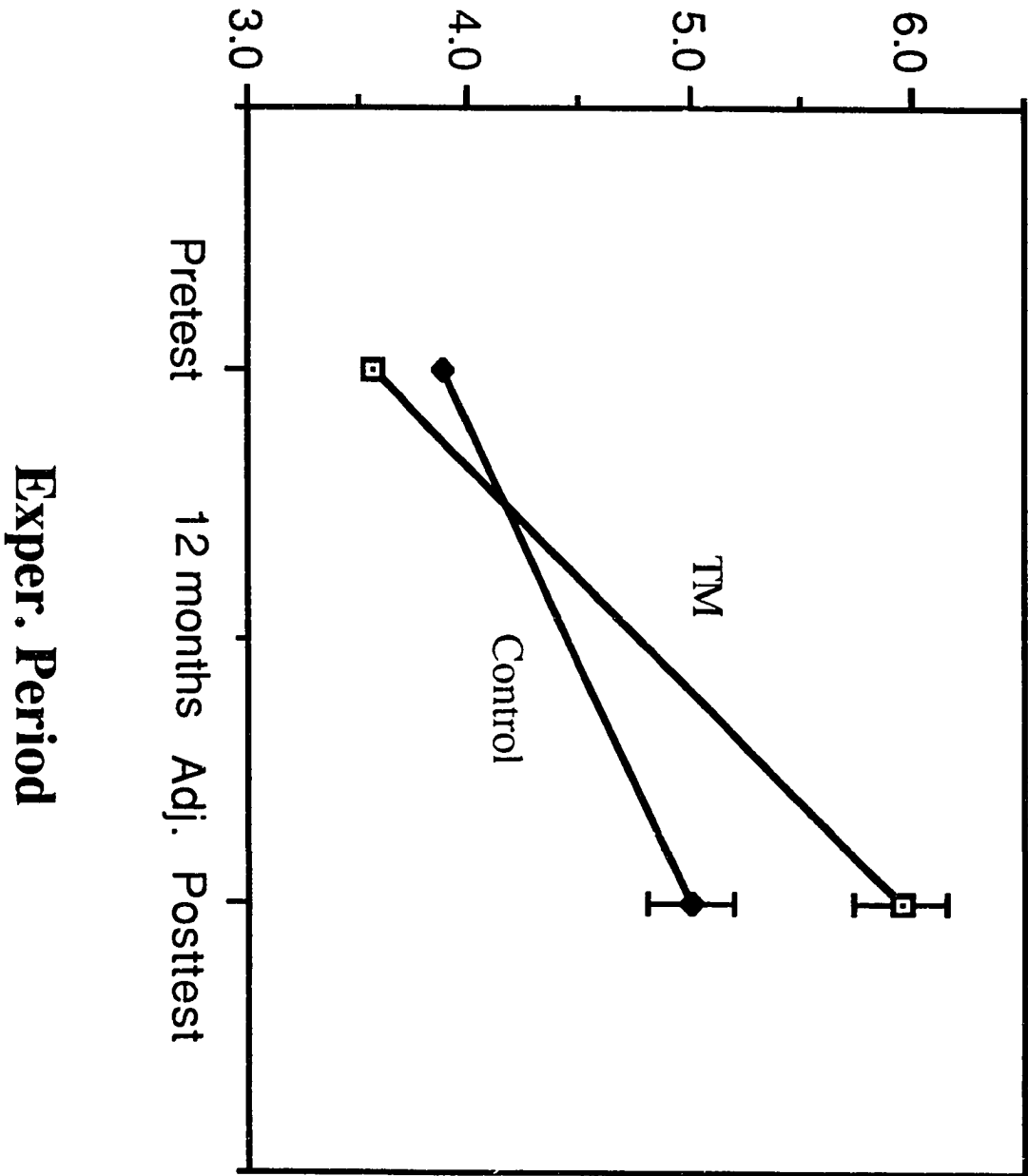
Exper. Period



**Figure 27**

**Change in Scores on Field Independence over 12 Months--  
Study 3**

# Mean Scores (GEFT)

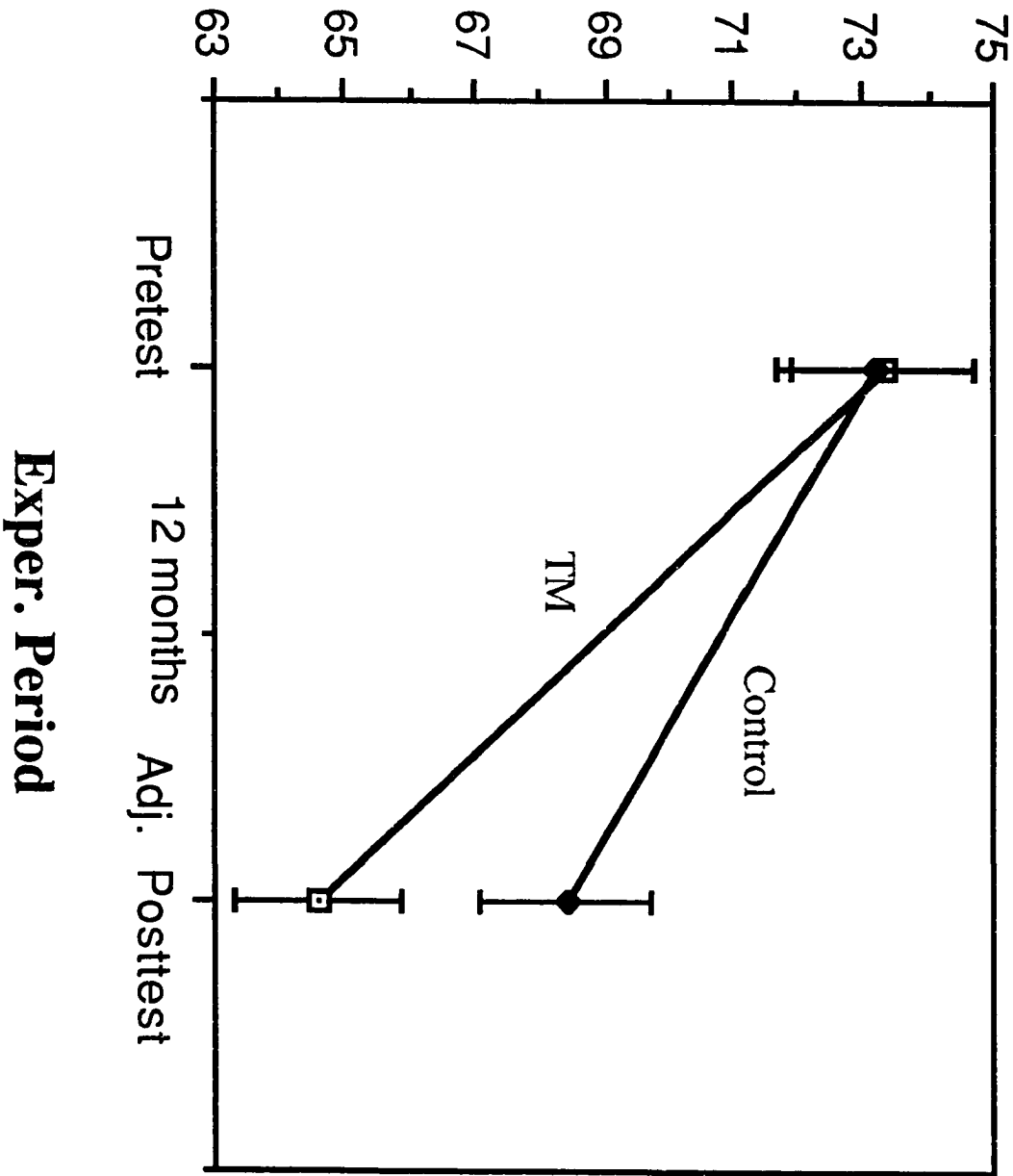


**Exper. Period**

**Figure 28**

**Change in Scores on Inspection Time over 12 Months--  
Study 3**

# Mean Scores (IT)

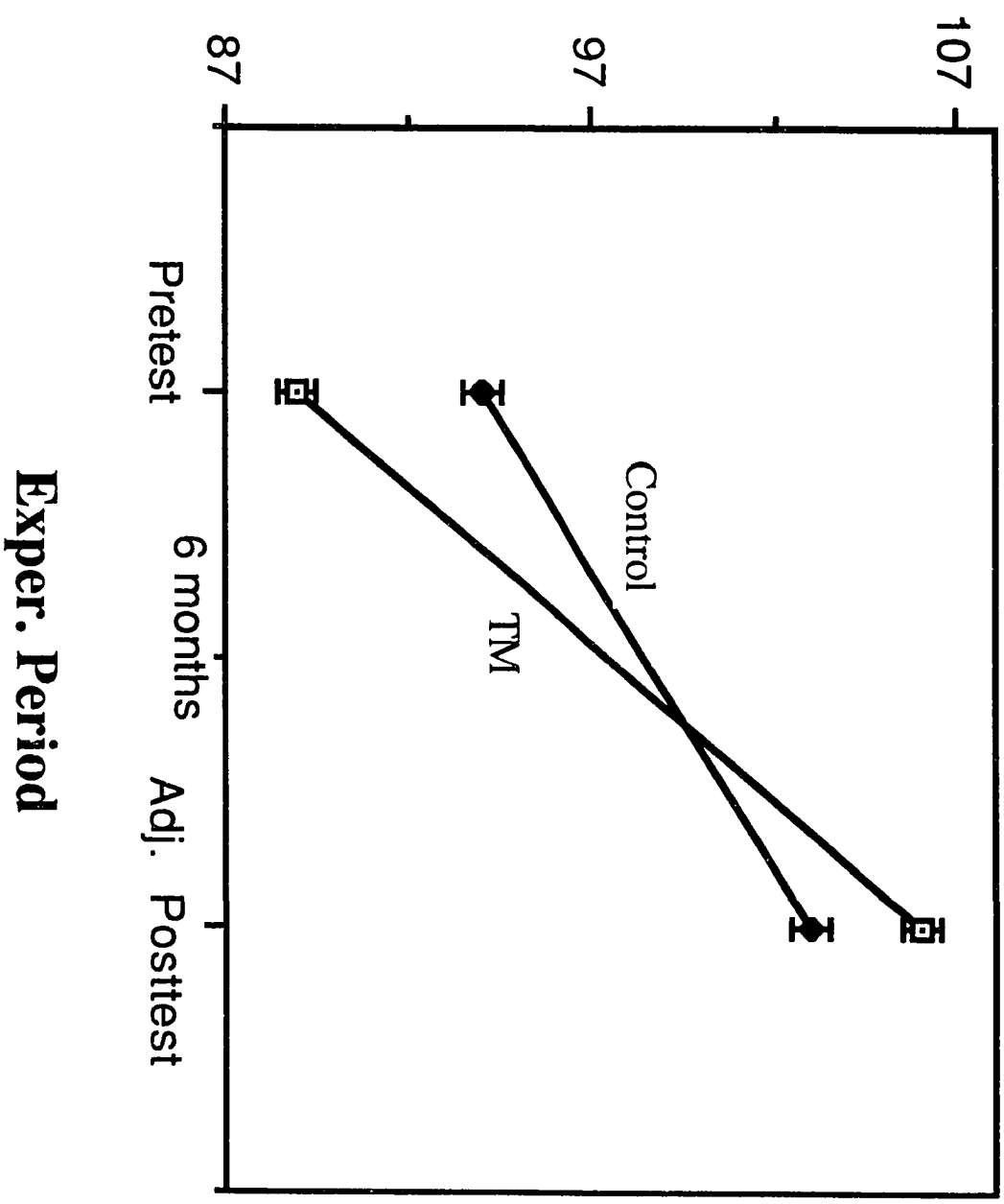


**Exper. Period**

**Figure 29**

**Change in Scores on Fluid Intelligence over 12 Months--  
Study 3**

# IQ Mean Scores (CFIT)



### Quantitative Synthesis of Three Experiments' Results by Meta-analytic Method

As seen from Tables 4, 6, and 8 of the first, second, and third studies respectively, factor analyses of the seven dependent measures showed similar loadings for pretest scores, eigen values, and percentage of total variance explained by the first six principal components. Although there were slight variations in the dependent measures loaded on the sequence of components among the studies, as well as CFIT loaded more heavily on the second than the other two studies, the overall patterns of loadings, eigen values, and percentage of total variance explained seem to be consistent with one another. These replications of the consistent patterns of factor loadings seem to suggest that the experiments were successful in capturing the designed broad range of different expressed intelligence values that were stable across different subject populations.

In addition, the overall results of Univariate Analysis of Covariance, by combining the results of the three individual experiments, also showed consistently significant values among the seven dependent measures as seen in Tables 5, 7, and 9. Using Stouffer's method (see Hunter and Schmidt, 1990) the F-Statistics of the three individual experiments were converted into T-Statistics by taking the square root of each the three experiments. Then the  $t$  values were added up and divided by the square root of the number of the studies ( $N = 3$ ) to obtain the standardized Z-Statistics,  $z$ . The  $z$  scores of each of the seven dependent variables in the three individual studies then yield the overall combined  $p$ -values for each of the seven respective experiments. The overall combined results are shown as follows:

For GEFT,  $z = 5.39$ ,  $p < .00000004$ ; for CFIT,  $z = 3.03$ ,  $p < .0015$ ; for State-Anxiety,  $z = 4.21$ ,  $p < .00001$ ; for Trait-Anxiety,  $z = 4.24$ ,

$p < .00001$ ; for IT,  $z = 3.48$ ,  $p < .0003$ ; for TCT-DP,  $z = 5.66$ ,  $p < .000000008$ ; and for CTI,  $z = 3.74$ ,  $p < .00009$ .

Table 10 presents the much *larger* overall significant results of the combined statistical  $p$ -values of the replications of the three individual experiments. In particular, CFIT, which did not show statistical significance in the first and second studies, became significant when the  $p$ -values of the three individual studies were combined. Similarly, State-Anxiety became statistically significant when the insignificant  $p$ -values of the second studies was combined with the significant  $p$ -value of the first and third experiments.

The reason why combining the experiments could yield significance when some of the individual experiments were insignificant is because all the studies should change in the predicted direction, and in many cases the results approached significance. When the experiments were combined, it took into account these facts--the consistency of the replications--and thus yielded significance.

The overall analysis of the three results seems to confirm the hypothesis that *holistic* intelligence could be developed when pure intelligence is *sufficiently* enlivened over a *longer* period of regular practice of the TM program. Note that in the third experiment, which was 12 months in duration, all the dependent variables were significant. When the longer experimental period in the third study was combined with the shorter experimental periods (6 months) in the first and second studies, the overall results of CFIT ( $p < .001$ ) and State-Anxiety ( $p < .00001$ ) from the combined  $p$ -values became statistically significant.



TABLE 10

Overall *P*-Values of Dependent Measures between the  
Experimental Group and Control Group(s)\*  
of all Three Studies

<b>TEST</b>	<b><u>P - V A L U E S</u></b>			
	<b><u>Study 1</u></b> (6 mo.)	<b><u>Study 2</u></b> (6 mo.)	<b><u>Study 3</u></b> (12 mo.)	<b><u>3 Studies Combined</u></b>
<b>GEFT</b>	<.005	<.02	<.00007	<b>&lt;.00000004</b>
<b>CFIT</b>	<b>.06</b>	<b>.23</b>	<.03	<b>&lt;.001</b>
<b>STAI (State)</b>	<.04	<b>.07</b>	<.001	<b>&lt;.00001</b>
<b>STAI (Trait)</b>	<.01	<.02	<.01	<b>&lt;.00001</b>
<b>IT</b>	<.05	<.05	<.05	<b>&lt;.0003</b>
<b>TCT-DP</b>	<.01	<.000003	<.0008	<b>&lt;.000000008</b>
