INCREASED PERSONAL HARMONY AND INTEGRATION AS EFFECTS OF *MAHARISHI GANDHARVA VEDA* MUSIC ON AFFECT, PHYSIOLOGY, AND BEHAVIOR: THE PSYCHOPHYSIOLOGY OF AN EVOLVING AUDIENCE

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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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CERTIFICATE OF APPROVAL

PH.D. DISSERTATION

This is to certify that the Ph.D. dissertation of

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has been approved by the Examining Committee for the dissertation requirement of Doctor of Philosophy degree in Psychology at the June 1995 graduation.

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To the memory of Beloved Mother Olson and Roland, my already enlightened parents, who brought Maharishi home and made it possible for me to enjoy the fruit of his Vedic Science from a very early age.

Gandharva Veda music makes a precious contribution to the creation of world peace—the use of sound, melody, and rhythm to restore balance and harmony in the mind, body, behavior, and environment.

Maharishi Mahesh Yogi

ACKNOWLEDGEMENTS

Thank you to Maharishi who set the challenge twenty-five years ago to write a dissertation and then made it possible for me to fulfill it at MIU. Your infinite wisdom has brought forth the possible from the impossible: a golden flower from a desert rock. May this golden flower bloom in its full dignity and bring you great delight.

Thank you to my committee members who have weathered many a storm during this endeavor. You all are incredible human beings whom I love and respect deeply.

To David Orme-Johnson, Ph.D., Dean of Research, Professor of Psychology, Director of the Doctoral Program in Psychology and Co-Director of the Doctoral Program in Neuroscience at MIU . You are a true Vedic scientist who saw the inherent good in this challenging topic and helped to create clarity out of ambiguity. Without your kind guidance, I do not know if the quality of this thesis would be anywhere near what it is. You represent the best of Vedic Psychology because you are living what you teach us. I hope someday to make you proud of your dissertation student.

To Robert Boyer, Ph.D., Clinical Psychologist and previously Assistant Professor of Psychology at MIU. You believed in me from the very beginning and knew that I could do this. Thank you, Bob, for your loving support and your faithfulness and your deep friendship.

To Fred Travis, Ph.D., Assistant Professor of Psychology and Director of Evaluation at MIU. You insisted that I had what it takes to think science. Your generosity in sharing ideas and helping with experiments and offering practical tips for making the document more professional were invaluable.

To Ashley Deans, Ph.D., Associate Professor of the Science of Creative Intelligence and Physics, MIU and now Director of the Maharishi School of the Age of Enlightenment. You brought to the committee a refined sensitivity and understanding of the total value of Maharishi's Vedic Science as it pertains to *Maharishi Gandharva Veda* music. As soon as you joined, the process of manifesting this dissertation topic became manageable, more do-able—actually a realizable goal. You must have special organizing power on loan from the unified field.

To Jill Margolis, Ph.D., Associate Clinical Professor in the Department of Internal Medicine at the University of Nevada Medical School. You joined the committee so recently and yet brought so much completion with you. You also reminded me how to laugh and enjoy the process. Thank you for contributing to this project.

And thank you to Maxwell Rainforth, M.S., who reviewed the statistics and brought the mathematical information up to the level of simple sophistication that this project deserved. Maxwell, you are one wise soul; may your dissertation soon be completed but may the process be effortless. At least the statistics should be easy.

Thank you's also go to those who helped with the gathering of data, with getting permission to use certain quotations, and with running the many experiments. To Henry Herzberger, Ph.D. who helped with the running of several of the studies and spent time with my statistics. To Ken Krumpe for smoothing out the red tape and enabling me to use certain reference materials on *Maharishi Gandharva Veda* music that otherwise would have been unavailable. To Graciella and Werner Elmkar for your consistent care and loving attention in helping me learn all I could about *Maharishi Gandharva Veda* and for making materials available. To Kevin Purcell for actually collecting data far away in Ohio. To Dr. David Sands, M.D. for so willingly contributing your valuable time to the EEG study and to Stokes Dickens, Ph.D. who

kindly sat down with me and "read" the EEG paper record. To Jim Brooks, Michael Eisen and Pat Barrett who helped make the music therapy study happen. To Susan Vegors, Ph.D., who manifested the Richo Akshare chart and helped with formatting. To Cathy Orpet for your help in editing the experience section. And to Eileen Elsinger for typing that mammoth first chapter so cheerfully.

Thank you to the renowned performers mentioned in this document who so graciously allowed me to disturb their performances with my questionnaires. Especially thank you to Debu Chaudhuri, one of the most enlightened of the great Gandharvans. You recognized my truly honorable intentions in researching this precious field of knowledge and risked your reputation by helping this non-musician pursue her research quest. You encouraged me at all times to do my very best. Your patience has been admirable.

Also thank you to Deepak Chatterjee, David Burgess, and to James and Kathryn March for allowing me to attend your concerts and conduct my study. It made for a rather unique yet richly fulfilling experience.

Thank you to the subjects who so willingly participated in my many projects.

I would also like to thank the administrators of MIU, especially Kris Wood, who took me through the many hurdles of administrative red tape and always had a smile and a warm heart for me. If only the world were peopled with more tender souls like Kris, then there would be no more wars.

Also, thank you to Gretchen and Eric Schaffer, Ph.D., President of Human Factors International, who donated funds and contributed love and support and use of the xerox machine. Your compassion is truly appreciated.

My deepest gratitude goes to my husband, John Walter Sorflaten, Ph.D., who never ever let me stop achieving. John, you not only stood by my side, but you breathed life and purpose into me during those last few months. Your love,

gentleness, creativity, good sense of humor, enduring strength, and professional editing ability, along with your amazing way with statistics, has brought this project to a close. Words can never express what your attention to my project has meant. Without you, this project would not be. And now, we can get on with the rest of our lives. Jai Guru Dev.

ABSTRACT

This dissertation presents a theoretical understanding of *Maharishi Gandharva Veda* music and five exploratory studies on its integrating effects for the listener. Experiment 1 measured immediate pre-post effects of five live concerts (N= 697), using a specially created self-report bipolar adjective check list based on *Maharishi Ayur-Veda*, measuring balanced and imbalanced affect. (1) The concerts significantly balanced affect on three orthogonal scales, indicating reduced tension, decreased irritability, and less lethargy ($p < .0001$); (2) females changed more than males on the first two dimensions; (3) greater pre-post changes occurred in the evening compared to afternoon performances. Experiment 2 (N=188) found no social compliance effects. Also, unfamiliar *Maharishi Gandharva Veda* music produced greater balance on the tension dimension than did familiar, liked Western Baroque.

Experiments 3 and 4 were pilot EEG experiments with single subjects. Experiment 3 found that *Maharishi Gandharva Veda* music improved psychophysiological balance as indicated by increased global EEG alpha and theta activity and by changes in the subject's *Maharishi Ayur-Vedic* pulse taken by a trained physician. Experiment 4 found frontal beta power increased, associated with subjective experiences of bliss.

Experiment 5 measured immediate effects of *Maharishi Gandharva Veda* music on 27 psychiatric, institutionalized geriatrics randomly assigned to two groups— 20 min five days a week for eight weeks of *Maharishi Gandharva Veda* music or Western Baroque music. Previous investigators have shown that the Western Baroque selections had significant therapeutic effects. No significant changes were found in either group for the Brief Psychiatric Rating Scale or Fairview Self-Help Scale, which were administered every two weeks six hours after the session. Thus, neither *Maharishi Gandharva Veda* music nor Western Baroque had long-term therapeutic

effects for this elderly psychiatric population for the amount of exposure to the music that they received. However, structured observations during the music indicated the *Maharishi Gandharva Veda* group demonstrated greater improvement in physical and social behavior.

Together, the five experiments suggest *Maharishi Gandharva Veda* music can be a powerful tool for balancing the individual's mind, body, and behavior. Further research is needed to confirm these initial findings.

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A New Psychology of Music Based on Maharishi's Vedic Science— A Rationale

Traditionally, the Psychology of Music has centered around the study of musical behavior, attempting to understand objectively the dynamics involved in the human production of melodic sounds. Among the fundamental questions most often asked by music researchers in this field are: (1) What is music? (2) Why does music exist and what are its origins? (3) By what process is music created and perceived; can these processes be measured? And, (4) What effect does music have on the listeners? As Boyle and Radocy (1988), experts in the field of music psychology point out, no one theory exists today which can account for all types of music in terms of its production, dynamics and effects. No one theory offers complete knowledge acceptable to all points of view. Rather, a body of knowledge has developed, consisting of conflicting theories and assumptions which attempt to explain music, its origins and its effects. Each theory has its own perspective, its own question to answer. And, in turn, different specialized fields of knowledge have emerged to study these fundamental questions and theories. Thus, instead of one area of knowledge existing for the study of music, four or more have been created. What is lacking in the field of music research is a comprehensive model which connects all the diversified theories and branches of knowledge into one unified, holistic perspective.

The purpose of this dissertation is to present a holistic theory that offers new answers to age-old questions and thus harmoniously integrates diverse fields of knowledge. I would like to suggest that this holistic or unified theory be known as the Vedic theory of sound based on the teachings of His Holiness Maharishi Mahesh Yogi. And encapsulated in this theory would be what I would like to refer to as a new Psychology of Music based on Maharishi's Vedic Science.

Maharishi's Vedic Science

This new Psychology of Music is but one area of knowledge based on Maharishi's Vedic Science and Technology. Maharishi's Vedic Science is a body of knowledge which has been recently introduced to the world by His Holiness Maharishi Mahesh Yogi. It is based on the complete understanding of the *Veda*, a *Sanskrit* word which translates as "pure knowledge". Included in the concept of pure knowledge is the understanding of its infinite organizing power. So, *Veda* actually stands for pure knowledge and its infinite organizing power— or, the structure and function of pure knowledge (Maharishi, 1994, pp. 3, 5, 10). Following is a brief explanation of Maharishi's Vedic Science and Technology[1].

Maharishi considers his Vedic Science to be a complete science of life. "Vedic Science is the science of *Veda*, the science of complete knowledge" (Maharishi, 1994, p. 154). According to Maharishi:

> Knowledge results from the coming together of the knower, the process of knowing, and the object of knowing—knowledge blossoms in the togetherness of knower, knowing and known. Therefore, knowledge is the Unified Field of Knower, Knowing, and Known...and my Vedic Science is the science of the Unified Field of Knower, knowing, and known (Maharishi, 1994, p. 154).

Maharishi's Vedic Science is the total science of all aspects of life, subjective (knower), objective (known) and the connection between subjectivity and objectivity (the process of knowing). It uncovers the knowledge of the total potential of natural law in its completeness and brings human awareness in tune with those fine creative impulses that are engaged in transforming the field of intelligence into the field of matter (Maharishi, 1985, p.35).

Maharishi's Vedic Science technologies, the Transcendental Meditation (TM) program and the TM-Sidhi program, are the applied value of Maharishi's Vedic Science.

1See Chapter One for a comprehensive discussion of Maharishi's theories.

These are purely scientific procedures for bringing about the total development of the human psyche, and the total development of the human race (Maharishi, 1985, p. 35).

For Maharishi, Vedic Science differs from modern science in that modern science is at best one-third of Vedic Science. According to Maharishi:

> Through its objective approach, modern science reveals that which is perceived, the object. The subject, the perceiver, remains separate from it. Modern science investigates into the field of the known, but it does not touch at all the field of the knower and the spontaneous process of knowing. Vedic Science has all the wealth of total knowledge of the knower, the process of knowing and the known (Maharishi, 1985, pp. 27 - 28).

Maharishi has recently introduced his Vedic Science to the world. Since 1957, Maharishi has been establishing universities, associations and organizations for the express purpose of presenting his Vedic Science and Vedic Science technologies to all levels of society. Maharishi states that implementation of his Vedic Science technologies will bring harmony, prosperity, progress and fulfillment to all branches of knowledge and to the lives of people everywhere, resulting in an improved quality of life for every individual and problem-free, natural law based administration of society throughout the globe.

Historical Development of Maharishi's Vedic Science

Recognized as an enlightened sage among his peers, Maharishi first presented his knowledge of Vedic Science thirty-five years ago to an audience of ten thousand in Southern India (Maharishi, 1955). Based on the massive positive reception of his lectures, and with thousands learning the practice of Maharishi's Vedic Technologies even in those first few days, concerned well wishers of the world arranged for Maharishi to embark on a series of world-wide tours in order to convey his timely message to people everywhere. Simply put, Maharishi explained in every country that human beings do not have to suffer, that we were born to actualize our full potential, that is, to become individuals whose

mind, body, intellect and behavior act naturally in accord with all the laws of nature (Maharishi, 1955). He explained that every member of the human race should enjoy all that life has to offer— without violence, without frustration at the inability to fulfill one's desires, without losing harmonious integration of career and spiritual growth. According to Maharishi, a life based on the principles and understanding of the organizing power of Natural Law as presented in his Vedic Science would result in a life free from problems, fear and disease, thus creating a life filled with bliss, harmony and peace balanced harmoniously with economic prosperity and career satisfaction. Individual life, community life, social life, national life, global life: every level of life would stand to profit from the adoption of his Vedic perspective and technology[2] (Maharishi, 1985, p. 32).

In 1957 he established the Spiritual Regeneration Movement Foundation through which Maharishi presented a science of consciousness which described the knowledge of seven states of consciousness for optimizing maximum growth in human development. His knowledge extended present day knowledge of three states of consciousness to include four more refined levels of human awareness: transcendental consciousness, cosmic consciousness, refined cosmic consciousness and unity consciousness.

He developed practical *Vedic* technologies, the Transcendental Meditation and TM-Sidhis, for unfolding these higher states of consciousness naturally in human awareness. Since then Maharishi has created other organizations, including the International Meditation Society (in 1965), the Students International Meditation Society (1966) and the American Foundation for the Science of Creative Intelligence (1970) to further disseminate this information to all levels of society.

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2 See the last inset page of Maharishi Mahesh Yogi's *Maharishi Vedic University: An Introduction* (1994) for a complete chronological listing of Maharishi's discoveries and his established organizations.

Beginning in 1970, scientific research began to support Maharishi's predictions regarding the efficacy of his Vedic Science and the benefits accrued by the application of this Vedic technology in human life. During the past 24 years, even when using the most stringent research designs possible, research has repeatedly confirmed[3], the practicality of Maharishi's vision — to create a situation on earth wherein individual life would operate according to Natural Law, resulting in the dawn of a Vedic Civilization, "a civilization based on pure knowledge and the infinite organizing power of Natural Law; where no one will suffer; and all will enjoy the eternal glory of God — Heaven on Earth" (Maharishi, 1994, p. 363). Research on various aspects of Maharishi's Vedic Science and Technology are referenced throughout this dissertation.

Maharishi has spent the past thirty-five years introducing his Vedic Science and Vedic Science technologies to every country in the world. He has founded Maharishi International University, Maharishi Vedic University, and Maharishi Ayur-Veda University for the purpose of teaching his Vedic Science to people everywhere and for allowing scientific investigation to research the authenticity of his predictions. He has written many books and he has given innumerable lectures on diverse topics, each of which has been videotaped or audio taped.

He has created a World Government for the Age of Enlightenment (1978), and recently he has inspired the development of a new political party, the Natural Law Party (1992), whose precepts are based on establishing life in accord with Natural Law. In addition, he has completely revolutionized the medical field, the fields of architecture, education, religion and business. The Vedic theory of sound and Maharishi's Vedic Psychology of Music is his gift to the field of music.

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[3] For a complete listing and review of the scientific research on Maharishi's Vedic Science and his Vedic Science Technologies, please see *Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers. Volumes 1 - 6*, available on Internet gopher server MIU. edu.

The Vedic Theory of Sound

As a Vedic theory of sound, this new Psychology of Music explains music in terms of 1) its origins in the Unified Field of Natural Law— also known as the Cosmic Psyche, 2) the psychological dynamics of human awareness involved in music production and perception, and 3) the evolutionary effects of music on both the individual and the environment. It discusses music as an evolutionary continuum of sound — from its emergence as infinite vibratory frequency in the Unified Field of Natural Law to its limited expressed value as sound and music in relative creation.

In this concept of the continuum Maharishi's theory differs from all other theories in that it extends beyond and yet supports previous theories, thereby bringing dignity and respect to diverse points of view while integrating them into one continuum of wholeness — the Vedic Psychology of Music.

Corollary to the New Psychology of Music Based on Maharishi's Vedic Science: The Musical Psyche

Included in Maharishi's Vedic Psychology of Music is a corollary which describes the dynamics of the human psyche when it is involved with the production and reception of melodic sounds. I refer to this corollary as the "Musical Psyche"—a term originally coined by the founding father of the Psychology of Music in the West, Carl Seashore, in 1938, but used here in a more inclusive sense.

Seashore's use of the term "Musical Psyche" referred to the psycho-dynamics involved in musical sound production. My use of the term includes Seashore's definition and extends it to include the total range of functioning of the human psyche— from the origin of the human psyche in the Cosmic Psyche to the involvement of the human psyche

with the perception and production of music for the pleasure of the individual and society. This concept will be fully discussed in Chapter One.

Maharishi Gandharva Veda Music

The practical application of this new Psychology of Music based on Maharishi's Vedic Science is the knowledge of *Maharishi Gandharva-Veda* music which embodies the *Vedic* principles of sound production for the benefit of human evolution. During 1987, 1988 and 1989, three global concert tours, called Maharishi's Festivals of Music for World Peace, took place. The purpose of these global concerts was to introduce *Maharishi Gandharva-Veda* music to audiences throughout the world. More than 40 teams of the finest *Maharishi Gandharva Veda* musicians from India traveled to 355 cities in 55 countries playing the melodies of *Maharishi Gandharva-Veda* music to create balance in nature and harmony in world consciousness. During these festivals, it was reported that "the dangerous rivalry between the superpowers resided, conflicts between nations ended and peace and freedom began to be enjoyed by the people of many countries for the first time in many decades" (Maharishi, 1991, p. 2-3). Furthermore, it was noted that during the first festival, in December 1987, "the historic signing of the U.S.A.—U.S.S.R. treaty eliminating medium-range nuclear weapons" took place; during the second festival, from May - July 1988, "a peace-promoting influence was created which permeated the proceedings of the superpower summit conference in Moscow"; and during the third festival "fear had ceased to be the dominant influence in the world" and the end of the Iran - Iraq War occurred (Maharishi, 1991, p. 8). In order to perpetuate this dawning world peace, Maharishi set a goal of establishing 1000 schools of *Maharishi Gandharva Veda* music world-wide in order to train individuals from every land in the knowledge and application of *Maharishi Gandharva Veda* music.

This dissertation includes some of the first exploratory research on the effects of *Maharishi Gandharva Veda* music on Western audiences and hopefully will give a direction for further research which will confirm the authenticity of this *Vedic* theory and its value for modern Western society.

Approaches to the Study of Music

Following is a brief review of some of the existing fields of knowledge involved with music, their theories regarding the fundamental questions of music and a very brief discussion of the point of view presented in this new Psychology of Music. This new theory will be fully explained in Chapter One.

(a) What is music?

Music is generally understood as the art of organizing sound so as to elicit an aesthetic response in a listener (American Heritage Dictionary, p. 465). Although every branch of music knowledge addresses this issue, it is generally relegated to the field of music theory and to psycho-acoustics in the field of the psychology of music.

Boxhill (1985) considers music to be a universal phenomenon found in all cultures. It "is structured tonal sound moving in time and space" (p. 5). Quoting Rowley, Boxhill distinguishes between sound and music. Whereas sound is ordinary natural phenomenon, music "is the result of man's conscious development of sound into an art and science". According to Boxhill, the basic elements or components of music are: rhythm, melody, harmony, pitch, tempo, dynamics, timbre and the lyrics of song. These elements are elaborated in Chapter One.

Michel (1985) offers a general definition of music as a "system of organized sound communication". He considers music to be a social phenomenon which results when two or more individuals concur on what sounds constitute music. Music is generally a

pleasurable activity and nearly always structured within precise time boundaries. This, Michel suggests, enables the use of music as positive reinforcement in therapy.

Radocy and Boyle (1988) point out that "music of all cultures involves the organization of sounds with varying pitches, loudness levels and timbral qualities within a rhythmic framework. They define musical sounds as "a complex of individual vibrations" containing numerous frequencies. These vibrations are cyclic in nature and have a certain period, frequency and amplitude. If the vibrations have acceptable frequency and intensity, and if they can somehow be transmitted to a listener, then music is possible (p. 30).

Representing the psycho-acoustic perspective, Scartelli (1989) describes the dynamics of music. Like all sound, music is "transmitted through the air via oscillating waves of varying degrees of complexity. These waves carry much musical information, such as pitch, intensity, timbre, harmony, tempo, rhythm—the combinations are limitless" (p.20). Scartelli adds that an inherent property of music is that it elicits emotion and thereby can be used to balance emotions in therapy.

For Lundin (1967):

> The constituents of a melody in the final analysis are merely sound waves whose properties are frequency, amplitude, length, and complexity of structure, (number of overtones). When one hears a melody objectively, all he/she perceives is a sequence of tones varying in these four attributes. The melody is created by the listener out of the raw material supplied to him/her. To hear a melody is to evolve a form out of the tonal material so that what may appear to be a melody for one person is nothing more than a conglomeration of tonal stimuli to another (p. 194).

To summarize then, music is a universal social phenomenon found in all cultures. It is humankind's conscious attempt to organize sound communication in such a way as to elicit an aesthetic and/or emotional response. As structured tonal sound moving in time and space, it is a complex of individual vibrations containing numerous frequencies which are cyclic in nature and have a certain period, frequency and amplitude. If these vibrations have an acceptable frequency and intensity, they can be transmitted to a listener who

interprets the vibration as music that is pleasing to one's self and thereby can bring balance to one's emotions.

In this new Psychology of Music, Maharishi distinguishes between sound and music. Maharishi (1991, p. 11) states that sound is frequency; coherence in sound/ frequency is melody; therefore, it could be said that music is essentially a collection of coherent frequencies.

According to Maharishi the total knowledge of sound and its effects is contained in *Maharishi Gandharva Veda*, a fundamental branch of *Vedic* literature. Maharishi describes the music produced from this *Vedic* knowledge as "the eternal melody of nature responsible for all the transformations and expressions of the universe" (Maharishi, 1991, p.13). Maharishi defines it as "the science of transformation of sound"; all other forms of music are simply transformations of *Maharishi Gandharva-Veda* at a more expressed level of creation[4].

According to Maharishi (1991, p. 12) *Maharishi Gandharva-Veda* is knowledge of the most refined evaluation of sound value or frequency. It arises from the infinite frequency generated through the self-interacting dynamics of the Unified Field of Pure Consciousness, the Unified Field of Natural Law. The sound values or frequencies found in *Maharishi Gandharva-Veda* music match the frequencies inherent within the structure of the laws of nature[5]. And because the human mind and body are parts of nature, the frequencies of *Maharishi Gandharva Veda* music create a profound internal resonance for the individual psyche thereby reestablishing it in harmony and balance with natural law[6].

According to Maharishi "[*Maharishi*]*Gandharva Veda* music is the eternal melody of nature which is ever lively in transcendental consciousness. From there it reverberates

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[4]This concept is further elaborated in Chapter One, Section III.
[5]For a complete description, see Chapter One, Sections II A, B-H; III, and VI.
[6]See Chapter One, Sections III.2,3, V, VI.

and constructs different levels of creation. It is the basis of all order and harmony in nature" (Maharishi, 1991, p.13).

Maharishi Gandharva-Veda uses the principles of melody, rhythm and sound (provided in the drone[7]) to restore harmony and balance to the individual. It purports to integrate all aspects of matter with the underlying value of pure consciousness through the medium of music thereby simultaneously nourishing while restoring balance and harmony to the mind, body, behavior, environment, world and universe[8].

(b) Why does music exist? What are its origins?

Theories from the fields of musicology and ethnomusicology have attempted to answer these questions. In addition, theories can be found in the psychology and sociology of music and in music therapy.

Researchers have explored this question from two major points of view: nature vs. nurture. The nature point of view suggests music is a result of humankind's biological evolution; the nurture point of view proposes that the origin of music is based in cultural behavior. Regarding the nature point of view, Blacking (1973) holds that humans first evolved the ability to perceive "sonic order" which then enabled them to create musical sounds. He pointed out that "understanding music involves both the sound (the object) and the man (the subject)"; thus, "the key to understanding music lies in the relationships existing between subject and object, in the activating principle of organization". Sloboda (1985) suggested that human evolution, which led to the development of mental processes used in language and music, supplied a "motivation for music, making it 'natural' and enjoyable for people to indulge in it". Sloboda emphasized the importance of man's biological development to the origins of music. He also suggested that music provided a

[7]Please see Chapter One, Section VI.C.3 for explanation of the drone.
[8]This is elaborated in Chapter One, Section VI.C,VI.D,VI.E,VI.F, and VI.G

mnemonic framework through which society could express and communicate the structure of its social relations.

Darling and Harwood (1986) commented on music's biological adaptive, explaining that music served as a 'cohesion-facilitating group activity—an expression of social solidarity'. They maintained that culture should be viewed as a grouping of genes, rather than a grouping of individuals. Each cultural group has its unique gene pool which then adapted certain types of music to express its solidarity. Darling and Harwood recognized the power of music as a symbol of cultural identity based on genetic adaptation.

According to Gaston (1968), the father of music therapy, "music is an essential and necessary function of man. It influences his behavior and condition and has done so for thousands of years." For Gaston, music had both a biological and cultural basis. He suggested that without the evolution of the human cortex, the capacity to create complex music patterns would not exist. At the same time each type of music served a unique purpose in its own cultural setting. To summarize Gaston's perspective:

> The two most distinguishing characteristics, then, of man's development are his society and the immense complexity of his brain. They are highly interactive and each is dependent on the other. In the society of man, he has constantly drawn closer together and become more inter-dependent. His brain makes possible speech, communication, abstract thinking, and, as will be shown, significant nonverbal communication in the form of music (Gaston, 1968, p. 12).

For Gaston, music is a source of gratification; its function is to enrich human life. As an essential and necessary function of humankind, music influences human behavior. According to Gaston "There are many different musics, but each fulfills its proper function in its own culture. Music came into being because of man's interdependence, his need for expression and communication" (Gaston, 1968, p. 15).

Gaston (1968) pointed out that "music is the essence of humanness, not only because man creates it, but because he creates his relationship to it." He added that "music creates a gestalt of sensory, motor, emotional, and social components in which, for the most part,

the participants concur." According to Boyle and Radocy, this gestalt understanding of the range of music has led to confusion and diversification in the field. Consequently, the psychology of music has become associated with measurement and evaluation of musical behavior, psychological aesthetics with the affective responses humans have to music, music theory with the processing of sound impulses into melodies, and music therapy with the applied value of music for the restoration of human well-being, both physical and mental. What has been lacking is an understanding which links the various theories together into one unified whole.

This new Psychology of Music based on Maharishi's Vedic Science answers this need. It gives rise not only to an understanding of the dynamics involved in musical behavior on the individual level, but also to the dynamics involved in the manifestation of all melodic sounds in the universe and then explains the connections arising between the two. It postulates a Musical Psyche as that aspect of an individual's psyche involved with musical performance and connects it to the Cosmic Psyche, the field of pure consciousness from which the Musical Psyche springs. It details the dynamics of sound located on the level of the unified field of pure consciousness, its transformations into matter at the junction point between consciousness and matter; its properties as sound evolving into melody and rhythm in manifest creation; and its effects on the individual and society[9]. It also offers subjective methodologies for developing the full potential of the musical psyche in the individual[10].

Regarding the nurture viewpoint, Radocy and Boyle (1988) explain the origins of music in terms of how humans came to use sounds for musical functions. They reference Nettl and Revesz who in turn review various theories which venture to explain the origins of music. Among the various theories are:

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[9]This is explained in Chapter One, Sections IV,V,VI, and VII.
[10]Please see Chapter One, Sections II-VIII, and Chapters Four, Five, and Six.

1) The Darwinian theory which states that music developed as a mating call to sexual instincts; however, little evidence supports this viewpoint.

2) The Rhythm theory which says that music evolved from dance. Although dance does provide occasions for music making, Radocy and Boyle point out that there is little support for confirming that music evolved from dance.

3) The Work Song Theory. Karl Buecher's theory holds that work provides the impetus for music. He suggested that the people of early cultures would sing to help complete chores. However, according to Nettl, the world's simplest cultures do not have work songs; therefore there is little evidence for Buecher's theory.

4) The Imitation Theory. Revesz suggests that music originated from man's imitating of bird calls. He supports this theory on the basis that some bird songs do have fixed pitches; however, Boyle and Radocy point out several criticisms of the theory, including that primitive cultures do not have songs based on bird songs, that vocal utterances do not sound like bird calls even when serving as mating calls or cries of alarm and that unlike the instinctual behaviors that serve as a basis for bird calls and animal sounds, human sounds result from purposive, conceptual and aesthetic behaviors.

Other theories include the theory of expression, impassioned speech, lalling melodies of children, and communication . Nettle suggested his own three-part theory to music's origins. He assumed that (1) an undifferentiated method of communication existed in the earliest cultures which was neither speech nor music but rather possessed three attributes common to both: pitch, stress, and duration. There were no fixed pitches nor definite vowels and consonants; instead, the sounds were grunts, cries and wails. Through a long gradual stage of differentiation and specialization in culture, (2) language acquired the characteristics of vowels and consonants while music acquired the characteristic of fixed pitches. With greater differentiation, (3) styles in music diversified. Boyle and Radocy support Nettl's theory stating that research confirms his perspective.

The historical origin of music used in therapy has been reviewed by many authors (see Diserens, 1926; Alvin, 1966; and Pratt, in Lee, 1989). To sum up their findings, nearly every culture has used music to restore balance and well-being in both the society and the individual.

Regarding the historical origins of music, Boxhill (1985) explains that early cultures were aware of the power of music. She states that the understanding of the power of music, its congruence with human feelings, emotions and states of being, can be found in the literature ranging from ancient Egyptian and Greeks to the present day. She writes:

> Thousands of years before the advent of the profession of music therapy, the *shaman* or medicine man of many cultures was aware of the curative power of music and used it directly in healing. This power was also known to the healing cult of *Asklepios*, an actual or mythical priest-physician who was worshipped as a demigod in Greece and later as *Aesculapius*, the god of medicine, in Rome. In classical Greece, *Pythagoras* prescribed specific musical intervals and modes to promote health, and *Plato* linked music to the moral welfare of the nation in Laws, a work that contains a poetic description of music and movement as a means of restoring the being to health and harmony (Meinecke, 1948). Among the biblical tales of the restorative effects of music, we learn that David, by playing his harp, eased the afflictions of Saul (Boxhill, 1985, p.1).

There are many references regarding the beneficial effects of music in other cultures as well. For instance, Diserens (1926) notes the effects of certain Indian melodies or *Ragas*.

> In the reign of the Emperor *Akbar* [sic], the celebrated singer Mia Tousine[*sic*] (most likely the famous musician Tansen[*sic*]) once sang a *raga* consecrated to the night in the open day. Immediately the sun was eclipsed and darkness spread as far as the voice was heard. Another *raga* burned him who dared sing it. *Akbar* desired to make a trial of it, ordered a musician to sing the song, while plunged up to the chin in the river *Jumna*. It was no use, the unfortunate singer became a prey to the flames (Diserens, 1926, p.45).

Diserens also reports on other effects produced by performing the Indian *ragas* including: the changing of the course of the seasons, influencing the growth of plants, stopping the sun in its course (similar to the story of the Biblical Joshua), preventing the continuation of a drought, and the ability to first create anger and hostility in individuals

through song followed by a cessation of anger and the restoration of peace (Diserens, 1926, p. 45).

According to this new Psychology of Music, from the nurture point of view, the goal of all music is to make individual life vibrate in "the cosmic melody of life" (Maharishi, 1973). For Maharishi, the master musicians of all times have been those who "could inspire a thrill from the basic level of life, their own consciousness". The supreme thrills of music can be found existing in the junction points between consciousness — "where waking meets transcendental consciousness, where transcendental consciousness meets cosmic consciousness, where cosmic consciousness meets refined cosmic consciousness, and where refined cosmic consciousness meets *brahman* consciousness" (Maharishi, 1973). By using the principles of sound, melody and rhythm embodied in the music of *Maharishi Gandharva-Veda*, a musician is not only able to create thrills in his or her own musical psyche but in the musical psyches of the audience as well. The musician thus can create a situation in which individual life vibrates in the cosmic melodies of life[11].

Regarding the theoretical origins of music, Maharishi's Vedic Science has located the origin of frequency or sound vibration in the self-interacting dynamics of the three-in-one structure of the Unified Field of Pure Consciousness, the field of pure knowledge, the *Veda*. It has traced the development of frequency through the "warmed-up" layers of this unmanifest field, into the junction point of consciousness and matter and finally into its expressed values as music in the applied areas of life[12].

According to the new psychology of music based on Maharishi's Vedic Science, the conception of, and interaction with music as coherent frequencies is lively on all levels of the individual psyche. But more specifically, it is lively in that part of each level of the individual mind and body which actively participates in the composition, production

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[11]Please refer to Chapter One, Sections VI.E, and VI.F.1-4 for more detail.
[12]Please see Chapter One, Sections I, II, III, IV, V and VI.

and/or response to music. The parts of the musical psyche engaged in musical activities operate together simultaneously as an holistic musical awareness whenever musical stimuli are present[13].

Historically, Maharishi (1991) explains that *Maharishi Gandharva Veda* music is the classical music of the ancient *Vedic* civilization which reportedly enjoyed heaven on earth. The music of this great civilization is in alliance with natural law in that it upholds the natural rhythms which prevail at different times throughout the day and night[14].

(c) How is music created? How it is perceived? Can these processes be measured?

Research on these queries resides primarily in the fields of Psychology and Sociology of Music. Seashore (1938), in one of the earliest texts on the psychology of music, explained that everything rendered as music or heard as music is actually nothing but an expression of a sound wave. He suggested that every conceivable sound in nature and art can be accounted for in terms of the sound wave. According to Seashore, associated with the sound wave's physical properties were psychological properties perceived by the individual listener.

> The psychological attributes of sound, namely, pitch, loudness, time, and timbre, depend upon the physical characteristics of the sound wave: frequency, amplitude, duration and form (Seashore, 1938, p. 2). Rhythm, harmony, volume, and tone quality are compounds of these; thought, feeling, action, memory, and imagination are in terms of these. (Seashore, 1938, p. 29).

Through this albeit imperfect correspondence of physical sound wave to psychological property, Seashore suggested that it became possible to measure the effects of sound on the psychology—hence, the development of the Psychology of Music.

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[13]For more information, please refer to Chapter One, Sections V.A, V.B, V.C, V.D.
[14]Please see Chapter One, Section VI.D.2.

According to Boyle and Radocy (1987) music is human behavior and therefore can be measured. Musical knowledge, skills and attitudes are evaluated through behaviors and/or products resulting from such knowledge, skills, and attitudes (p. 316).

They explain that "The measurement of musical performance is inherently subjective. Music consists of sequential aural sensations; any judgment of a musical performance is based on those sensations as they are processed by the judge's brain" (Boyle and Radocy, 1987, p.171).

Johnson and Hess (1970) developed a taxonomy of response behavior and response methodology which is used for classifying musical tests. Boyle and Radocy note that musical response behaviors include aural discrimination, aural identification with note reading, musical background knowledge, composition, note reading, playing proficiency, and musical preference. Musical response methodologies include pair comparisons, successive categories, reproduction, melody composing, verbalization, singing, and instrument playing (p. 103).

Seashore (1938) adds that musical talent may be measured and analyzed in terms of a hierarchy of talents as related to the total personality, the musical medium, the extent of proposed training, and the object to be served in the musical pursuit (p.29).

Boyle and Radocy (1987) suggest that the study of musical behavior is the realm of the psychology of music. Musical behavior refers to the overt manifestations of a myriad of psychological, physiological, and neurological processes that an individual has in relation to musical sound and/or other music-related events or phenomena.

> Musical performance (singing or playing an instrument individually or in a group), reading or writing music, improvising or composing music, listening to music, moving to music, reading about music, having a feeling response (affective/aesthetic) to music, or analyzing music are all musical behaviors (Boyle and Radocy, 1987, p. 3).

Boyle and Radocy consider changing musical behavior to be the essence of music teaching, and the study of musical behavior as the realm of the psychology of music.

> ...Talent, aptitude, musicality, musical intelligence, music ability, and music audition...reflect constructs that are used to differentiate between individuals and groups of individuals who demonstrate different levels of performance on selected musical tasks

(Boyle and Radocy, 1987, p. 3). Individuals who perform better on tasks are considered "talented" compared to those who perform poorly. Boyle and Radocy (1987) also point out that

> Musical behavior may involve highly complex integration of various levels of cognitive, affective, and psycho-motor behaviors related to musical phenomena or may be limited to a single, simple response to a given musical stimulus. Any observable human activity that is related to music may be conceived of as musical behavior (Boyle and Radocy, 1987, p. 3).

From Maharishi's perspective, musical behavior is the realm of the Musical Psyche. For the Musical Psyche, all aspects of musical behavior, involving all levels of the mind and body, as understood in Maharishi's Vedic Psychology, interact and thereby transform the unmanifest flow of musical knowledge regarding sound, frequency and melody into the manifest dynamics of a musical performance[15].

Music as such evolves from the self-interacting dynamics of the Unified Field of Pure Consciousness. This new Psychology of Music explains the dynamics involved in the sequential unfoldment of sound from this unmanifest field of consciousness into physical manifestation as melody[16].

According to Maharishi's Vedic Science the origin of frequency or sound vibration can be located in the self-interacting dynamics of the three-in-one structure of the Unified Field of Pure Consciousness, the field of pure knowledge, the *Veda*. From there frequency evolves through the "warmed-up" layers of this unmanifest field into the junction point of consciousness and matter. In this junction point, the laws of *Maharishi Gandharva Veda* music activate the processes which transform sound frequency into musical melodies.

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[15]See Chapter One, Sections V, VI, VII.
[16]Please refer to Chapter One, Sections II and III.

These melodies are then acted upon by the musical psyche of the musician resulting in musical performances which can be enjoyed by all.

From another perspective, Maharishi's Vedic Science has found the first manifestation of sound frequency in objective creation to be the "essence" of sound associated with *akasha* or space—the vacuum state as explained by the *Panchamahabhuta* theory of *Maharishi Ayur-Veda*[17] . From there, the essence of sound manifests as sound or vibrational frequency subordinated to the laws of physics, until, finally, it emerges as musical frequency which is heard and responded to by the human nervous system[18].

To study and measure the Musical Psyche as it interacts with the frequencies of nature would follow the same rules as found in the western science approach to the Psychology of Music.

(d) What are the effects of music?

This is the realm of music therapy.

Scartelli (1989) considers music an integral part of social, business, educational and religious functioning. He states that it pervades all aspects of daily life. Because of its elemental function in all areas of life, music researchers such as Boxhill (1985), Boyle and Radocy (1987), Gaston (1968), Benezon (1981), Hanser (1987), Eagle (1972) and many others assert that music has a tremendous effect on the individual.

Research has shown music affects the biology and psychology of the individual as well as the society in which the individual functions. Benezon (1981) sums up the effects of music on the biology of the individual in the following way. He indicates that:

a. muscular energy increases or decreases according to rhythm stimuli;

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[17]*Maharishi Ayur-Veda* is another branch of *Vedic* literature studied in ***Maharishi's Vedic Science.***

[18]Please refer to Chapter One, Section III.

b. breathing is accelerated or changes its regularity;
c. a marked but variable effect on the pulse, the blood pressure, and the endocrine function is produced;
d. the impact of sensory stimuli is reduced in different ways;
e. fatigue is reduced or delayed, and consequently muscular hardening is increased;
f. voluntary activity such as typing is increased, and the muscular reflexes used in writing, drawing, etc. are lengthened;
g. changes may be induced in the electrical leads of the body;
h. changes in the metabolism and the biosynthesis of various enzymatic processes may be induced (Benezon, 1981, p.17).

The branch of music knowledge which studies the effects of music on the individual for the purpose of improving overall quality of life is known as music therapy. Boxhill (1985) explains that the overall aim of music therapy is to "bring about inner change and to develop skills and abilities through music activities that affect every area of life".

Hanser (1987) describes the benefits of music therapy for individuals in need of clinical assistance.

> For the developmentally disabled, music therapy teaches social, motor, academic and conceptual skills. With the behaviorally disordered, it offers opportunities for self-expression, self-esteem and self-control. The acquisition of musical skills in a child with a learning disability brings parallel developments in perceptual-motor and cognitive areas. For the physically handicapped, the positive, creative aspects of music learning offer incentives for freer movement, rhythmic understanding, and enhanced sense of worth. Medical patients divert attention from pain while attempting to deal with their illnesses. People with psychiatric disorders respond to the non-verbal metaphor established in the music therapy setting. Geriatric patients become involved in a creative reality-oriented experience which may be revitalizing and reminiscent of joyous times. These populations represent a small segment of the clientele who can benefit from the use of music as therapy (Hanser, 1987, p. 12).

Regarding the effect of music on society, Bonny and Savary (1983) quote Confucius:

> The superior man tries to promote music as a means to their perfection of human culture. When such music prevails, and people's minds are led towards the right ideals and aspirations, we may see the appearance of a great nation. (In Bonny and Savary, 1983, p. 21).

According to Maharishi, *Maharishi Gandharva-Veda* music affects both consciousness and matter. He explains that everything in creation is, in actual fact, nothing but a composite of frequencies. He says that even disorderly behavior in society

has its own unbalanced frequency. Because *Maharishi Gandharva-Veda* is the science of transformation and since *Maharishi Gandharva-Veda* music is considered to be the custodian of all frequencies at the junction point between consciousness and matter, Maharishi claims that it can amend any "topsy-turvy situation" including disorderly behavior in society by restoring balance to the unbalanced frequencies. In this way *Maharishi Gandharva Veda* music can eliminate all human fears, suffering and sicknesses and can resolve the problems of every nation and bring peace to the whole world.

To determine the effects of music, this new Psychology of Music measures changes reflecting increased balance in behavior, both musically and otherwise, in both the individual and in society. Included are cognitive measures of musical talent, measures of psychophysiological changes in mental and physical health, measures of affective response behaviors, changes in electroencephalographic measures indicative of higher states of consciousness, and measures of changes in social behavior descriptive of the development of lasting world peace.

Summary

To summarize, then, in researching the answers to the fundamental questions raised in the study of music, different branches of knowledge have evolved in the Western arena of knowledge. Although each branch of knowledge has contributed its own unique understanding to what constitutes music, the fields of Music Theory and Psycho-acoustics in the field of Psychology of Music seem best suited for studying this area responsibly. For studying the origins of music and why it exists, the fields of Musicology and Ethnomusicology have evolved. To explain how music is perceived and performed, i.e., musical behavior, the fields of Psychology and Sociology of Music have been created. To understand the effects of music, the field of Music Therapy has emerged. As will be seen

in Chapter One, the Vedic theory of sound and a new Psychology of Music based on Maharishi's Vedic Science encapsulate all these branches of knowledge into one holistic model, thus bringing dignity to each separate field while connecting it to the whole.

Chapters Two and Three of this dissertation will discuss methodologies for measuring affective responses to music and Chapters Four, Five and Six will present research on *Maharishi Gandharva-Veda* music.

CHAPTER 1

THE VEDIC PSYCHOLOGY OF MUSIC— THE HARMONIOUS INTEGRATION OF THREE IN ONE

See deep enough, and you see musically;
The heart of nature being everywhere music,
If only you can reach it.
Thomas Carlyle

The purpose of this first chapter is to present: (1) A brief overview of Maharishi's Vedic Science theory on the origin and function of sound and music; and (2) a new psychology of music based on Maharishi's Vedic Science, its corollary of a Musical Psyche, and its implications for harmonizing and integrating individual and social life.

I. Maharishi's Vedic Science

A. Definition of Terms

Maharishi defines his Vedic Science by defining each word in the title. *Maharishi* actually consists of two words: *Maha* and *Rishi* . In *Sanskrit, Maha* translates as great and *Rishi* seer. Hence the name translates as Great Seer. According to Maharishi, whereas a *Rishi* or Seer sees or cognizes the truth of life, the knowledge of the inner reality of everyone's life—the *Vedas*, a *Maharishi* or Great Seer not only sees but also enlivens that knowledge within the physiology of everyone by teaching the knowledge of the *Veda* and its applications to daily life (Maharishi, 1994, p. 2 - 3).

According to Maharishi, "*Veda* means pure knowledge and the infinite organizing power that is inherent within the structure of pure knowledge" (Maharishi, 1985, p. 26). Maharishi defines pure knowledge as self-referral consciousness—a state in which consciousness knows only itself. Maharishi says:

> 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 of that is also the same mass of knowledge (Maharishi, 1985, p.27).

Self-referral consciousness will be discussed in more detail further on.

Maharishi's Vedic Science is the science of *Veda*, the study of pure knowledge and its infinite organizing power. Its range of study is the field of pure, self-referral consciousness and the self-interacting dynamics of pure consciousness in both manifest and unmanifest creation. Its textbooks are the thirty-seven texts of Vedic literature.

B. The Unified Field of Pure Consciousness— The Field of the *Veda*

According to Maharishi's Vedic Science, all objective expressions of nature and all aspects of subjective life, including music, have their basis in a unified field of pure consciousness, the field of pure knowledge. This field of pure consciousness has been compared to, and identified with, the unified field of natural law described by quantum field theory in physics (Hagelin, 1987). Properties of the unified field of consciousness include: self-referral, self-sufficiency, and infinite dynamism. The field has been described as unmanifest, undifferentiated, and existing beyond space, time and all other physical dimensions (Maharishi, 1985). It is a field of pure intelligence that creates the universe through its own self-interaction. It is the total potential of natural law, the source of all creative processes—a field of pure creative intelligence (Maharishi, 1972, p. 150). From the point of view of Psychology, it is the Cosmic Psyche (Maharishi, 1976, 1980). From this unified field of pure consciousness the evolutionary processes of creation, encapsulated in the laws of nature, interact and thereby sequentially unfold to become the manifest expressions of subjective and objective life, thereby producing the physical world and universe as we know it.

Maharishi's Vedic Science studies the dynamics inherent within the structure of this unified field of pure consciousness. It uncovers the fundamental properties of the field, isolates its self-interacting dynamics, and describes the mechanics by which the field of pure consciousness manifests as objective creation. In addition, Maharishi's Vedic Science identifies this field of pure consciousness as the source of human consciousness or awareness lying at the basis of all thought and behavior in the individual and provides subjective technologies, Maharishi's Transcendental Meditation and TM-Sidhi programs, for accessing this field and incorporating its values in human consciousness.

According to Maharishi:

> All speech, action, and behavior are fluctuations of consciousness. All life emerges from and is sustained in consciousness. The whole universe is the expression of consciousness. The reality of the universe is one unbounded ocean of consciousness in motion (Maharishi, 1994, p. 68).

C. Self-Referral Value of Consciousness—Self-Referral Loops

Vritti sarupyam itah atra (*Yoga-Darshana* 1.3, 1.4).

The frequencies of self-referral consciousness emerge *from* self-referral consciousness and remain *within* self-referral consciousness.

Maharishi explains that

> In its 'self-referral' state, or transcendental state, consciousness knows itself alone; as such, it is the knower of itself. By being the knower of itself, it is also the object of knowledge and the process of knowing. Thus, in its self-referral state, consciousness is the unified state of knower, knowing, and known (Maharishi, 1994, p. 59).

This three-in-one structure of consciousness Maharishi calls the *Samhita* (unity) of *Rishi* (knower), *Devata* (knowing) and *Chhandas* (known). Maharishi's Vedic Science (1994, p. 61) holds that *Veda* equates with the self-referral intelligence of *Samhita*. Maharishi says that the three values within the oneness of pure consciousness comprise the lively potential of the infinite organizing power of pure knowledge. The process by which

consciousness evolves from its *Samhita* value of singularity—through diversified values of knower, knowing and known interacting with each other, thus transforming consciousness into its more object-referral values of manifest creation—occurs through what Maharishi calls "self-referral loops." Maharishi explains that while pure consciousness transforms itself into its object-referral expressions, it maintains the memory of its self-referral source. The dynamic of ever progressing and yet ever remembering its source structures a self-referral loop. These self-referral loops are found at every level of the creative process and are an inherent part of the structure of the thirty-seven texts that constitute the *Veda* and the Vedic literature. According to Maharishi this phenomenon of a self-referral loop explains why the Vedic literature is represented in a *mandala* structure, a circular form.

D. *Mandala* Structure of Pure Knowledge

According to Maharishi (1994, p. 74) each aspect of the Vedic literature, from beginning to end, expresses the full range of a specific quality, from its infinity to its point value—from its holistic, general value to its progressively quantified or specific values in orderly sequence. This concept of generality and specificity characterizing the different qualities or laws of nature will be discussed a little further on. Because each aspect of the Vedic literature expresses the self-referral structure of consciousness in which every expression is always connected to its source, the Vedic literature has a non-destructibility quality to it—what Maharishi (1994) calls an immortal status. In referring to its source, Maharishi says that the Vedic literature refers to itself; but, in order to do so, the Vedic literature must be in a circular form. That is why Maharishi says that the structure of the *Veda* is in

> the *Mandala* form, and each structure of the Vedic literature (being the structuring dynamics of *Veda*) is in a *Mandala* form—we call it a self-referral loop. Being in a circular form, a *Mandala* form, each aspect of the Vedic literature breathes immortality, eternity (Maharishi, 1994, p. 76).

As will be seen later on, it is suggested that *Maharishi Gandharva Veda* reestablishes these self-referral loops in the conscious awareness of the individual through music, thereby restoring the connection of self-awareness with its source, the field of pure, Self-referral consciousness. Maharishi holds that this re-connection of the part to the whole, of small self to pure Self-referral consciousness is what harmonizes and integrates individual behavior and action with the *Veda,* the laws of nature.

E. The Self-Sufficiency of Pure Knowledge

Maharishi considers *Veda* to be self-sufficient. According to Maharishi:

In its self-referral state, consciousness knows itself alone, as such it is the knower, of itself. By being the knower of itself, it is also the object of knowledge and the process of knowing (1994).

It is the total potential of natural law that creates from within itself through its own self-referral property (Maharishi in Orme-Johnson, 1988, p.170). Maharishi considers consciousness to be its own technology. "It is one unbounded ocean of consciousness in motion within itself, eternally sustaining the process of evolution." (p.9) Because it does not need anything outside itself to exist or create, Maharishi describes the field of pure knowledge as self-sufficient.

F. The Infinite Dynamism of the Field of Pure Knowledge

There are two properties of the field of pure knowledge which makes it infinitely dynamic. Both involve the principle of oscillation. Maharishi explains that the field of pure knowledge oscillates from its three-fold nature of knower, known, and process of knowing to its unified value as *Samhita.* This process of oscillation is infinitely dynamic (Maharishi, 1985). Also, the field of pure knowledge oscillates between the two extremes of its nature.

From its expression of wholeness, totality, symbolized by the first letter of *Rk Veda*, "A" which is the very first expression of the entire Vedic literature, to its expression as a point value in the second letter "k". Rk *Veda* opens with these two extreme values of infinity and a point, and the entire field of pure knowledge oscillates at infinite frequency between these two continually. From this oscillation the entire creation arises. According to Maharishi, the field of pure knowledge "must be infinitely dynamic because its activities are continuously creating and expanding the universe." (Maharishi, 1985, p.65). More will be said later on the sound value of this infinite oscillation.

G. *Veda*: The Eternal Laws of Nature

According to Maharishi the *Veda* is made up of eternal laws. Eternal means non-changing, immortal, immutable. These eternal laws are responsible for the emergence of creation and its continual evolutionary processes. According to Maharishi (1994, p. 207), "*Veda* is the expression of the totality of all the laws"; it is also the expression of total order. Maharishi quotes *Manu Smriti*, 2.6 which says "*Vedo akhilo dharma mulam*" (*Veda* is the root of all laws). He explains that because the *Veda* is the source of the eternal, orderly process of creation and evolution it should be termed the Constitution of the Universe. He says that "*Veda* is the structure of the eternal Constitution of the Universe, the structure of eternal order" (Maharishi, 1994, p. 207). Consequently Maharishi maintains that this Constitution is "lively within the self-referral consciousness of everyone and within the intelligence of every grain of creation" (Maharishi, 1994, p. 204). The description of the Constitution of the Universe as the structure of eternal absolute order is given in Maharishi's *Apaurusheya Bhashya* of *Rk Veda* which is discussed further on in this chapter.

H. The Structure of the Laws of Nature Pure Knowledge— Generality and Specificity

In commenting on the structure of pure knowledge, the structure of the *Veda*, Maharishi explains that "knowledge is structured in consciousness." Maharishi actually considers knowledge to be just a mode of consciousness.

> So knowledge is just a mode of consciousness, awareness, or intelligence. Intelligence is a very innocent level of existence. We could call it a pure level of existence, which in its changing modes plays the role of or receives knowledge; it is knowledge. Knowledge is born in the junction point between pure intelligence, the simplest form of intelligence, or pure awareness, and its changing modes (Maharishi, 1980, p. 73).

Maharishi explains that the state of knowledge is born between two states of consciousness: the self-referral state of unbounded pure consciousness, the *Samhita* value of knowledge, and the localized or specific state of awareness in which pure awareness is object-referral, the diversified values of consciousness. This phenomenon is often referred to as the *Brahmana* aspect of the *Veda* and will be discussed further on in the chapter. For Maharishi, the structure of pure knowledge thus has both a general state of awareness and a specific state of awareness— generality and specificity—and this, Maharishi says, appropriately characterizes all the laws of nature.

> The beauty in any law is that it has two values inherent in it, the values of generality and specificity, those two values which are the characteristic feature of the home of all the laws of nature, the absolute state of organizing power, the structure of pure consciousness (Maharishi, 1980, p. 75).

Maharishi further describes the properties of these two values of natural law when he says:

> Specificity is a variable, changeable quantity; generality is non-changing. These two features, which belong to the mother of all the laws of nature in the absolute state of pure knowledge, are contained and carried over in the children of that law of nature. All the different laws of nature conducting activity in nature on different levels of creation have this characteristic of being both specific and general (Maharishi, 1980, p. 75).

Maharishi points out that one characteristic of the generality of a law is its constancy— it does not change.

As will be seen later on, these characteristics of the laws of nature can be found in the dynamics of *Maharishi Gandharva Veda.*

I. Expressions of the *Veda*

Maharishi has said that "Consciousness is the most basic element of creation. *Veda* is structured in consciousness. Vedic literature is the literature of consciousness" (Maharishi, 1994, p. 74). Maharishi considers the *Veda* and the Vedic literature to be the integrated structure of total knowledge and its infinite organizing power—the total potential of natural law—and this, he explains, constitutes his Vedic Science and Technology (Maharishi, 1994, p. 76).

According to Maharishi, the textbooks of his Vedic Science are all the different aspects of the Vedic literature. Since every aspect of the Vedic literature expresses a specific quality of consciousness, reading the Vedic literature in its perfect, sequential order enlivens those specific qualities in the individual's consciousness. Maharishi considers the human brain physiology to be the instrument by which anyone can easily become aligned with the self-referral state of consciousness—the abode of the *Veda.* Reading the Vedic literature apparently generates an effect which regulates and balances the functioning of the brain physiology, thereby training individual consciousness, the mind, to flow always in perfect accord with the evolutionary direction of natural law. Recently, the thirty-seven areas of the Vedic literature have been related to thirty-seven areas of the human physiology represented in the physiology of the brain (Nader, in press).

Maharishi points out that these expressions of Vedic literature are important not only for their meaning but also for their sound value. When uttered as speech, these Vedic

expressions, or *mantras*, convey, in their very sound-frequencies, the self-interacting dynamics of natural law involved in the process of creation (Maharishi, 1994). This concept will be developed further on.

The thirty-seven texts of Vedic literature include:

> (the) four *Vedas*: *Rk Veda, Sama Veda, Yajur-Veda, Atharva Veda; Stapathya Veda, Dhanur Veda, Gandharva Veda*; six *Vedangas: Shiksha, Kalpa, Vyakaran, Nirukta, Chhandas, Jyotish*; six *Upanga: Nyaya, Vaisheshika, Samkhya, Yoga, Karma Mimansa, Vedanta*; six *Ayur-Veda*; six *Brahmanas: smriti, Purana, Itihasa, Brahmana, Aranyaka, Upanishad*; and the six *Pratishakyas* (Maharishi, 1994, footnote on page 144).

Figure 1-1 presents a complete list of the Vedic literature displaying its sequential elaboration from *Rk Veda* to the *Pratishakyas*, from the unmanifest basis of pure consciousness to its most expressed, warmed-up expression at the verge of manifest creation. Please note that Figure 1-1 is modeled on figures found in Maharishi's (1994) book, *Vedic Knowledge for Everyone.*

In summary, Maharishi's Vedic Science is the study of consciousness, the unified field of knower, known, and knowing. Maharishi's Vedic Science is the study of pure knowledge and its infinite organizing power—the *Veda.* Self-referral consciousness is the abode of the *Veda.* The *Veda* is the intelligence of the *Samhita* value of self-referral consciousness. The *Veda* consists of the eternal laws of nature which are responsible for the emergence of creation from its unmanifest state and for its continual evolution. Characteristics of these eternal laws of nature include: generality, specificity, and constancy. The totality of the *Veda* is expressed in the thirty-seven textbooks of the Vedic literature. Each textbook expresses the full range of a specific quality or law of nature. Reading the Vedic literature has a positive effect on human brain physiology. *Maharishi Gandharva Veda* is one of the thirty-seven textbooks of the Vedic literature.

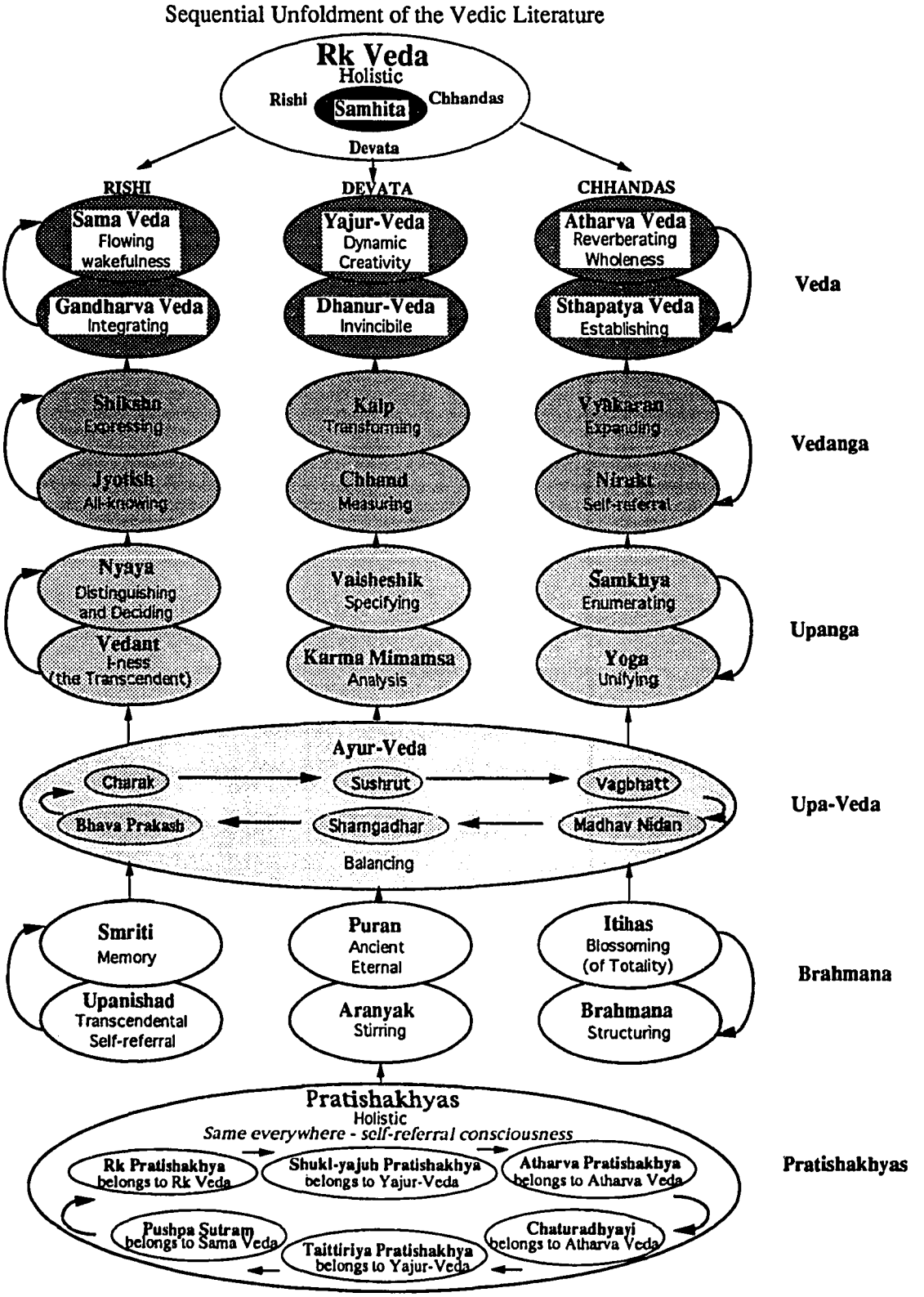

Figure 1-1. Sequential unfoldment of the Vedic literature expressing Maharishi's theory of the sequential unfoldment of natural law. (After Maharishi, 1994, pp. 77 and 81)

J. The Difference Between Modern Science and Maharishi's Vedic Science

Maharishi (1985) points out how modern science differs from his Vedic Science in its approach to understanding the full range of knowledge. From Maharishi's point of view, modern science primarily studies the dynamic interactions of objective creation. Although it studies everything there is to be known about the object of knowledge and its interactions in manifest creation, modern science rarely investigates the field of subjective creation—what Maharishi calls the area of the knower and the process of knowing. Thus, Maharishi considers modern science to be at best one-third of his Vedic Science; and, therefore, Maharishi suggests that modern science teaches incomplete knowledge.

Maharishi expresses his concern regarding the effects of the applied value of incomplete knowledge on the individual and society in the following quote:

> Incomplete knowledge, based on isolated areas of experimental investigation, has created a society full of problems and suffering, in which it is difficult to live a healthy and happy life. For example, the harmful side-effects of modern medicine; the pollution of air, water, and food produced by industrial and chemical technology promoted by modern science; and the destructive power of electronic and nuclear technologies have all affirmed the truth: A little knowledge is a dangerous thing (Maharishi, 1994, footnote found on page 188- 189).

Cavanaugh (1987), a highly trained statistician in social science, points out that contemporary social science, the field responsible for researching the subjective aspect of life, has largely ignored the basis of all thought and behavior—consciousness or awareness—in favor of focusing solely on observed behavior. "Such theories," he says, "are intrinsically incomplete in that they fail to incorporate a satisfactory theory of human consciousness."

Maharishi's Vedic Science, however, extends beyond modern science to incorporate the study of consciousness and its effects on life. Cavanaugh considers the *Vedic* description of the nature and development of consciousness, its connection to the physical

universe, and its relation to the behavior of the individual and society as highly precise and coherent. He supports Maharishi's assertion that Maharishi's Vedic Science is a complete science which can be applied to improvement of life on every level.

For Maharishi, his Vedic Science is the total science of life: it studies the subjective aspect, the objective aspect, and the connection between the two. It uncovers the complete knowledge of the total potential of natural law and brings human awareness in tune with those fine creative impulses that are engaged in transforming the field of intelligence into the field of sound vibration, and hence the field of matter. Maharishi's Vedic Science intellectually analyzes all values of the field of relative life and of the absolute state of self-referral consciousness. The application of these values is through Maharishi's Vedic Technologies, the Transcendental Meditation and TM-Sidhi programs, purely scientific procedures for the total development of the human psyche and the total development of the human race (Maharishi, 1985).

A discussion of music must begin with its root origins in sound. The following brief review of Maharishi's Vedic Science will focus primarily on those principles which explain how sound emerges from the self-interacting dynamics of the unified field of pure consciousness.

II. The Vedic Theory of Sound Based on Maharishi's Vedic Science

A. *Veda*—The Language of Nature

> Utterance (Vak) brought forth all
> the universe. He (God) pronounced
> 'Bhu' and the Earth was born.
> From the sound of *Veda*s that
> supreme Divinity made all things.
> (*Manusmriti* 1. 21)[1]

[1] The quotes used in this section on the *Vedic* literature come from various translations of *Vedic* texts. However, these translators are not involved with Maharishi's revival of his *Vedic* Science. Therefore, it should be understood that their translations may not correspond directly with Maharishi's interpretation of the quote's precise meaning.

According to Maharishi (1985), "Vedic Science is the science of *Veda*. *Veda* means pure knowledge and the infinite organizing power inherent within the structure of pure knowledge."[2] Maharishi explains that pure knowledge refers to the unified field of consciousness when it is completely undifferentiated; it knows nothing other than its own self—similar to an ocean being seen only as ocean. In such a case, when consciousness knows only itself, it is completely self-referral. However, by the very process of knowing itself, consciousness activates the organizing power inherent within its self-referral nature and diversifies from one wholeness into a field containing the three values of knower, process of knowing, and known—similar to the ocean becoming conscious of waves on its surface and thereby becoming both waves and ocean. This, Maharishi says, is the three-in-one structure of pure knowledge. The processes by which this occurs exist completely within the structure of the unified field of consciousness. Since the field does not depend on anything outside of itself for its existence nor for its transformations from one to three, it may be considered self-sufficient (Maharishi, 1980, p.10).

The field is also infinitely dynamic. As will be explained in more detail further on, the field sequentially unfolds within itself creating layers of three-in-one structures until consciousness ultimately transforms itself into matter (Maharishi, 1985). This process of constant transformation or oscillation from one-to-three and three-to-one, from infinity to point value and back, is filled with all possible permutations and combinations of frequencies at many levels of the unmanifest field—similar to the currents and flows existing at many levels of the ocean. It is these dynamically oscillating frequencies which are responsible for the manifest creation.

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[2] It should be noted that this particular description of the structure of pure knowledge and its sequential elaboration throughout the *Vedic* literature is presently being revised by Maharishi. As this latest version is still in press, I decided to use the previous version which has been thoroughly reviewed by the other scientists referred to in this chapter.

B. The Infinite Frequency of the *Veda*— The Source of Sound Vibrations in the Unified Field of Pure Consciousness

> In this Universe, there is no form of
> knowledge which is not perceived through
> sound; knowledge is pierced through by sound;
> all this Universe is but the result of sound.
> (*Vakya Padiya* 1.124)

According to Maharishi, the field of pure knowledge contains the totality of natural law within its unmanifest structure. This natural law is responsible for the creation, maintenance, and evolution of the entire universe (Maharishi, 1980, pp. 74-75).

Maharishi's Vedic Science states that the field of pure consciousness is fully awake to itself; it is self-referral, self-aware. In the process of becoming aware of itself, its unbroken wholeness *(Samhita)* differentiates into the three values of the knower, known, and the process of knowing. In terms of Maharishi's Vedic Science, these are the (1) *Rishi* (knower), (2) *Devata* (process of knowing), and (3)*Chhandas* (known) aspects of *Samhita* (wholeness).

Maharishi explains that

> In 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 the unmanifest because it is open to itself—pure singularity but with three qualities, three and one both 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 with itself, is fully awake to its infinite value. At the same time it is awake to its 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 causes noise. It is completely an unmanifest noise, but noise nevertheless, just because its very nature is such that it is three and one together. This phenomenon is not open to anyone except itself. In this self-referral, self-interacting state we have noise, though noise is too crude a word. It creates vibrations within itself (Maharishi, 1985).