<b>CTI</b>	<.05	<.02	<.04	<b>&lt;.00009</b>

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\*For a more meaningful assessment of the overall effect of the TM program, only control groups without intervention were considered and combined. For this reason, the Contemplation group was not included in the second study for the assessment of the overall effect.

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### **Overall Analysis of Six Factor Components of All Three Experiments**

Factor analysis established that there were six different factors which could be related to different expressions of multiple mental ability being measured, as originally designed in order to test the theory of the research study. By combining the data from the three experiments, results of the overall analysis of the six different factors showed different effect sizes for each test. An estimation of effect sizes is a meta-analytic procedure that allows the sizes of effect of variables across studies to be computed separately. The present analysis combined all six factors' components across the three studies in order to estimate the effect size for each of the six tests (see Hunter and Schmidt, 1990).

Table 11 presents the effect sizes of the six different tests of the three experiments in ascending order by comparing the TM experimental group with the control group.

After combining and averaging the effect sizes of the six different factors of the three experiments (as represented by M), the results showed that TCT-DP had the biggest effect size ( $M = .765$ ), almost twice as much as the smallest effect size of CFIT ( $M = .393$ ). The effect sizes of the other factors were IT ( $M = .46$ ), CTI ( $M = .498$ ), GEFT ( $M = .579$ ), STAI ( $M = .626$ ) expressed in ascending sequence.

Starting from the bottom in Table 11, the organization of the effect sizes of the six different factors in ascending order could be used to explain the size of effects of the TM program on levels of mind. Accordingly, meta-analysis suggested that the TM program has the greatest effects on TCT-DP and STAI respectively, which indicated in the proposed theory that the improvements on creativity and anxiety were most prominent.

In contrast, the TM program has the smallest effects on CFIT and IT respectively, which indicated in the proposed theory that the

improvements on abstract reasoning and efficiency of neurophysiology related to the speed of information processing did not change as much within the time frame of the experiment. For CTI and GEFT, the TM program showed intermediate effects.

To go one step further, these results suggest that the TM program has the greatest effects on the deepest levels of mind, as creativity and anxiety were hypothesized to be associated with the subtlest levels of feeling and ego of mind. This is because, as explained earlier, Maharishi's Vedic Psychology delineates the whole range of personality from subtle to gross, from ego to feelings, intellect, mind, senses, physiology, and behavior. The tests relating to these different levels were TCT-DP and STAI (ego and feelings), CFIT (intellect, mind, and senses), IT (mind, senses, and physiology), GEFT (intellect, mind, senses and ego), and CTI (behavior, ego, and feelings), as shown previously in Table 1, Chapter 13.

According to this theoretical basis, the TM program has relatively lesser effects on the more surface levels of mind. Abstract reasoning and efficiency of neurophysiology related to the speed of information processing were hypothesized to correspond to the grosser levels of intellect, mind, senses, and physiology.

Since both field independence and practical intelligence were hypothesized to be associated with both the subtle levels and gross levels of mind--ego, intellect, mind, and senses, as well as ego, feelings, and behavior respectively, the effect sizes seemed to confirm why the TM program has intermediate effects on them.

Taking the effect sizes for each factor as a whole, the results seem to confirm very well the hypothesis that the TM program was most effective in culturing the deepest levels of the mind. The other side of the confirmation was also true: the TM program has relatively less effect on the surface levels of the mind.

It should be mentioned that the more "surface" levels of the mind--meaning the intellect, mind, and senses--are only relative to the more subtle levels of ego and feelings. It may be argued that the

level of intellect is not the surface level in an absolute sense, and thus CFIT, which accesses abstract reasoning related to the intellect, is not the surface level. To resolve this dilemma, an alternative explanation, in terms of structural changes and style of psychological functioning, will now be discussed.