According to Maharishi (1994, p.335) the simultaneity of opposite values within the nature of pure consciousness constitutes a kind of "infinite frequency" of oscillation. This generates an unmanifest noise, which is the silent hum of the unified field whispering to itself. This hum is called *shruti* (that which is heard) and is the infinite frequency, the perfectly coherent, unmanifest sound of the *Veda*. Maharishi (in Dillbeck, 1988) thus points out that "inherent within the very nature of pure consciousness is a fundamental form of frequency which, in turn, gets transformed into other modes of frequencies or vibrations." It is in the form of frequency that the dynamics of natural law become expressed as *Veda* and frequency is the organizing power of pure knowledge.

C. The *Shruti* Value of the *Veda*

According to Maharishi (1994, p.21) *shruti* is an eternal sound which is heard at the basis of creation. It is heard within the self-referral structure of consciousness. Maharishi calls *shruti* "the administrator of the universe in the form of sound" (p.356). It is general and specific at the same time. "It is the sound that is heard by itself. It is energy and intelligence at the same time, because its existence is on the level of self-referral consciousness" (p.357).

Maharishi also refers to *shruti* as *chaitanya* "the specific representative of total creativity, total intelligence" the unified field of pure consciousness (P.357). *Shruti* is the infinite frequency generated in the self-interacting dynamics of the unified field of pure consciousness[3].

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[3] As will be seen later on, the concept of *shruti* is carried on into *Gandharva Veda* but its structure as one specific frequency changes into its expression as many specific frequencies. This will be discussed in section 7 in which the dynamics of *Maharishi Gandharva Veda* are elaborated.

According to Maharishi, the sequential structure of the *Veda* unfolds from its *shruti*—*Veda*'s first expression as sound—into its expression as multiple frequencies. These myriad frequencies are responsible for producing form in manifest creation. Maharishi refers to these multiple frequencies as the primordial sounds of the unified field of pure consciousness. He also calls them the language of nature (Maharishi, 1994, p.320).

D. The *Mantras* and *Brahmanas* of the *Veda*— Pure Knowledge and its Organizing Power

According to Maharishi (1994, p.3) *Veda* is defined as pure knowledge and its organizing power. In the *Veda*, pure knowledge and organizing power have clearly defined components. The *Mantras* represent the component of pure knowledge, while the *Brahmanas* constitute the component of organizing power.

Maharishi holds that the *Mantras* are "the structure of pure knowledge, the source of the *Veda; Brahmanas* are the internal dynamics of the structure of pure knowledge, the organizing power of the *Mantras*, the intelligence that structures the *Mantras*" (1994, p.3).

E. *Samhita* Value of the *Veda*

Recall from figure 1-1 that the first texts of Vedic literature are the four *Vedas*, *RK Veda, Sama Veda, Yajur Veda*, and *Arthava Veda.* Associated with *Sama Veda*, the knower (*rishi)* is *Gandharva Veda.* Associated with *Yajur Veda*, the process of knowing (*devata)* is *Dhanur Veda.* Associated with *Atharva Veda*, the known (*chhandas*) is *Stapathya Veda. Rk Veda* is considered to be the totality of all knowledge, the collectedness of *Sama, Yajur* and *Arthava.*

Maharishi's Vedic Science refers to each of the four *Vedas* as *samhita. Samhita* means the collected wholeness of the field—a complete and perfect expression of the total potential of natural law as it emerges from the self-referral performance of the Self

(Maharishi, 1985). The *Mantras* within each *samhita* refer to the utterance of the actual primordial sounds found within the Vedic text.

According to Maharishi:

> The *Mantras* are the language of nature in which cosmic intelligence reverberates as the laws of nature. All the *Mantras* together form the structure of pure knowledge, a lively field of the total potential of the organizing power of nature. The *Mantras,* being the fabrics of the unmanifest, immortal field of pure knowledge, are eternal and indestructible *(Vedic Science, Fulfillment of Modern Science,* 1980).

Regarding the *Samhita* aspect of Maharishi's Vedic Science, Maharishi explains that:

> The knower, the known and the process of knowing which connects the knower with the known—when these three aspects of knowledge are seated one within the other, that is called *Samhita. Samhita* is the collectedness of knower, known, and knowledge. There are *Rig Veda Samhita, Sama Veda Samhita, Yajur Veda Samhita,* and *Artharva Veda Samhita*—four *Vedas,* four *Samhitas* (Maharishi 1985).

Maharishi's Vedic Science assigns particular characteristics or qualities to *Rishi* (knower), *Devata* (process of knowing), and *Chhandas* (known) in the *Samhitas.*

> *Rishi* is the witnessing quality within the wakeful quality of *Samhita; Devata* is the transformational quality of consciousness, the value of activity or dynamism; and *Chhandas* is the structural quality of consciousness, also defined as 'that which hides'—the concrete, structural value which obscures the wakeful quality of consciousness within (Maharishi in Wallace, 1993).

According to Maharishi:

> The three-in-one structure of *Samhita* of *rishi, devata,* and *chhandas* is the basis of all the laws of nature at every point in creation; it is the availability of all the laws of nature at any point in the whole span of infinity of space and time (Maharishi, 1994, p.315).

Maharishi's Vedic science explains that all knowledge in seed form is provided in the sequential development of knowledge available in the structure of *Rk Veda.* Maharishi holds that the process of the three *Vedas* emerging from *Rk Veda* is the process of triggering diversification from within the structure of unity" (Maharishi, 1994, p.137). Furthermore, "the sounds of the *Veda* sequentially developing the Vedic literature constitutes the creative process in nature, upholding all levels of expression of nature's

intelligence, and promote the infinite diversification of the ever-expanding universe" (1994, p.140). These sounds are the *Mantras* of the *Samhitas* of Vedic literature.

Note that, as pure knowledge sequentially elaborates on itself, different *Vedic* texts get created from the *Samhitas* (viz. *Rk Veda Samhita, Sama Veda Samhita, Yajur Veda Samhita, and Artharva Veda Samhita*). Maharishi's Vedic Science has determined that these elaborated levels of the Vedic literature can be seen also in terms of *Rishi, Devata,* and *Chhandas.*

> *Rk Veda* is the totality of all knowledge—the knowledge of the three-in-one. *Sama Veda* is attributed to the value of *Rishi, Yajur* to the value of *Devata,* and *Artharva Veda* to the value of *Chhandas.* All the other aspects of Vedic literature expound these three values, connect them to humankind in terms of the Self, the mind, and the body, and detail the perpetually self-referral transformation through steps of sequential development by which consciousness becomes matter, the body (Maharishi, 1985, p. 40-41).

F. The *Shruti-Darshana* Relationship in the *Veda*—The Precision of Nature's Language

One of the specialties of the Vedic language is the intimate relationship that exists between the name and its corresponding form, the sound and the object it names. This principle (known as *Shruti-Darshana*) states that on the level of the unified field of pure consciousness, as consciousness engages in its transformations from the one-to-three structure of itself on all levels of elaboration, it assumes different dynamical expressions or forms. The name or sound *(shruti)* value activated on that level of pure consciousness becomes identified with a corresponding form *(darshana)* (Maharishi 1994, p. 315-318). That form *directly* corresponds to the name because the form is created from the frequencies inherent in the expression of the name. For example, *vayu* directly represents the form "air," *prithivi,* "earth," and so on. According to Maharishi, the *Vedic* names associated with these fundamental forms are the actual vibrational patterns of the unified field.

This language of nature is unlike most spoken languages used in the world today. In these languages, the vibrational pattern or frequency may or may not directly represent the form. Maharishi (1994, p.316) says that: the same self-referral process of transformation that transforms one sound into another sound and continues to build up more and more individuality of sound. "These individual structures of sound we know as forms of sound," (Maharishi , 1994, p.316). According to Maharishi each sound has a form. Implicit in the process of evolution of sound is the process of evolution of form.

> Sound has a form, form has a sound; form is physiology, sound is the frequency that structures physiology. Sound and form, being the transformation of consciousness are appreciated by consciousness as its own expression in terms of *shruti* (sound) and *darshana* (form). (p.317).

Maharishi explains that

> the modern understanding of sound and its corresponding form is described in terms of frequency, and the Vedic understanding of sound and its corresponding form is expressed in terms of vowels and consonants —in terms of spoken and written language (1994, p.317)

This Vedic language is what Maharishi calls the language of nature (1994, p.317).

According to Hagelin (1987), a physicist who has worked closely with Maharishi in bringing to light Maharishi's Vedic Science, because of the intimate connection between sound and meaning, (name and form), Maharishi's Vedic Science can be considered to be a highly refined and sophisticated science of sound. It is the language of nature, responsible for transforming consciousness into its expressed value as matter (Maharishi, 1994). And because it is the emergence of nature, Maharishi says that "it can train the brain physiology to function spontaneously in an evolutionary direction, promoting thought and action always in accord with natural law" (p.328).

G. *Ritam Bhara Pragya*—Accessing the Language of Nature

According to Maharishi (in Hagelin, 1987), all the fundamental modes or primordial sounds of the unified field can be systematically stimulated on the level of human consciousness through the expression of the *Veda.* It is suggested that when, through practice of Maharishi's Transcendental Meditation technique, human awareness comes into contact with the unified field of pure consciousness, and if, through practice of Maharishi's TM-Sidhi program, it can remain lively there, then the impulses of sound expressed in human awareness will automatically generate their corresponding form, with all the associated properties and characteristics. Maharishi calls this level of awareness in which the name automatically invokes the form of the object "*ritam bhara pragya* — that level of the intellect that comprehends only the truth" (Maharishi in Hagelin, 1987).

Maharishi holds that the sound quality of the language of nature at the level of *ritam bhara pragya* directly produces a life-supporting influence on one's physiological functioning (Maharishi in Dillbeck, 1991). According to Maharishi (in Dillbeck, 1991) by attending to the primordial sounds (*shruti*) on the level of *ritam bhara pragya* in human awareness, the restructuring of the form (*darshana*) or in this case, the nervous system, will automatically commence, leading over time to the restructuring of that area in terms of its balanced state. Experiences at the level of *ritam bhara pragya* can include cognition of the *Vedas* themselves as outlined in the next section.

H. The *Apaurusheya Bhashya*—Nature's Own Commentary On the *Veda*

How is the *Veda* known to us? Maharishi indicates that the normal modes of perception, recognition, and cognitive processing are inadequate to the task. Instead, the *Veda* is "cognized by individuals with well-developed nervous systems, much in the fashion that form accompanies perception of the *Vedic* name in *ritam bhara pragya*". The *Apaurusheya Bhashya*, is the first principle of nature's functioning, "the eternal uncreated commentary," Maharishi's own cognition of the internal structure of the *Veda*. According to Maharishi, the *Veda* is a progressively elaborated commentary upon itself. Maharishi's *Apaurusheya Bhashya* describes creation as an expanding self-commentary of the Cosmic Psyche upon itself—level upon level of consciousness, becoming aware of its own three-in-one structure, and creating all possibilities of relationships between knower, known, and knowledge.

According to Maharishi (1985b),

> the *Veda* is not man-made; it is the eternal dynamics of consciousness collapsing within itself, the self-referral activity of the unified field and the dynamics of symmetry breaking by which the unified field expresses itself as creation. The *Veda*...is not a creation of the intellect, and no man-made commentary can adequately express the totality of knowledge contained within it. The *Veda* stands as its own commentary; it comments upon itself through its own sequential elaboration. Its commentary is *apaurusheya*. Thus, the *Veda* is not known through the intellect; it is cognized on the level of the Self through the realization *Vedo ham*—"I am the *Veda*."

Maharishi describes the *Apaurusheya Bhashya* in the following way. (Please note that the definitions of *Sanskrit* terms used by Maharishi are found in Dillbeck's explanation which comes immediately after Maharishi's commentary.)

> The *Apaurusheya Bhashya* presents the commentary of the *Veda* in the sequential progression of the *Samhita* itself. The first syllable of *Rk-Ved*, AK, expresses the dynamics of *akshara*—the '*kshara*' of '*A*,' or collapse of infinity to its point value, which is the source of all the mechanics of self-interaction displayed in the sequential unfoldment of the *Samhita*. From the lively seed of total knowledge expressed in the first word of *Rk-Veda*, *AKNIM*, the totality of the *Veda* and the Vedic literature unfolds in perfect

sequence. Each elaborated stage serves as a commentary on the mechanics of transformation present in the gap preceding it.

The 24 gaps in between the syllables of the first *richa* are elaborated as the 24 *padas* in the following eight *richas*. The 192 gaps between the 192 syllables of the eight *richas* (2-9) of the first *sukta* are elaborated in the 192 *suktas* of the first *mandala* of *Rig-Veda* —191 *suktas* plus one *avyakta* (unmanifest) *sukta*—while the 192 syllables themselves appear as the 192 gaps between the 192 *suktas* of the first *mandala*. These gaps in turn are elaborated in the 192 *suktas* of the tenth *mandala*. In addition, each of the eight *richas* (2-9) in the first *sukta* gives rise in sequence to one of the following eight *mandalas* of the *Rig-Veda* (*mandalas* 2-9). All the four *Samhitas—Rk-Veda, Sama-Veda, Yajur-Veda*, and *Atharva-Veda*—are compactly contained in *AKNIM* and emerge from its four letters: the *Rk Samhita* from G, the *Sama Samhita* from N, the *Yajur Samhita* from I and the *Atharva Samhita* from M.

In this precise, step-wise manner, beginning with A, extending to *AKNIM*, and then to the first *richa,* to the first *sukta*, to the entire *Rk-Veda,* and to all four *Vedas*, the *Veda* unfolds sequentially from the totality of knowledge contained in A—the first expression of the Self knowing itself in the state of pure knowledge (Maharishi Vedic University, 1985b, pp. 1-2).

Dillbeck elaborates on Maharishi's commentary:

> In Maharishi's *Apaurusheya Bhashya*, each sequentially larger unit of the *Veda* forms a more elaborated expression of the self-interacting dynamics of the unified field, just as each stage of growth of a tree is a more elaborated expression of the information contained in the seed. This principle has been illustrated by Maharishi in terms of the first sound of the *Veda* (A), the first syllable (AK), and the first word (*AKNIM*). (According to rules of *Sanskrit* pronunciation, the syllable AK becomes AG because of the sound that follows it [N] in the word *AKNIM*. Maharishi states that just as the remaining sounds of *AKNIM* "comment" or elaborate on A, so the sequential progression of syllables and words of the first *richa* (verse) and all following richas and sections of the *Veda* comment and elaborate on this first expression of self-interacting dynamics. The *Veda* is elaborated through a nested series of sequentially larger units: sounds, syllables, words, *padas* (lines), *richas* (verses), *suktas* (collections of verses), *mandalas* (a collection of *suktas)*, and the *Rig-Veda, Sama-Veda, Yajur-Veda*, and *Atharva-Veda,* which are themselves collections of *mandalas*. Maharishi identifies the process of the *Veda* sequentially commenting upon itself as the process of sequential manifestation of natural law from the unified field (Dillbeck, 1989).

Recently Maharishi (1994, pp. 133-335) has explained more about the holistic value of "A". According to Maharishi's Vedic Science:

> The holistic sound A is the unmanifest sound, the source of all sound, the source of all frequencies—the holistic expression of the eternal silence of self-referral consciousness

> The holistic sound, A, is the conceptual flow of intelligence between the two conceptual qualities within the nature of unity: (1) unbounded infinity, (2) the point of infinity. The conceptual holistic sound, A, emerges from the conceptual relationship (stir) of these two values within the nature of unity. (p.336)

He adds that the holistic sound, A, springs from the relationship of infinity with its point within the nature of singularity.

"It is interesting to note that the eternal basis of creation on this level has been described as the tumultuous uproar" of the move of the eternal void—and in this process of evolution of consciousness, the breaking of the holistic sound, A, into different frequencies constitutes the structuring dynamics of the *Veda*. These sounds are the alphabet (vowels and consonants) which structures the dynamics of the *Veda* in the different aspects of the Vedic literature.

I. Vedic Science Principle of the Gap— Dynamics of the Junction Point

In addition to explaining the sequential elaboration of the primordial sounds of the *Veda*, Maharishi brings out another important aspect of the *Apaurusheya Bhashya* when he discusses the value of the gaps between the sounds. According to Maharishi (Dillbeck, 1989), gaps of silence are structured within the sequential progression of the primordial sounds or phonemes of the *Veda*. It is within these gaps that the primordial sounds transform from one frequency/form into another. Maharishi contends that inherent in these gaps are the complete dynamics of natural law responsible for the emergence of creation, and therefore, they play an important role in the transformation of consciousness into matter.

1. Modern Science Explanation— Mechanics of the Gap

Speech science also acknowledges gaps of silence. Acoustic phoneticists call these gaps "areas of speech production in which the just noticeable difference between the expression of two different phonemes occurs" (Goldstein, 1984). Research in this area has found that discrimination between stop-voiced consonants such as [b, d] and [g] occurs in categorical shifts or jumps (Liberman el al, 1957], whereas discrimination among vowels occurs in a continuous flow (Fry et al. 1962).

Attempts to understand this phenomena have led to the development of various models or theories of speech perception. These models attempt to explain the psychophysiological processes involved with the correct perception of speech sound stimuli by the auditory system and the processes by which this perceived information gets properly interpreted by the listener as the intended message of the speaker. Among these models are the motor theory of speech perception (Liberman et al., 1967); Liberman, Delattne, and Cooper, 1952; and Studdert-Kennedy, 1974, 1976); the analysis by synthesis motor model of speech phoneme perception (Halle and Stevens, 1959); and the syllabic motor theory of speech perception (Christovick, 1960; Kozhenikov and Christovich, 1965).

According to Pickett:

> Motor theory hypothesizes that the speech perceptual process has a stage where the auditory patterns are interpreted by reference to speech movements, including the adjustments of the vocal folds. Perception by motor reference is not conceived to be a conscious process by the listener but rather a very rapid computer-like 'cross-check' performed automatically by the sections of the nervous system that deal with auditory speech-motor, and linguistic functions (Pickett, 1980, pp. 189-190).

Studdert-Kennedy (1970) suggested "that evidence of categorization of perceptual response to consonant cues was not necessarily solely because of motor discontinuities"

but could also be due to inherited articulatory and auditory templates or feature detectors which are both involved in the learning of speech communication.

Critics of the motor theory include: Fant, 1973; Pisoni (1977) and Lane (1965). Fant suggested exposure to language was itself responsible for developing destructive articulatory features. Lane (1965) suggested that normal VOT (voice onset time) differences were perceived by a special motor reference speech decoder that was submitted by previous motor experience and not by motor skills alone. Pisoni (1977) demonstrated that even non-speech sounds were subject to categorical perception, implying that "perception tends naturally to organize itself categorically." He suggested that when complex stimuli such as pure tone are heard as a series, natural psychophysical boundaries tend to develop. These boundaries are points at which the perception abruptly shifts from one impression to another" (in Pickett, 1980, pp. 205-206).

Stevens (1972) suggested that language seeks out regions of relatively invariant "quantal" patterns for use in the communication code (In Pickett, p.203, 1980). He reviewed the acoustic production of consistent patterns for voiced and unvoiced phonemes and pointed out that they exist even to the extent of "favored" regions of consonant articulation where differences in position of constriction produced little or no difference in the format patterns.

Applying the principles of Steven's (1972) quantal theory, Tuller and Kelso (1991) have isolated phase transitions that occur during the speech continuum. They described these phase transitions as "linear changes in the relative phase of glottal and oral movements" and suggested that these transitions be perceived as "categorical changes in the location of syllable juncture."

Phoneme discrimination is measured by voice onset tone duration, and by fundamental and format frequency transitions among other measures. Moeni, Flege and McCutcheon (1990) describe voice onset time (VOT) as the interval that exists between the

stop burst of one phoneme and the onset of voicing for the next phoneme. "For example, in spoken (acoustic) syllable such as 'ta,' the interval between the release of the tongue constriction for the stop consonant [t] and the onset of the voicing of the vowel [a] is called voice onset time." The authors suggest that the duration of VOT is crucial in speech perception for discriminating the initial phoneme from other similar phonemes such as [t] from [d].

2. Maharishi's Vedic Science Explanation—Mechanics of the Gap

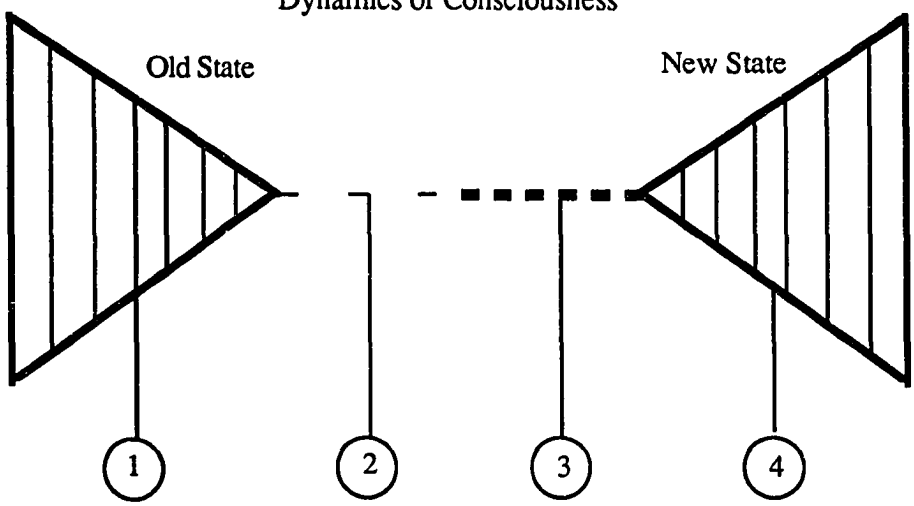
The mechanics by which one phoneme changes into another is only partially understood in modern science. Maharishi's Vedic Science, on the other hand, gives a complete description of the mechanics by which this process takes place on the level of the unified field of pure consciousness.

According to Maharishi in Wallace (1993), each succeeding phoneme arises from the specific mechanics of transformation present in the gap which precedes it. These mechanics of transformation involve four distinct stages.

> The first stage involves the collapse of the first sound (example [t]) This is referred to in Sanskrit as *pradhvansabhav*. The second stage, *atyantabhav* is the state of non-activity, involving the total annihilation of the syllable to the unmanifest silence of pure consciousness. The third stage, *anyonyabhav*, is a state of all possibilities. In pure consciousness exist all the lively transformations or self-interacting dynamics of consciousness. These self-interacting dynamics structure the fourth and final stage, *pragabhav*, the emergence of the next syllable. Thus in every gap is the unmanifest dynamism of silence which ensures the orderly unfoldment of knowledge (Maharishi in Wallace, 1993. p. 238).

Figure 1-2 presents a visual display of the mechanics of the gap in the self-interacting dynamics of consciousness. From this it can be seen that the dynamics of categorical perception, although observed and described by modern science, is more thoroughly understood by Maharishi's Vedic Science.

Figure 1-2
The Four Stages of the Gap within the Self-Interacting Dynamics of Consciousness



1. *PRADHVANSABHAVA*: Collapse of old state
2. *ATYANTABHAVA*: Non-activity, unmanifest silence
3. *ANYONABHAVA*: Lively transformation or self-interaction
4. *PRAGABHAVA*: Emergence of following structure of natural law (new state)

Figure 1-2. The Four Stages of the GapWithin the Self-Interacting Dynamics of Pure Consciousness Maharishi has identified four stages of the gap between two expressions of natural law in the *Veda*. The first is the collapse of the previous state, *pradhvansabhav*. The second is a stage of non-activity or unmanifest silence, *atyantabhav*. Next is a stage of lively transformations or self-interacting dynamics—*anyonyabhav*. These dynamics structure the fourth stage, *pragabhav*, the emergence of the following structure of natural law.(Taken from Wallace, 1993, p.239).

Maharishi adds that the quality and dynamics of each gap are determined by the phonemes occurring on each side of the phonetic boundary. He says that the different dynamics of natural law are lively in the gaps existing between the sounds of the *Rk-Veda Samhita* and that these values of natural law are elaborated in the specific expressions and sections found in the rest of the Vedic literature.

J. Phonetic Analysis of *AKNIM*—From The Collapse of Infinity Creation Emerges

In explaining the *Apaurusheya Bhashya*, Maharishi explains how the *Veda* spontaneously and sequentially unfolds from the most compactified form of pure knowledge. According to Maharishi (1985), the totality of knowledge resides within the entire range of Vedic literature; however, it is more consolidated in the *Rk-Veda* itself. Within the *Rk-Veda*, it is concentrated in the first *mandala* (the first collection) of *suktas* (stanzas). It is condensed even more in the first *sukta* (stanza). And it is even more concentrated than that in the first *richa* (verse). This first *richa* (verse) has 24 syllables, but the first eight syllables of that *richa* (or what is known as the first *pada*) contains the totality of knowledge in an even more compact form. This complete knowledge is again condensed in the first word of the *Rk-Veda, "Aknim,"* and finally it is found consolidated into the first phoneme of the *Rk-Veda, "Ak."*

Hagelin (1987) brings out how the phonetic articulation of the first word of the *Rk-Veda* reveals this mechanics of creation.

> According to Maharishi, the letter A (of *AKNIM*) represents fullness—the field of all possibilities. Phonetically, it corresponds to the most wide open and least obstructed position in the physiognomy of speech. It is the first letter in every major phonetic (or alphabetic) system and is said to include all other sounds, in the sense that its modulation by the tongue and lips produces all other sounds. The letter K represents its extreme opposite—complete emptiness or "point value" of speech. Phonetically it corresponds to the most closed or fully obstructed value of speech. The combination AK, according to Maharishi, represents the collapse of fullness to a point, which occurs when consciousness, the field of all possibilities, becomes aware of its own point value....The letter N represents negation, while the letter I indicates a leading out. The combination NI represents a negation of the point value followed by a leading out from the point back in the direction of infinity. In the words of Maharishi, 'consciousness recoils from its own point value, which represents a highly restricted and hence unnatural state of the awareness'....Finally the M in *AKNIM* represents continuance, and implies that the mechanics of creation, once set into motion by the collapse of infinity, continues indefinitely....(p. 3708).

All of Vedic literature is an elaboration of this theme and from its sequential elaboration, the whole dynamism of the physical universe emerges. As Maharishi has explained

> *Veda* is the impulse of consciousness, and by listening to the sound of the *Veda* (*shruti*)—and by reading it or hearing it—one can enliven it within one's own consciousness and realize the total organizing power of pure knowledge within oneself (Maharishi, 1994, p.123)

K. Summary

To summarize the mechanics of creation, then, sound first emerges in its unmanifest expression as an infinite frequency which is generated during the transformational process of pure knowledge knowing itself as knowledge—the three-in-one structure of pure knowledge. As pure knowledge and its infinite organizing power (the *Veda*) continue to elaborate, layers of this three-in-one structure are created, each resonating with all possibilities of frequencies. This ocean of frequency ultimately transforms consciousness into matter or physical sound vibrations into physical manifestation.

The following is a summation on the characteristics of sound in the unified field of pure consciousness which have been discussed in this section.

1. There is a perfect correspondence between the sound of an object's name and the object's form. This phenomenon is unique to sounds generated in the unified field of pure consciousness. Thus, knowledge of *shruti-darshana* (name and form) becomes available on the finest level of human awareness, the level of *ritam bhara pragya* ("that level of intellect that comprehends only the truth") when an individual participates in the Transcendental Meditation and TM-Sidhi program (Maharishi, 1994, and Maharishi in Hagelin, 1987).

2. The actual sequence or ordering of sound and gaps between the sounds in the *Mantras* of the *Veda*, from the first phoneme, AK, to its first *mandala* or chapter, is itself a commentary on the structure of pure knowledge. This *Apaurusheya Bhashya* describes the

mechanics of creation as an expanding self-commentary of pure consciousness upon itself, with each succeeding level creating all possibilities of relationships between knower, known, and knowledge (Maharishi, 1994).

3. There is structure to the gaps of silence existing between sounds. The mechanics of transformation of sound frequency occurs in these gaps. The transformation has four stages: a collapse of the previous frequency is followed by non-activity or unmanifest silence after which a stage of lively transformation begins leading to the emergence of a new frequency (Maharishi in Wallace, 1993).

4. The phonetic structure of the sounds themselves portray the mechanics of creation. For example, in the word *AKNIM*, each phoneme represents an aspect of the mechanics of manifestation. A, totality, collapses to K, closed point-value. AK represents the collapse of fullness to a point. Phonetically, the mouth and throat are wide open to express A; but the throat closes to express K. N represents negation; I a leading out. NI indicates consciousness recoiling from the point value leading out to greater expression. Phonetically the throat opens slightly to express the sound N but the tongue restricts full openness of the sound. With I, the restriction placed on the sound by the tongue is eased to allow a partial opening of throat and mouth. M represents continuance, implying that once the mechanics of creation has been set in motion it continues indefinitely. In Sanskrit, M flows on connecting with the next sound. Phonetically, M produces a hum; the lips are slightly closed yet sound moves out. *AKNIM* thus phonetically represents the mechanics of creation (Maharishi, 1994).

This section has briefly reviewed the mechanics by which sound emerges in the unified field of pure consciousness and has described the characteristics of sound in that field. The next section will discuss how sound manifests from the unified field, transforming consciousness into matter at the junction point of consciousness and matter. Then I will then describe how these sound qualities further develop to become music.

III. *Maharishi Gandharva Veda*— Knowledge of Transformations at the Junction Point Between Consciousness and Matter

Maharishi has explained that the *Samhita* gives rise to a multitude of differing values of transformations through its self-referral activities. These various transformational values exist in the unmanifest gaps between the syllables of the *Samhita.* According to Maharishi, this gap, or "junction point" of consciousness, is

> the level of infinite correlation, the level of no friction, where everything has melted and can be molded in any desired way. By striking at this most delicate point in nature, one can accomplish a desire without any doing; a mere intention is all that is needed to transform one value into something else.
> From the perspective of physics, the value of the gap can be located in the superfield at the singularity level in physics. This is the ultimate level of quantum mechanics, where all possibilities are lively in the infinite dynamism of the unified field. Transformations that are impossible at more superficial and expressed levels of nature...are effortlessly accomplished at this scale (Maharishi Vedic University, 1985, pp. 15–16).

Transformations of consciousness into matter occur in the junction point or gap. The expressed value of these dynamics of transformation are reflected in the specific texts of the Vedic literature. For example, the three *Brahmanas* bring to light specific formulas for modifying these transformations, *Gandharva, Dhanur* and *Stapathya Veda* are responsible for integrating consciousness and matter. These 3 *Vedas* are considered to be part of the *Samhitas* themselves. According to Maharishi, these arise when the transformation within consciousness has been reached on the level of the junction point in the gaps, and consciousness has assumed the quality of matter. "In the sequential growth, consciousness becomes matter. Then what we find is that the field of *Veda (Sama, Yajur and Arthava)* as consciousness is over and the field of *Veda (Gandharva, Dahnur* and *Stapathya)* have come up to deal with matter" (Maharishi in Wallace, p. 231).

According to Maharishi (1985b), *Gandharva, Dhanur* and *Stapathya Veda* present the knowledge of how to enliven the *Veda* in one's own life. They provide the principles and techniques through which matter can be re-enlivened with the full value of consciousness.

In a recent formulation Maharishi has explained the structure of the *Veda* from the perspective that each of the aspects of Vedic literature provides a structure to the eternally silent, self-referral, self-sufficient, fully awake state of consciousness, which is intimately personal to everyone (Maharishi, 1994).

Moreover, Dr. Tony Nader under Maharishi's inspiration has shown how the 37 different aspects of Vedic literature correspond precisely to the different aspects of neuropsychology. Maharishi maintains that although we can say that matter is different from consciousness, actually matter is nothing other than consciousness—the physiology is the *Veda* (Maharishi, 1954, p.315-31). In the following discussion even though I use the word "matter" it is understood that ultimately everything is consciousness.

From this new perspective, *Gandharva Veda* like *Sama Veda* comprises the specific set of laws of nature that are engaged in promoting the quality of *rishi* (knower). *Dhanur Veda*, like *Yajur Veda* comprises a set of laws of nature that are engaged in promoting the quality of *devata* (process of knowing). *Stapathya Veda*, like *Arthava Veda* comprises the set of laws that are engaged in promoting the quality of *chhandas* (known).

Gandharva Veda uses the principles of sound, melody, and rhythm to restore balance and harmony to the psychophysiology of the individual and thus re-enliven pure consciousness within the individual psyche. It integrates all aspects of matter with the underlying value of pure consciousness by restoring balance and harmony to the mind, body, behavior, environment, world, and universe.

Maharishi's contribution to the knowledge of *Gandharva Veda* includes: (1) The revelation of its true Vedic purpose in reconnecting matter to consciousness through melody and rhythm; (2) The restoration of the value of *Gandharva Veda* music as a

procedure for developing enlightenment in the individual rather than just entertainment, and (3) The reintroduction of the traditional performances and study of *Gandharva Veda* music world-wide. Because of Maharishi's contributions to the knowledge of music and sound this branch of Vedic Science is called *Maharishi Gandharva Veda.*

Maharishi's *Gandharva Veda*[2] contains within it the total expression of the knowledge of sound. It is the classical music of the ancient Vedic civilization which reportedly enjoyed "heaven on earth" (Maharishi Mahesh Yogi, 1991). Maharishi adds that *Gandharva Veda* embodies the "eternal melody of nature responsible for all transformations and expressions in the universe" (Maharishi, 1991). Maharishi also regards all forms of music simply as transformations of the original *Maharishi Gandharva Veda.* He considers the relationship between the two to be like the relationship between the sap and its manifest expressions at the branches, leaves, and flowers of a tree.

Some independent evidence exists for the ancestral role of *Gandharva Veda* music. According to Danielou (1942)[4]— a widely published musicologist formerly associated with UNESCO and who specialized in Asian music—all systems of modal music originate from *Gandharva Veda* music. Maharishi also regards all forms of music and language simply as transformations of *Maharishi Gandharva Veda.* He considers the relationship of the two to be like the relationship between the sap and its manifest expressions of branches, leaves, and flowers of a tree. I shall explore the independent evidence for claims regarding *Gandharva Veda* music in the next section.