### *Structural Changes versus Style of Psychological Functioning*

IQ as measured by CFIT is known to be highly inheritable in the field of intelligence in modern psychology (see Scarr, 1981; Jensen, 1979, 1981, 1985; Bouchard and McGue, 1981; Wilson, 1983; Teasdale and Owen, 1984; Vandenberg and Vogler, 1985; McGue and Bouchard, 1990; McGue, Bouchard, Lykken, and Feuer, 1984; Vernon, 1987). As such, it depends more on structural changes in neurophysiological functions.

In this research, it has been explained earlier why IT (and CFIT), which were related to information processing, could be measures of neurophysiological intelligence. Principle components analyses in the first and third studies also showed that both IT and CFIT loaded in the same factor which could be labeled as physiological intelligence. Based on structural changes in neurophysiological functions, IQ is known to be very stable. It is, however, remarkable that the TM program can change, it as shown in this research.

Anxiety, on the other hand, depends on the style of psychological functioning. In other words, it is more psychological than physiological, structural change. It depends more on how the mind reacts to the environment. In these research studies, the environment was the same--same school, same Chinese students with similar background in respective studies. The control groups controlled for any change in environmental factors on pretest to posttest. Yet, the meditating students showed great improvement in anxiety. This means that how they interpreted the environment, and

reacted to it, changed. This style of physiological and psychological functioning is more "soft-wired" rather than "hard-wired" as IQ. This explains why the changes for anxiety as measured by STAI were faster and larger.

As mentioned in Maharishi's (1969) commentary on the *Bhagavad-Gita*, "Even a little of this dharma delivers from great fear" (p. 117). Experience of pure intelligence, or the *Tao*, has a stabilizing effect on the whole psychology. Happiness, inner peace, stable internal frame of reference, well-being, and all those positive qualities anchor the psychology in the absolute, non-changing field of pure intelligence. This process happens quickly, and thus Maharishi's *Bhagavad-Gita* also says "In this (Yoga) no effort is lost and no obstacle exists" (p. 117).

Gelderloos (1987), for example, found meditating students' psychological health, including autonomy, spirituality, creativity, well-being, and integration improved over as short as a period nine months. In addition, statistical meta-analysis of all available studies with 99 independent outcomes indicated that the effect of the TM program on reducing trait anxiety was approximately twice as great as that of concentration, contemplation, and relaxation techniques, including progressive muscle relaxation (Eppley, Abrams, and Shear, 1984; Dillbeck, 1977).

These scientific studies also suggested that meditators are able to develop a more flexible style of physiological and psychological functioning, and consequently begin to see the world in a more positive light soon after they have the first experience of pure intelligence.

In conclusion, test scores on all the six tests depend upon both the structural characteristics of the nervous system and the style of psychological functioning. Those measures which reflect psychological and state physiological effects, such as TCT-DP, STAI, GEFT, and CTI, changed most, while those measures which are more

indicative of structural changes, such as CFIT and IT would changed more slowly.

**TABLE 11****EFFECT SIZES OF SIX DEPENDENT MEASURES OF THREE EXPERIMENTS IN ASCENDING ORDER: TM Vs. CONTROL**

<b>Test</b>	<b>Experiment 1</b>	<b>Experiment 2</b>	<b>Experiment 3</b>	<b>M</b>
1 CFIT	.418	.325	.435	<b>.393</b>
2 IT	-.448	-.527	-.406	<b>.460</b>
3 CTI	.449	.619	.425	<b>.498</b>
4 GEFT	.640	.507	.590	<b>.579</b>
5 STAI	-.635	-.732	-.510	<b>.626</b>
6 TCT-DP	.564	1.182	.549	<b>.765</b>

## CHAPTER 17

### DISCUSSION

As presented in the last four chapters, the results of the three studies in all the experimental groups consistently showed significant improvements on almost all measures. They all appeared to confirm that the practice of Maharishi's Transcendental Meditation program improved measures that are associated with different aspects of intelligence. The significant results of the three studies rejected all the three null-hypotheses set out in this research.

#### Confirmations of All Three Alternative Hypotheses

First, the global improvements on different measures as indicated by Multivariates (Wilks' Lambda = .743,  $F(7, 105) = 5.20$ ,  $p < .0002$ ; Wilks' Lambda = .61,  $F(7, 77) = 6.9$ ,  $p < .000005$ ; Wilks' Lambda = .70,  $F(7, 90) = 5.48$ ,  $p < .00003$ ) of the three studies supported the first hypothesis that the practice of the TM program induced a holistic improvement of intelligence associated with the whole personality of a person. Based on this broad range of improvements, one can infer that there exists a unified, universal field of pure intelligence underlying the multiple expressions of intelligence. By enlivening this underlying field of universal intelligence, the multiple expressions of intelligence will be enlivened at the same time.

Table 5, Table 7, and Table 9 showed that the results of the experimental and control group differences of the three studies respectively were: 1) increased creative potential ( $p < .01$ ),



( $p < 0.00002$ ), ( $p < .008$ ); 2) increased practical intelligence ( $p < .05$ ), ( $p < .02$ ) ( $p < .04$ ); 3) increased field independence ( $p < .005$ ), ( $p < .02$ ), ( $p < .00007$ ); 4) decreased inspection time ( $p < .05$ ), ( $p < .05$ ), ( $p < .05$ ); 5) increased fluid intelligence ( $p = .06$ ), ( $p = .23$ ), ( $p < .03$ ); and 6) decreased state-trait anxiety that restricts intelligence development ( $p < .04$  and  $.02$ ), ( $p = .07$  and  $< .02$ ), ( $p < .001$  and  $< .01$ ).

Hunter & Schmidt meta-analysis also showed in Table 11 that for all three studies combined, the Transcendental Meditation groups improved more than controls on all experiments: TCT-DP ( $p < .000000008$ ), CTI ( $p < .00009$ ), GEFT ( $p < .00000004$ ), IT ( $p < .0003$ ), CFIT ( $p < .001$ ), and STAI (state  $p < .00001$ ; trait  $p < .00001$ ).

These results seem to suggest that pure intelligence not only unifies but simultaneously integrates and supports different values of mental potential which are broadly conceived in traditional Chinese cultures as wisdom or intelligence. These different values of mental potential were supported by principle components analyses for data from the six different tests, as presented in Table 4, 6, and 8, and as six distinct components for holistic intelligence as broadly conceived in the ancient Chinese wisdom and in the Vedic tradition.

The results taken together support the conclusion that the practice of the TM program promotes multiple improvements of creative intelligence in the Chinese, assessed by the multiple measures related to the different expressions of intelligence. The results also support the understanding from Maharishi's Vedic Psychology and the ancient Chinese view that intelligence is both unified and diversified. As such, it also clarified the issue of single versus multiple intelligences in Western psychology. Intelligence is both single and multiple.

Second, the results from the three studies also consistently showed that creativity and different aspects of intelligence improved

simultaneously. Based on the simultaneous improved performances of the students on TCT-DP and four to five other measures which were explained as related to different aspects of intelligence, one can refer that creativity and intelligence may have their common source in pure intelligence; creativity is an integral part of intelligence as the second hypothesis predicted.

Third, the studies also demonstrated that Maharishi's Transcendental Meditation program is a holistic technique which is capable of enlivening the deeper levels of mind, and is more holistic than the Contemplation technique used in this research. This seems to be confirmed in the second experiment in which the TM group, but not the Contemplation technique group, showed statistically significant changes over the control group in TCT-DP, STAI, and CTI. These tests were all hypothesized to be associated with the more subtle and holistic structures of self and feelings of the individual.

This point can be further illustrated in Table 12 which summarizes the significant  $p$ -values of the seven independent measures among the TM group, Contemplation technique group, and control group at a glance. An examination of the magnitude of changes of  $p$ -values between the TM versus control groups and TM versus Contemplation technique group suggests that the TM technique induced a more profound improvement especially over TCT-DP and STAI. It can be seen in Table 12 that the TM group showed highly significant results (in bold types) on TCT-DP over both the Contemplation technique group and the control group. In addition, the TM group also showed highly significant results over the Contemplation technique group.

An examination of the mean scores between the pretests and posttests among the three groups also showed that the Contemplation technique group increased rather than decreased on both state and trait anxiety even more than the control group.

TABLE 12

**Summary of Statistical Significance of TM, Contemplation  
and Control Groups--Study 2**

<u>P-VALUES</u>			
<u>TEST</u>	<u>TM vs Control</u>	<u>TM vs CT</u>	<u>CT vs Control</u>
<b>GEFT</b>	<.02	.75	<.05
<b>CFIT</b>	.23	.82	.31
<b>IT</b>	<.05	.49	.18
<b>TCT-DP</b>	<b>&lt;.00002</b>	<b>&lt;.0000001</b>	.17
<b>STAI(State)</b>	.07	<b>&lt;.0005</b>	.11
<b>STAI(Trait)</b>	<.02	<b>&lt;.0007</b>	.33
<b>CTI</b>	<.02	.28	.18

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Note CT: Contemplation Technique

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These results confirmed the hypothesis that the TM technique is more effective than the Contemplation technique in unfolding the source of pure intelligence, which in turn naturally enlivens the more subtle and holistic structures of self and feelings. Although the Contemplation technique has also been described as a "natural, effortless procedure" which was supposed to induce the mind to "a state of deep relaxation" and ultimately to "experience the Tao," the fact that "meaning" was involved in the practice might have kept the mind on the thinking level. Consequently, with the Contemplation technique, it might not be as easy to transcend mental activities to experience the source of pure intelligence, as explained by Maharishi (see Russell, 1976).

In short, the difference in terms of easiness of transcending may explain the group differences in results in unfolding the holistic values of intelligence in this research. The results in this research are also consistent with previous research on comparing the effectiveness of the TM program with other techniques. For example, a statistical meta-analysis of all available studies with 99 independent outcomes indicated that the effect of the TM program on reducing trait anxiety was approximately twice as great as that of concentration, contemplation, and relaxation techniques, including progressive muscle relaxation (Eppley, Abrams, and Shear, 1984; Dillbeck, 1977). Another exhaustive statistical meta-analysis of all existing studies (42 treatment outcomes) on the effects of the TM program on self-actualization indicated that the effect size of TM on overall self-actualization ( $ES = .78$ ), is approximately 3 times as large as that of concentration and contemplation techniques (.26) and relaxation (.27) (Alexander, Rainforth, and Gelderloos, 1991).

Furthermore, as explained in the previous chapters, the holistic results of Maharishi's TM technique can be explained by the fact that it is very effective for an individual to transcend all mental activities to ultimately experience the source of thoughts through its natural and systematic procedure. As a result, it gives a more profound

enlivenment of pure intelligence which is associated with the source and deeper levels of the conscious mind. This is confirmed by the effect sizes of the three experiments presented in Table 11. The TM program has the greatest effects on the deepest levels of the mind, feelings and ego, as indicated by the largest effect sizes ( $M = .765$  and  $.626$ ) on creativity and anxiety. It has relatively smaller effects on the surface levels of intellect, mind, senses, and physiology as indicated by the smaller effect sizes ( $M = .393$  and  $.46$ ) on abstract reasoning and efficiency of neurophysiology related to the speed of information processing (refer to Chapter 20).

The holistic nature of Maharishi's TM program shows that it is a practical, reliable, and scientific means to fulfill the Chinese traditional view of holistic intelligence. In addition, it also gives us a vision of the broad range of full human potential when holistic intelligence is unfolded through the practice of an effective technique like Maharishi's Transcendental Meditation program.

### **Consideration of Threats to Validity**

*Study 1.* There may be a concern that potential confounds related to performance on IQ tests and other measures, such as level of interest in meditation, subject's age, subject's education level, father's education level, and father's annual income, may be responsible for the significant results of the intelligence tests. The "double blind" research design, combined with "random assignment" into groups in the experiment, should have ruled out other alternative explanations and biases of the results.

In addition, many of the variables known to be correlated with intelligence, such as subject age, education level, and socio-economic level, are not potential confounds because the subjects were highly similar on these variables. Before random assignment into groups, all the student subjects were purposely selected by the teachers of the

school by considering comparability of the students in these classes. The students compared were on the same level of education, and thus their age and education were the same. They were all within a year or two of the same age (16 to 17) and all in the same level or class in school. Surveys from their teachers also showed that their fathers' education level and annual income were by and large similar, mostly around junior high school education level and from the middle-lower class. Moreover, all subjects in the experimental and control group were interested in learning the TM program.

The research was double blind in that both the students and the persons who administered and scored the tests were not informed what were the measures were supposed to test. Neither were they informed that the testing was part of a research in meditation. The scorers of the tests did not know the relationship between the tests and the treatment groups. The selected subjects all took the pretest before they were randomly assigned into the TM group or the control group. Thus, even the researcher himself could not bias or favor which subject went to which group.

In addition, the "double blind" design also controlled for reactivity or compensatory equalization of treatments, compensatory by experimenters.

According to research methodology, random assignment controls for all confounds to internal validity except attrition. But attrition should not be a confound because there were only 5 students altogether who attrited from the study; 1 to 2 from each group. Compared to the 155 total subjects' size, the attrition rate was minor. In addition, according to the teachers, the attrition of the students were due to unexpected, random absence from different classes. Thus, it is reasonable to exclude attrition as a factor that would have caused significant change in test scores between the experimental group and the control groups.

Random assignment also eliminated regression to the mean. Multivariate Analysis of Variance of pretest scores can verify that

random assignment worked. MANCOVA among groups showed that the three groups were not significant different: Wilks' lambda = 0.964;  $F(7, 106) = .505$ ,  $p = .783$ ; between the TM and control group: Wilks' lambda = .984 and the  $F(7, 106) = .252$ ,  $p = .970$ ; between the TM group and no-interest group: Wilks' lambda = 0.919 and the  $F(7, 106) = 1.336$ ,  $p = .241$ .

There was also no significance difference between the control group and the no-interest group as shown in Wilks' lambda 0.912,  $F(7, 106) = 1.466$ ,  $p = .187$ .

*Study 2.* As in study one, the concerns about the potential confounds related to performance on IQ tests and other measures that may be responsible for the significant results can also be ruled out in this study. This is due to the "double-blind" research design together with "random assignment" by class into group. Although the random assignment by class is not as rigorous as by student, the classes were selected on purpose by the school teachers on a comparable basis. The students compared were on the same level of education, and thus their age and education were almost the same. Surveys from their teachers also showed that their fathers' education level and annual income were by and large similar, mostly around high school education level and from the middle class.

Their similarities were also shown in Multivariate Analysis of Variance of pretest scores among the TM group, control group, and Contemplation technique comparison group: Wilks' lambda was 0.914 and the F-statistic was 1.046 ( $p = .407$ ,  $DF = 7, 78$ ). Wilks' lambda between the TM group and control group was .908,  $F = 1.130$  ( $p = .353$ ,  $DF = 7, 78$ ); Wilks' lambda between the TM group and Contemplation technique group was .903,  $F = 1.199$  ( $p = .314$ ,  $DF = 7, 78$ ); Wilks' lambda between the Contemplation technique group and control group was .882, F-statistic 1.492 ( $p = .183$ ,  $DF = 7, 78$ ). As shown, the three groups were not significantly different from one another in terms of their performance in the pretests.

In addition, there was no regression towards the mean because the control group as well as the Contemplation technique group both started at a similar level with the TM technique group and did not show any significant improvement on the measures as the experimental group did. Furthermore, in the TCT-DP measure, the experimental group even started at a higher level than the control group and the Contemplation technique group ( $p < .01$ ) and gained even higher scores than the other groups in this test.

Attrition as a possible threat to internal validity does not seem likely either. There was only attrition by one subject in STAI in both the experimental group and control group; there were three attritions in STAI and two in CTI in the Contemplation technique group. Compared to the total subject size of approximately 40 in each group as well as no attrition in other measures, the attrition rate can be considered insignificant. In addition, according to the teachers, the attritive students in each group were due to unexpected or random absences from class. Thus, it is reasonable to exclude that the significant changes in test scores were caused by the potential confound of attrition.

*Study 3.* A similar concern about the potential confounds related to performance on IQ tests, and other measures that may be responsible for the significant results, can also be ruled out in this study. This is due to the "double-blind" research design together with "random assignment" by class into group. Similar to the previous study, although the random assignment by class is not as rigorous as by student, the classes were selected on purpose by the school teachers on a comparable basis. The students compared were on the same level of education, and thus their age and education were almost the same. Surveys from their teachers also showed that their fathers' education level and annual income were similar, mostly around primary school education level and from the middle-lower class.



Their similarities were also shown in Multivariate Analysis of Variance of pretest scores between groups: Wilks' lambda .934,  $F = .920$  ( $p = .495$ ,  $DF = 7, 97$ ). The two groups were not significantly different from one another. Hence, they were similar to begin with.

There was no regression towards the mean because the control group started at a similar level to the TM technique group, and it did not show any significant improvement on the measures as the experimental group did.

Unlike the other two studies, there was no attrition in this study, and thereby attrition did not pose a threat to internal validity. The zero attrition rate was due to the "make-up posttest session" designed for any students who happened to be absent from school when the posttest was conducted. It is true that this "make-up posttest session" might be different from the formal posttest session and might have thereby posed a threat to internal validity. But the fact that the "make-up" was composed of both students from the experimental and control groups should have "evened out" any possible confounds to internal validity.

### **Strengths of the Research Studies**

Firstly, random assignment of subjects to group would control for most, if not all, of the plausible confounds. The three studies, especially the first one, were true experimental designs. Combined with the longitudinal design, the random assignment of the research studies are rare in the field of social science.

In addition, in the previous seven longitudinal studies on intelligence and creativity with the TM program, three of the studies did not have a control group. As revealed in present studies, some of the tests such as CFIT and GEFT are highly susceptible to "practice effect." Furthermore, all the seven previous studies did not have random assignment to group. The experimental rigor of the first

random assignment of the current research studies is an extension of the previous research and has thus strengthened the findings on the benefits of the TM program in the related areas.

Secondly, the methodology of the proposed studies was further strengthened by other conceivable means, such as "blind" design for the subjects and testing administrators, independent scorers, as well as preventing "practice effect" and "carry-over effect" to control for plausible confounds. Accordingly, these rigorous design processes, combined with random assignment, have given the current research studies greatly significant value in internal validity.

Thirdly, three replications of the results among students from different backgrounds, at different locations, with different designs, together with the consistency of results as well as meta-analysis of the three results would not only strengthen the theory of the current studies, but also support a causal interpretation of the results. In these three studies, construct validity, internal validity, external validity, statistical conclusion validity, and even reliability of the research, were simultaneously strengthened.

Fourthly, the current studies simultaneously adopted six testing instruments to assess the holistic nature of creativity, intelligence, and Maharishi's TM technique. Since the different measures had been able to capture different expressions of intelligence, the study more completely and solidly verified the effects of the TM program, as well as broadening the understanding of intelligence and creativity.

To conclude, the current studies were probably the most rigorous studies on intelligence and creativity ever done. The rigorous methodology employed in this research will once again disprove the major criticisms of the American National Research Council (NRC) on TM research. In the "Key conclusions" of the NRC's review of research on meditation (Durckman and Bjork, eds., 1991, *In the mind's Eye: Enhancing Human Performance*, pp.120-133), for example, it was concluded that "experimental work [on meditation] to

date is characterized by weak designs: a lack of control for subject selection, experimenter biases, expectancies, and atmosphere effects." In response to these criticisms on experimental rigor, the current research adopted a true experimental design--random assignment, longitudinal design, and three replications. In addition, the subjects, test administrators, and test scorers were blind to the purpose of the experiment. As such, it has eliminated the possible confounds of subject selection, experimenter biases, expectancies, and atmosphere effects mentioned by the NRC.