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[4] The term *Gandharva Veda* will be used to explain theory expressed by authors other than Maharishi. The term *Maharishi Gandharva Veda* will be used whenever Maharishi's theory is being discussed.

A. Two Approaches to the Study of *Gandharva Veda*

Danielou (1942) points out two major approaches to the study of *Gandharva Veda* music. One approach considers it "the systematic application of the universal laws of creation common to sound," the other as the "empirical utilization of physical peculiarities in the development of sounds." The first approach he calls *Marga. Marga,* thought by some to be the most ancient tradition of *Gandharva Veda* music, is in accord with Maharishi's revival. It is considered to be based on absolute laws, which are universal and unchangeable, and therefore *Marga* can be considered to have an extraordinarily positive influence over both animate and inanimate creation. Music of this type can be used for achieving enlightenment. Similarly, according to Mahajan (1989), another noted musician and writer on *Gandharva Veda* music, "*Gandharva* is that type of music which is exclusively devotional and practiced by the saints and the sages. Its main aim is to achieve spiritual realization." Maharishi's revival of traditional *Gandharva Veda* music is apparently *Marga* music.

The other approach to music is that of *Desi.* (Mahajan (1989) also calls this system *Gana.*) *Desi* is man-made compositions, varies according to region and time, has as its purpose the pleasure or expression of human feelings and passions and may have either a good or bad influence.

Mahajan points out that *Desi* or *Gana* can be used in two ways: general or specific. Generally speaking, *Gana* "refers to any type of singing" including *Gandharva;* specifically, it refers to a particular type of music quite distinct from *Gandharva. "This* music was more flexible in its rules and its main purpose was to please the senses" (Mahajan, 1989).

From Maharishi's point of view, *Maharishi Gandharva Veda* music is based on *Vedic* principles of creation: it is allied with natural law; it contains those frequencies which

produce harmony and balance in both the individual and the world, and listening to it can bring about a state of enlightenment. Thus, I suggest that *Maharishi Gandharva Veda* music could be considered as *Marga.*

B. The Vedic Properties of Sound in *Maharishi Gandharva Veda*

To understand the characteristics of *Maharishi Gandharva Veda* music, it is first necessary to recall the characteristics of the unified field of pure consciousness. Maharishi explains pure consciousness as a continuum upon which the transformations of consciousness take place.

According to Maharishi (in Chaudhuri, 1990), all sounds in the universe are modes of interaction of *Rishi, Devata,* and *Chhandas. Maharishi Gandharva Veda* sits in the gap between

Samhita and *Rishi, Devata,* and *Chhandas.* Therefore, it represents that value of the silent omnipresent intelligence in nature responsible for the production of sound.

> It sits in the absolute vacuum, the *akasha*, in the *Sandhi*, [a principle of Sanskrit phonetics], like a lamp at the door. And because it is in the middle point between consciousness and matter, it is the custodian over the laws of nature. That is why *Maharishi Gandharva Veda* can easily transform any unwanted situation into any desirable situation. *Maharishi Gandharva Veda* is truly the science of transformation (Maharishi, in Chaudhuri, 1990).

Maharishi describes *Maharishi Gandharva Veda* music as music that is in alliance with natural law. According to Maharishi (private conversation, 1990), the ebb and flow of its melody is based on the non-changing continuum of its tonic being expressed by the constantly sounding drone.[5] This combination of non-changing drone and ever-changing

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[5] The organizing power of pure knowledge is found in the dynamics of natural law expressed as different frequencies oscillating within the field. This power is represented by the *Brahmana* aspect of the Vedic literature—the laws by which the *mantras* are organized in order to produce the different features of creation. The *Brahmanas* include the *Upanishads*, the *Aranyakas*, and the *Brahmanas* and each of the four *Vedas* has its own set of three Brahmanas.

melody reflects the continuum of pure consciousness along with its high and low peaks—the peaks being created by the transformations of consciousness into its multiple three-in-one layers. For Maharishi, this maintenance of evenness along with peaks rising high and low depicts the mechanics by which harmony sustains all the diversified values, and this, he suggests, is the basic characteristic of *Maharishi Gandharva Veda* music.

> *Gandharva* music is such a forceful melody that unity and diversity exist together and with this comes bliss, *ananda*. The bliss that is produced by *Maharishi Gandharva* music is like a flood of the Ganges. It sweeps away the mud for miles on both sides of the river. All the dust and dirt are washed away by the flood, the bliss. (Maharishi, 1991, p. 12)

Maharishi (1991) points out that *Maharishi Gandharva Veda* music is not man-made; rather it is "spontaneously created by that eternal theme of unity multiplying itself." It operates in alliance with the changing values of nature to create perfect harmony in nature. It is *nitya* (eternal), *apaurusheya* (uncreated), the voice of nature. "It is the song of nature which delightfully inspires the process of evolution." It restores the lost relationship of *Samhita* and *Rishi, Devata*, and *Chhandas* by re-enlivening those mechanics which connect unity [*samhita*] with diversity [*rishi, devata, chhandas*].

Musicians imitate that natural upheaval on the ground of eternal sameness in their compositions and this, he says, removes the imbalances in nature and creates a powerful balancing influence in the whole world consciousness.

1. The Phonetic Analysis of *Maharishi Gandharva Veda*.

The mechanics by which *Maharishi Gandharva Veda* music reflects the evolutionary tendencies of natural law are located in the phonetic analysis of its name, what Maharishi calls the knowledge of *GAM* (Maharishi, personal communication, 1990). But to understand *GAM* one must first understand the structure of the dynamics of *Rk*.

Maharishi (1990) commented that *Rk* is a whirlpool of consciousness which moves in a cyclic spiral eight times until in the eighth spiral it fully collapses upon itself as a point. The eight spirals are the eight *prakritis* or elements of creation. "Thus *Rk* is cyclic motion with a vertical trend—a whirlpool created by the unbounded ocean of consciousness interacting with itself" (Maharishi).In regard to *GAM* Maharishi said:

> The transition from A to G is a commentary on this whirlpool. A is infinity; G the point value. But, actually, G is the sound K [recall Dillbeck's (1989) comment regarding the Sanskrit rule which describes that k changes to g when it is followed by a particular sound]. Infinity, A, finding itself in a point, K, gets horrified. A experiences a horror of extinction, of ending in absolute vacuum. Fortunately, infinity and point are fully awake both to their own natures and to each other. The point value K looks to A and in so doing saves itself from extinction. When the point looks to A, this changes the nature of the point. Looking to A, K becomes lively and then K is found as G. K gets transformed into G. What this means is that the point value begins to hum within itself. G is humming in terms of K. G is K advancing in a hum and G starts to sequentially elaborate from there.
>
> K is the direction of the point; G is the point humming. GAM is G, the point value, plus M, the hum. So GAM is the point humming, ready to sequentially elaborate.
>
> In *Gandharva*, we have GAM and DHA. DHA means the intellect. When GAM and DHA are combined together to form GANDHA, [here again, according to Sanskrit rules, the m changes to n when followed by a particular sound] we have the humming point and the intellect—infinity along with the liveliness of a point. And in that exists the total value of all transformations responsible for creation. That is why listening to this music will align us with the evolutionary trends of nature. The infinity circling and the point humming is the eternal uncreated music of natural law. So, *Gandharva* means the infinity and the point humming together. And *Gandharva Veda* means knowledge of infinity and the point humming. (Maharishi, personal communication, 1990).

2. The Use of Frequency in *Maharishi Gandharva Veda.*

Maharishi defines *Maharishi Gandharva Veda* music as the eternal music of nature. "Music is coherent frequencies—some different, some the same, many different values of frequency of sound—and coherence in sound makes a melody." Maharishi's Vedic Science identifies the infinite items in the universe as comprised of these different frequencies or

sounds. The net effect of all these coherent frequencies being in motion all the time is the creation of bliss in the universe.

In fact, according to Maharishi (1991), *Maharishi Gandharva Veda* music is the most refined evaluation of a sound value, or frequency. It arises from the infinite frequency generated through the self-interacting dynamics of the unified field of pure consciousness.

> From there we know the different values of frequencies emerging from that infinite frequency of unbounded awareness or transcendental consciousness. All possible sounds are lively there in that infinite, unbounded silence, which is fully awake within itself. That is the field of all possibilities, the field of all frequencies, the lively presence of all frequencies. (Maharishi, 1991, p. 13).

But besides being lively in the unified field, I would submit that *Maharishi Gandharva Veda* is the first level of elaboration of the *Veda* responsible for transforming consciousness into matter. *Maharishi Gandharva Veda* frequencies reverberate with those transformational frequencies of the unified field and contribute toward the construction of more manifest levels of creation. They govern the dynamics of transformation. Whereas the *Samhita* of *Veda* produces the initial frequency inherent in nature from consciousness, *Maharishi Gandharva Veda* activates those frequencies to structure the more manifest levels of consciousness.

> Every level of creation is a frequency," Maharishi says. "One frequency melts into the other and this is how the process of evolution takes place. This cycle of change is perpetual and because everything is a frequency there is sound at every stage of creation (Maharishi, 1991, p. 12)

Because everything in creation is a frequency, one could say that even disorderly behavior in society has its own imbalanced frequency. Since *Maharishi Gandharva Veda* is the custodian of all frequencies, "it can amend any topsy-turvy situation" (Maharishi, in Chaudhuri, 1990), even restoring balance to behavior in society. By using this master key, Maharishi says, it will be possible to eliminate all human fears, suffering and sicknesses. "It will resolve the problems of every nation and bring peace to the whole world."

3. The *Shruti-Darshana* Relationship in *Maharishi Gandharva Veda* Music

As stated before, on the *Samhita* level of *Veda,* the relationship of *shruti* to *darshana* refers to the direct correspondence between name (sound- *shruti*) and form (object- *darshana*). A similar correspondence exists in the area of *Maharishi Gandharva Veda* music, but of a somewhat different way. Here, there is direct correspondence between frequencies. The frequencies found in *Maharishi Gandharva Veda* match the frequencies found in nature. However, while the unmanifest frequencies of the unified field direct the primordial creative processes of evolution (Maharishi, 1994, pp. 315-318), the manifest frequencies embodied in *Maharishi Gandharva Veda* direct the processes of nature responsible for creating and then maintaining the creation (Maharishi, 1991, pp. 131). As Maharishi explains, *Maharishi Gandharva Veda* music "is that powerful swing of nature– those rhythms are being maintained at all times. Due to the maintenance of all those systems the infinite variety of creation is very well coordinated by natural law" (Maharishi, 1991, pp. 131).

In this way, then, it could be said that the relationship of *shruti* and *darshana* is lively in *Maharishi Gandharva Veda* music.

4. The *Apaurusheya Bashya* of *Maharishi Gandharva Veda*

Veda is pure knowledge and infinite organizing power, and the sequential progression of sound on the level of *Samhita* contains within it the dynamics of the evolutionary process. Similarly, but on a more manifest level, the sequential progression of sound in a *Raga* or melody contains within it the dynamics of creation. Maharishi has called *Maharishi Gandharva Veda "apaurusheya,"* uncreated, and *"nitya,"* eternal. As it is associated with *Sama Veda,* it would seem reasonable to expect an *apaurusheya bhashya* or uncreated commentary to exist within the structure of *Maharishi Gandharva Veda* as well.

In fact, the structuring of *svaras* (notes) based on the activity of the *shrutis* (microtones) existing within the gaps is similar to that of the gaps and their function in the structuring of primordial sounds *(nada)* in *Samhita*[6]. Also, the orderly progression of notes and the rules governing their sequencing in various *ragas*, the phonetic representation of name and form, and the *shruti—darshana* quality of frequency, all point to qualities of an uncreated commentary structured within the knowledge of *Maharishi Gandharva Veda.* As Maharishi has pointed out, *Maharishi Gandharva Veda* music is not created by man but rather by nature.

5. Differences in Quality of Sound: From *Rk*, to *Sama*, to *Gandharva*

Maharishi has enumerated several differences between the Primordial Sounds of *Rk Veda Samhita, Sama Veda Samhita* and *Maharishi Gandharva Veda* music. According to Maharishi (1990, private communication), the Primordial Sounds: 1) are not a melody, 2) are the sounds of *Rk Veda*, 3) begin with A, and 4) are the fundamental frequencies of consciousness. *Gandharva* music, on the other hand, 1) is a melody, 2) contains the sounds of the associated *Vedas,* 3) begins with Sa, the tonic of the *Raga*, and 4) although considered fundamental, is still more manifest than *Rk Veda.*

Maharishi points out that while *Sama Veda* affects one's level of consciousness, *Maharishi Gandharva Veda* music, existing between consciousness and matter, affects both consciousness and physiology. The means by which *Gandharva Veda* music influences the physiology may be explored in the context of *Maharishi Ayur-Veda.*

Maharishi Ayur-Veda means "the science of life." It brings out the knowledge of the three temperaments or body types known as "*doshas*"—*vata, pitta,* and *kapha. Maharishi*

6 The concept of *shrutis* will be discussed further on in the chapter

Ayur-Veda explains how the interactions of these three body types create a balanced psychophysiology within a single individual[7].

According to Maharishi, *Maharishi Ayur-Veda* deals with all three *doshas*, restoring balance to all three of them. It can focus on any one *dosha*, or all three, or combinations of the three. *Maharishi Gandharva Veda*, as an expression of the dynamics of creation, deals with *vata dosha* primarily (Maharishi, personal communication, 1990). *"Vata* imbalances account for most disorders in the psychophysiology of the individual. By balancing the *vata* element and restoring it to balance, we can resolve most of these disorders." (Maharishi, 1990). Also, Maharishi has explained that in the same way that *Rishi* contains *Devata* and *Chhandas* within its nature, so, too, *vata dosha* contains *pitta* and *kapha*. "By creating balance in *vata dosha*, we ultimately create an influence which brings balance to all three *doshas* in matter, to all their origins in *Rishi, Devata*, and *Chhandas* in consciousness, and therefore to the whole of the individual and society" (Maharishi, personal communication, 1990).

Other investigations of *Gandharva* by authors besides Maharishi discuss details that link *Gandharva* to techniques of recitation of the *Veda*. Kaufmann (1976) and Gautam (1980) point out the characteristic differences in qualities of sound generated in the primordial sounds of the four *Vedas* and in *Gandharva* music. The following is a very brief review of these differences.

According to Kaufmann, differences can be found in four areas: recitation, melody, meter, and notation. For *Rk Veda*, the recitation was sung by a *pandit*. No instruments were used. The rule for recitation was to start at a central note *(udatta)* and either move one whole tone [or semitone] downward *(anudatta)* or move one whole tone upward *(svarita)*. The sound produced was a chant, almost a march. "The melody consisted of three tones

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[7] Also see Chapter 3.

which fluctuates from the central note up and down, representing the linguistic accents of the sacred texts" (Kaufmann, 1976). The duration of the notes was determined by the duration marked on the textual syllables. Usually one *pandit* would perform the recitation.

Regarding meter, there were a number of fixed metrical sequences such as *gayatri, tristubh, jagati*, etc., in which the first four syllables of a *pada* were treated freely while the last four were in fixed metrical patterns.

The notation was simple: an unmarked textual symbol denoted the central note (*udatta*); syllables underlined by short horizontal lines indicated the *anudatta*, and syllables over which small vertical lines appeared were the *svarita*.

Sama Veda used the same text as *Rk Veda* but transformed it with certain sounds and additions. Gautam (1980) considers these transformations to be the origins of Indian aesthetics or ornamentations. "Certain changes were introduced to adapt *Rk Veda* to singing." The recitation therefore resembled more of a melody. It was sung by a group of *pandits*, sometimes as many as 16. No instruments were used. The songs consisted of seven sections: 1) the *aumkara*, in which "*aum*" was sung by all officiating *pandits*; 2) the *prastava*, a prelude which used only three notes and resembled the *Rk Vedic* chant; 3) the *udgitha*, the main body of the melody which was sung by only one *pandit*; 4) the *pratihara*, a response to the *udgitha;* 5) the *upadrava*, another response; 6) the *nidhana*, a closing; and 7) the *pranava*, a second closing feature in which "*aum*" was sung again (Kaufmann, 1976).

For the melody, *Sama Veda* used texts from *Rk Veda* but also inserted certain combinations of syllables in order to create more of a flow to the melody. Rather than being chanted, these melodies were sung. The melodies consisted of at least three notes *(samika)* but could extend to a four, five, six and even seven note range. The seven note scale was called *Sama*.

With the development of the extended note range, the *murchana* system of scale classification came into being (Gautam, 1980). This classification was based on which note the scale began. For instance, if the melody began on *Sa* [western music's middle c] the scale was then called a *Sa* scale. But if it began on *Ga* [western music's sol], then the scale was called a *Ga* scale.

The meter remained the same as found in chants of the *Rk Veda*. However, the notation differed. Gautam (1980) considers the cheironomic notation system developed by the Saman *pandits* to be the "earliest system of notation in the world." Cheironomic notation is accomplished by denoting the different *svaras* (notes) of the scale with the different fingers of the right hand. Kaufmann (1976) mentions three important schools of *Sama Veda* chant, each having their own particular system of notation. *Kauthama* used numbers and few letter symbols on the text; *Ranayaniya* used interpolated syllables and the figure "o"; *Jaiminiya* used notation syllables placed above the textual syllables.

With the introduction of *Gandharva* music, these four areas of recitation, melody, meter, and notation became more elaborated and complex with fixed rules for each. For instance, recitation now became a performance, either vocal or instrumental, with one to four performers involved. The songs were genuine songs with scales using from five to seven to twelve notes, with fixed rules governing the use of notes in the melody, with particular structures governing the sequencing of notes, with rhythm and ornamentations. The parts of a *raga* [melody] consisted of the *alap*, the *jor* and the *gat* (Chaudhuri, 1990). The *raga*'s *alap* began with a non-rhythmic slow-paced introduction in which the identifying phrase of the particular piece was played and embellished. During the *jor*, the tempo slowly increased to a medium speed and rhythm was introduced. In the *gat*, the tempo for both the melody and the rhythm increased steadily until it was brought to a close with the *jhala*.

The meter became elaborated as rhythm with adoption of fixed rules and inventing of various instruments to express the pulses. Basic *Talas* (rhythms) were created and *bols* (rhythmic phases) became more complex as a system of notation developed to transmit that complexity.

Notation for melody became more complex as well, including marks for registers, types of notes, and embellishments (Chaudhuri, 1990). According to Chaudhuri there are three *Saptaks* or registers in *Maharishi Gandharva Veda* music: *Taar* or upper register, *Madhya* or middle register, and *Mandra* or lower register. *Taar* is designated with a dot on top of the note; *Madhya* is designated without a mark of any sort; *Mandra* is designated with a dot below the note. Chaudhuri explains that *Shuddha svaras* (pure notes) have no mark; *Komal swaras* (flattened notes) have a horizontal line written below the *swara*; and *Teevra swaras* (sharpened notes) have a vertical line written above the *swara*. Examples of some of the notations for embellishments include: the *Meend*, the *Krintan*, the *Kan*, and what is called "in one beat."

Chaudhuri points out that although these notations exist, there are many subtleties in *Maharishi Gandharva Veda* music that cannot be written. These are passed on in the *Guru/Shishya* (teacher/student) tradition. "*Ragas* are played differently depending on their application and must be heard to understand it properly. Also, frequently, there is much ornamentation between notes and that cannot be written but must be taught by the teacher." (Chaudhuri, *Maharishi Gandharva Veda* Music Curriculum, Lesson Four ,1990)

C. Maharishi's Vedic Science Principle of *Panchamahabhuta* The First Manifestation of Matter

According to Maharishi's Vedic Science, consciousness sequentially develops from the unified field of pure consciousness through various stages of transformation into matter. There are several Vedic perspectives regarding these transformational stages. They

can be viewed through the *Sankhya* system, (one of the six systems of Indian Philosophy known as *Upangas*), through the *Maharishi Ayur-Vedic* theory of *Panchamahabhuta*, and through the Vedic theory of sound, which is based on Maharishi's Vedic Science.

The Vedic theory of sound, based on Maharishi's Vedic Science, presents four stages of major transformation. Consciousness transforms first into sound, second into meaning, third into matter, and fourth into behavior (Maharishi, 1991, personal communication). Pure consciousness is said to connect all four transformations as an underlying continuum (the peaks rising high and low) which permeates not only the finest structures of matter but the whole manifest creation. Within the junction point the transformation of meaning into matter occurs.

Maharishi (1980) explains the mechanics and stages of elaboration in the following way:

> The whole picture [of Vedic Science] can be seen in the analogy of a plant. There is a level of the sap, which is not green nor white, but completely unmanifest. Then there is another level of the sap which starts to think: 'I want to become green; I want to become white. 'Figure 1-2 presents a visual display of the mechanics of the gap in the self-interacting dynamics of consciousness. From this it can be seen that the dynamics of categorical perception, although observed and described by modern science, is more thoroughly understood by Maharishi's Vedic Science.
>
> Now, if we take the sap to be consciousness then we have two values, two characteristics of it: in one it is completely silent, in the other it starts to reverberate within itself. Reverberating within itself it comes to express itself in different modes—in terms of green leaf, green stem, white petal. It is reverberating in different terms, in different tones. So there is one completely unmanifest level and another level which hums within itself. There is a third level where the hum starts to express itself in different modes.
>
> The 'non-humming' value of the sap we can call the home of all the laws of nature, a level of life where all the laws of nature are fully awake in themselves in the state of least excitation. They are not intending, they are just there. We can say it is the state of Being of natural law. The total potential of natural law is fully wide awake within itself. And then it starts to swell up, it starts to be in a mood to think. Then, it starts to think. (Maharishi, p. 9)

According to the Vedic theory of sound which is based on Maharishi's Vedic Science, at the first stage of transformation, consciousness is pure, unmanifest, a field of

all possibilities that has not yet been aroused. At one point, it has a desire to know itself; it becomes aroused and through its self-interacting dynamics the totality of knowledge collapses to point value. Through this process of collapse, the field begins to vibrate as an infinite frequency. This process continues creating layers upon layers of field transformations and more and more discrete values of frequency, the sound values or the words of *Rk Veda Samhita.* At this level, each frequency has a form associated with it. Consciousness continues to reverberate within itself, and in so doing, the unmanifest field collectively swells up and transforms into the fundamental particles of manifest creation, the third stage of transformation—matter. As these manifest particles continue to combine and permute according to laws of nature, they interact or behave with one another, and thus the whole material creation emerges.

Sankhya enumerates the different components of the object as consciousness sequentially evolves into matter, the third stage of transformation (Maharishi, 1967). Consciousness first transforms into what may be called the subjective aspect of creation—the levels of Cosmic ego, intellect, mind, and senses—and then into the objective aspects of matter, starting with the elemental particles of creation. According to *Sankhya, Purusha,* or Cosmic Psyche, the "ocean of consciousness," (the previously mentioned *Samhita* of *Rishi, Devata,* and *Chhandas* residing at the basis of the subjective aspect of life), becomes lively or aroused at the junction point between consciousness and matter. When the ocean begins to stir itself in waves, it transforms itself into the next level, *Prakriti. "Prakriti,* or Nature is the primal substance out of which the entire creation arises" (Maharishi, 1967). *Rishi, Devata,* and *Chhandas* become lively in *Prakriti.* Once enlivened, these values actually become *Prakriti,* and having diversified into their respective values, these values become responsible for all change, for the processes of evolution. The infinite dynamism of the three-in-one structure on the level of *Prakriti* ultimately creates the multitude of permutations and combinations which structure all the other layers of creation.

Maharishi describes *Prakriti* as having eight basic tendencies or components.

> The *Veda* describes the basic tendencies in Nature [*Prakriti*] to be eight in number....These eight values, the five senses, the mind, the intellect, and the ego, are recorded to be nature.... Now these eight are the fundamental basis of all creation...This is the value where natural law begins to sprout in these eight channels of the laws of nature....These sprouts of natural law spring from the totality of natural law, in the same way as the five fingers of the hand come out of the palm. The palm is the common ground for all the five fingers. Each finger has its own characteristic, like the eight values of *Prakriti*, the eight values of nature. (Maharishi, p. 10)

One of the first components or spirals of *Prakriti* described by Maharishi is the transformational stage in which consciousness becomes Cosmic intention (*Mahat*). Here *Prakriti* begins to move in an outward direction towards objective manifestation. *Mahat* then individuates (ego) and becomes *Ahamkara* which in turn manifests as intellect (*Buddhi)* and then Cosmic Mind (*Manas*). At this point consciousness has transformed itself into the first three components of *Prakriti*: ego, intellect, and mind. The Cosmic Mind then transforms itself into the ten *Indriyas* which, Maharishi says, are the five senses of perception *(gyanendriya* which are hearing, touch, sight, taste and smell) and the five organs of action *(karmendriya*), one of which is the organ of speech. The ten *Indriyas* connect the mind with the manifested world of objects. Consciousness as *Indriyas* transforms next into the *Tanmatras*.

Maharishi explains that as the influence of *Chhandas* increases, the subjective creation comes to an end and the objective creation begins. The *Tanmatras* form the basis of the five objective elements of creation and therefore can be considered to be the grossest aspect of subjective creation—the five fundamental elements of creation: *akasha* or vacuum (space), air, fire, water, and earth.

The *Tanmatras* constitute the five basic realities or essences of the objects of the five senses of perception. They sequentially express themselves in the five elements which go to make up the objects of the senses and which provide the material basis of the entire objective creation. First, the essence of sound (*shabda tanmatra*) expresses itself as space;

second in sequence, the essence of touch (*sparsha tanmatra*) expresses itself as air; third, the essence of form (*rupa tanmatra*) as fire; fourth, the essence of taste *(rasa tanmatra)* expresses as water; and fifth, the essence of smell (*gandha* [8]*tanmatra*) expresses as earth. (Maharishi, 1967) See table 1-1 for a list of the ten *indriyas.*

From the *Tanmatras*, consciousness then transforms itself into the *Mahabhutas* which can be described as "broad principles and structures of natural law." The five *Mahabhutas* are explained in the *Maharishi Ayur-Veda* theory of *Panchamahabhuta*. Maharishi (1993) explains that the *Mahabhutas* are broad principles and structures of natural law and are elaborated in *Maharishi Ayur-Veda*. The five *mahabhutas* are: space *(akasha)*, air *(vayu)*, fire *(tejas)*, water *(apas)*, and earth *(prithivi)*. Each of the five senses of perception are associated with each of these five elements. Associated with *prithivi* (earth) is the sense of smell; associated with *apas* (water) is taste; associated with *tejas* (fire) is sight; associated with *vayu* (air) is touch; and associated with *(akasha)* space is sound or hearing. *Maharishi Gandharva Veda* music uses the sense of hearing and sound and therefore is associated with the element of *akasha* in the *Panchamahabhuta* theory.

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[8] To my knowledge, this term is not related to the meaning of *Gandharva* as given by Maharishi.

TABLE 1-1
The Ten *Indriyas*

TANMATRA			*MAHABHUTA*		
Sanskrit		English	Sanskrit		English
Shabda	=	sound	*Akasha*	=	space
Sparsha	=	touch	*Vayu*	=	air
Rupa	=	form	*Tejas*	=	fire
Rasa	=	taste	*Apas*	=	water
Gandha	=	smell	*Prithivi*	=	earth

The ten *Indriyas* consisting of the five *Mahabhutas* and the five *Tanmatras* as explained in Maharishi's Vedic Science (Maharishi, 1969).

In summary, Maharishi's Vedic Science has located the origin of frequency or sound vibration in the self-interacting dynamics of the three-in-one structure of the unified field of pure consciousness, the field of pure knowledge, the *Veda*. It has traced the development of frequency through the "warmed-up" layers of this unmanifest field, into the junction point of consciousness and matter. Maharishi's Vedic Science has found the *first* manifestation in objective creation to be the "essence" of sound associated with *akasha* or space as explained by the *Panchamahabhuta* theory of *Maharishi Ayur-Veda*. From there, the essence of sound manifests as frequency subordinated to the laws of physics, finally, emerging as musical frequency which is heard and responded to by the human nervous system.

How does Maharishi's Vedic Science explanation of the manifestation of matter connect to psychology? Several authors have assembled Maharishi's statements in a manner that outlines a systematic approach to this question. The field of inquiry has been termed "Maharishi's Vedic Psychology" (Orme-Johnson, 1988; Dillbeck, 1989; Orme-Johnson, Dillbeck, & Alexander, 1993). We will describe Maharishi's Vedic Psychology in some detail because it is the theoretical framework within Maharishi's Vedic Science that

will be used to present the various areas of music and *Maharishi Gandharva Veda* in particular.

The field of modern psychology studies the relationship between mind and behavior (Orme-Johnson, 1988). Maharishi's Vedic Psychology extends this study to include the field of consciousness at the basis of mind and behavior. Thus, from Maharishi's perspective, the field of psychology, the study of the subjective nature of human awareness, actually ranges from the level of the unified field of pure consciousness to collective human behavior on the level of international relations.

Following is a brief description of Maharishi's Vedic Psychology, with a discussion of how it differs from twentieth century modern psychology, and an analysis of its relationship to the psychology of music.

D. Maharishi's Vedic Psychology—The Relationship of Human Awareness to the Unified Field of Pure Consciousness

Orme-Johnson (1988), a psychologist who has worked closely with Maharishi in bringing to light Maharishi's Vedic psychology, explains that twentieth century psychology and sociology lack a central unified theory which could account for the structure and full range of mental and behavioral phenomena. Orme-Johnson (1988) explains that the principles of modern psychology are modeled on principles found in classical physics and experimental physiology and were originally based on the study of the superficial levels of thought and behavior. Experimental psychology has focused on developing methodologies for understanding the simplest mental and behavioral systems first, with the intention of going on to explain more complex systems later. However, little cumulative progress has been made in over a century of this endeavor. The different approaches to Psychology include: behaviorism, physiological psychology, cognitive psychology, psychoanalytic theory, and clinical psychology, developmental psychology, and social psychology. As

Orme-Johnson points out, although many advances have occurred, no one approach has even begun to explain much less develop the full potential of human life in any area. From the perspective of Maharishi's Vedic Science, it is apparent that the study of the basis of thought and behavior is missing from these approaches, as well as consideration of human consciousness or awareness and its source in the unified field of pure consciousness. This, Orme-Johnson insists, "is the real subject matter of psychology."

By taking recourse to the vast knowledge of consciousness contained in Maharishi's Vedic Science, the new discipline of Maharishi's Vedic Psychology has arisen, which addresses this need, and provides a unifying basis for all approaches of modern psychology developed thus far.

Dillbeck (1989, p.85), another psychologist who has worked closely with Maharishi, sums up the human activities within the realm of psychological inquiry and explains the perspective of Maharishi's Vedic Psychology:

> Processes of perception, feeling, thought, and decision involve the reception, transformation, and abstraction of environmental information, in interaction with memory from past experiences and the individual's present activity and goals. Maharishi's Vedic Psychology considers pure consciousness to be the basis of all these levels of subjectivity or mental activity levels—senses, mind, intellect, and ego.

Orme-Johnson (1988) calls Maharishi's Vedic Psychology "the absolute and ultimate state of the evolution of psychology capable of creating a supremely evolved state of life in freedom, happiness and prosperity for everyone."

Orme-Johnson quotes Maharishi who describes "the subtlest level of human thought, the source of thought, pure consciousness" as the Cosmic Psyche—the unified field of natural law, the source of all creation. The Cosmic Psyche is identical to the unified field described by the superfield theories of quantum mechanical physics.

> The Cosmic Psyche is the unmanifest, unbounded, unified field of natural law at the basis of all the activities of the mind and their expressions in behavior. It is the underlying causal influence determining all mental and behavioral phenomena. Inherent in the Cosmic Psyche is the infinite

> organizing power which gives rise to all subjective and objective aspects of creation. Whereas twentieth-century psychology has restricted itself to the study of the more superficial values of behavior and mind, Maharishi's Vedic Psychology embraces the full range of natural law, from the unexpressed infinite dynamism of the Cosmic Psyche to all its expression in the mind and behavior. (Maharishi in Orme-Johnson, 1983, p. 30).

Maharishi's Vedic Psychology has both theoretical and practical aspects: its theory is based in Maharishi's Vedic Science, the study of pure knowledge, the *Veda*; and its practical aspect is Maharishi's Transcendental Meditation and TM-Sidhi program, which Maharishi (1988) calls the "subjective means of gaining knowledge that leads to the direct experience within consciousness of the self-interacting dynamics of the unified field of natural law." Because it contains both theoretical and practical aspects, Orme-Johnson considers Maharishi's Vedic Psychology to be a completely developed science, "not an experimental psychology but rather a proven psychology."

Maharishi describes his Transcendental Meditation technique as "a simple, natural, effortless procedure practiced for 15 to 20 minutes in the morning and evening while sitting comfortably with the eyes closed. During this technique the individual's awareness settles down and experiences a unique state of restful alertness: as the body becomes deeply relaxed, the mind transcends all mental activity to experience the simplest form of human awareness, Transcendental Consciousness, where consciousness is open to itself (Maharishi, 1994, p. 261).

Similarly he explains the TM-Sidhi program as an advanced aspect of Maharishi's Vedic Science. It trains the individual to think and act from the level of Transcendental Consciousness, greatly enhancing the co-ordination between mind and body. The individual gains the ability to enliven natural law to support all avenues of life to fulfill his desire (Maharishi, 1994, p. 261-2).

1. Distinguishing Characteristics of Maharishi's Vedic Psychology

Unique features of Maharishi's Vedic Psychology include:

1) Its theoretical basis in the unified field of pure consciousness—Maharishi's Vedic Science.

2) Its applied programs for developing the full potential of human awareness—Maharishi's Transcendental Meditation and TM-Sidhi program.

3) Its developmental theory of seven states of consciousness. Developing consciousness through Maharishi's Transcendental Meditation and TM-Sidhi program is the means to effectively reduce problems in all areas including education, health, business, drug abuse, crime and prison rehabilitation.

4) Its principle of collective consciousness and its study of the application of the Transcendental Meditation and TM-Sidhi program for improving the quality of life in society—The Maharishi Effect.