Furthermore, the NRC's recent review of research on meditation (Druckman and Bjork, eds., 1994, *Learning Remembering, Believing: Enhancing Human Performance*, pp. 230-248) concluded that "it is not clear whether the positive effects observed in TM are due to the specific effects of the unique features of TM or to the frequency and discipline with which TM is practiced."

With reference to this question, the second study of the current research on the TM technique and the Contemplation technique has also helped to clarify the issue. The teachers of the school surveyed that both the TM technique group and the Contemplation technique group had practiced their respective program regularly in class in the morning and approximately 85% at home in the evening. The experiment was also conducted under the same "atmosphere" in school. The TM group, however, showed significant improvements on four dependent measures over the Contemplation technique group. Based on these results obtained from the similar experimental conditions, the effectiveness of the TM technique was once again strongly supported.

Last but not least, the NRC also called for more research in applied areas and performance (p.126) but gives no acknowledgment of many studies that have been conducted on enhancing personality and cognitive/affective development through meditation. The current research on holistic intelligence was "performance-oriented" that had been "applied" to a very important area of life, the field of

education. In studying the holistic unfoldment of intelligence, the current research study has also touched upon the full range of personality from ego, feelings, intellect, mind, and senses, to physiology and even behavior. All these are solid evidence that are opposite to the NRC's judgement.

### **Shedding Light on the Issue of "Nature" versus "Nurture" in Relation to Intelligence**

In addition to confirming the three alternate hypotheses, the results also empirically suggest that holistic intelligence can practically be developed and unfolded, and thus help to resolve the dilemma of "nature" versus "nurture" in relation to intelligence.

The dilemma of primacy of heredity or environment on intelligence has been a topic of intense argument in modern psychology since the beginning of 20th century. Research which supported primacy of heredity suggested that genetic factors accounted for approximately 50% to 70% of individual differences in intellectual abilities and personality traits (Scarr, 1981; Jensen, 1979, 1981, 1985; Bouchard and McGue, 1981; Wilson, 1983; Teasdale and Owen, 1984; Vandenberg and Vogler, 1985). McGue and Bouchard (1990) further showed that genetic differences accounted for approximately half of the variance in verbal reasoning, spatial ability, and tests on perceptual speed and accuracy. In addition, since measures of "g" are primarily measures of heredity-determined factors of intelligence, the strong correlation between speed measures and measures of "g" showed by McGue, Bouchard, Lykken, and Feuer (1984), and (Vernon 1987) also gave support to genetic differences in speed component of intelligence. Based on these and other similar results, some theorists have thus concluded that intelligence cannot be improved. In response to this assertion, other psychologists who believed that learning experiences are more

important in influencing intelligence have challenged the heredity-determined view with evidence of environmental influences.

Based on the theories of Maharishi's Vedic Psychology and the knowledge of the ancient Chinese tradition, the present research suggests that both nature and nurture interact and influence intelligence. Intelligence, however, can be developed, as indicated by the significant improvements on a broad range of mental tests. The dilemma exists only because both a comprehensive theory of intelligence and a practical means to unfold it have been lacking. Both Maharishi's Vedic Psychology and the traditional Chinese theory construct a holistic foundation by suggesting that there exists a unified source of pure intelligence which integrates and supports other expressed values of intelligence such as reasoning, perception, and other intellectual abilities. In addition, this research further indicates that this holistic intelligence can be unfolded through a direct experience of pure intelligence through a technology of developing consciousness, such as the TM technique.

By directly experiencing and enlivening the most enriching "inner environment" of pure intelligence (as discussed in Chapter 5), different values of intelligence can be developed. The conclusion is that although one may be born with a certain level of intelligence which is "genetically determined" at birth, the full potential of creative intelligence can still be "cultured" through the most profound direct experience of pure consciousness. The empirical findings of this dissertation thus shed light on the dilemma of "nature" versus "nurture" in relation to intelligence.

### **Validation of Five Conditions of Chinese and Maharishi's Vedic Theories on Holistic Intelligence**

In terms of the five necessary conditions of a complete theory of intelligence proposed in the introduction of the dissertation, the

experimental results presented in the last four chapters have also supported both the Chinese and Vedic theories as explained in the "integrated approach to intelligence" in Chapter 12.

(1) The source and very essence of intelligence is pure consciousness, pure intelligence, or the *Tao*. By virtue of its intrinsic nature of being fully awake, pure consciousness is also the source of creativity which (2) manifests into different modes of intelligence and expresses itself into different levels of inner or subjective mental processes, including thought and feelings, as well as into outer or objective existence such as is seen in the intelligence of the physiology and behavior.

(3) Therefore, holistic intelligence is not separated from but is integrated with daily behavior which may be termed as practical intelligence. Based on this complete knowledge of the full range of intelligence and the availability of a practical means to experience pure intelligence or the *Tao*, (4) this dissertation has attempted to design three testable and replicable research studies to access the holistic nature of the Vedic and Chinese concepts of intelligence. (5) The results suggested that intelligence is able to be developed when a holistic knowledge of intelligence which includes a direct experience of the full range of intelligence is available through Maharishi's Vedic Psychology.

To recapitulate, the complete knowledge that is able to account for the source and the essence of intelligence, psychological phenomena and processes, everyday intelligence, together with a testable theory which is also capable of developing intelligence, makes the Chinese and Maharishi's Vedic theories of intelligence holistic and comprehensive.

### **Answering Three Basic Questions of Intelligence**

While meeting these five conditions of a holistic study of

intelligence, the three basic questions of (1) what is intelligence, (2) how can it be measured, and (3) how can it be developed, were also answered.

The first and third questions of what is intelligence and how can it be developed have been explained in the previous sections. In regard to the second question of how intelligence can be measured, this dissertation has suggested that multiple measures are needed in order to assess the holistic expressions of intelligence. Principle component analyses of the six dependent measures conducted in the three experiments, for example, supported that there are multiple intelligences expressed from a universal source of pure intelligence when this unified source is enlivened through the TM program. These multiple intelligences were suggested in the five to six distinct components that emerged from the factor analyses of the three studies presented in the Result section in Chapter 16.

Nevertheless, the six aspects of intelligence researched in this dissertation are by no mean exhaustive. It is also important to recognize that there is still a broader range of intelligence than just these six components uncovered by the measures used in this research. Gardner (1983), for example, has also proposed at least six distinct kinds of intelligence, as mentioned in Chapter 2 of this dissertation. Two kinds of intelligence, such as musical and bodily-kinesthetic intelligences, for example, were not studied in the present research.

After all, it seems impossible to study all different aspects of intelligence, because both Maharishi's Vedic Psychology and the Chinese tradition consider all forms and phenomena in nature as expressions of pure intelligence, the Tao, the intelligence of nature. In other words, there will be unlimited aspects of intelligence to study as innumerable laws of nature are expressed in nature. This research, however, provided a framework of how holistic intelligence is expressed in terms of the whole of the personality. By assessing

different levels of the personality, the holistic expressions of intelligence were brought under consideration..

In addition, the over 500 studies on Maharishi's Transcendental Meditation and TM-Sidhi program have covered an even wider range of intelligence in a very broad sense. In addition to mental abilities, this research has also studied the TM program in relation to such areas as athletic performance (e.g. Reddy, Bai, and Rao, 1974), health (e.g. Orme-Johnson, 1987) and other areas, and showed significant results in all of them.

### **Validation on Multiple Intelligences**

In relation to the five or six components uncovered in this research, however, the fact that each of the five or six components accounted for a large amount of variance relative to one another seems to suggest that these multiple expressions of intelligence are equally important. This also means that there were indeed different modes of intelligence as predicted by the theories of the Chinese concept of intelligence as well as by Maharishi's Vedic Psychology.

The five or six components--STAI, CTI, TCT-DP, GEFT, IT, and CFIT--seemed to provide a very clear validation for the existence of multiple intelligences which could be called or which have been called herein *experiential* intelligence, *practical* intelligence, *creativity*, *contextual* intelligence, *physiological* intelligence, and *intellectual* intelligence respectively. Although these different terms of intelligence were borrowed from modern psychologists, such as Epstein and Meler (1990) and Jellen and Urban (1989), they describe different aspects of mental ability that predicted by the proposed theory of the Chinese concept are similar to those of intelligence presented in this dissertation. In CFIT, for example, although the loading was not as heavy as the other components, its distinct



existence as the sixth component did suggest that abstract, analytical thinking is an important aspect of *intellectual* intelligence.

### *CFIT and IT*

The fact that CFIT and IT loaded together in the first and third studies, however, suggests that CFIT and IT are somehow related to each other. Although IT was hypothesized to assess physiological intelligence in this research, it is also a test of information processing which involves senses, mind, and intellect according to the theory of Maharishi's Vedic Psychology. Accordingly, it was not surprising that IT has also to do with the intellectual aspect of intelligence. Thus, its loading together with CFIT might only suggest that they both have to do with cognitive aspects of intelligence. The mixture of loadings also seems to suggest that in order to measure physiological intelligence more clearly, a better or more appropriate measure, which is designed for biologically-based intelligence, is needed for future research. After all, it may not be possible to have a "pure" test of biological intelligence because any test will invariably measure the intellect, senses, and other levels of mental ability.

One more consideration, however, is that some technical problems of the IT instrument happened during the testing processes in the studies as mentioned in the Method section in Chapter 15. The computers were out of memory from time to time in the middle of the test. The subjects had to start all over again. This problem might have either distracted the subjects' attention or exaggerated the practice effect. Although the technical problems do not immediately invalidate the significance of the results due to the random assignment and control group design employed in the research, the problem, however, does pose a serious concern over the accuracy of the correlations with other measures.

Given the results between CFIT and IT, as they were, in this dissertation, the correlations between .5 to .6 seem to be consistent

with the previous research (e.g. Zhang, 1991, Nettelbeck and Wilson, 1972; Nettelbeck and Lally, 1976; Nettelbeck, 1982; Brand and Deary, 1982; Anderson, 1986; Longstreth, Walsh, Alcorn, Szeszulski and Manis, 1986); Nettelbeck, Edwards and Vreugdenhil, 1986; Nettelbeck, 1987; Deary, Caryl, Egan and Wight, 1989). Assuming that the correlations in this research were correct, the results seemed to suggest that IT could be a good correlate of intellectual intelligence.

### *CFIT*

CFIT did not show statistical significance in the first two studies. In the first study, the experimental group increased approximately 8 IQ points (from 100 to 108) while the control group gained 3 points (from 100 to 103) and the no-interest group remained unchanged (at 104) on CFIT in six months. In the second study, the experimental group gained approximately 15 IQ points (from 91 to 106) and the control group gained approximately 11 IQ points (from 94 to 105) while the Contemplation group rose only 5 IQ points (from 98 to 103) on CFIT in six months. Even though the differences among the groups were not significant, the results of the first two studies were in the predicted direction.

In addition, the vocational students in the experimental group showed significant improvement on CFIT after one year's practice of the TM program in the third study. The TM group gained 17 IQ points (from 89 to 106) while the control gained 9 IQ point (from 94 to 103) on CFIT. Furthermore, when the three studies were combined, CFIT also became significant as a whole, ( $p < .001$ ). The different results of all the three studies seem to suggest that time is the crucial factor for significant changes to take place. The longer the time of practicing the TM program, the more improvements on fluid intelligence showed as measured by CFIT.

From the results of the three studies, it is clear that "practice effect" was responsible for a significant part of the overall improvements of all the groups. Otherwise, the control group's gain

of 3 to 9 IQ points within a 6 to 12 months' period seems difficult. This showed that control group design is indispensable for pretest-posttest research studies in general. These research studies feature not only the control group design, but also the first random assignment study of the effect of the TM technique on intelligence and have significantly strengthened and extended the previous TM research on intelligence.

From another perspective, the results on CFIT in these three studies taken together seem to be consistent with the previous findings on the effect of the practice of the TM program on intelligence. Previous research showed that improvement on abstract reasoning requires a longer period time practicing the TM program before any significant change can be seen on CFIT. Aron, Orme-Johnson, Brubaker (1981) and Dillbeck, Assimakis, Raimondi, Orme-Johnson, and Rowe (1986), for example, found that it took four years in long-term meditators to gain 8 points and 9 points on CFIT respectively. Similarly, Cranson (1989) found that international students who were also long-term meditators gained 4 points on CFIT with the practice of the TM program in 2 years.

Although improvements on fluid intelligence as measure by CFIT were apparently faster and greater in the present studies in relation to the "longer time" required for significant changes on CFIT, they were consistent with all the previous research on the TM program's effect on intelligence.

This faster and greater improvement in the ability to think logically in high school students relative to college students (over 20 years old) in the previous research (see Cranson, 1989) might confirm the investigator's speculation that the younger students (mean age 17.5 years and below) may be able to improve on fluid intelligence within a shorter period of time due to greater flexibility of their nervous system.

The faster and greater unfoldment of fluid intelligence in high school students with the practice of the TM program is also

supported by two other previous studies in which the Raven Progressive Matrices were used for testing fluid intelligence. Similar to the present three studies, the high school students who were new TM meditators showed an increased non-verbal, fluid intelligence in as short a time as 14-weeks (Shecter, 1978).

In addition, Tjoa (1975) found that university students and adults who were also new practitioners of the TM program improved on figural reasoning as measured by Raven Progressive Matrices over a 16-month period. More importantly, Tjoa found that the more regular the subjects were in their meditation, the greater was the increase in intelligence. Accordingly, the regularity in the practice of the TM program among the high school students in the present studies seem also to explain the faster and greater increase in fluid intelligence.

#### *Need for Holistic Measures*

Paradoxically, by comparing the speed of improvements on CFIT to other measures in the same experiments, the relatively slow improvements on CFIT seem to support the investigator's assertion that more holistic measures were necessary if the "holistic concept" of intelligence were to be accessed more clearly. Had other measures that were hypothesized to be associated with deeper levels of mind not been used at the same time, the first two studies would not have detected the other subtle aspects of improved intelligence, such as field independence, practical intelligence, and experiential intelligence, of the Chinese students. Although the same possible problem of CFIT may also apply to other people from other cultures, it seems particularly important for the present research because the Chinese people are said to have the tendency to show a characteristic of "holistic thinking" due to cultural influence (see Introduction, Chapter 9 and 10). For the future, it should make an interesting

research topic to compare the patterns of development of intelligence based on different levels of mind across cultures.

There is another important implication regarding the need for holistic measures in this research. The results seem to suggest that the TM program could be a very effective technology of consciousness in unfolding the deeper and thereby more holistic value of intelligence. This can be seen in the consistent, and significant improvements of intelligence shown in STAI, CTI, GEFT, and TCT-DP which are all associated with the deeper levels of mind, such as feelings and self (see Figure 19, 10, Table 1, and Chapter 13).

On the other hand, the findings indicate a smaller improvement of intelligence associated with the grosser levels, such as senses, thinking mind, and intellect, of mind on CFIT and IT. Meta-analysis of all three studies on six different measures showed that the effect sizes of CFIT ( $M = 3.93$ ) and IT ( $M = 4.60$ ) were smallest; CFIT, for example, is approximately one time smaller than TCT-DP ( $M = 7.65$ ) (see Table 11, Chapter 20). These results seem not only to suggest that the TM program is capable of inducing a profound or holistic unfoldment of intelligence, but also to imply that some holistic measures are needed in order for the full appreciation of the holistic nature of intelligence and the TM program. This once again confirmed the necessity of the holistic measures proposed in this dissertation.

### **Extending Previous Research on Holistic Intelligence on Outer Fulfillment**

To further the point on a holistic theory of intelligence, the significant results showed on CTI and TCT-DP also fulfilled Cranson's (1989) suggestion that a measure of "practical intelligence" and a more "holistic measure for creativity" are needed to assess more "abstract levels of mind" brought out in the introduction of this

dissertation. In addition to extending the previous research on holistic measures of intelligence, both CTI and TCT-DP seemed to serve well in validating the Chinese concept of holistic intelligence.

In addition, the significant results on measuring practical intelligence by CTI, as well as physiological intelligence by IT, have also confirmed the Chinese concept of "outer fulfillment" as an important ingredient of being intelligent as an integrated person.

### **Validation on Inner Enlightenment**

The results shown by GEFT and STAI were also consistent with the previous research that the TM program is an effective means to develop the integrated ability of field independence and to reduce stress, anxiety, and fear (see Chapter 12, 13) that restrict the unfoldment of intelligence. In this dissertation, the significant results of these measures are particularly interesting with regard to the concept of "inner enlightenment" from the Chinese tradition and Maharishi's Vedic Psychology. This involves the unfoldment of contextual intelligence and experiential intelligence in terms of the ability to see the parts within the whole, maintaining a stable internal frame of reference, as well as developing a more stable self devoid of fear and anxiety.

In the reduction of anxiety, the TM subjects in all the three studies showed significant improvements while the control subjects showed an increased anxiety level. Compared to the norm for high school students and working adults, the TM subjects in the three studies showed the following improvements:

The first study involved senior high school students, both male and female, of mean age 16.5. Both the experimental and control groups were ranked in the top 82% in state anxiety level and in the top 88% in trait anxiety level; the no-interest group was ranked in the top 80% in state anxiety level and 88% in trait anxiety level.

After six months practicing the TM program, the TM group *dropped* to the 78th percentile in state anxiety level and the 85th percentile in trait anxiety. The control group, on the other hand, *rose* to the top 85% in state anxiety level and 95% in trait anxiety level. The no-interest group also *rose* to the top 85% in state anxiety level and 92% in trait anxiety.

Similar contrasts between the experimental group and controls also showed in the second study in which junior high school female subjects of mean age 14.5 were involved. The experimental group *dropped* from the 78th to the 73rd percentile in state anxiety level and from the 89th to the 83rd percentile in trait anxiety level. The control group, on the other hand, *rose* from the 79th to 82nd percentile in state anxiety level and remained unchanged for trait anxiety at the 93rd percentile. Similarly, the Contemplation group *rose* from the 84th to the 88th percentile in state anxiety level and from the 92nd to the 93rd percentile in trait anxiety level.

In the three studies, more reduction of anxiety was shown in the vocational students who were all male with mean age 17.5. The TM group dropped from the 90th to the 80th percentile in state anxiety and from the 95th to the 92nd percentile in trait anxiety. The control group, on the other hand, remained unchanged in state anxiety level at the 91st percentile while trait anxiety level rose from the 94th to the 96th percentile.

From these data, it is obvious that the level of anxiety among the high school students in Taiwan was very high. The fact that the anxiety levels in most of the control groups even increased more in the posttests might be related to the pressure of examination at the end of the semester when the posttests were conducted in all the studies. Before the research studies were conducted, the author had been told by the school principals that anxiety was found to be very detrimental to health and learning ability of the students in general. The different results shown between the experimental group and

controls clearly indicate that the TM program is an indispensable tool for education today.

Taking a positive perspective to the development of holistic intelligence, since maintaining a stable internal frame of reference was hypothesized as an indication of moving in the direction of "enlightenment," it was very inspiring that the Contemplation technique group in the second study also showed significant improvement on GEFT compared to the control group. It is, however, interesting to question why only GEFT showed significance but not the other measures in the same study.

One plausible explanation, as mentioned before, is probably because GEFT involves a cognitive factor and the Contemplation technique gave more enlivenment on the thinking level and less enlivenment on the deeper levels of feelings and ego which were supposed to be better assessed by other measures such as TCT-DP and STAI. The fact that IT, which also involves the more surface levels of the mind, such as the senses and mind, was not significant in the Contemplation technique group should have refuted this explanation.

Another plausible explanation may be simply that the significant improvement on the GEFT score might have happened randomly, especially when the  $p$ -value at .046 only showed marginal significance.