The genius of Maharishi's Vedic Psychology is that all these areas have been validated by the more than 500 scientific papers[9] on Maharishi's Transcendental Meditation and TM-Sidhi program, a body of research generated in over 200 universities and research institutions in 30 countries. The Maharishi Effect of the TM and TM-Sidhi program, which is enlivening all areas of physiology, psychology, sociology, and ecology as demonstrated by the 500 scientific studies, supports due assertion that this program operates from the unified field level. Each point is taken up in greater detail, as follows:

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[9] See *Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi program: Collected Papers, Volumes 1–5* for a complete review of the research studies on Maharishi's Transcendental Meditation technique. The volumes contain over 700 documented studies on the effects of Maharishi's Transcendental Meditation and TM-Sidhi program, both during and after the practice.

1) Orme-Johnson considers Maharishi's Vedic Science to be the complete means of gaining knowledge, the necessary complement of the objective means of gaining knowledge of modern science.

2) Practice of Maharishi's Transcendental Meditation technique "provides a systematic procedure by which the mind is allowed to settle naturally into a state of restful alertness, the self-referral state of pure consciousness in which the mind is completely silent and yet awake" (Chandler, 1987, p. 13). Maharishi's Transcendental Meditation technique "provides an opportunity for consciousness to experience its qualified and unqualified status. The practice of Maharishi's TM-Sidhi program provides an opportunity for consciousness to create qualified states from its unqualified state at will" (Dillbeck, 1989). It purports to enliven the total potential of natural law for fulfillment of desires (Orme-Johnson, 1988). Physiological research has shown pure consciousness to be a distinct fourth state of consciousness (Wallace, 1970, 1986).

3) The developmental theory of Maharishi's Vedic Psychology describes the sequential development of the individual mind to fully realize its status as the Cosmic Psyche (Orme-Johnson, 1988). As Orme-Johnson explains:

> The range of twentieth century psychology has been limited to the study of the three commonly experienced states of consciousness, sleeping, dreaming, and waking. [Maharishi's] Vedic Psychology extends the range of the study of consciousness [to include] transcendental consciousness, cosmic consciousness, god consciousness, and unity consciousness. These four higher states of consciousness are the major stages as the individual mind rises to attain its full stature as the Cosmic Psyche. This development is fully accomplished in the seventh state, unity consciousness, in which the individual's consciousness is realized as the wholeness of the Cosmic Psyche, and the infinite organizing power of nature is available in daily life (p.30).

Chandler (1987), who is deeply involved with Maharishi's revival of Vedic Science, explains that the purpose of Maharishi's TM and TM-Sidhi program "is the development of consciousness, the unfoldment of the full human potential to live life in enlightenment" (p. 14). According to Maharishi, the sequential development of these higher states of

consciousness, which occurs in the normal course of human development, are considered universal stages accessible to everyone. Each state of consciousness has a corresponding state of neurophysiological functioning which distinguishes it from the preceding state. Each succeeding state apparently provides "greater joy, knowledge, and fulfillment" (Chandler, 1987). Scientific research has validated that this is the direction of development of the seven states of consciousness (see Alexander, Boyer, and Alexander, 1987, for an in-depth review of the research).

4) Maharishi (1983) characterizes the Cosmic Psyche as the source of all order and evolution in nature. He describes the Cosmic Psyche as the common source of individual, family, community, and national consciousness, and all corresponding levels of physiology and behavior. According to Maharishi (1988), the theory of collective consciousness in his Vedic Psychology is based on the understanding that the field of pure consciousness is also the field of infinite correlation that interconnects all members of society.

Orme-Johnson and Dillbeck (1987) define the collective consciousness of a social group as "the wholeness of consciousness of the entire group," noting that each level of society has its own form of collective consciousness. Maharishi explains (1977) that the quality of collective consciousness of a society actually reflects the quality of the consciousness of its constituent members. He says that there is a "reciprocal relationship" existing between individual consciousness and collective consciousness. "That is, each individual influences the collective consciousness of the society, and at the same time each individual is influenced by the collective consciousness" (Maharishi, p. 124). The best way to improve the quality of life on any level of the collective is to improve the quality of life of the individuals who comprise that collective. And, according to Maharishi, that is best accomplished through the practical application of Maharishi's Vedic Psychology, his Transcendental Meditation and TM-Sidhi program.

The Maharishi Effect is a law predicted on the basis of a theory of collective consciousness. The Maharishi Effect implies that it is possible to influence the collective behavior of individuals on any level of society, including the world as a whole, by generating a harmonious and integrating influence from the level of the Cosmic Psyche (Maharishi Mahesh Yogi, 1977). When as few as one percent of a society's population practice his TM program, or, when the square root of one percent of a society's population practice his TM-Sidhi program together in one place, a measurable influence of harmony and integration is predicted to spread throughout the entire population, resulting in decreased negative behavior and improved quality of life. This "field effect," which has undergone rigorous scientific scrutiny (Landrith, 1974; Dillbeck, 1978; Landrith and Dillbeck, 1983; Bandy and Langford, 1984; Cavanaugh, King and Titus, 1989; Davies and Alexander, 1983), confirms the reciprocity existing between individual and collective consciousness. Recent studies have indicated the value of the Maharishi Effect in producing national and world peace (Davies & Alexander, 1983; Abou Nader, Alexander & Davies, 1984; Alexander, Abou Nader, Cavanaugh, Davies, Dillbeck, Kfoury & Orme-Johnson, 1984; Davies & Alexander, 1989; Davies & Alexander, 1983; Gelderloos, Frid, Goddard Xue & Lolliger, 1988; Orme-Johnson & Gelderloos, 1984; and Orme-Johnson, Dillbeck, Bousquet & Alexander, 1979. See Orme-Johnson, 1994, for an in depth review).

2. The Psychology Unified Field Chart: The Range of Knowledge at a Glance

To graphically portray the different relationships existing between the subjective and objective approaches for gaining complete knowledge of a field of study, scientists have created "unified field charts," a "cognitive map" of interrelated topics. Under Maharishi's guidance, the MIU psychology faculty have created a unified field chart for Psychology to illustrate the contributions of Maharishi's Vedic Psychology to twentieth century

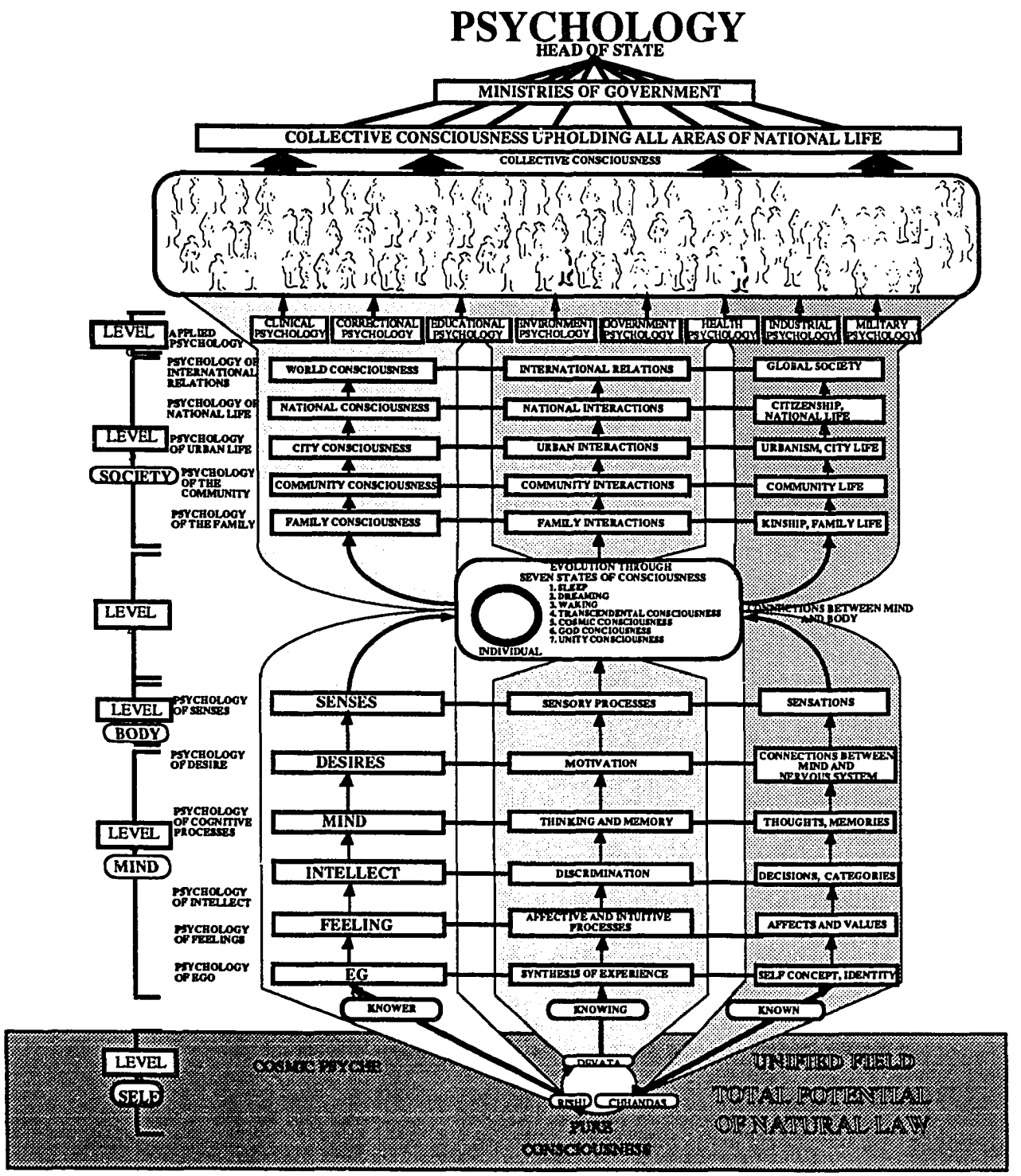
psychology. It incorporates the unified field of pure consciousness, the Cosmic Psyche, into its structure (Orme-Johnson, 1988). The chart has both a vertical and horizontal dimension. Vertically, it specifies each area of knowledge hierarchically in terms of self, mind, body, and society. Horizontally, it shows the three-in-one diversification of the structure of pure knowledge into knower, process of knowing, and known for each level.

Orme-Johnson (1988) explains that the left column of 'knower' refers to pure subjectivity expressed as separate and distinct levels of psychological functioning; the middle column, the process of knowing, represents the dynamical process through which subjectivity functions; and the right column, the known, pertains to the product that results from the given process. The center of the chart lists the seven states of consciousness, indicating this developmental theory to be at the heart of Maharishi's Vedic Psychology. Figure 1-3 presents the Psychology Unified Field Chart. Note the six major divisions of the chart into "levels": Self, Mind, Body, Human Development, Society, and Applied Psychology.

Following is a brief description of the latter five levels from the point of view of Maharishi's Vedic Psychology depicted in the chart. "Self" has already been covered in the preceding discussion of the "Cosmic Psyche." The following discussion is based on Orme-Johnson (1988) who fully describes the unified field chart for psychology .

3. Level Two: Mind

Orme-Johnson (1988) explains that the fundamental mental structures mentioned in Maharishi's Vedic Science—ego, intellect, mind, and senses—plus the structures of feeling and desire together comprise what Vedic Psychology considers "mind." He points out that mind has two contextual meanings: one, a specific mental structure, the other a general reference to "all levels of subjectivity other than pure consciousness" (p.154).



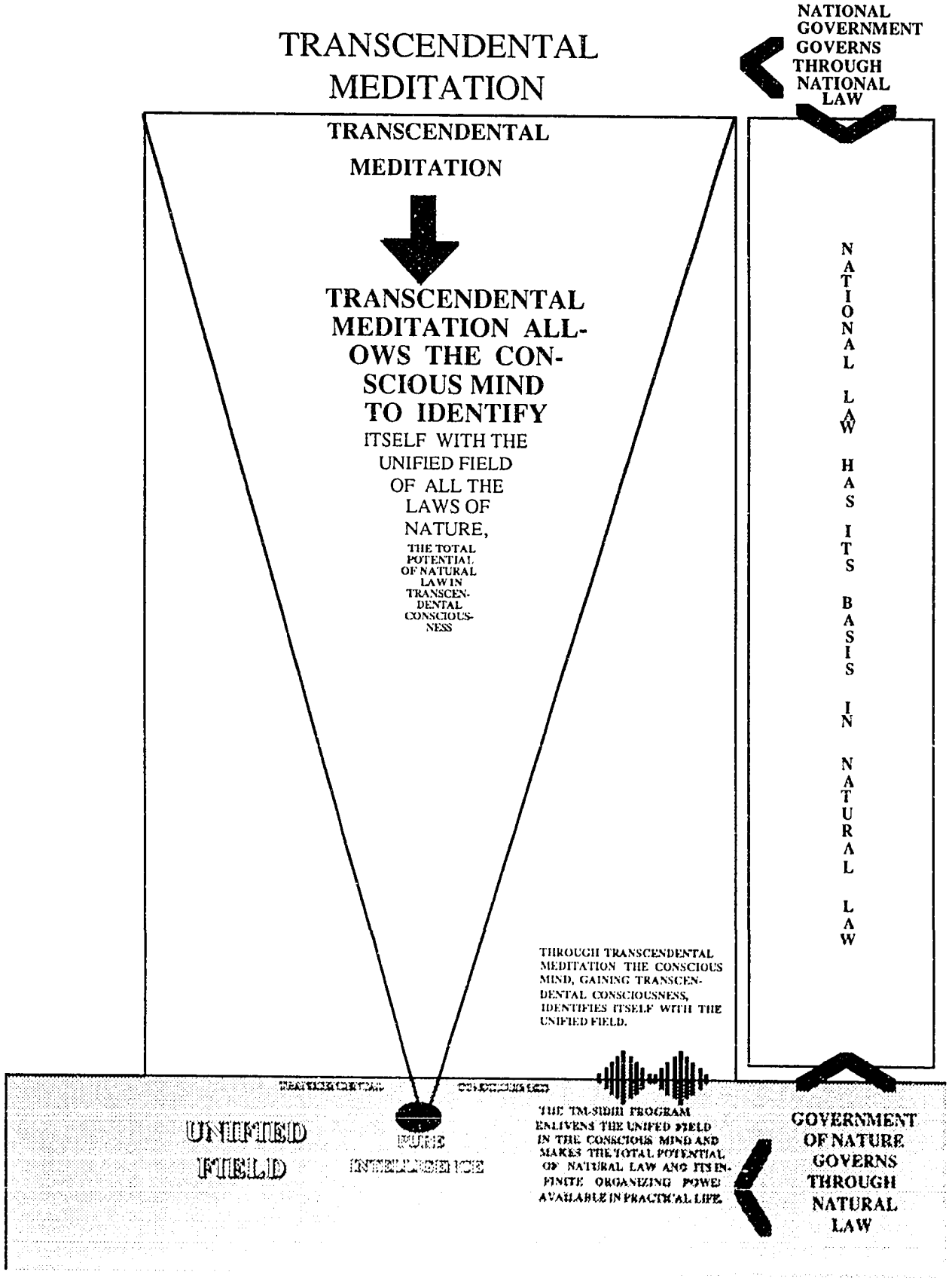


Figure 1-3 The Psychology Unified Field Chart This chart shows how the different aspects of internal mental functioning are related to each other.

Each level of the mind has a particular function. (See Table 2 for a complete description of levels of mind.) For instance, ego is the deepest level of individuality, the experiencer, and is responsible for integration and synthesis (p.154). Feeling is considered a deep structure of the mind, although affective processes may occur on all levels of the mind as well. Orme-Johnson (1988) defines feeling as "the subtle and refined affective processes involved in intuition, creativity, and basic values of the individual." Desire, on the other hand, is distinguished from feeling in that it resides at a more expressed level of mind. Orme-Johnson (p. 154) points out that desire originates in the desire of pure consciousness to know itself; however, in the process of fulfilling specific desires, the individual's attention gets drawn out through the senses toward behavior in the environment. Thus Maharishi's Vedic Psychology considers the level of desire as a connecting link between mind and senses.

While the intellect is involved in decision-making skills and attention, the mind is concerned with memory, association, and apprehending relationships. It processes the data coming in from the senses and establishes meaning through memory. The senses access information from the environment and relay that information to the mind.

4. Level Three: Body

The body refers to the physiology and behavior of the individual. According to Orme-Johnson, "The 'process of knowing' is comprised of conditioning, learning, and adaptive and homeostatic processes. Through these processes, physiological and behavioral functions of the individual adjust to the conditions of the internal and external environment to produce physiological balance, skills, and behavioral adaptation—the "known" (1988, p. 154).

5. Level Four: Human Development

All the levels of mind and body unfold their full potential through the development of higher states of consciousness. Orme-Johnson points out that modern psychology accepts the existence of three major states of consciousness: waking, dreaming, and sleeping. Maharishi's Vedic Psychology extends this number to seven.

Through the practice of Maharishi's Transcendental Meditation and TM-Sidhi program, an individual can experience and stabilize a fourth major state of consciousness, Transcendental Consciousness, which is the experience of individual awareness as the self-referral state of unbounded pure consciousness, the Cosmic Psyche. Extensive scientific research has confirmed that this state of consciousness exists.[10] Wallace (1970, 1971, 1972) calls it a state of restful alertness characterized by reduced respiration, plasma lactate, and cortisol, as well as increased EEG coherence and skin resistance.

6. Level Five: Society

This level of the unified field chart presents the structure of collective consciousness in terms of its subjective value, the knower; its procedures, process of knowing, and its expression as a part of society, the known.

Maharishi further describes the other three states of consciousness:

> Cosmic consciousness is a stable state of consciousness characterized by the permanent experience of pure consciousness along with the changing states of waking, dreaming and sleep. This state and the two later states are also known as stages of enlightenment. God consciousness, a refined cosmic consciousness, the sixth state of consciousness is a further stage of development in which the most refined level of each object is perceived. In Unity consciousness, the seventh state of consciousness, the gap between subject and object is fully bridged, and every object is perceived in terms of pure consciousness, the Self, the unified field of natural law (Orme-Johnson, 1988, p.155).

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[10] c.f.footnote 8

TABLE 1-2
Levels of the Mind and their Functions

Level of Mind	Function
Ego	the deepest level of individuality, the experiencer responsible for integration and synthesis
Feeling	involved in intuition, creativity, and basic values of the individual
Intellect	discrimination, decision making controls the allocation of attention
Mind	association, memory apprehending relationships
Desire	draws attention out through senses to behavior for personal fulfillment
Senses	processes environmental information

A description of the Levels of Mind and their corresponding functions according to Maharishi's Vedic Psychology.

According to Maharishi, consciousness governs both the individual and society (1976). He explains that at each level of society—family, community, city, nation, or the world as a whole—the subjective element is the collective consciousness of that level, governing the collective functioning of its social life. Collective consciousness, comprised of individual consciousness interacting with each other, has the capacity for evolution. As individual life grows in the qualities of enlightenment, the growth of collective consciousness grows in coherence and harmony, resulting in greater integration between the individual's desires and the needs of society. Such a society is called an enlightened society (Maharishi, 1976).

Maharishi describes an enlightened society as one that will be

> characterized by the development of self-sufficiency leading to invincibility in a natural state of balance and orderliness. In this state, all activity will be supported by the laws of nature. Trends of life in society will spontaneously remain positive, progressive, and fulfilling. Negative tendencies of

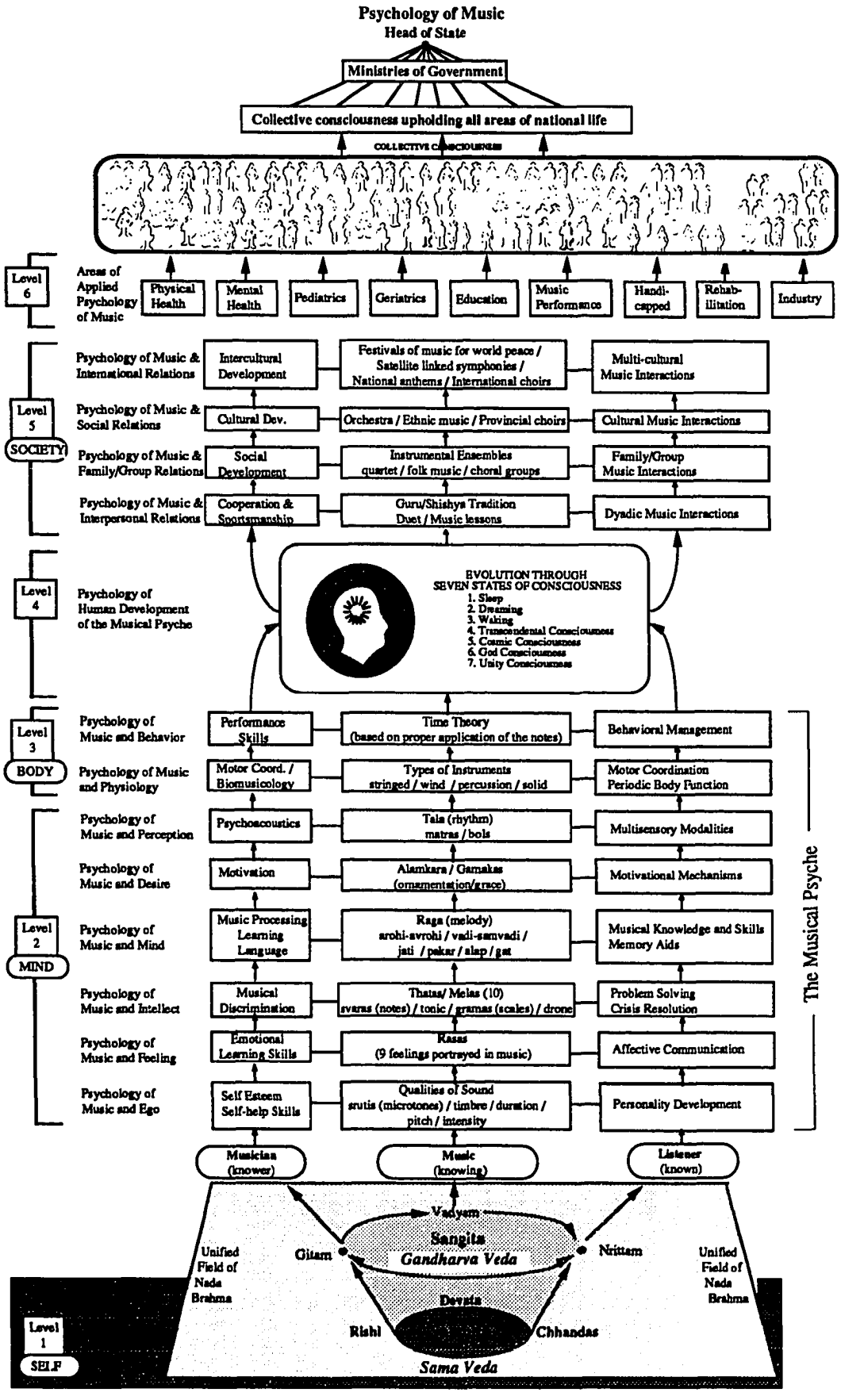
> sickness, crime, and other weakening habits will naturally fall off, saving national energy and resources to structure the steps of fulfilling progress. Accidents, conflicts, and rivalries will disappear; morals and virtues will grow freely; and pure consciousness will guide the destiny of society for all good to everyone. In this environment of harmony and progress, community leaders will spontaneously make right decisions and steer the course of society in a right direction. Society will grow in its ability to give maximum to, and take maximum from, neighboring [sic] societies. Every community will become a joy to every other community. Harmony and happiness will naturally prevail everywhere (Maharishi, 1976).

7. Level Six: Applied Psychology

This level lists all the applied fields of psychology. It depicts the application of Maharishi's Vedic Psychology to these fields for the improvement of each area of psychology. These areas, in turn, are governed by ministries of government and the head of state whose own activities for the society are governed by the collective consciousness of the society.

IV. A New Psychology of Music based on Maharishi's Vedic Science

Extrapolating from the concepts presented in the Unified Field chart, I would like to outline a proposed theory of the Musical Psyche. It represents a new psychology of music based on Maharishi's Vedic Science. Figure 1-4 displays the Unified Field chart for this new psychology of music. The Unified Field chart maps the overall structure of the fields of psychology of music, music theory, and music therapy. It should be noted that there may be several plausible versions of a Unified Field chart for a discipline, each containing similar information but organized differently. Based on my understanding of Maharishi's Vedic Psychology and these three major disciplines, I have chosen to represent the chart in the following fashion.



TRANSCENDENTAL MEDITATION

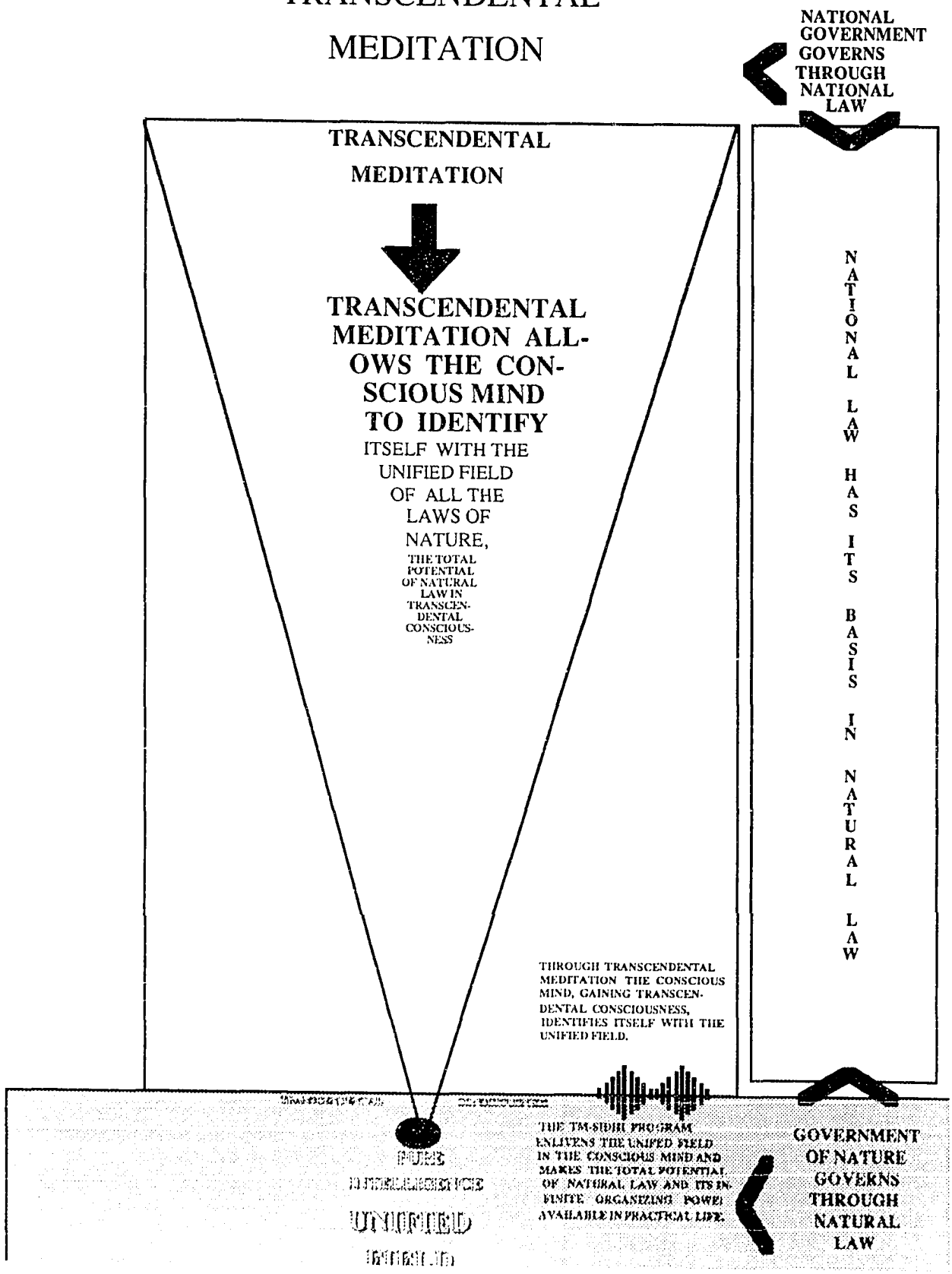


Figure 1-4 The Psychology of Music Unified Field Chart This chart shows how the different aspects of music relate to different aspects of mental functioning.

Following the chart is a brief description of each of these areas in relationship to the Unified Field chart of a new psychology of music based on Maharishi's Vedic Science.

The source of sound vibration is in the field of *Nada Brahma,* the source of creation, the Cosmic Psyche which is represented in the Unified Field chart as Level 1: THE SELF.

A. Introduction

> *Gitam* (vocal melody), *vadyam* (playing on instruments)
> and *nrttam* (dancing), all the three together
> are known as *sangita* which is twofold, viz. *marga* and *desi.*
> (*Sangita Ratnakara* , vol. 1 (v), p. 10)[11]

Recall that the *Rk Veda Samhita* of *Rishi, Devata,* and *Chhandas* is understood as the *Samhita* of *Sama Veda* (knower), and *Yajur Veda* (process of knowing), and *Atharva Veda* (known)[12]. As explained earlier, in this *Samhita,* the knowledge (or *Veda*) of frequency is associated with the knowledge of the knower, *Sama Veda. Samhita,* or "collectedness" can also be ascribed to the associate *Vedas,* thus, the *Samhita* of *Sama Veda* is historically considered the source of knowledge regarding sound vibration. This is portrayed as Level 1: THE SELF on the Unified Field Chart of the Psychology of Music[13].

I would submit that the Cosmic Psyche, as the knowledge *(Veda)* of sound, manifests as an associate *Veda* . This creates the *Sangita,* or "collectedness," of *Gandharva Veda* at the junction point between consciousness and matter. According to Chaudhuri (1989, Lesson 8, Main Point 4) and supported by *Sarngdeva* (*Sangitratnakara,* vol. 1, p. 2), author of the authoritative text on *Gandharva Veda* music, at this level *Rishi, Devata,* and *Chhandas* transform into *Gitam (Rishi,* knower) [the individual who sings or vocal

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11 Although Maharishi (in Chaudhuri, 1989) brings out these principles of *Sangita* and its three-in-one structure, the orginal quote is given from *Sangita Ratnakara* instead.

12 See Figure 1-1

13 See Figure 1-3

music]; *Vadyam (Devata*, process of knowing) [the instrumental music or the process by which instrumental music takes form]; and *Nrittam* (*Chhandas*, the known or object of knowledge) [the dance, or the individual who, hearing the music, responds in terms of movement] respectively.

The conception of, and interaction with, music as coherent frequencies is lively on all levels of the individual psyche. But more specifically, it is lively in that part of each level of the individual psyche which actively participates in the composition, production and/or response to music. The parts of the individual psyche engaged in musical activities operate together simultaneously as a holistic musical awareness whenever music stimuli are present—hence I introduce the term, "Musical Psyche." The Musical Psyche is a new term that draws upon and expands a psychological term previously used—the "musical mind."

According to Seashore (1938): "the musical mind does not consist of its dissected parts, but in an integrated personality. In its evaluation we must always have regard for the total personality as functioning in a total situation" (p. 2).

Seashore goes on to describe the musical mind, the prototype of the Musical Psyche, as an aspect of a normal human mind.

> Musical talent is not one, but a hierarchy of talents, branching out along certain trunk lines into the rich arborization, foliage, and fruitage of the tree, which we call the "musical mind." The normal musical mind is first of all a normal mind. What makes it musical is the possession, in a serviceable degree, of those capacities which are essential for the hearing, the feeling, the understanding, and ordinarily, for some form of expression of music, with a resulting drive or urge toward music (p.2).

The Musical Psyche of the individual, then, is individual human awareness actively engaged in music. However, it is more than just the musical "mind." Structural components of the Musical Psyche as understood from the perspective of Maharishi's Vedic Psychology include its existence as a particulate expression of Self and the mind. Although it may not have a precise location in the body, the Musical Psyche utilizes different aspects of the body for creating different expressions of music. In terms of

behavior, researchers have studied the different behavioral patterns associated with learning music stimuli (see Radocy and Boyle, 1988, pp. 305, 348-349). In terms of its function, the Musical Psyche interacts with and responds to *all* auditory stimuli, whether manifest as concrete sound (music) or subtler expressions of sound (cognitive structures of music) or as unmanifest infinite frequency (*shruti*) on the level of pure consciousness. The Musical Psyche, which is represented by the leftmost column of the Unified Field Chart of the Vedic Psychology of Music, represents the "knower" of music: it focuses primarily on cognition and behavior. The other two columns do not represent the Musical Psyche *per se,* however, they obviously depend on it for their existence.

The middle column, representing the dynamics of music, reflects the sequential elaboration of the field of music theory in terms corresponding to the levels of the Musical Psyche. It represents the "process" of making music. Maharishi has commented that all music has its source in *Maharishi Gandharva Veda* music; hence, the musical theory of *Maharishi Gandharva Veda* has been selected for examination in the middle column of the chart.[14]

The right column, representing the listener, reflects the types of *effects* music may have on each level of the Musical Psyche. These effects are most clearly defined in terms of music therapy. The column represents the "known," the outcome of the music experience. Those music therapy modalities which best trigger healing responses on each particular level of the Musical Psyche have been listed accordingly.

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[14] It should be mentioned that the musical theory presented herein is from the point of view of a psychologist and not of a musician. Although the chart describes a sequential elaboration of levels of music theory, in actual fact, all levels of the mind and body function together simultaneously to produce musical melodies and rhythms. The sequential elaboration of the components of *Maharishi Gandharva Veda* theory are for the purpose of this discussion. The same may be said for each of the three columns.

Following is a description of each of the levels of my unified field chart on the Vedic Psychology of Music. Each column will be explained in terms of its sequential elaborations. I begin with the leftmost column, the "knower," or the Musical Psyche.