A more logical alternative explanation, however, may be more consistent with the proposed theory that the Chinese tend to be dominant in "contextual thinking" which is associated with field independence measured by GEFT as mentioned in Chapter 10. If the theory was right that the Chinese are especially good at "disembedding" information from a context, then it may be easier to enliven that contextual aspect of intelligence in the Chinese students even without a profound unfoldment of the source of pure intelligence.



This was evident from the magnitude of change in scores compared to the baseline as well as to other measures. Compared to the baseline, the TM groups improved the mean score almost 100% (from 3.7 to 7) in the first study, almost 25% (from 3 to 3.9) in the second study, and almost 85% (from 3.5 to 5.95) in the third study. The overall average change of mean scores of over 70% of GEFT is the largest improvement compared to other measures in all studies.

Compared to the norms obtained in the United States, the students from first and third experiments ranked the upper end of the *first* quartile in the pretest. In the posttest, the TM groups then improved to reach the *third* quartile in the first study, and to reach the *upper end of the second* quartile in the third study. The students from the second experiment improved from the middle level of the first quartile in the pretest to the upper end of the first quartile in the posttest.

These improvements on GEFT could be interpreted as reasonably impressive for two reasons. First, since norms from high school students are not available, the comparisons here were based on the norms obtained from men and women "college" students from an eastern liberal arts college in the United States. The subjects in this research studies, however, were "high schools" students. Although field-independence does not improve with age, college age are supposed to be at the peak of the development of field-independence. Accordingly, the high schools students might actually be ranked in higher quartiles.

Second, even compared to the college norms, the improvements from the first quartile to the second and third quartiles were remarkable within six to twelve months' time. Although the female subjects in the second experiment did not score high and did not show large improvement in GEFT, the results seemed to be consistent with the norms that men usually perform slightly but significantly better than women (e.g. see Andrieux, 1955).

In any case, the significant results on contextual intelligence with the Contemplation group seems to have provided a very important clue for further research on the distinct characteristic of Chinese intelligence in the future.

### **Implications for Future Research on Intelligence**

As the first attempt to study the intelligence of the Chinese tradition from the perspective of Maharishi's Vedic Psychology in a more holistic way, this dissertation was based on the Chinese conception of intelligence and used multiple measures to assess a fuller range of expressions of intelligence on different levels of mind. There is, however, room for improvement, both theoretically and empirically, so to make the study even more holistic and comprehensive.

Theoretically, one way to extend this dissertation research may be to also evaluate the direct experience of the unified *source* of pure intelligence or the Tao. Although a personal experience is subjective, if many people experience and describe such similar qualities as "unboundedness" or "wide-awake," however, this would suggest that there does exist an underlying field of pure intelligence as described by the traditional Chinese wisdom and Maharishi's Vedic Psychology. This is especially true if this experience can be correlated with changes in individuals' lives on some measures.

Furthermore, the existence of pure intelligence has also been shown in many scientific research studies on physiological correlates of pure intelligence. During the practice of the TM program, a profound state of restful alertness is reflected in greater brain-wave coherence (Levine, 1976; Badawi et al, 1984; Orme-Johnson et al, 1977; Dillbeck and Bronson, 1981), along with lower respiration rate, lower plasma lactate, lower skin conductance levels (Dillbeck and Orme-Johnson, 1987), natural suspension of breath (Farrow and

Hebert, 1982; Gallois, 1984), and reduced cortisol (Jevning, Wilson, and Davidson, 1978).

In addition to the source of intelligence, this dissertation has delineated higher states and stages of consciousness in the growth of intelligence from both Maharishi's Vedic Psychology and the Chinese tradition. Accordingly, assessing the *goal* of human development in terms of these higher states of consciousness could be another crucial study to make a theory of intelligence more comprehensive. There have been research studies on the experiences of witnessing deep sleep, for example, as a means to assess Cosmic Consciousness (e.g. see Cranson, 1989, in press). Perhaps more and better measures, however, are needed in order to evaluate higher states of consciousness beyond Cosmic Consciousness.

This dissertation has been focusing on measuring the full *course* of development of human consciousness from ego to behavior. In fact, as mentioned earlier, all the previous 500 research studies on the TM program could be interpreted in terms of "intelligence" associated with the source, course, and goal of development of intelligence. For example, increased ego development (e.g. Alexander, 1982) can be interpreted as increased intelligence of the self; lower blood pressure (e.g. Wallace et al., 1983) can be interpreted as increased intelligence of the cardiovascular system of physiology; and improved relationships (e.g. Alexander et al, 1987) can be interpreted as increased intelligence of social behavior.

In addition, beyond the level of behavior is the social and physical environment which, according to Maharishi's Vedic Psychology, is simply a further unfoldment of pure intelligence. There have been over 40 empirical studies (see *The Maharishi Effect*, 1990) on the effects of enlivening pure consciousness by a group of meditators which brings about a "phase transition" from a chaotic environment to a more orderly and positive one, from "unintelligent" to "intelligent." An intelligent environment is expressed in a more orderly and harmonious state of life, as measured by decreased

crime, violence, accidents, illness, and improvements in economic conditions and other sociological indicators of quality of life (see Orme-Johnson, 1988, pp. 144-146, 1994).

In addition, there is a branch of Vedic knowledge specializing in how to bring physical structure in accord with natural law. In this knowledge, termed Sthapatya Ved, the beneficial or harmful effects of the physical environment on human life could be observed, and thereby the intelligence of physical structure could be evaluated. Similarly, there is a branch of knowledge concerning the design of the physical environment in the Chinese tradition called *Fung Shui* which enables an individual to live life in harmony with his or her environment and to gain the support of nature. Hence, the study of both social and physical environments could be an extension of a complete theory of holistic intelligence for future research.

In relation to psychometrically measured intelligence, the current research has extended Cranson's (1989) study of intelligence by incorporating better measures on both practical intelligence and creative potential, as suggested (see Introduction and Chapter 13). It has also extended other TM research on intelligence (Tjoa, 1975; Shecter, 1978; Aron et al, 1981; and Dillbeck et al, 1986) by measuring not only fluid intelligence but other aspects as well. All the measures, however, are far too unsophisticated in assessing the full nature of holistic intelligence; some better and more holistic measures still need to be developed and applied in future research.

Empirically, although the current research has employed considerable experimental rigor, the second and third studies could be further improved if the experimental design were randomly assigned by student rather than by class. The studies would be still better if all the three groups were randomly assigned on an individual basis. In addition, in future research, it may be better to include subjects of other age groups, such as university students as well as working adults. This will help to improve external validity so that the findings can be generalized to the whole Chinese population.

To conclude, designing an ideal experiment includes compromising with the feasibility of accomplishment in reality. Despite some aforementioned weaknesses, this research has improved on the previous research on intelligence. Similarly, future research will improve on the present studies, both theoretically and empirically. These are simply the steps of progression in science.

However, the positive effects of the TM program on the unfoldment of intelligence should have been recognized in the light of these replications of scientific studies as well as in the context of over 500 studies on the TM program. It may be more relevant for implementing the TM program in education when future research is to be conducted. For the betterment of humanity, this direct application of the TM program is the final goal of all research, rather than doing research just for its own.

### **Significance of the Research Studies**

To repeat some of the needs and significance of the current research studies on holistic intelligence brought out in Part One of this dissertation, a few important points will be confirmed and discussed as follows:

Firstly, this was the *first* research study on Maharishi's TM program involving Chinese subjects as well as the Chinese culture. This was also the *first* research in East Asia on the TM program and psychological factors. As such, it extends previous research on other cultures in showing the universality of the TM program in terms of the beneficial results revealed in this research study, as well as the universality of the concept of creative intelligence.

Secondly, these research studies could be the beginning of a cross-cultural study of intelligence and creativity with the TM

program. It would also open up a whole new area of research in intelligence and creativity for cross-cultural studies in the future. In addition, some new culture-fair assessment methods on intelligence and creativity, such as TCT-DP and IT, are still in the beginning stage. The wider application for assessment would not only strengthen the reliability of these testing instruments, but also provide a broader and more accurate understanding of human intelligence and creativity across cultures. The applications of these new culture-fair measures in the Chinese culture in the current dissertation studies have certainly provided a step toward this end.

Thirdly, this dissertation research has applied some new testing instruments in the context of holistic intelligence as broadly conceived in the Chinese tradition and Maharishi's Vedic Psychology. In addition, both TCT-DP and IT, for example, were being used in TM research for the first time. These measures are supposed to be more holistic in assessing intelligence and creativity than other measures being used in similar areas. They appear to assess a much broader range of levels of mind than just cognitive factors. Using these tests for the assessment of intelligence and creativity, the current research was better able to reveal the wider scope of effects of the TM technique.

In addition, the multiple tests results have also appeared to provide a more holistic view on the nature of intelligence and creativity and to yield new information about the relationship among different aspects of intelligence as well as different levels of mind. For example, Maharishi's Vedic Psychology predicts that the TM program will holistically enliven the source of creative intelligence and will thereby produce the greatest enlivenment on the deepest levels of mind. By calculating the effect sizes of the three experiments for each of the factors of intelligence different components revealed their relationships with one another and with

different levels of mind. As explained before, meta-analysis confirmed that the TM program produced the largest effects on the deepest levels of mind, as TCT-DP and STAI, which correspond to the levels of feelings and ego, showed the largest effect sizes.

Furthermore, when the overall effect sizes of the 6 aspects of intelligence factors were arranged from large to small--TCT-DP, STAI, GEFT, CTI, IT, and CFIT, they also generally correspond to different levels of mind from subtle to gross--ego, feelings, intellect, mind, senses (see Table 11, Chapter 16).

Fourthly, the significant results of all the six measures indicating different aspects of intelligence also confirmed the theories of the Chinese tradition and Maharishi's Vedic Psychology that intelligence is holistic. Had these multiple measures not been used, testing intellectual intelligence alone would not have detected the other expressions of intelligence most all the previous research on intelligence in the Chinese, and probably people from other cultures as well showed this lack.