V. The Musician—the Knower—The Psychology of Music

The left hand column of the unified field chart on this new psychology of music based on Maharishi's Vedic Science pertains to the knower, which is interpreted here as the musician/composer, because it is through the knower knowing the music that music has its effect—both subtle and concrete—on the composer/musician. I have organized the knower in terms of the psychology of music. Following the levels of the knower in Maharishi's Vedic Psychology, the development of the musician/composer is explained by Levels 2 and 3: THE MIND AND THE BODY; and Levels 5 and 6: SOCIETY and APPLIED VALUES OF MUSIC PSYCHOLOGY. These levels help to further explain the interrelationships between structure and function of the Musical Psyche. In addition, I shall discuss contemporary developments in the psychology of music in light of Maharishi's Vedic psychology. Note that level 1: Self, was discussed in the introduction to this section.

A. Level Two: The Mind of the Musical Psyche

1. The Musician and Ego

Since ego in Maharishi's Vedic Psychology referred to the experiencer, the ego shows as the deepest level of individuality responsible for integration and synthesis. For the Psychology of Music, ego has the same purpose: it is the experiencer, the creator of music, that which behaves musically. It is the basic structure of self-awareness involved with music making. Individual skills developed at this level involve self-esteem and self-

help methodologies as a musician/composer. Contemporary research investigates these issues in the context of the concept of "self" (not the same "Self" identified in Level One).

The concept of self as involved in music behavior is not fully developed in music psychology. However, Gaston (1968) understood music to be the essence of humanness. Radocy & Boyle (1988) acknowledged that self and music could be viewed from the humanistic perspective of Maslow's self-actualization. By participating in musical behavior, they submit, an individual grows more in self-concept. Michel and Martin (1970) suggested that musical activity had direct implications for an individual's self-image. The more positive one felt about the music, the better one felt about oneself. They tested the hypothesis of whether or not the learning of a popular music skill, such as playing rhythm guitar, would influence the self-esteem and academic achievement of disadvantaged black junior high school students. Michel and Martin concluded that "the development of musical skill may be an aid in increasing the self-esteem of disadvantaged problem students, and consequently may generalize to increased self-confidence in other tasks" (In Ruud, 1978, p. 54). Ruud (1978) explained that "music provides possibilities for a general strengthening of the ego structure of the patient along the lines of adequacy and security." He added that music "may open the music maker's mind to new aspects of the individual's awareness of himself" which in turn can lead to increased insight (p.27).

2. The Musician and Feeling

For most music psychologists, affective behaviors are the deepest, most intrinsic level of the mind involved with music. Skills learned on this level involve emotion learning skills; i.e., skills in how to express emotion in music and how to perceptually recognize emotion in musical compositions. In order to understand how musicians express emotion in music, psychologists have focused primarily on objectively understanding the perception

of emotional feelings produced by music. In the process, theories regarding the types of emotion or affective behaviors involved with music performance have evolved.

Seashore (1938) suggested that "music is essentially a play upon feeling with feeling. It is appreciated only insofar as it arouses feeling and can be expressed by active feeling." Gaston (1968) maintained that feelings or emotions could be conveyed nonverbally through music—that music provided a means of non-verbal communication of emotions. He added that music is an "expression of the tender emotions" (p. 25). Boyle and Radocy (1987) noted that affective behaviors include a significant feeling component. They commented that

> the various affective states, which individuals develop as a result of experience, are internalized neuro-psychic states reflecting positive or negative predispositions towards music and music-related objects, events, or phenomena. They provide an individual's primary means for guiding his or her approach/avoidance behaviors to music and music-related objects, events, or phenomena. (1987, p. 196)

The range of terminology for affective behavior includes: affect, emotion, aesthetic feeling, attitude, appreciation, interest, taste, preference, and sensitivity. For purposes of this discussion, affective behaviors refer to aesthetic feelings associated with music.

Krathwohl, Bloom, and Masia (1964) classified affective behaviors in terms of a continuum and thereby attempted to relate attitude, appreciation, interest, and value. The continuum represented an "internalization process" or levels of acceptance an individual may undergo when interacting with social and psychological phenomena. It ranged from "awareness" of a phenomenon to the "characterization" level in which an individual developed a consistent response pattern to a particular phenomenon.

A more in-depth analysis of aesthetic feelings associated with music will be described in the next chapter.

3. The Musician and Intellect

In the Psychology of Music, intellect refers to musical discrimination skills, including cognitive skills and understanding of musical structures. Musical intelligence is often associated with musical ability or aptitude. A major focus in the Psychology of Music is on the development of intelligence tests for determining musical ability.

According to Seashore (1938), "Intelligence is musical when its background is a storehouse of musical knowledge, a dynamo of musical interests, an outlet in musical tasks, and a warmth of musical experiences and responses." For Seashore, an example of someone with musical intelligence is the great composer, the great conductor, the great interpreter. "They have the power of sustained thought, a great store of organized information, and the ability to elaborate and control their creative work at a high intellectual level" (p. 8). However, Seashore does not explain exactly what he means by high intellectual level.

According to Radocy and Boyle (1988, p. 302) different definitions of musical intelligence have resulted from the use of different measurement tools for determining musical ability. They offer the following general definition: "Intelligence could be defined as a means of coping with the intellectual demands of one's environment." According to the authors, "all highly musical people appear to be highly intelligent, but not all highly intelligent people are musical. Musical ability requires an interaction between intelligence and appropriate environmental stimulation" (1988, p. 302).

Research on musical intelligence outlines relationships between intelligence scores and musical ability. The most accepted, most used, and well-validated tests of musical intelligence include the *Standardized Tests of Musical Intelligence* developed by Wing in 1961 and the *Musical Aptitude Profile* of Edwin Gordon (1965).

In his investigation of rhythmic abilities, Thackray (1968) developed a rhythmic perception test battery that essentially involved discrimination tasks. He said that there are three essentials for rhythmic perception: (a) the ability to count, (b) time discrimination, and (c) loudness discrimination. Boyle and Radocy (1987, p. 163) suggested that aural discrimination skills involved intonation judgments (used in determining modulation), comparison of two or more musical performances to determine which is more artistic, or determining more artistic phrase endings according to normal performance standards.

4. The Musician and Mind

Maharishi's Vedic Psychology's qualities of mind involved association, memory, and apprehending relationships. The Musical Psyche's activities on the level of mind involve similar mental skills associated with musical processing. To process music requires learning musical structures or schemata, gaining skills in sight-reading and musical notation, and understanding the history, style, and literature of music.

Radocy and Boyle (1987) advance that musical behavior requires learning. They suggest that

> learning music includes learning to perform, analyze, evaluate, create, and rearrange music through deliberately-sought formal experiences. It also includes the development of musical expectations, based on the perceptions and cognitions that result from immersion in one's environment and musical cultures. Knowledge of musical notation requires recognition skills and performance skills. (p. 319)

Dowling and Harwood (1986) discussed the use of melodic schema (knowledge structures regarding melody) in the processing of music. Melodic schema are the pattern of expectations a listener may have when hearing a melody. They suggested that "melodic schema apparently reflect melodic contour, intervals, pitch chroma (the circular dimension of pitch), and tonality " (pp. 124–144) which enable the individual to distinguish between different melodies.

Based on Chomsky's work regarding the deep structures of languages and Schenker's theoretical system for conceiving surface musical structures as outgrowths of an underlying musical core or Urtext, music psychologists such as Sloboda (1985) have suggested analogies between the underlying cognitive structures of music and language behaviors. Sloboda submits that the surface structures of music (notes and rests) are subsumable into larger "deep" hierarchical structures based on combinations of melodic, harmonic, rhythmic, and extra-musical information. Recent cognitive research has focused on isolating the hierarchical structures found in music and understanding their representation in neural networks in the brain. In a similar vein, Dr. Tony Nader, President of Maharishi Ayur-Veda University has shown that *Veda* is structured in the neurophysiology of the individual, or, actually, the neurophysiology is structured in the *Veda.*

According to Boyle and Radocy (1987), recognition skills in musical notation include naming clefs, lines and spaces, notes and rests, meter and key signatures, metric structure, and possibly dynamic and tempo markings. They also commented that "'general musical knowledge' could include facts about music and musicians, aspects of music theory and history, musical acoustics, music 'appreciation' and musical form" (p. 157).

For Seashore (1938, p. 149), "The learning process in music involves two primary aspects: acquisition and retention of musical information and experience, and the development of musical skills." These two aspects he understands to be musical memory which, he suggests, can be improved with training.

5. The Musician and Desire

Desire in Maharishi's Vedic Psychology draws the attention out through the senses to the level of behavior for personal fulfillment. In terms of the Musical Psyche, desire is the level of mind concerned with motivation. Motivation is often associated with goal setting.

For Radocy and Boyle (1987, p. 321), "A goal is something toward which an organism directs its behavior. It may be long-term and elegant, such as desiring to become the conductor of an orchestra; it may be short-term and mundane, such as desiring rehearsal in time to reach the supermarket." Goals can be associated with physiological or psychological needs and motivation. Radocy and Boyle (1987, p. 322) suggest theories of motivation that may be involved in musical activities. Walker (1981) classified motivation as intrinsic or extrinsic. Intrinsic referred to motivation that arises from within, extrinsic to that which arises from without the individual.

Walker identified three types of intrinsic motivation: autarkic motivation, idiocratic motivation, and extrinsic motivation. Autarkic refers that type of motivation which arises from some desired object or state "in and of itself." The task is intrinsic to the motive. An example would be someone who practices the piano for the sheer joy of practicing. Idiocratic motivation is due to the personality characteristics of the desiring individual. It arises from within but is directed outwards by the personality towards accomplishing widely varying goals. Here the desire comes from within, but the task is extrinsic. This is more akin to Maharishi's Vedic Psychology perspective. For instance, a business leader may be motivated by financial success; a student by good grades on a test; a child's need for self-esteem may be met through successful musical performance in class. The third type of motivation, extrinsic motivation, arises due to some reward or threat. Both the desire and the task are extrinsic to the individual. When the threat or reward condition dissolves, the motivation also disappears.

Different forms of motivation may also interact. Radocy and Boyle (1987) give the example of when a music therapy client "simultaneously feels an inner idiocratic drive to enhance well-being, an autarkic attraction to a particular musical activity, and an extrinsic desire for rewarding comments from the therapist" (p. 323).

Boyle and Radocy (1987, p. 248) comment that motivation is not only a catalyst for behavior, it also directly influences musical ability. In Atkinson's research (1981), a clear relationship was shown between efficiency of test performance and amount of motivation. "As motivation strength increases, performance increases to a certain point; after that, an increase in motivation causes a decrease in performance." Optimal motivation yields optimal performance.

6. The Musician and Perception

In Maharishi's Vedic Psychology, perception refers to the activity of the senses. The senses are responsible for processing environmental information. Applicable to the context of a Musical Psyche, Bruscia (1989) comments:

> Music engages all of the senses. Though we typically think of music as an 'auditory' art form, it also provides visual, tactile, and kinesthetic stimulation, and it also affords us opportunities to respond through these sensory channels. Thus, as a 'stimulus' music can provide multisensory input, and as a 'response' music can provide multisensory channels for output (p.21).

Psychoacoustics studies the activity of the sense of hearing involved with musical processing. According to Lundin (1967), psychoacoustical phenomena measures the perception and processing of the sound stimulus. The sound stimulus has two aspects: vibration and tone. Tonal attributes of sound include pitch, loudness, timbre, time, and density or volume. Vibrational attributes of sound include frequency, intensity, duration, and form.

Seashore writes:

> The psychological attributes of sound, namely, pitch, loudness, time, and timbre, depend upon the physical characteristics of the sound wave: frequency, amplitude, duration, and form. In terms of these we can account for every conceivable sound in nature and art—vocal or instrumental, musical or nonmusical. (1938, p. 2)

According to Roederer (1975), fixed pitches are essential for the perception of music. Davies (1978) refers to experiments on physiognomic[15] pitch perception which indicate that individuals perceive a succession of tones in a piece of music to "rise and fall as though it had spatial characteristics" (p. 105). Associated with this rise and fall are qualities of moods or emotional reactions. Consequently, music with high notes and general upward movement has been perceived as conveying a tense or energetic state which is released when the notes comes back down to a rest position (the tonic).

Boyle and Radocy (1987) refer to musical perceptual skills as musical aural-visual skills. "Aural-visual musical skills require an interaction of hearing and sight. Common examples include error detection while following printed music, and melodic and harmonic dictation" (p. 160). Dictation for the authors is both aural (hearing, and then holding what was heard in short-term memory) and visual (writing what was heard in notation form). Aural skills involve both recognition and discrimination abilities. Aural skills are used for chord classification, interval recognition, tonality, chord progress, and meter recognition.

B. Level Three: The Body of The Musical Psyche

1. The Musician and Physiology

The physiology objectively produces and responds to music. The physical properties of sound evolve from unmanifest thought processes to manifest written thought processes, interact with the physical properties of the Musical Psyche, and result in the production of

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[15]Physiognomy pertains to facial features. Here Davis uses it to refer to what appears as spatial characteristics of a tone.

sound through the interaction of the human channel, the coordinated movement of the psychophysiology. The fields of study associated with this level are biomusicology and musical neurology, which study how music manifests from thought to physical sound in the physiology. This includes the physiology of neural pathways involved in the processing of music, motor coordination which studies the physiological components involved in producing music, and music-making dysfunctions which may inhibit the proper production of music.

According to Sloboda (1985), the biological approach to music psychology identifies various attributes of a tonal stimulus as a result of human psychophysiological make-up. Sloboda suggests that the learning mechanisms and basic neurological pathways for processing tonal stimuli appear to be biologically determined and reflect inherent human limits for processing tonal structures.

Psychophysiological measures of covert music behavior include: electroencephalography (EEG), electromyography (EMG), pupillography, electrooculography, heart rate, blood pressure, plethysomography, respiratory rate, electrogastrography, and electrodermal activity. Overt musical behavior is measured physiologically by motor activity and motor performance.

2. The Musician and Behavior

Behavior in the psychology of music refers to performance skills and training. According to Seashore (1938):

> Musical performance...is limited by certain inherent and inherited motor capacities....Singing involves the possession of a favorable structure of the vocal organs and motor control. Playing various kinds of instruments calls for a high order of natural capacity, for speed and accuracy in control. (p. 10)

Research on musical performance has investigated vocally: voice quality, pitch intonation, the vibrato, and the trill among other measures; and instrumentally: piano technique, violin vibrato, trills, pitch intonation, and intensity (Lundin, 1953). Physical features such as teeth alignment and limb, hand, and finger sizes may influence performing ability regarding particular instruments.

Performance measures for determining musical performance skills are the Watkins-Farnum Performance Scale (Watkins & Farnum, 1954, 1962) for wind instruments and snare drum and the Farnum String Scale (Farnum, 1969) for orchestral strings. Both tests require performance of printed music, progressively increasing in difficulty. The tests measure prepared performance and sight reading.

C. Level Four: Psychology of Human Development—Seven States of Consciousness

This is the same as for Maharishi's Vedic Psychology. There may be different types of music associated with the different stabilized higher states of consciousness—cosmic consciousness, god consciousness, and unity consciousness—but it is premature to speculate here on what they might be.

D. Level Five: Society and The Musical Psyche

Levels 5 and 6 refer to the value of collective consciousness and the Musical Psyche. There are four sublevels to Level 5: Interpersonal Relations, Family/Group Relations, Social Relations, and International Relations.

1. The Musician and Interpersonal Relations

Interpersonal relations refers to the interactions between two people, two Musical Psyches. Generally, such interactions occur when two individuals are involved in

perfecting performance skills, as in a teacher-student relationship. Lundin (1967) notes that "during the one hour or half hour a teacher has with his pupil, the teacher can point up contingencies of reinforcement for the student. Continuous progress can be made by clarifying the relation between a response and its consequences" (p. 133). Cooperation and good sportsmanship can be learned when a child learns to perform with another child.

2. The Musician and Family/Group Relations

This sublevel is concerned with the social development of the Musical Psyche. According to Radocy and Boyle (1988, p.13)

> Music is truly a social phenomenon, inviting, encouraging, and in some instances almost requiring individuals to participate in group activity. Music is used as a signal to draw people together or as a rallying point around which individuals gather to engage in activities which require group cooperation and coordination.

Music provides group activities, bringing together individuals who otherwise might not meet. Music activities enable these individuals to interact in an ordered, socially-acceptable way (Radocy and Boyle, 1988; Gaston, 1967).

Dasilva, Blasi, and Dees (1984, p 3-5) suggest three reasons why music should be viewed as social behavior. First: performing, creating, hearing and interpreting music involves the use of shared social constructs—grammars and symbols; second: musical performance occurs in social groups comprised of composers, interpreters and listeners; and third: music takes place in communities, i.e., limited circles in which particular interpersonal and intergroup relationships exists. Therefore, to understand musical behavior, the authors contend it must be examined in a social context.

3. The Musician and Social Relations

This sublevel looks at the relation of the Musical Psyche to a society's cultural development. Radocy and Boyle (1988, p. 13) consider one of music's major functions to be the enforcement of conformity to social norms; music's most important function is its contribution to the integration of society. Dowling and Harwood (1986, p. 236-7) recognize music as a powerful symbol of cultural identity, "especially since musical style tends, like language, to reflect a highly stable set of shared behaviors that are culturally transmitted."

4. The Musician and International Relations

This sublevel studies the intercultural development of the Musical Psyche and identifies music universals that cross cultural boundaries, oral and literate cultures, and geophysical cultural differences. Music is viewed as being unique to each culture and yet shares common rules, such as pitch and tonality, rhythm and melody, and sound quality features.

According to Radocy and Boyle (1988, p. 17) "music of all cultures involves the organizations of sounds with varying pitches, loudness levels, and timbral qualities within a rhythmic framework." Other music universals include fixed pitches, fixed reference pitches (such as a drone), the use of the octave as a scale, the use of untempered scales (nearly universal) rather than tempered scales for creating melody, and the use of pulse or meter as a time reference point.

The Musical Psyche exposed to music from different cultures learns to view the world cultures from a unifying perspective, that of the shared language of music, indicating that music is more fundamental to human consciousness than is language.

Music is human behavior that reflects the values, attitudes and temperament of a culture (Radocy and Boyle, 1988). Although each culture has its own music; there are commonalties of musical function among different cultures. Nettle (1956, p.6) notes that music is present in all cultures, "primitive and civilized." Like Radocy and Boyle (1988) Dowling and Harwood (1986, p. 238) also suggest that there are cross-cultural universals in music. When individuals from different cultures hear music from other countries, although at first the music may sound unfamiliar, with repeated exposure, those individuals will eventually find the strange music familiar and even enjoyable. In this way, music serves as a unifying language across cultural boundaries, bringing about shared experiences in the midst of cultural differences.

Sloboda (1985) discusses the differences between oral and literate cultures. He explains that in oral cultures, music, like verbal knowledge, is subject to mutation over time; in literate cultures, exact knowledge of particular pieces of music is possible due to repeated examination of scores and hearing through records, CD's, tape cassettes, recordings, etc.

Moreover, music not only transcends cultural boundaries, it also communicates some deep essential features of the human experience across time, as modern audiences enjoy the music of their ancestors.

E. Level Six: Applied Psychology of Music

This most expressed level of the psychology of music based on Maharishi's Vedic Science lists the areas of society in which the Psychology of Music can be applied. These include the areas of music performance, education, health, and nearly every area of society. These areas both influence and are influenced by the ministers of government administering

their areas who are, in turn, governed by the Head of State, who also influences and is influenced by his or her area.

This section has described the psychology of music as the *rishi*, or known aspect of this psychology of music based on Maharishi's Vedic Science. The next section presents an overview of *Maharishi's Gandharva Veda* Music in terms of the *devata* or "knowing" aspect. *Maharishi Gandharva Veda music* is presented as the middle column of the Unified Field Chart for a new psychology of music based on Maharishi's Vedic Science because it is through the process of knowing the music itself that the musician influences the listener. *Maharishi Gandharva Veda* music, being the most fundamental type of music, represents all types of music in the chart.

It should be understood that this perspective of the sequential elaboration of *Maharishi's Gandharva Veda* music from its least expressed value to its most concrete level of expression is my own interpretation. This is but one of several ways that the information presented here could be interpreted.

VI. The Music—the Process of Knowing—*Maharishi Gandharva Veda* Music

We worship *Nada-brahman*, that incomparable bliss
which is immanent in all the creatures as intelligence
and is manifest in the phenomenon of this universe.[16]
(*Sarngadeva* in *Sangit Ratnakara*
vol. 1, (3), pp. 108-109)

A. Introduction

According to Shringy[17] (1991, p. 105 - 106), a noted commentator on *Gandharva Veda* music theory outside of Maharishi's revival of Vedic knowledge, of the five basic

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16 In order to get the benefits of *Maharishi Gandharva Veda* music, it is not necessary for one to worship Hindhu gods or believe in its spiritual value.This music, according to Maharishi, benefits all cultures, people of all religions and beliefs, and all political ideologies because it operates on the most fundamental level of natural law .

17 Throughout this section various Indian musicologists responsible for the development of *Gandharva* music theory but not affiliated with Maharishi's revival of

elements, the most pervasive is the space element, *akasa*. From *akasa* arise the other four elements: air, fire, water, and earth. Associated with *akasa* is the sense of sound. *Nada* is the *Sanskrit* term for sound, and *Nada Brahma*, (primordial sound), is the primary cause of the phenomenal world.

Shringy explains that (1991, p.109) *Nada Brahma* is the intangible substance which manifests itself through articulate sound. It is immanent in all beings as intelligence and bliss. As an undifferentiated state of manifestation, it is all-pervading, without any limitations of individuation.

This non-differentiated state of consciousness manifests in differentiated consciousness as the relationship between the seer and the seen, between the subject and the object (i.e., the self-interacting dynamics existing between knower, process of knowing, and known). *Nada Brahma* is primordial sound and *akasha* is its field of origin. Because *Nada Brahma* is the base from which the other elements arise, it can be considered the cause of the manifest universe. It is also the source of *shrutis*[18], letters and words, and is, therefore, the base upon which all worldly affairs are conducted (Shringy, 1991, *Sangit Ratnakara*, vol. 1, (3) p. 109).

According to *Sarngadeva*, (p. 23), author of *Sangita Ratnakara*. the authoritative text on *Gandharva Veda* music theory, *Nada* has two forms: *"anahata"* unstruck or uncreated, and *"ahata"* struck or created. *Anahata* exists on the level of consciousness in which name

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Vedic Science will be quoted. Gautum (1989) explains the evolution in music theory presented by these authors. The evolution of music theory by this author is briefly outlined in Appendix A: The historical perspective of *Gandharva Veda.*

[18]*Shruti* means "audible sound"; it generally refers to the microtones or intervals existing between notes (*svara*). The *shrutis* of *Gandharva Veda* theory should not be confused with the *shruti* value of the *Veda*. Whereas the *shruti* of the *Veda* refers to the infinite frequency resulting from the self-interacting dynamics of the cosmic psyche, *shruti* as 'audible sound' in *Gandharva Veda* theory refers to the microtones existing between the notes (*svara*). It will be discussed in more detail in the following section.

and form are synonymous (*Nama Rupa).* I submit that *anahata* is the unmanifest sound on the level of the Cosmic Psyche. Danielou (1968) comments that it "is not produced by a shock, or strike...it is a vibration of ether which cannot be physically perceived....It corresponds to the music of the spheres.... It forms permanent numerical patterns which are the basis of the world's existence" (p. 21). This apparently corresponds to what Maharishi refers to in his *Vedic* Science as "unmanifest sound" at the basis of creation.

Ahata is an object of sense perception. It is a vibration of air; it is audible and is always produced by a shock, (i.e., by striking). Danielou, one of the foremost experts in music theory who wrote extensively on Asian music, comments on *ahata nada*:

> Not all audible vibrations are intelligible sounds. The sounds used in music are those whose mutual relationships form an image of the basic laws of the universe as represented by the unstruck sounds. Thus musical sounds have it in their power to reproduce the first creation of the Primordial Intellect. This creation is at the same time a rhythm and a thought. The main characteristics of musical sounds is that they convey ideas, emotions, and at the same time form simple harmonious relations. This is why, according to a symbolic etymology, musical sound is called *'Nada,'* 'intelligible sound,' and is said to result from the union of physical breath with the fire of intellect. (1968, p. 22)

B. Level One: From Sound to Music—

The Emergence of *Gandharva Veda* Music from the Field of *Nada Brahma.*

I suggest that at this level the Self is defined in its largest sense. The unbounded Self bridges the gap between unmanifest and manifest. It is possible that this is the same bridge created by the emergence of *Gandharva* music from *Nada Brahma*, as described in the *Sangita Bhashya.*

> Now, therefore, we shall describe the creative process of the manifest sound, which expounds through (the concept of) *shruti* etc., the entire subject matter of music which is the means of peoples' amusement as well as of attaining freedom from the limitations of existence, and also we shall investigate into its being the origin of *shruti* etc.(*Sangit Ratnakara* vol. 1, 167-168b, p. 106-107.)
>
> *Nada* is the treasure of happiness for the happy, the distraction of those who suffer, the winner of the hearts of hearers, the first messenger of the

> God of love. Easy of access, it is the nimble beloved of passionate women. May it forever be honored. It is the fifth approach to the eternal wisdom, the *Veda*. (*Sangita Bhashya* in Danielou, 1968, p. 21)

Shringy (1991, pp. 105-106) explains that, "Music is truly a universal language and therefore is capable of being used as a medium not only of aesthetic experience but also of spiritual experience."

Shringy elaborates:

> ...the sages have discovered a technique of attaining liberation through the meditation of the unmanifest *nada*, i.e., the primordial sound which is heard inside the head if carefully listened to with an unburdened mind. This sound is produced without any content of matter, i.e., without any friction; it is natural and spontaneous and that is why it is called *anahata* (unstruck).

As *Sarngadeva* (p. 105) points out, because it is devoid of emotional color and requires one-pointed concentration of the mind to attain, the unmanifest *nada* cannot be easily experienced by the common populace; therefore, the ancient rishis made use of the *ahata* value of *nada* to bring enlightenment to the people.

Shringy says that

> even though all human endeavor may culminate in the awakening of the unmanifest *(anahata) nada* within, it can best be achieved through the pursuit of the manifest *(ahata) nada*, i.e., through the cultivation of musical arts which cater to the individual, the social and the spiritual good of humanity at the material and the spiritual levels at the same time. (p. 105).

He adds that through the *ahata nada* aspect of sound, music becomes useful and a treatise on the science of music becomes necessary, so that people can easily cultivate both the ends of life, viz., not only experience of the world but also salvation from its limitations through a pleasant and a convenient means like music which is universally approved and considered attractive.

> Therefore, the utility of music as a mass-entertainer of the people and as a means of salvation approachable by the common folks without effort is brought out...as the prominent characteristic feature of the manifest sound, i.e., *ahata nada*; it serves as a means of enjoyment in this world and of liberation from the limitations of worldly existence which is burdened with limitations of personality and the interplay of the opposites. (*Sangit Ratnakara*, vol. 1, p. 106).

Thus, in the development of *Gandharva* music theory, the concept of *nada* is understood by Shringy (p.105) to refer to the manifest form of *nada*, the sound value which is at the basis of music. I submit that while on the one hand *anahata nada* may be considered as Level 1, the Self, on the other hand or the Cosmic Psyche, *ahata nada* may be considered to be the finest level of *Maharishi Gandharva Veda* music, and, therefore should be located on the same level as the finest level of the mind of the Musical Psyche, the ego (Level 2):

C. Level Two: The Mind

1. Ego and *Maharishi Gandharva Veda* Music

Qualities or attributes of sound include: pitch, intensity, timbre, duration, and *shruti*[19]. According to Berendt (1983), *nada* is the basic element of musical structure. *Nada* can be either musical (that produced by regular vibrations) or unmusical (that produced by irregular vibrations)— i.e., noise. *Sangit Ratnakara* (vol. 1, p. 112) indicates five varieties of *nada*: 1) extremely subtle (resides in the navel); 2) subtle (resides in the heart); 3) local or manifest (resides in the throat); 4) not so loud or manifest (resides in the cerebrum); and 5) artificial (resides in the mouth). However, in practice, only three are used—the sound produced in the heart, throat, and head.

Mahajan (1989, p. 24), both a musician and author of commentary on *Gandharva Veda* music theory, describes the features of *ahata nada* as pitch, intensity, timbre and duration.

Pitch depends upon the rate of vibration per second or, in other words, the frequency of the sound. It can be either high or low and contributes to intonation and accent.

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[19]*Shruti* has also been spelled as *sruti* in some texts. It should be understood that *shruti* in *Gandharva Veda* is different from Maharishi's interpretation which explains it as the sound of the *Veda.*

Intensity refers to the relative strength of the sound. It can be soft or powerful. It depends upon the amplitude or width of the vibration. The louder the sound, the greater the amplitude of the vibrations. It plays an important role in accent and stress.

Timbre or tone color, is the singular quality of a sound as it is resonated by a given instrument or the voice. Timbre is affected by the material, shape, and size of the resonator.

Duration refers to the length of time that a sound is sustained. All musical sounds are subject to duration. Mahajan notes that duration is one of the bases of rhythm.

According to Shringy (1991, p. 408), "*Sruti* is that audible musical sound which is free from resonance and is capable of being individually perceived, recognized and reproduced. There are twenty-two *shrutis* in a given scale which are the same in all three registers." Shringy's definition is a composite of that provided by the major music theorists of *Gandharva Veda* music, including *Bharata, Matanga,* and *Sarngadeva.* B.C. Deva (1967) recorded the results of an experiment which objectively confirmed the number of *shrutis* as being 22 as well.

Shringy explains (1972, p. 399) that the concept of *shruti* was formed as a means of precisely measuring, relating, or comprehending pitch relations spontaneously perceived as tone. *Shrutis* can be understood as the microtones or intervals existing between notes. This apparently corresponds to the levels of the gap as explained in Maharishi's Vedic Science, specifically, the level of anyonyabhava, the state of all possibilities (Maharishi, 1994; Wallace, 1993. According to Gautum (1989, p. 250), Western musical intervals were mathematically determined around the 17th or 18th century whereas the concept of *shruti* was first introduced by *Bhara*ta 2000 years prior to that. In Western Classical music systems, the number of intervals between notes is fixed; there is an even number of intervals between each note in the scale—a tempered scale. However, in *Gandharva Veda* music, as in most music in Asia, the number of *shrutis* or microtones existing between each note varies—an untempered scale. Gautum explained that Bharata's *shruti* system

determined the intervals of notes on the basis of a 4-3-2-4-4-3-2 *shruti* relationship. These in turn were developed on the basis of the consonance of the notes Sa (Do) to Pa (Sol) and Sa (Do) to Ma (Fa).

Danielou (1968) explained that:

> according to the mode, the notes can be slightly sharper or flatter, thus forming certain microtonal intervals which convey particular expressions. Hence, the microtonal scale, or scale of the *shrutis*, is considered to be the fundamental basis of musical scales, the notes or *swaras* depending for their significance on the place they occupy in the microtonal scale. (p. 25)

Deva (1981), another author outside Maharishi's revival who has written on *Gandharva Veda* music, defined *shrutis* as additive measures of pitch relations in music. He considered *shrutis* to be convenient steps of measurement of pitch analogous to notes, the "difference limen" for pitch. *Matanga* and *Sarngadeva,* two theorists who composed treatises on *Gandharva Veda* music, derived the meaning of *shruti* from its root *shru* which means "to hear." *"Sruyate-iti-shruti"* literally translates as "that which is heard is *shruti.*" *Sarngadeva* understood *nada* to be the musical substance of *shruti.* He said that although not each sound constitutes *shruti, shrutis* do give rise to musical sounds. Kallinatha, a commentator on *Sarngadeva,* mentioned by Deva (1981) suggested that *shruti* is a factor of musical sound in the form of just perceptible difference of pitch, which is free from resonance, devoid of tonal color, has its own individual perception and recognition, and therefore is capable of being reproduced. (p. 407). For *Matanga,* also mentioned by Deva (1981) that which is heard is the object of hearing, audible sound. He states that *shruti* may be one or it may be many, and for him, it is primarily one, audible sound. Another commentator by the name of Visvavasu, on the other hand, says that *shruti* refers to two: the standard notes and the intervening notes. Kumbha defined a threefold function of the fourfold string movement, the *Chatush Arana* procedure for determining *shrutis* from plucking the strings of the *vina* in a specific way (Mahajan, 1989, p. 26-27).

There are different viewpoints regarding the exact number of *shrutis* in an octave or scale. They have been listed as 22, as 66, and as infinite. *Bharata* and *Sarngadeva* listed 22, and based it on a correspondence to the *Ayur-Vedic* concept of 22 *nadis* existing in the region of the heart "which, when the force of air acts upon it, produces their own *shruti* or audible sound" (Mahajan, 1989, p. 26). The *shrutis* of these 22 *nadis* are successively higher and higher in pitch. Mahajan goes on to explain that actually there are three sets of 22 *nadis*: one in the heart region, one in the throat region, and one in the head region. These three sets or 66 *nadis* create 66 possible *shrutis* which can be found existing in the three registers of *Gandharva Veda* music. Although some theorists suggest that each of the 66 has a distinct sound because of their unique location in one of the three registers, *Sarngadeva* maintains that there is not a fundamental difference between, for example, high *sa* or c, middle *sa* or c, and low *sa* or c to allow one to enumerate these as different *shrutis*. Hence, he says, there are only 22 distinct *shrutis* in a scale which are audible and recognizable to the human ear. "These twenty two independently distinguishable *shrutis* have an infinite number of interstitial *shrutis* which become discernible only during the rendering of a musical piece." (Mahajan, 1989, p. 27).

Regarding the concept of an infinite number of *shrutis*, Danielou (1968) comments:

> The number of theoretically possible intervals in relationship to a given note is obviously limitless. Yet the number of intervals used in music is comparatively small. This is due to the limitations of the mental mechanism through which we can distinguish sounds. Intervals do not merely produce pleasing or unpleasing sensations. Like words, they convey distinct and definite expressions to the mind of the hearer.

Danielou goes on to say:

> Indian musical theory considers that the ear can perceive 66 distinct meaningful intervals within the compass of an octave. We find, however, that among these intervals, 22 are mainly used in music. These 22 which form well-defined ratios with the tonic are those which convey to our mind the most distinct meanings. In practice, we could say that within an octave, it is possible to distinguish accurately 22 distinct expressions, and 66 distinct pitches of sound; beyond this we can naturally conceive of limitless

> relationships of sounds, but since we cannot distinguish them they have no reality in music. (Danielou, 1968, p. 28).

Mahajan (1989) explains that *shrutis* have been divided into five different classes: *dipta, ayata, karuna, mridu* , and *madhya. "Dipta* literally means illumined—used in the sense of dazzling; *Ayata* means vast; *Mridu* refers to tenderness; *Madhya* applies to moderate, and *Karuna* means compassion" (p. 27). Mahajan comments that the names not only signify the tonal sequence in melodic development, but also represent emotional colors. Each has its own individual image and evokes particular feelings, sentiments, or various moods. Each of these five classes of *shruti* can be further subdivided as follows:

Dipta is four-fold: *Tivra, Raudri, Vajrika*, and *Ugra*;

Ayata is five-fold: *Kumudati, Krodha, Prasarini, Sandipani*, and *Rohini;*

Karuna is three-fold: *Dayavati, Alapini, and Madanti*;

Mridu is four-fold: *Mandra, Ratika, Priti*, and *Kriti;*

Madhya is six-fold: *Chhandovati, Ranjani, Marjini, Raktika, Ramya*, and *Ksobhini.*

Each note not only has one *shruti* associated with it, but a second, third, or fourth *shruti* as well. And each *shruti*, with its tonal sequence and emotional color contributes to the overall tonal color of each note—which, in turn, conveys the "deep-rooted feeling, mood or emotion" associated with a particular *Raga* or melody. This leads us into the discussion of the next level of the unified field chart, the level of feeling.

2. Feeling and *Maharishi Gandharva Veda* Music

I suggest that feelings in *Maharishi Gandharva Veda* music are represented by the term *Rasas*. The word, *Rasa*, means sentiment or taste. It refers to the taste of emotion or mood that is created in the music. Danielou comments (1968) that each note is considered to have its own kind of expression and a distinct psycho-physiological effect. Each note has tonal color, mood, and meter. Danielou also mentions (1949) that from the 22 *shrutis*,

one must carefully select those microtones which convey certain definite emotions or ideas, and then group these together in such a way as to form a scale, a melody. "The essential feature of a *raga* (melody) is its power of evoking an emotion that takes hold of the hearers like a spell" (Danielou, 1949, p. 115).

Mahajan (1989) noted that emotions determine our moods and in the context of music, emotions refer to the "distinct atmosphere or the tonal structure of a *Raga* which imparts a particular state of feelings" (p. 9). Shringy (1991) remarked that *Gandharva* music was developed originally to accompany drama and dance. It served to evoke emotion. According to Mahajan, when the notes of a particular *Raga* are improvised for a certain period of time, a particular mood gets created. Different *Rasas* will create different moods in varying shades.

Chaudhuri (1990) goes on to explain that there are nine different *Rasas* or feelings. He defines *Rasa* as the inner feeling that arises in the musician and the listener when listening to a particular *Raga* or melody. "It is an inner feeling that is difficult to communicate but distinct in experience. Examples would be something like a feeling of devotion, a feeling of joy, or a feeling of happiness" (Lesson 2, Main Point 7).

Shringy (1991) remarks that *Rasa* generally means "aesthetic delight." *Rasa*, as delight, is distinguished from pleasure, sensation, and sensual enjoyment in that it is derived from a state of mind which is free from personal likes and dislikes. "*Rasa* is the delight of a consciousness in which emotion is experienced as a universal affection. It is not only contemplation but also a direct experience of beauty and love. It is delight approximating universal love" (Shringy, p. 158). From the point of view of Maharishi's Vedic Psychology, aesthetic delight would, in this context, be an experience of the enlightened, who, established in unbounded pure consciousness, the Cosmic Psyche, experiences *Rasa* in its purest expression, as delight in the form of universal love.

According to Deva (1981 p. 139), there are nine *Rasas*: *Srngara* (love), *karuna* (compassion), *raudra* (anger), *vira* (heroism), *hasya* (laughter), *bibhatsa* (disgust), *bhayanaka* (fear), *adhbhuta* (wonder), and *santa* (peace). "These are recognized by their *vibhava* (stimulus), *satva bhava* (involuntary response) and more particularly the *anubhava* (voluntary response)." In a series of footnotes to *Sarngadeva's* treatise, Shringy (1991) comments on the *Rasas*:

> *Vira* is expressive of dignity, majesty and glory, courage and heroism. *Adbhuta* is expressive of wonderment, amazement, surprise, exhilaration, and also the mixed feelings of anticipation. *Raudra* depicts anger or excited fury. *Bibhatsa* conveys the sentiment of hate, hostility and disgust which is usually made explicit in dramas. *Bhayanaka* represents the sensation of fear, fright and awe. However, it is difficult to express this in music or a solo-instrument. *Karuna* is sad, pathetic, tragic and expresses loneliness, longing and yearning for the absent lover or God. *Hasya* is humorous and comic, happy and joyful and producing laughter. *Srngara* represents the universal creative force and embodies romantic and erotic feelings of love between man and woman, the longing for the absent lover, and sensitivity to the beauty of nature. (Shringy footnotes 24–31 in *Sangit Ratnakara* 1.(3) pp. 157–158.)

Chaudhuri (1990, private conversation) commented that in *Maharishi Gandharva Veda* music, only the positive *Rasas* are expressed, as these are indicative of the more enlightened state of awareness.

3. Intellect and *Maharishi Gandharva Veda* Music

According to Maharishi's Vedic psychology (Dillbeck, 1988, p.247) the function of the intellect in individual life is to discriminate or decide (Maharishi, 1969, p.167-339). I suggest that the level of intellect in *Maharishi Gandharva Veda* music refers to the organizing power inherent in the structure of the notes or *swaras*[20], the building blocks of the *Raga* or melody. This organizing power is responsible not only for the actual sounds of the *svara*, but also for the combination of notes into scales, grouping of sounds, the

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[20] Also spelled *svaras*

arrangement of the tonal movement, and the classification of notes into scales (*jati*). These concepts are displayed below in figure 1-5, which displays how a *svara* evolves to become a *jati*. According to Mahajan,

> Each note of the musical scale has its own psychological effect; though in combination with other notes this effect may be totally different. Hence the proper sequencing, alignment, distribution and presentation of the notes is essential for creating a desired effect (Mahajan, 1989, p. 10).

Mahajan adds that the same note or set of notes may create different shades of emotions in different parts of the musical piece; each time it is used differently it creates a different reaction in the audience. This, Mahajan states, is a unique feature of *Gandharva Veda* music. Combinations of notes are covered as well in this level, under the topics of "tonic" (drone), *svara* (scales), and the later, historical descendants of *Gramas*: *jati, thatas*, and *melas*.

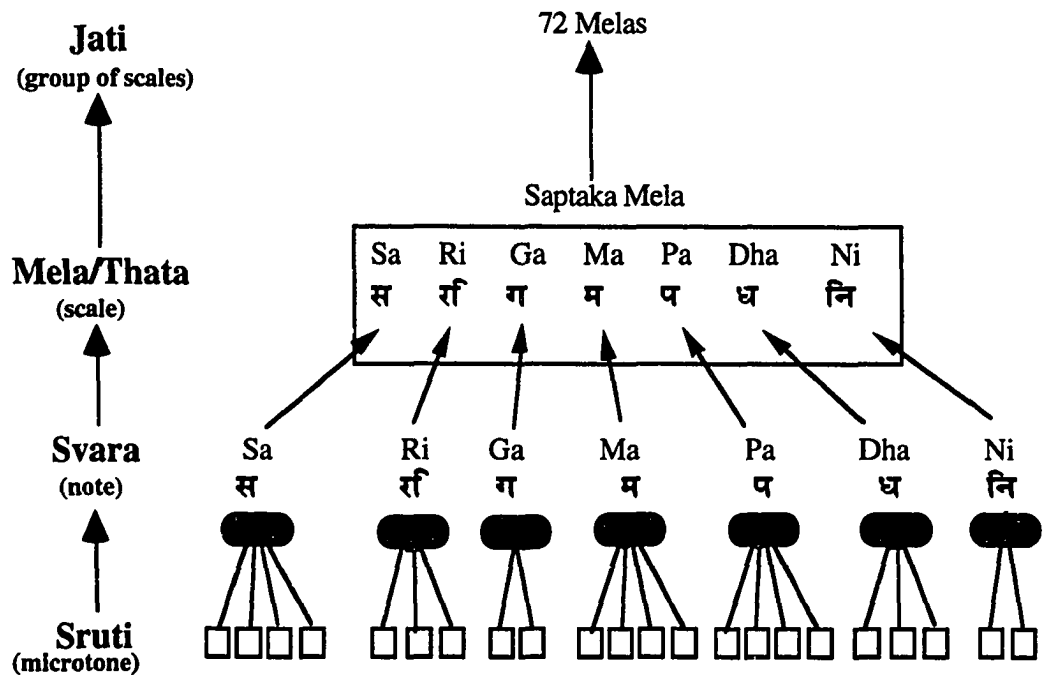

Figure1-5 Sound Unfolding to Scale:This figure is an example of how the organizing power inherent in the *svara* (sound) unfolds to form a *Jati* (group of scales)

Svara

Sarngadeva defines *svara* in the following way:

> Immediately consequent upon *shruti*, creamy and resonating,
> the sound that delights the listeners' minds
> by itself is called *svara.*
> (*Sangit Ratnakara*, vol. 1, (3), pp. 134-135)

Matanga, another writer on Indian musical theory, defines *svara* in another way when he writes: "The word *svara* means 'that which shines of itself'—from *rajri* (to shine) with the prefix *sva* (self) Matanga, *Brihaddeshi* 1.63 (Danielou, 1968, *Ragas of Northern Indian Music*, p. 24). Danielou (1968, p. 24) suggests that *svara* should be defined as an expressive note rather than just a note.

Shringy (1972) explained the difference between *shruti* and *svara.* According to Shringy's analysis of music theory, *Sarngadeva* described the *svara* (tone or a note) as arising out of the *shrutis* (microtones). Although both are comprised of *nada*, musical sound, they are different in function. A *svara* (tone) manifests after the *shruti* (microtone) ceases to be. Also, no single *shruti* can produce a single *svara*; rather, it requires several *shrutis* to manifest a *svara.* A *svara* is the sum total effect of the *shrutis* from which it is constituted. Characteristics of a *svara* include resonance, softness, self-sustained delightfulness, and according to Shringy, a fourth dimension, spontaneous perceptibility.

Svaras are the notes used in a scale. According to *Maharishi Gandharva Veda* music theory, there are basically seven notes: 1) *shadja* (sa: the precursor of the six other notes; 2) *rishabha* (ri): quickly appeals to the heart; 3) *gandhara* (ga): has the ability to delight the *Gandharvas;* 4) *madhyama* (ma): center of the scale; 5) *panchama* (pa): fifth from the basic note; 6) *dhaivata* (dha): discerned by sensitive minds; and 7) *nishada* (ni): notes of the scale come to an end (Mahajan, 1989).

Sa, ma, and *pa* consist of four *shrutis* (microtones) each; *ri* and *dha* consist of three *shrutis* each; and *ga* and *ni* consist of two *shrutis* each. *Sarngadeva* assigns sentiments to each

note and also ascribes the sound of a particular animal to each. Table 1-3 presents the *Gandharva svaras*, their equivalent in Western music, and the associated animal and sentiment for each.

Kallinatha, commentator on *Sarngadeva's* treatise, remarks that these seven notes correspond with seven basic elements of the body. According to *Narada Samhita* (2, 53-54): "The note *Sa* (the tonic) is said to be the soul, *Ri* is called the head, *Ga* the arms, *Ma* the chest, *Pa* the throat, *Dha* the hips, *Ni* the feet. Such are the seven limbs of the modal scale."

According to Mahajan, the total number of *svaras* equals twelve when *shuddha* and *vikrit* forms of *svaras* are taken into account. *Shuddha svara* are those established on the original *shruti* (the original seven); *vikrit svaras* are those which deviate from the original *shruti* (another five). Deviations are known as *komal* (flattened) or *tivra* (sharpened). Unlike Western music, not all the notes can be flattened and sharpened. Instead, *Sa* and *Pa* are never altered; *Ri, Ga, Dha,* and *Ni* can be flattened; *Ma* can only be sharpened.

Svaras are of four types: *vadi* (sonant), *samvadi* (consonant), *vivadi* (dissonant), and *anuvadi* (assonant). This will be discussed under Level 4, Mind.

TABLE 1-3
The *Svaras* of *Gandharva Veda* Music

***Gandharva* name**	***Gandharva* note**	**English name**	**English note**	**Animal sound**	**Sentiment**
Shadja	*Sa*	Do	C	Peacock	Heroism, wonder terror
Rishabha	*Ri*	Re	D	Ox	
Gandhara	*Ga*	Mi	E	Goat	Compassion
Madhyama	*Ma*	Fa	F	Crane	Humor
Panchama	*Pa*	Sol	G	Blackbird	
Dhaivata	*Dha*	La	A	Frog	Disgust Alarm
Nishada	*Ni*	Ti	B	Elephant	Compassion

The *Svaras* of *Gandharva Veda* music along with their English equivalents, and the animal sound and sentiment associated with each.

Tonic (drone)

The tonic is never omitted in a *Raga* because all other notes are related to it. All other notes are perceived, not as individual notes, but in relation to the tonic. According to Danielou (1968), the *Gandharva Veda* musical system is based on the establishment of relations between a permanent fixed sound which is invariable (the tonic, *Sa*) and the successive, variable sounds, the notes.

Dattila explains that the *Shadja* (the tonic) may be established at will at any pitch (on any *shruti)* and that, by relation with it, the other notes should be established at the proper intervals (*Sangit Ratnakara* 1, (4), pp. 15-16).

Mahajan (1989) suggests that the tonic also serves as a rest note. It is the note from which any melody starts and concludes. It represents a state of rest, because any departure from it leads to unrest which is resolved only by returning to the tonic. The tonic thus gives a feeling of completion. Regardless of what note the scale begins with, the tonic is always *Sa*. Thus, Sa represents the universal, non-changing, level in *Gandharva Veda* music.

Regarding the drone, which is produced with the *tampara* instrument, Danielou (1968) explains that the relationship existing between each note to the tonic determines the meaning of any given sound. Therefore, he concludes that the tonic must be constantly heard in order to maintain the proper relationship. The tonic can either be sounded as part of a drone, or repeated at frequent intervals, as on stringed instruments. The drone sounds the tonic *Sa* plus *Pa* . In *Maharishi Gandharva Veda* music theory, the drone is like the Cosmic hum, the continuum in the background upon which the melody rises and falls.

Danielou comments that the drone not only keeps the singers on pitch, but also serves a much higher purpose as the key to all modal expression. "As long as the hearer has not entirely identified himself with the tonic, but still perceives drone and melody as separate entities, it will remain impossible for him to follow or understand the meaning of modal

music" (Danielou, 1968, p. 23). Audience reports on the effects of the drone indicate it has a very relaxing effect on the listener, similar to the effects of "white noise" (Deva, 1989).

Gramas

A collection of notes that "belong" to a tonic is called "*Gramas.*" *Gramas* refer to scales. Danielou (1968, p. 55) comments that the Indian scale is divided into seven regions or sections ruled by the seven notes and is named after them (viz., Sa scale, Ri scale, Ma scale etc.). The organization of notes into scales was the purpose of *grama*. Shringy (p. 160) points out that taken individually, the *svaras* (notes or tones) do not have any use, obvious or hidden. In order to create an effect, the *svaras* had to be organized and presented in a systematic form. This organizing power is the basic pattern of tonal organization and the system of formal presentation related to it—the *grama-murcchana-jati* system. This system is the organizing power of the sounds of ancient *Gandharva Veda* music. It will be explained in more detail later in this chapter.

Recall that in the Vedic theory of sound, pure knowledge has organizing power. On the level of the *Veda*, organizing power was inherent in the structure of the sound itself, here in *Gandharva Veda*, the organizing power exists outside of the notes.

According to Shringy (p. 160), the *grama* for *Sarngadeva* forms the basis of tonal organization. It is formally presented in the *grama-murcchana-jati* system of tonal organization which consists of such concepts as *murcchana* (tonal movement of the seven notes), the *murcchana* series (*rama*) and *thetana* series (note series), all of which are important features in ancient Indian music. For purposes of this discussion, only the concept of *grama* and how it differs from *murchanna* will be explained.

The concept of *grama* is exclusively found in the more ancient *Gandharva Veda* texts. After the 6th Century A.D., the physical means for determining *Gramas* became obsolete and so the classification of *Gramas* lost its purpose. It was first replaced by the concept of *jati* and later on by *thatas* and *melas*.

Grama pertains to the organization of notes in a scale. "The scale (*grama*) is the assemblage of the notes" (*Sangita Makaranda* 1.49).

"*Grama* is a group of tones that forms the basis of *murcchana*. etc." (*Sarngadeva* in *Sangit Ratnakara* 1,(4), p. 160).

The *Gramas*, which consisted of just three scales, were not meant to be sung; rather they referred to the various types of melodic patterns or musical forms which could be set to a particular pattern (Sangit Ratnakara, 1,(4), p. 166).

The word *grama* means village, a collection that is more than the sum of its parts (Shringy, p. 160). In musical terms, *grama* refers specifically to a group of notes of relative tonal value organized into an integrated whole. This group consists of at least seven notes—the *saptaka* scale. According to Shringy, the *saptaka* scale still serves as the basis for musical compositions in *Gandharva Veda* music today.

According to Chaudhuri (1990, Lesson 2. Main Point 8), *Maharishi Gandharva Veda* music is based on the *Saptaka* scale which has two fixed *svaras*: *Sa* (the tonic) and *Pa* (the fifth *svara*). The tonic is always *Sa*, but *Sa* may change in pitch. Other *svaras* can be *tivra* (sharp), *komal* (flat), or *shuddha* (pure). The *Saptaka* scale thus consists of twelve notes: seven *shuddha*, four *komal*, and one *tivra*. It is equivalent to the octave of Western music in that *Sa*, the tonic, both begins and ends the scale. (According to Chaudhuri, [public lecture, 1990] in *Gandharva Veda* music tradition, when the same *svara* both begins and ends the scale, the last *svara* is not mentioned in the scale and the eight note scale becomes a seven-note scale).

Chaudhuri (1990, Lesson 4) lists three *Saptaka* registers or octaves: *Tara* (upper register) indicated by a dot on top of the note; *Madhya* (middle register) designated without a dot; and *Mandra* (lower register) designated with a dot below the note.

The three basic *grama* scales of *Sarngadeva* were based on corresponding tunings of the harp, an instrument used in *Gandharva Veda* music until the 6th century A.D. when it

was replaced by lute-type instruments. The scales were based on tuning the harp, not on arrangement of its frets; hence the reason for the decline of *grama* when the instrument disappeared (Danielou, 1968). Each scale was named after its main note: *Sa, Ma,* and *Ga.*

According to Shringy:

> This unsingable group scale consisted of *suddha-vikrta svaras* collected together and preserved for the purpose of selecting from one particular group of notes the desired seven notes complete with a starting point (*graha*). This *grama,* when sung in the natural order of ascent and descent, was called *murcchana*; when a harmonic individuality was established with the help of *amsa, nyasa, vadi* and *samvadi* it was called *jati* (Shringy, 1991, p. 162).

The *murcchana* was defined as the action or tonal movement of the seven notes ascending or descending successively. The function of the *murchhana* was to develop, enlarge, and spread the *Raga.* According to *Sarngadeva* there are seven *murcchanas* in each *grama* (*Sarngadeva,* 1.4.p. 167).

Jati

Jati refers to the class or family of scales. Danielou (1968, p. 55) quotes *Narada Samhita* (2.60) which says that there are three types of *jati:* "*audava* of five notes, *shadava* of six, and *sampurna* (complete) of seven notes." A *Raga* must have at least a five-note scale to be considered a *raga.* Melodies with less than five notes are called *tanas.* Danielou notes that seventy-two possible scales exist in the *jati* system of classification.

In the history of the evolution of *Raga* structure, Mahajan (1989, p. 57) points out that in the ancient music, the *grama-murcchana-jati* system was prevalent; it was replaced by the *Raga-Ragini* system during the eighteenth century which in turn was replaced by the *Thata* system during the early part of the twentieth century.

Thatas and *Melas*

Although *Bhatkhande's Thata* system simply classified *Ragas* according to ten scales, it has received criticism due to not all the *Ragas* fitting into its classification scheme (ex.

Lalit). However, it is still quite popular and is used extensively today throughout Northern India (Mahajan, 1989).

Danielou (1968, pp. 57-58) notes that whereas North Indian music theory refers to the scales as *Thata*, South Indian music theory uses the term *mela*. *Melas* consist of the original seventy-two scales, the ten most common of which are the North Indian *Thatas*. Gautam (1989) notes that whereas *Thata* means "a framework," *mela* means "to get together desired notes"; and since that is more in line with *Sarngadeva's* definition of *shruti 39*(the shifting of a *svara* from one *shruti* to another), it is more appropriate than *thata*. This is explained more in Appendix A: the historical perspective of *Gandharva Veda* music. .

Chaudhuri (1990, Lesson 10, Main Point 6) considers *Thata* to be like a structural foundation; a good foundation makes a good building. When *Thata* is embellished with other elements (see next level), it becomes a *Raga*. The ten *thatas* of *Maharishi Gandharva Veda* music are listed in Table 1-3.

4. Mind and *Maharishi Gandharva Veda* Music

In Maharishi's Vedic Psychology, the level of the mind deals with memory, association, and apprehending relationships (Orme-Johnson, 1988, p.154). The data coming in from the senses is processed at this level and given meaning through memory. Similarly, in the unity chart for *Maharishi Gandharva Veda* music (the process of knowing column), we can associate the level of mind with that level of musical structure which gives meaning to the notes, the use of melody in a *Raga*. This level processes the melody in such a way as to create a musical composition.

According to Maharishi, mind is a more active level that the intellect (Maharishi, 1969, p.242). The mind considers possibilities and their relationship and also serves the function of memory and thought. The difference between the intellect and mind is that the

intellect filters the information which comes to it through the mind. I suggest that a similar relationship exists between the *svara* and its function in the *Raga* The total information is in the *Raga*, the *jati* or *mela* filters and/or selects the *svara* which may be used in a *Raga.*

TABLE 1-4
The Ten *Thatas* of *Maharishi Gandharva Veda* Music

Name of Scale	*Svaras* in the Scale							
Bilawal	Sa	Ri	Ga	Ma	Pa	Dha	Ni	Sa
Bhairav	Sa	Ri	Ga	Ma	Pa	Dha	Ni	Sa
Bhairvi	Sa	Ri	Ga	Ma	Pa	Dha	Ni	Sa
Todi	Sa	Ri	Ga	°Ma	Pa	Dha	Ni	Sa
Asawari	Sa	Ri	Ga	Ma	Pa	Dha	Ni	Sa
Kafi	Sa	Ri	Ga	Ma	Pa	Dha	Ni	Sa
Kalyan	Sa	Ri	Ga	°Ma	Pa	Dha	Ni	Sa
Purbi	Sa	Ri	Ga	°Ma	Pa	Dha	Ni	Sa
Marwa	Sa	Ri	Ga	°Ma	Pa	Dha	Ni	Sa
Khamaj	Sa	Ri	Ga	Ma	Pa	Dha	Ni	Sa

The ten *Thatas* of *Maharishi Gandharva Veda* music: their names and *svaras*. Note: an underlined *svara* means that note is *komal* (flat); a *svara* with ° before it is *tivra* (sharp).Taken from Chaudhuri (1990) Introduction to *Maharishi Gandharva Veda* music, Lesson 10.

Whereas the level of intellect discussed the structural organization of *svara* (notes) into *thatas/melas* (scales) and *jatis* (class of scales) I would like to suggest that the level of the mind looks at the functional organization of *svaras* as one aspect of a larger whole, the *Raga*. The *Raga* is composed of sound, melody and rhythm. The level of intellect discriminates between notes to create sound and melody. One could say that the organization of *svara* comes before the *raga* can be heard. Consequently, I submit that organization of *svara* is associated with finer levels than the *raga*.

Historically, *Bharata* used the word *Raga* to attribute emotional color, aesthetic enjoyment or pleasure (*rakti*) to a musical composition. The full development of *Raga, per se*, was first recognized technically by *Matanga* and then by *Sarngadeva*. According to *Matanga* (*Sangit Ratnakara*, II, p.3), "That particular sound (formation) which is embellished by musical tones and the movement of tonal patterns, and is (thereby)

delightful to the people's minds, is called *Raga* by the wise." *Raga* is derived from its *Sanskrit* roots *ranj* (to color).

Deva (1981) describes the elements of a *Raga*:

> *Raga* is a melodic pattern or scheme. The musician singing or playing a *Raga* does not sing a set piece or composition. He does not interpret. On the other hand, he has to create and improvise a melodic scheme on the spot. Apart from certain traditional (sometimes parochial) rules the musician is free to create as he chooses. The virtuoso approach predominates. Some of the guiding rules are given below:
> A *Raga* has a definite musical scale—naturals, flats and sharps.
> A *Raga* usually has not more than seven and not less than five notes.
> A *Raga* has a prescribed form of ascent and descent.
> A *Raga* has certain characteristic tonal combinations which have to be sung or played. Certain tones must find emphasis.
> A *Raga* should never omit the tonic, *Sa*.
> A *Raga* should have at least one of the following notes—*sa, ma, pa*.
>
> Apart from these major conditions, each *Raga* may have its minor characteristics which are definitive of the *Raga*. With these arbitrarily accepted rules the musician is free to create and improvise (Deva, 1981, footnote, pp. 84-85).

According to Chaudhuri (1990, Lesson 10), the *Raga* is the basis of *Maharishi Gandharva Veda* music. Its purpose is "*Raga iti jayanti*" (*Raga* makes one feel good). A *Raga* is composed of certain elements: the *thata, arohi/abrohi, vadi/samvadi, jati, pakar*, and the movements of the *Raga* designated as *alap/jor/gat*. According to *Sarngadeva*, there are 264 *Ragas* (Gautam, 1989).

Thata has already been described as a systematic grouping of seven *svaras*. *Maharishi Gandharva Veda* music consists of ten allowed *thatas*, as given in table 1-3.

Arohi/abrohi refers to the ascending/descending order of the *svaras*. Each scale in a *Raga* has a particular order of ascension for its notes which may vary from its order of descension.

There are four types of *svaras*: *vadi, samvadi, vivadi*, and *anuvadi*.

Vadi (sonant) is the dominant note, the most frequently used note in the *Raga* other than the tonic *Sa*. According to Mahajan (1989), the essence of the *Raga* lies in this note.

Samvadi (consonant) is the subdominant or next most frequently used note. *Vivadi* (dissonant) refers to the note which is not used in a *Raga.* Mahajan notes that application of *vivadi* would destroy the mood of the *Raga. Anuvadi* (assonant) refers to all the notes used in the *Raga* other than *vadi* and *samvadi.*

Jati refers to the number of notes used in the *arohi/abrohi* of the *Raga.* The number of notes in the *arohi* (ascending) order may differ from the number of notes used in the *abrohi* (descending) order. For example, seven notes may be used in the *arohi,* but only five in the *abrohi* of a particular scale.

Pakar is the musical phrase that identifies a particular *Raga.* By performing just this phrase, one can identify the *Raga. Pakar* is a color combination of notes that gives a distinctive shape, quality or image to a *Raga* (Chaudhuri, 1990, Lesson 10, Main Point 2.4).

Depending on the theorist, there are two or three stages in the movement of a *Raga.* In *Maharishi Gandharva Veda* music, these three stages are called the *alap,* the *jor,* and the *gat.* As described earlier, Chaudhuri (1990, Lesson 10, Main Point 2.5) defines *alap* as a slow introduction; it builds up the mode or picture of the *Raga.* The main concern of the *alap* is to unfold the tonal beauty of the *Raga.* Mahajan (pp. 75-76) remarks that the ancient texts noted two parts to this stage of unfoldment: the *alap* and the *jor.* The more modern texts note three parts: *alap, jor,* and *jhala.*

According to *Maharishi Gandharva Veda* music, in the *alap,* more emphasis is laid on embellishments to link the notes; "each *svara* is nurtured, carefully handled, and beautified" (Chaudhuri, Lesson 10, Main Point 2.7). *Alap* is instrumental or vocal only, no rhythm is used. *Alap* may last anywhere from a few seconds to a few minutes to an hour, depending upon the length of the *Raga.* In the second phase, *jor,* the tempo increases and pulsation (rhythm) is introduced. The third phase, *Gat,* means a composition set to a rhythmic cycle. In this phase, the tempo becomes much faster and the cycle is repeated several times. The

musician composes the *Gat* and then returns to its tonic, the rhythmic *Sa* known as *Sam.* Chaudhuri maintains that the creativity coming out of the *gat* is the most difficult part of the *Raga* to perform (Lesson Eleven, Main Point 2.6).

According to Chaudhuri:

> Playing a *Raga* is like decorating a house. The feeling that gets created makes the house a home. When the seven elements of a *Raga* are integrated into a wholeness, then the *svaras* come alive and shine, and hearing the *Raga* makes you feel good, *"Raga iti jayanti."* (Chaudhuri 1990, Lesson 10, Main Point 4)

5. Desire and *Maharishi Gandharva Veda* Music

Desire is associated with motivation. According to Maharishi's Vedic Psychology, desire draws attention out through the senses to the level of behavior for the purpose of personal fulfillment (Orme-Johnson, 1988, p.154). I suggest that the aspect of *Maharishi Gandharva Veda* music which most closely aligns with the level of desire is *Alamkaras/Gamakas,* the ornamentations of a musical composition.

According to Maharishi:

> It is desire that establishes contact of the senses with their objects... which in turn create a spur to activity involving the Self (1969, p.236).

Dillbeck (1988, p.271) explains that desire may be understood as "motivating the flow of attention and thus, in daily experience, connecting the mind with the environment through the senses."

According to Danielou (1968, p.90), "the essential feature of a *raga* is its power of evoking an emotion that takes hold of the hearers like a spell." Danielou explains that *ragas* center around one emotion which "it develops, explains, and cultivates, upon which it insists, and which it exalts until an impression is created on the listener which is almost impossible to resist."

I would like to suggest that this is accomplished through the use of ornamentation (Danielou, 1968, Chaudhuri, 1990, Mahajan, 1989) as reflected in various historical texts as paraphrased in the following:

A *Raga,* the sages say, is a particular arrangement of sounds in which notes and melodic movements appear like ornaments to enchant the mind (*Sangita-darpana,* 2-1 in Danielou's *Ragas of Northern India,* p. 90).

A melody without ornament is like a night without moon, a river without water, a vine without flowers, or a woman without jewels (*Bharata* in *Natya Sastra,* 29.75, p. 407).

Alamkara

Alamkara literally means ornamentation. Mahajan (1989, p. 36) explains that in ancient times ornamentation stood for various types of tonal embellishments. Today it refers to a progression of musical phrases which impart flavor and bring out the desired expression of the Raga. The musician, as it were, is motivated to express the rasa inherent in the Raga and this is best accomplished through use of *Alamkara* (Mahajan, 1989).

There are four categories of *Alamkaras: sthayi, arohi, avarohi,* and *sanchari.* They are based on *varnas* or note-patterns. Shringy (1989, p. 235) explains that *varna* when translated literally means color, caste, or a syllable. In the context of music, *varna* refers to the particular tone pattern used for creating an overall musical impression. This particular pattern of notes lends color or taste to the composition. Just as there are four categories of *Alamkaras*, there are also four categories of *varnas*, using the same titles.

Sthayi (level) *Alamkaras* are simple vocalizations which return to the same note or register on which they began. There are seven types of *sthayi Alamkaras.*

Arohi (ascending) *Alamkaras* lead from one note to another higher note and total twelve in number.

Avrohi (descending) *Alamkaras* also number twelve but are performed in the reverse order from the *arohi's.*

The last, *sanchari Alamkaras*, refer to circulatory tone patterns and total twenty-five. Unlike *arohi* and *avohi Alamkaras*, these do not have any specific order in rendering. Rather *sanchari Alamkaras* combine the movements of the other three-note patterns.

In addition to these four major categories, seven other kinds of *Alamkaras* exist: *Taramandra Prasanna, Mandratara Prasanna, Avartak, Sampradan, Vidhut, Uplolak*, and *Ullasita. Bharata* recommends that:

> Melody should be embellished by these (ornamentations) without disrupting the tone-pattern (*varna*), for ornaments are to be put on properly so that the girdle is not tied to the breast. (*Bharata* in *Natya Sastra* , IV, 29, 75 p. 131. quoted in Mahajan, p. 37)

Mahajan (1989) explains that one has to be cautious with the application of *Alamkaras*; otherwise they may destroy the intended mood rather than add to it.

Alamkaras are often confused with *tanas*. Whereas *tanas* are melodic phrases consisting of less than five *svaras* in the *Raga, Alamkaras* are a combination of several melodic movements which are used to adorn the melody. They are ornamental groups of notes.

Examples of *Alamkaras* include: the *kan* (grace note); *meend* (glissando or slide); *krintan* (many notes sung as one note); and "all in one beat" in which many notes are played in one beat.

Gamakas

Gamakas are a variation of the mean tones of music for purposes of greater beauty and appeal (Deva, 1981, p. 77). *Gamakas* differ from *Alamkaras* in that they are ornaments to specific notes, rather than to groups of notes. According to Danielou , the most widely accepted definition of *Gamaka* states "When, in music, a tone moves from its own pitch towards another so that the second sound passes like a shadow over it, this is called a *Gamaka.*" Sangita-darpana (commentary on verses 2 -4) defines *Gamakas* as grace notes, the ornaments of the notes (in Danielou, 1968, p. 80). Mahajan (p. 40) comments that the

Gamakas help impart the correct degree of pitch and expression necessary for the correct rendering of a *Raga*. She adds that a single note is neither played nor sung in *Gandharva Veda* music; rather a group of notes is played/sung. The application of the notes is very important—how one note transforms into the next and so on. The grace notes govern these transformations and thereby provide continuity to the *Raga*.