Fifthly, in addition to the aforementioned "theoretical significance," the current research program has also created some "practical significance." The findings from TCT-DP, for example, has found to be a potential clinical tool appropriate for diagnostic and prescriptive work; it is perhaps especially useful for such culture as the Chinese which has been experiencing rapid "transitional" or "conflicting changes" at the moment (see Jellen and Urban. 1989). The results would have significant diagnostic value for aiding the field of education in the Chinese culture, and for understanding the creativity of the Chinese in general.

Finally, the most practical significance among all, however, was the fact that as a result of this unique research on intelligence and creativity, at least 10 classes of students in Taiwan have started meditating regularly in class every day and gaining the holistic benefits of the TM program. From the findings of over 500 hundred research studies, the TM program has been shown to be the most

effective element of an educational curriculum in existence--it fully unfolds the creative intelligence of the students, which is the basis for all aspects of learning (see Dillbeck & Dillbeck, 1987; Dillbeck, 1984; Nidich et al., 1986; also see Jones, 1989).

In addition, more and more students have been influenced by their meditating classmates and have an interest in learning the TM program. In fact, the principals of two schools in Taiwan in which the studies were conducted have decided to implement the TM program in the whole school in order to reap the fullest benefits. Obviously, the decisions of the principals, as they admitted, came from their direct observations of the positive changes both in academic and daily behavior among their students who practiced the TM program. Other school principals have also shown an interest in knowing more about this "intelligence-enhancing technique" by inviting the investigator to their schools for further inquiry.

If all these have been happening in the field of education in Taiwan, then the significant and holistic improvements in intelligence and creativity shown in the current studies among the Chinese students could probably give further inspiration for both research on intelligence as well as for applying the TM program in the field of education. Just like Robert Sternberg (in Kezerian, 1986) remarked, "Psychologists can certainly continue to test intelligence, but they would provide more of a service to people by developing their intelligence than merely by measuring it (p. 28)." The goal of this dissertation is exactly that.

## **Conclusion**

This dissertation has presented a unique attempt to study more holistically intelligence and creativity of Chinese students in the Chinese culture. The research strongly confirms the hypothesis that Maharishi's Transcendental Meditation program would cause holistic



improvements in mental potential, reflecting increased "wisdom" or "intelligence" as broadly conceived in traditional Chinese culture.

The holistic assessment of intelligence in this research has exceeded all of the four all-purpose components of intelligence commonly agreed upon by modern psychologists (Sternberg, 1986). It showed that intelligence is not only the ability to learn, to reason abstractly, to adapt to the environment, or to accomplish task expeditiously, but is also a holistic development of the whole individual. This is seen in the results showing that the TM program enlivened all levels of mind, from active thinking processes (as measured by CFIT, IT, GEFT, and CTI) to the deeper levels of intuition (creativity in TCT-DP) and feeling (as indicated by decreased anxiety in STAI). Furthermore, this holistic development of different values of intelligence resulted from the enlivenment of the source of creative intelligence and well being (pure intelligence--the *Tao* ) at the basis of personality.

In addition, this holistic assessment of intelligence has not only made the study of intelligence of the Chinese appropriate and meaningful, but the holistic measures have also set a fertile ground for a cross-cultural studies of intelligence.

Furthermore, in addition to the unique combination of experimental rigor and other practical significance in the studies, there are also some subtle and profound implications. The dissertation research was perhaps the first attempt to illuminate and validate ancient Chinese wisdom by modern scientific means. It also may well be the first attempt to bring the knowledge of two most ancient civilizations--Chinese and Vedic--together to investigate intelligence and creativity, perhaps the most important topics of our time.

This unprecedented attempt may not only theoretically open up a new horizon in investigating the field of intelligence, but also may revitalize and make practical the heretofore almost forgotten wisdom of the ancient Chinese civilization. The beneficial results

found in this dissertation demonstrate that Chinese wisdom, as enlivened by Maharishi's Vedic Science, is not "meta-physical" or "impractical". The author hopes that this research will awaken some Chinese intellectuals to take a closer look into the invaluable treasure of their own tradition.

In addition, the theory and findings of this dissertation may also inspire those who appreciated the uniqueness of the Chinese civilization but were skeptical for not seeing "Western science" approach to knowledge in the wisdom of the Chinese culture. This dissertation has provided some theoretical and empirical evidence that the *different* expressions of intelligence between the East and West originate from nothing other than the *same* universal source of pure intelligence.

After all, it may be most inspiring that this research has shown that creative intelligence is universal, and that everyone on earth, by taking advantage of the full potential of one's own inherent creative intelligence and of one's own physiology through practicing Maharishi's TM program, can harness this infinite creative intelligence of nature and enjoy infinite possibilities in life!

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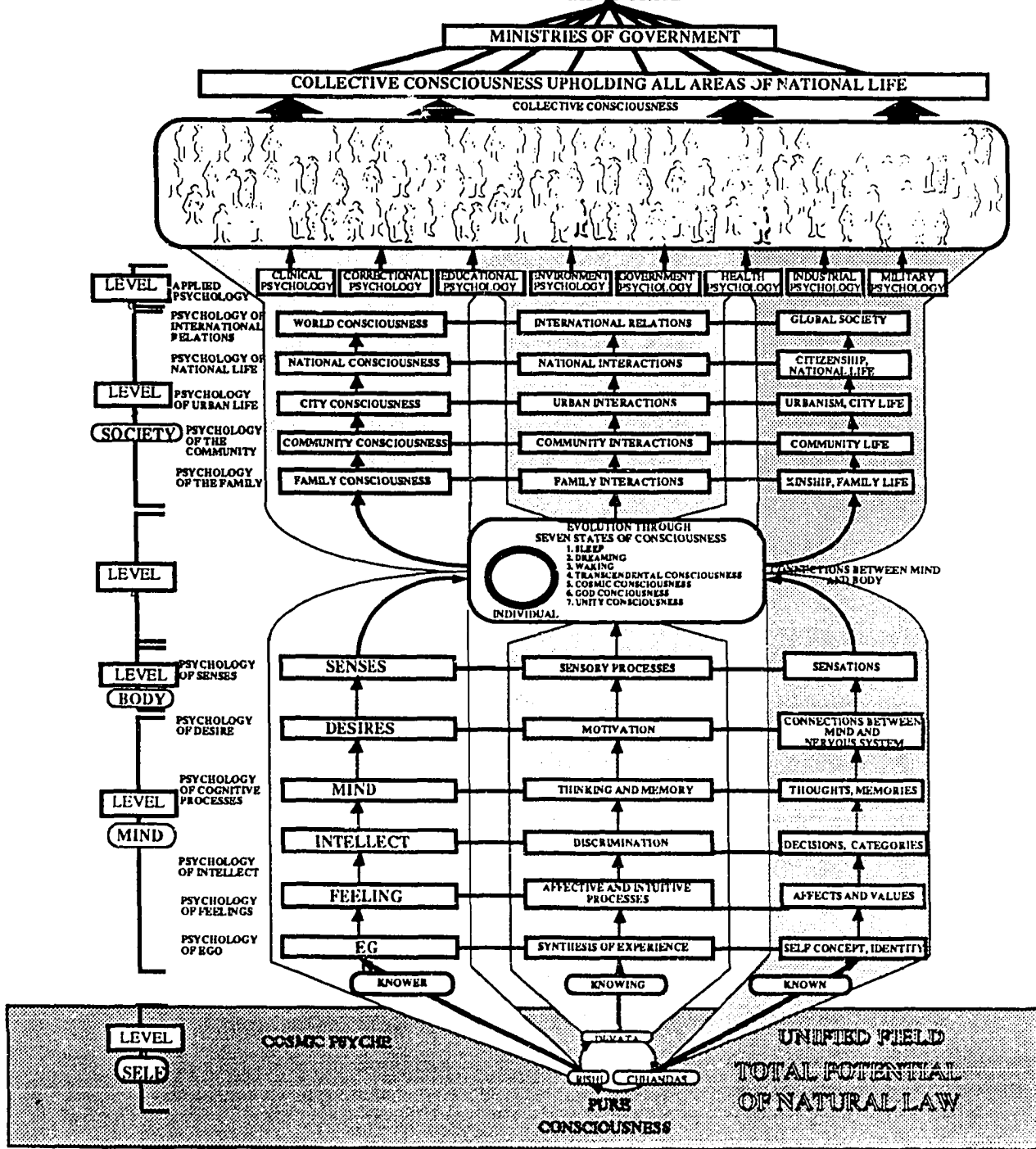


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**APPENDIX****Figure 30**

**The Sequential Unfoldment of Pure Consciousness into  
Layers of Subjectivity and Objectivity.**

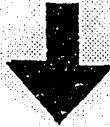
# PSYCHOLOGY HEAD OF STATE



# TRANSCENDENTAL MEDITATION

NATIONAL GOVERNMENT GOVERNS THROUGH NATIONAL LAW

TRANSCENDENTAL MEDITATION



TRANSCENDENTAL MEDITATION ALLOWS THE CONSCIOUS MIND TO IDENTIFY ITSELF WITH THE UNIFIED FIELD OF ALL THE LAWS OF NATURE, THE TOTAL POTENTIAL OF NATURAL LAW IN TRANSCENDENTAL CONSCIOUSNESS

NATIONAL LAW HAS ITS BASIS IN NATURAL LAW

THROUGH TRANSCENDENTAL MEDITATION THE CONSCIOUS MIND, GAINING TRANSCENDENTAL CONSCIOUSNESS, IDENTIFIES ITSELF WITH THE UNIFIED FIELD.

UNIFIED FIELD

PURJE INTELLIGENCE

THE TM-SIDHI PROGRAM ENLIVEN THE UNIFIED FIELD IN THE CONSCIOUS MIND AND MAKES THE TOTAL POTENTIAL OF NATURAL LAW AND ITS INFINITE ORGANIZING POWER AVAILABLE IN PRACTICAL LIFE

GOVERNMENT OF NATURE GOVERNS THROUGH NATURAL LAW