Gamakas are produced by the shake or quiver of the voice or instrument. Its root means "to move," that which carries or guides. *Gamakas* link each note to the ones that follow and the ones that precede. It occurs in three stages: 1) its emerging from the preceding stage, 2) its dwelling within its own *shruti* range, and 3) its phasing out into the following note (Mahajan, p. 40).

As previously outlined in section II.i in the Vedic theory of sound explained that in the gap there are four stages involved in transforming one Vedic sound into another: the *Pragabhav* (emergence of a new sound) is akin to the first stage of *Gamaka*, the *Pradhvansabhav* (collapse of old stage) is akin to the third stage of *Gamaka*, the phasing out of the sound. The *Gamaka* links notes together by sounding the *shruti* or microtones existing between notes so that it could be said that the stage of dwelling within its own *shruti* range is like the second and third stages of the gap in which the silence (*Atyantabhav*) becomes lively in the value of transformation (*Anyonyabhav*).

It is in this overt expression of the *shrutis* existing between the notes expressed through the *Gamakas* and *Alamkaras* that allows *Maharishi Gandharva Veda* music to transform consciousness into matter, intention into manifest reality, desire into fulfillment. Maharishi describes *Maharishi Gandharva Veda* music as the custodian of the junction point existing between consciousness and matter, "the custodian of all the laws of nature" (Maharishi in Chaudhuri, 1990); and says that *Maharishi Gandharva Veda* music functions from the junction point, in which the unified field gets transformed from consciousness into concrete expressions of matter. As the custodian, *Maharishi Gandharva Veda* music

has mastery over the field of transformations and therefore has the ability to purportedly transform or purify past, present, and future events.

By transforming desire into fulfillment, I suggest that *Maharishi Gandharva Veda* music enlivens the bliss of the unified field of pure knowledge in the awareness of the listener, thereby resulting in ever rising waves of desire to enjoy more and more in life.

Gautam (1989) comments on the importance of the *Gamaka*:

> When the actual function of the *Gamaka* as it operates in practical music is analyzed, it becomes clear that it is a dynamic energy which moves between two *svaras* illuminating the intervals between them. It is because of this that *Gamaka* is considered the soul of Indian music. It is like the incandescence to the lamp. Without it the *svara* will be like a lifeless body. It will be seen that the role of *Gamaka* in manifesting the essence of a *Raga* is very significant. (Gautam, 1989, p. 164).

Sarngadeva enumerates fifteen *Gamakas*; *Parsvadeva* mentions only seven.

The fifteen *Gamakas* are: *tiripa, sphurita, kampita, lina, andolita, vali, tribhina, kurula, ahata, ullasita, plavita, humphita, mudrita, namita, and mishrita* (Mahajan, pp. 43-44). The seven of *Parsvadeva* are: *spurhita, kampita, lina, tiripa, ahata, andolita,* and *tribhina.*

Perception and *Maharishi Gandharva Veda* Music

Maharishi's Vedic Psychology describes the function of the senses as the organs of perception which access information from the environment and relay that information to the mind (Orme-Johnson, 1988, p.154). The area of *Maharishi Gandharva Veda* music which I feel best corresponds with the level of senses is *Tala*, rhythm.

According to Maharishi, the senses are the projections of the mind, and they are also the organs through which the mind expresses itself (1972, g. 194). Similarly, I submit that in *Maharishi Gandharva Veda* music, the *raga*, uses the medium of rhythm produced by *Tala* as a means of expression— it connects the *raga* via rhythm to the outside world of the listener.

According to Chaudhuri, a *Raga* has three important elements: the drone, the melody, and the rhythm. Although *Tala* (rhythm) is not required for the *Raga*, it adds texture and body to the melody. Therefore I consider it to be a slightly more concrete level of manifestation than the *Raga*. *Tala* is first introduced as a pulse in the second phase of the *Raga*, the *jor*, but is actually fully developed in the *gat*.

Maharishi Gandharva Veda music has evolved a complex system of *Talas*. Gautum (1989, p. 219) remarked that *Tala* in the earlier treatises meant more than just the study of rhythm; it also included "tempo and the measurement of musical time in a cyclic manner." *Bharata* and *Sarngadeva* considered that the purpose of *Tala* was to measure musical time.

Chaudhuri describes the *Tala* system as a cyclic system which divides the beat (*matras*) into fourths. The *matras* are measured by *talis* or claps. The first beat or main *matra* is called *Sam*, the third *tali* is known as *Khali* or empty beat[21]. From the sound of the *matras*, the musician knows his place in the cycle and can always come back to the main *matra, Sam*, thereby creating a cycle of fullness.

Danielou (1968, p. 87) explained that in the earlier treatises on *Talas*, the *matra* was considered to be the shortest time in which a syllable could be pronounced. By this system the normal human heart beat lasted three *matras*. The musical beat, or clap of the hand, was called *laghu* (short) and lasted from 3 to 9 *matras*, usually averaging 4.

The notation system uses a circle divided into fourths to illustrate the measured beats. The number of *matras* in a circle can vary from 4 to 108. The *Sam* or beginning *matra* is written as a "+," the fifth *matra* is designated by "2," the "*Khali*" is written with an "O" and the thirteenth *matra* is written with a "3." See Figure 1-6 for an example of the *Tala* cycle in notation form.

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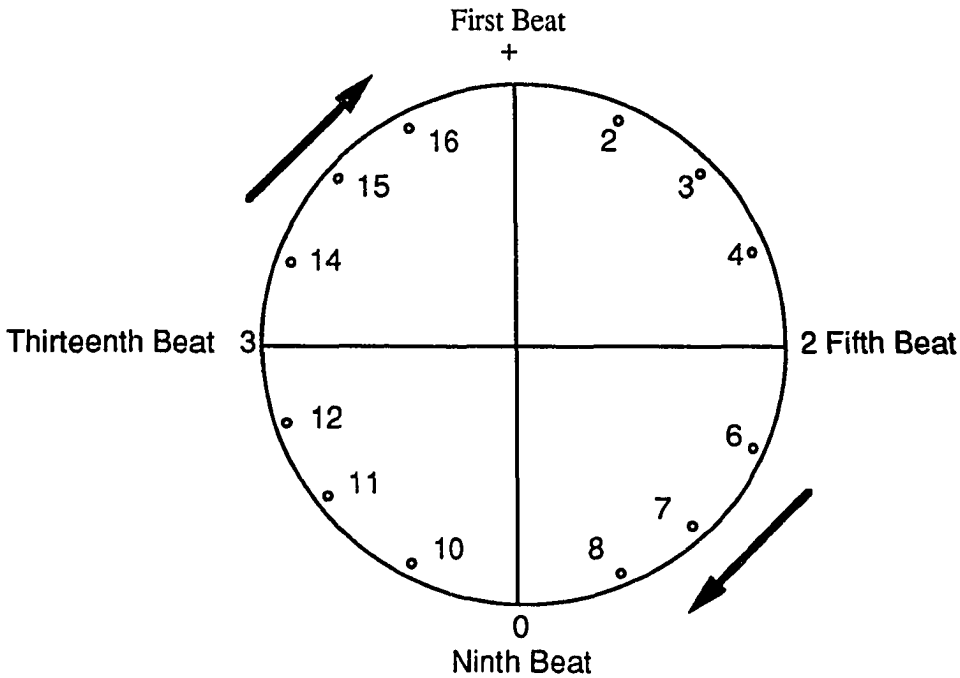
21 The *khali* or empty beat possibly may serve the same function in *Maharishi Gandharva Veda* music as the *avyakta sutra* does in *Rk Veda Samhita*.

Khaida (sometimes known as *Theka*) refers to the different patterns of measured beats that exist; each pattern with its own name. For instance, *Teen Tala,* considered the king of *Talas*, has sixteen beats consisting of four measures, each with four beats or *talis*. The first *tali* of *Teen Tala*, *Sam*, begins with the first beat; the second *tali* begins with the fifth beat; the third *tali*, starting with the ninth beat, is *Khali* (empty—designated by no clap); and the fourth *tali* begins on the thirteenth beat.

Bol refers to the syllables used to designate each *matra*. The tenth and eleventh beats is known by the syllables "*Tin*." "*Tin*" allows the musician to know his location in the *Tala* cycle. The location of *Tin* is set for each *khaida* and can never vary. The *bol* for *Teen Tala* is: Dha Dhin Dhin Dha / Dha Dhin Dhin Dha / Dha Tin Tin Ta / Ta Dhin Dhin Dha. Table 1-5 lists some of the major *khaidas* of *Maharishi Gandharva Veda* music.

Figure 1-5
The Tala Cycle



± SAM = FIRST BEAT (clap)
2 TALI = CLAP
0 KHALI = EMPTY (no clap)
3 TALI = CLAP

Figure 1-6. The *Tala* Cycle Notation for *Teen Tala* in *Maharishi Gandharva Veda* Music. Taken from the Course Syllabus, Introduction to *Maharishi Gandharva Veda* Music, Lesson Five.

The musician can create variations on the *khaida* so long as it fits the overall pattern. An example is the *Tia* which is a repetition of the same metrical phrase three times followed by a return to *Sam*.

The early writers of *Gandharva Veda* music theory gave great importance to the function of rhythm, not only in music but throughout the universe.

> The arising, enduring and disappearance of the three worlds came from rhythm (*Tala*). From the smallest worm onward, all animals move by rhythm. All work in the world depends on rhythm. It is by rhythm that the sun and the planets move. (*Raga Kalpadruma*, Danielou (1949) *Northern Indian Music*, pp. 88-89)

"Song, dance and the playing of instruments depend upon rhythm." *Sarngadeva* in (*Sangita Ratnakara* 5, 2).

TABLE 1-5
Talas of *Maharishi Gandharva Veda* Music

Khaida	Number of *Matras*	Identifying Characteristics
Teen		4, 4, 4, division *Khali* = 9th *matra* *Tin* = 10th and 11th *matras*
Jhap		3, 2, 3 division *Khali* = 6th *matra* *Tin* = 6th *matra*
Ek		2, 2, 2, 2, 2 division *Khali* = 3rd and 7th *matras* *Tin* =
Dadra		3 division *Khali* = 4th *matra* *Tin* =
Roopak		2, 2 division *Khali* = *tin* *Tin* = 1st and 2nd *matras*

A list of some of the major *Talas* used in *Maharishi Gandharva Veda* music along with their identifying characteristics.

According to Deva (1981), the Sanskrit root of the word *Tala* is *tal* which means "to establish." "*Tala* means slapping the hands together to a musical tune or measure, a dance, a cymbal, a variety of meter, etc." (*Dhatupatha* 32-58 in *Bharata's Natya Sastra*, p. 447).

The *Shiva-tattva-ratnakara* offers the following etymology:

> The syllable 'ta' represents *Shankara (Shiva)* the 'Giver of Happiness,' the syllable 'la' the 'Lady of the Mountain' *(Parvati)*. Rhythm is called '*Tala*,' because it is the union of the First Principle *(Shiva)* and his Energy *(Shakti =Parvati)*. *Shiva* and *Shakti* being its very nature, Rhythm *(Tala)*, one with the life-breath, is meritorious, leads to fame, gives enjoyment and Liberation and so is cherished by *Yogis*. *(Raga Kalpadruma* and *Shiva-tattva-ratnakara* 1927 an encyclopedia of *Basava Raja*, 1798-1815) [in Danielou, 1949, *Northern Indian Music*, vol. 1, p. 88]

One last point regarding *Talas* was made by Danielou (1968, p. 87) when he pointed out that the tempo created by the rhythm was associated with different moods or feelings (*Rasas*). He quoted the *Vishnu-dharmottara Purana* (Part III, Chapters 18 -19): In a laughing or a loving mood use a moderate tempo; in disgust and fear, a slow one; in the heroic mood, in wrath and in wonder, a fast tempo.

D. Level Three: The Body

1. Physiology and *Maharishi Gandharva Veda* Music

Physiology in Maharishi Vedic Psychology refers to the functioning of the physiology, the "instrument" of the mind. I suggest that in *Maharishi Gandharva Veda* music, it can be taken to refer to the types of instruments used in a performance.

There are four major classifications of instruments used to play *Maharishi Gandharva Veda* music: a) stringed, b) wind, c) percussion, and d) solid. This classification is slightly different from Western music which lists: a) stringed, b) woodwind; c) percussion, and brass) . The two systems differ in that Western includes solids as part of percussion, whereas *Gandharva Veda* makes solid a separate category. Also, Western isolates brass instruments from woodwind and *Gandharva Veda* music does not even mention brass.

Hartmann (1992) gives examples of the different instruments.

Tat vadya (stringed instruments) are played by plucking or bowing. These include the *vina, sitar, sarode, tanpura, santar, sarengi*, and *svarmandal* instruments.

Sushir vadya (wind instruments) are played by blowing. Primarily, these refer to types of flutes and include: *bansuri* (bamboo flute), *susira, vamsa, shenai*, and *bin.*

Avnadh vadya (percussion instruments) are played by striking with the hand. These are of two types: membraneous and idiophones. Membraneous include *naal, tablas*, and *pakhwaj*. Idiophones include *jhalra, jhang, tali, zymbeln*, and *jaltarang.*

Ghana vadya (solid instruments) are also played by striking. Examples of such instruments include *manjeera* and the *khartal* (cymbal).

2. Behavior and *Maharishi Gandharva Veda* Music

For *Maharishi Gandharva Veda* music, behavior refers to the proper application of the notes for creating balance in the individual and society. Proper application occurs most in what is known as time theory in *Maharishi Gandharva Veda.*

"One who sings knowing the proper times remains happy. By singing *ragas* at the wrong time (of day) one ill-treats them. Listening to them, one becomes impoverished and sees the length of one's life reduced" *(Sangita Makaranda).*

For Chaudhuri (1990, Lesson 9) time theory requires playing specific *Ragas* for the different times of the day. Time theory is based purely on the application of the *svaras*; it does not involve the *Alamkaras* or *Talas*. The same *svara* can be played many times during the day, but it will change slightly, either sharpened or flattened, depending upon the time of day.

Maharishi has commented on the power of frequency in *Maharishi Gandharva Veda:*

> Every level of creation is a frequency. One frequency melts into the other and this is how the process of evolution takes place. The night comes to an end and the dawn begins. At dawn, when the darkness and dullness of the night is over, some inspiring freshness comes and there is a different frequency in the whole atmosphere. At midday there is another big change in frequency; at evening, a different frequency; at midnight, a different frequency. This cycle of change is perpetual, and because everything is a frequency there is sound at every stage.
>
> From morning to morning the melody of nature is changing, changing. *Gandharva* music goes with the time, setting its melodies according to the changing nature. It sets forth those very natural melodies which match with the process of evolution. It provides a powerful harmonizing influence in the whole atmosphere to balance imbalances in nature. (Maharishi Mahesh Yogi, 1991, p. 12)

Maharishi Gandharva Veda is the science of transformation of sound. It is claimed to be the knowledge of frequency. Inherent within its study is claimed the knowledge of which frequency resonates with the laws of nature that are prevalent at different times of day. And, as Chaudhuri points out, because the human body and mind are part of nature, these frequencies create a profound internal resonance for the individual psyche.

Time theory exists for time of day and of season. Gangoly (1989) suggests that "there is some inherent quality in some *ragas* which...attune them to the particular atmosphere of a given season" (p. 80). There are six different *Ragas* for winter, spring, summer, and fall (Gangoly, 1989, p. 82): *Sri-raga* is the melody of winter; *Vasanta* for Spring, *Bhairava* for Summer, *Pancama* for Autumn, *Megha* for the Rainy season, and *Nata-narayana* for early Winter. However, as Gangoly points out, this is a flexible categorization.

Danielou (1949) finds a correspondence between the cycle of the day and the cycle of life which also has its dawn, its noon, and its evening.

> Each hour represents a different stage of development and is connected with a certain kind of emotion. This cycle of sounds is ruled by the same mathematical laws as all other cycles. This is why there are natural correspondences between certain hours and the moods evoked by certain musical modes. Played at the proper time, musical modes develop naturally in favorable conditions. Orthodox musicians in India never play a *raga* at any other than its proper time, for at the wrong hour it could never be developed so perfectly, no could it so greatly move an audience (pp. 131-132).

Deva (1981) describes the general characteristics of a time-oriented *Raga* in terms of its tonal quality, tonal level, and tonal movement. By tonal quality, Deva means whether the *Raga* is within one octave range and whether the notes in the octave are *shuddha* (pure note), *komal* (flattened note), or *tivra* (sharpened note). Both Deva and Chaudhuri concur that time theory revolves around the concept of "*Sandhi Prakash,*" the junction points between night and day—twilight at sunrise and at sunset. Deva adds that *Ri, Ga, Dha,* and *Ni* modes are played during this time.

By tonal level, Deva refers to the pitch of the *Raga:* whether it is high or low. Depending upon the position of the *vadi* (the dominant note), *Ragas* are divided into *Purvanga* (lower tetrachord) and *uttaranga* (upper tetrachord). *Sa, Ma,* and *Pa* may be included in both. *Purvangas* are performed during the first watch of the day or night following the *Sandhi Prakash ragas*; *Uttarangas* are performed after midday midnight. Tonal movement refers to the actual movement of the *Svaras.* The application of the *Svaras* can create an "almost unlimited number of moods" due to the sudden tensing and relaxation created by the application. Table 1-6 presents the time theory of *Maharishi Gandharva Veda* music and its general characteristics. Chaudhuri, Deva, and Danielou all note that these rules are not fixed.

TABLE 1-6
Time Theory of *Maharishi Gandharva Veda* Music

Time of Performance	Characteristics of Raga	Sample Ragas
4:00 a.m.- 7:00 a.m.	Komal (Sandhi Prakash) Ri, Ga, Dha, Ni are all Komal	Bhairava
7:00 a.m.– 10:00 a.m.	Blend (Purva) Ri, Ga, Dha are Shuddha	Todi
10:00 a.m.– 1:00 p.m.	Ma Tivra	Shudh-Sarang
1:00 p.m.– 4:00 p.m.	Blend (Uttara)	Bhimplasi
4:00 p.m.– 7:00 p.m.	Komal (Sandhi Prakash) Ri, Ga, Dha, Ni are all Komal	Marwa Patdeep
7:00 p.m.– 10:00 p.m.	Blend (Purva) Shuddha and Komal or Shuddha and Tivra	Yaman Shudh-Kalyan
10:00 p.m.– 1:00 a.m.	Ma Tivra	Kausi-Kanhra
1:00 a.m.– 4:00 a.m.	Blend (Uttara) Ga, Ni Komal	Lalit

The time theory of *Maharishi Gandharva Veda* music, with general characteristics and sample *ragas*. After Deva (1980)

E. Level Four: Psychology of Human Development
Seven States of Consciousness

According to Maharishi's Vedic Psychology, the goal of all music is to make individual life vibrate in the "cosmic melody of life" (Maharishi Mahesh Yogi, 1973, Music Core Course, Main Points). Furthermore, it is the pure consciousness of the musician that makes music melodious.

For Maharishi, the master musicians of all times have been those who could inspire a thrill from the basic level of life, their own consciousness. The supreme thrills of music can be found existing in the junction points between consciousness—"where waking meets transcendental consciousness, where transcendental consciousness meets cosmic consciousness, where cosmic consciousness meets (refined cosmic consciousness or) god consciousness, and where god consciousness meets brahman consciousness" (Maharishi 1973).

The full development of the musician occurs with the full development of the musician's Musical Psyche. Although musicians could perform without any awareness of all the laws of the Musical Psyche, the effect of the music may not be the same as that of a fully self-aware musician. I suggest that during the practice of Maharishi's Transcendental Meditation program, the individual psyche may pass through all the levels of mind, thereby enabling the individual psyche to comprehend the whole range of music within his/her own awareness. Knowledge of the full range of the individual psyche thus would enable a musician to comprehend not only the melody of the cosmos but also to be the embodiment of the cosmic melody in society. This, I call the Musical Psyche with respect to the musician. Note that the listener also embodies the Musical Psyche, as well.

F. Level Five: *Maharishi Gandharva Veda* Music and Collective Consciousness

Following is a brief excerpt from Maharishi (1991) regarding the importance of *Maharishi Gandharva Veda* music for the collective consciousness of the world.

> When the people of the world violate the laws of nature they create stress and disharmony, which result in pain and suffering. The whole population of the world has not been educated to think and act spontaneously according to natural law. Cries and failures and problems, terrorism and war—all these negative values spring from the violation of natural law by the whole population of the world.
>
> To neutralize this stress, there has been a knowledge in India—Vedic knowledge from Vedic times. The Vedic civilization was that civilization which enjoyed Heaven on Earth, which means that life was lived according to natural law. Supported by natural law, everyone enjoyed increasing waves of happiness all the time. *Gandharva* music is the music of the Vedic civilization....*Gandharva* music creates a powerful melody from morning 'til morning to neutralize the negative trends and tendencies born of the violation of natural law by the whole population of the world.
>
> From morning to morning the melody of nature is changing, changing. *Gandharva* music goes with the time, setting its melodies according to the changing nature. It sets forth those very natural melodies which match with the process of evolution. It provides a powerful harmonizing influence in the whole atmosphere to balance imbalances in nature.
>
> *Gandharva* music is the basis of all order and harmony in nature; therefore, it has that most harmonizing, most integrating influence. It is a very precious science and art of creating harmony within oneself, one's family, one's city, one's country, and the whole world.
>
> *Gandharva* music is a must today in this generation, when people are fighting and creating trouble for others. With all the problems in the national and international world, *Gandharva* music is a must for everyone. (Maharishi, 1991, pp. 12 - 13).

1. Interpersonal Relations and *Maharishi Gandharva Veda* Music

In *Maharishi Gandharva Veda* music, this level is best represented by the relation known as the *"Guru-Shishya Param Para"* (teacher-student) tradition.

Chaudhuri (1990, Lesson 4) points out that there are many subtleties in *Gandharva* music that cannot be written down but only passed on from teacher to student. "For this reason *Gandharva* music is traditionally taught orally from *Guru* (teacher) to *Shishya* (student)." In order to understand the proper application of the *svaras* for each *Raga* in its

different time periods, it is necessary to hear the teacher perform. The teacher also needs to teach the *Alamkaras* and *Gamakas* orally as this cannot be easily inscribed and understood from notation. By careful and repeated listening the student gains a profound understanding and perfection in performing *Gandharva Veda* music.

To accomplish this, music lessons wherein only the teacher and student are present occur. Also on the interpersonal level, come informal duets wherein two musicians perform with each other in order to perfect their skills.

2. Family and Group Relations and *Maharishi Gandharva Veda* Music

In terms of *Maharishi Gandharva* music, this level can be taken to refer to the instrumental ensembles which represent professional *Gandharva* performances.

Traditionally, four or five musicians will form an ensemble: the *sitar,* the *tablas*, the *tanbura*, the vocalist, and sometimes one or another instrument. This group of four or five will perform together. Small group performances can occur also as quartets, as folk music *(desi)* performances, and as choral groups.

3. Social Relations and *Maharishi Gandharva Veda* Music

Maharishi has established a necessary but ambitious goal to establish 1000 *Maharishi Gandharva Veda* music schools around the world wherein students of all nationalities would learn *Maharishi Gandharva Veda* music in order to establish harmony and balance in collective consciousness. Maharishi has said that, whether someone listens to the music or not, the reverberations created by the music will restore harmony in the atmosphere and imbalances will become balanced. Thus, these schools will purportedly help restore balance in the nations and hence in the world as a whole.

Also lively on this level would be the reflections of the Musical Psyche as collective consciousness in terms of musical orchestras, provincial choirs, and the music of different ethnic groups.

4. International Relations and *Maharishi Gandharva Veda* Music

The true value of *Maharishi Gandharva Veda* music is the restoration of world peace according to Maharishi (1991). To this end, Maharishi's Festivals of Music for World Peace took place during 1987, 1988, and 1989 in which global concert tours were organized and *Maharishi Gandharva Veda* music was performed in 355 cities in 55 countries. The purpose of the Festivals was to create balance in nature and harmony in world consciousness.

Other international music events include satellite-linked symphonies which connect orchestras from different countries performing together, national anthems of different countries, and international choirs.

G. Level Six—Applied Areas and *Maharishi Gandharva Veda* Music

Maharishi Gandharva Veda music can be applied to every level of society as listed in the chart. When music is used with the expressed aim of "improving" the state or condition of some area of life, it is considered a therapeutic application. The right hand column of the unified field chart on this new psychology of music based on Maharishi's Vedic Science addresses the known, interpreted here as the listener, because it is through the listener that music is known and that it has its effects—both subtle and concrete—on the listener. I have organized the listener, the known, in terms of music therapy.

VII. The Listener—Known—Music Therapy

The right hand of the column of the Unified Field chart on *Maharishi's Gandharva Veda* as it applies to music, pertains to the known, which is interpreted as the listener. It is through the listener that the effects of music—both subtle and concrete—can be known. Music has its effect— both on the subtle and the concrete, on the listener. I have organized the listener, the known, in terms of music therapy. Music therapy involves all levels of the Musical Psyche[22], but usually one level will be more active than the others. For instance, it may be that mind and body both improve through one music therapy modality, but the process itself focuses more on learning skills than mind-body coordination. Hence it could be said that a particular modality deals more with the level of mind than with level of physiology. Healing music affects all levels of the body, mind, and spirit. But choosing the proper type of music and the proper therapeutic procedure can be challenging to even the most expert of music therapists.

A. Introduction

Bruscia (1989) has offered a clear and concise definition of music therapy, along with its procedures, and specialties. He has explained that music can be used either *as* therapy or *in* therapy and the modalities based on these approaches can differ in their procedures accordingly.

Bruscia (1989) defines music therapy as "a systematic process in intervention wherein the therapist helps the client to achieve health, using musical experiences and the relationships that develop through them as dynamic forces of change" (1989, p. 47).

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[22] As given in column one.

Bruscia considers music therapy to be purposeful, organized, and regular activity. It is a sequence of events that takes place over time. It involves both a client and a therapist and can occur in both musical and non-musical situations.

Music therapy is a process; that is, it has a beginning, a middle, and an end. The beginning offers an assessment of need for behavioral change; the middle initiates a procedure for treatment which may produce the intended behavioral change and then stabilize it as a standard behavioral norm for the client; and the end brings the treatment to a close and then evaluates whether the goals of assessment have been achieved. Bruscia considers assessment, treatment, and evaluation to be the three phases of music therapy.

He suggests that the process of music therapy may develop in different ways. It can be 1) developmental, 2) educational, 3) interpersonal, 4) artistic, 5) creative, and/or 6) scientific. For Bruscia these types of processes may occur independently of one another or they may overlap, depending upon the needs of the client.

Music therapy involves intervention by a therapist. It does not occur without a therapist. In other words, just listening to music and gaining benefit from it is not considered music therapy. "For therapy to take place, the therapist must act in some way on the client to produce an effect or change of some kind" (Bruscia, p.51).

Bruscia qualifies therapy in four ways. There must be "1) an intervention, 2) made by a therapist, 3) induce therapeutic changes in the client, 4) which can be causally linked to the therapist's efforts" (p.51).

Music plays an integral role in the intervention process. Bruscia says that music *as* therapy has a direct influence on the client and serves as the primary agent of therapeutic change. Music *in* therapy is used to enhance the effects of the therapist-client relationship or other treatment modalities.

According to Bruscia, music therapy requires the skilled application of music by a therapist in order to create interventions. Interventions enable the therapist to focus on

changing certain behaviors while at the same time utilizing different agents (melodies, rhythms, dance, etc.) to bring about the change. Music therapists may use any of the ten different types of intervention listed in Table 1-7.

Following is a brief review of different music therapy modalities as they relate to Maharishi's Vedic Psychology and the Musical Psyche of the listener. Note that in the case of therapy, the patient (here, the listener) is the *"object* of attention" for the therapist. Therefore, we can reasonably place the listener in the position of being the "known" in our tripartite division of knowledge into "knower," "process of knowing," and "known." Please note that all levels of the mind and body can simultaneously benefit from the therapeutic effects of music; however, for purposes of this discussion, various representative modalities have been selected which best correspond to the sequential elaboration of knowledge presented in the leftmost column of the Musical Psyche, the knower of music.

Maharishi's definition of perfect mental health is quite different from the current model accepted in modern psychology (Orme-Johnson, 1988). Perfect health in *Maharishi Ayur-Veda* is defined as an individual whose body is functioning at its full potential, and whose mind and heart are bathed in bliss. Such an individual lives life in perfect balance (Maharishi, 1994). In Maharishi's Vedic Psychology perfect mental health connotes a fully developed, fully enlightened individual. From Maharishi's perspective, everyone needs therapy until they are fully enlightened, in unity consciousness.

B. Level Two: The Mind and the Listener's Musical Psyche

1. Ego

As noted earlier, according to Maharishi's Vedic Psychology, the ego is the experiencer, the deepest level of individuality, that is responsible for integration and

synthesis (Orme-Johnson, 1988). This level of music therapy is concerned with personality development. For example, Henderson (1983) suggests that music activities, such as instrumental social feedback and successful experiences in playing a selection on an

TABLE 1-7
Music Therapy Interventions

Empathy:	The client's experience is matched, entrained and resonated by the music.
Redress:	This intervention provides a means to fulfill the physical, emotional, mental, behavioral, social, or spiritual needs of the client, either through musical experiences or through verbal/non-verbal interactions with others. It also contains the idea of normalization of the nervous system to develop full mental and physical health.
Connection:	This intervention provides an opportunity for the client to compare, associate, or relate various experiences in his/her inner and outer worlds.
Expression:	This intervention provides a vehicle for the client to externalize, enact, release, ventilate, represent, project or document inner experiences.
Communication:	This intervention provides an opportunity for the client to share or exchange ideas or feelings with another person.
Interaction:	This intervention provides an opportunity for the client to act upon the environment in a reciprocal way.
Exploration:	This intervention provides an opportunity for the client to investigate problems, discover resources, evaluate alternatives, or choose solutions.
Influence:	This intervention provides an opportunity for the music or the therapist to affect the client directly or induce any type of change in the client's state.
Motivation:	This intervention increases the likelihood of a client engaging or participating in the therapeutic process.
Validation:	In this intervention the music or therapist supports, praises, accepts, or encourages the client.

A List of major interventions that may be encountered in a music therapy situation. Taken from Kenneth Bruscia's *Defining Music Therapy*, (1989, p. 53).

instrument, can improve.patients' self-concepts; while structured movement techniques such as dance and physical exercise helps promote body awareness and establish ego boundaries. Following are four therapeutic modalities that appear to meet patient needs for improved self-concept.

Free Improvisational Therapy

In Juliette Alvin's Free Improvisational Therapy (the term created by Bruscia, 1987 to describe Alvin's music therapy modality) the therapist does not impose any rules but rather allows the client to "let go" on a musical instrument, thus giving the client the freedom to find his/her own means of ordering and sequencing sounds.

According to Bruscia (1987), Alvin's model of music therapy is viewed as a developmental process, utilizing sequential stages of intellectual, physical, and socio-emotional growth in order to help the client relate to self, others, and objects. Therapy has three stages: relating self to objects, relating to self and therapist, and relating self to others. Each stage focuses on different relationships between self and parts of the world. The three goals of therapy are self-liberation, establishing relationships with the world, and developmental growth in the physical, intellectual, and social-emotional realms.

Benenzon Model

The Benenzon Model of music therapy employs the Iso principle. The Iso principle claims that there is an internal sound characteristic for each person which is unique to that person.

> This sound is the sum total of one's sound (archetypes): one's intrauterine and gestational sound experiences and one's sound experiences from birth and infancy up to the present moment. It is a sound structured within a sound mosaic, which in turn is built up over time and which is in perpetual movement (Benenzon , 1982).

Benezon explains that there are several kinds of musical Iso's: the gestalt Iso, which is unique to each individual; the complementary Iso, which reflects ongoing fluctuations

due to dynamic and environmental factors; the group Iso, which is the integration of individual Iso's within a social context; the cultural Iso; and the universal Iso.

This concept of Iso reflects Maharishi's multi-dimensional mind schema in Vedic Psychology. The gestalt Iso is akin to the level of ego; the complementary Iso may be the sum of the multi- dimensional levels of mind and body which go to make up individual mind. The group Iso is family and group collective consciousness. The cultural Iso parallels cultural or national consciousness. And the universal Iso may be either the world's collective consciousness or the unified state of consciousness found in the unified field prior to its diversification.

Maharishi's Vedic Psychology parallels Benezon's model but is more complete. It provides detailed information for each level of mind and a thorough explanation for the development of individuality from universality. Although these are hinted at in the Iso principle, they are lacking the detail of the actual process by which the Iso develops into the various stages of representation. Maharishi's Vedic Psychology fulfills and completes the knowledge introduced in Benezon's model.

The music therapy of the Benezon model introduces the understanding that, at the beginning of a music therapy session, when the mood of the music matches the mood of the client, then the Iso principle of that individual becomes lively and restoration of homeostasis or balance results.

Continuum of Awareness Method

Boxhill (1985) developed a "Continuum of Awareness" method of clinical musical improvisation for developmentally disabled individuals. Modeled on Perl's Gestalt Therapy, Boxhill's Continuum of Awareness refers to "the creative process of using music functionally as a tool of consciousness to awaken, heighten, and expand awareness of self, others, and the environment" (p. 71). Boxhill explains that maintaining consciousness is a

self-regulatory, homeostatic process which has three cyclic phases: awareness, excitement, and contact. According to Boxhill:

> The shift from one cycle to another in the healthy person moves with a natural rhythm whose accents fall in the right place in time and space for that particular individual and can bring about integration and self-awareness. Perception of self and of the immediate environment is, at these moments, a harmonious, energizing, and fulfilling experience. As individuals come to distinguish between external and internal events, and as they become psychologically differentiated from their surroundings, awareness of self and others increases. This expanding awareness is a liberating force that enables people to take responsibility for their actions, to make their own choices (1985, p. 73).

In Boxhill's method, music therapy helps the client maintain a cycle of awareness in the psychosocial, mental, physical, and emotional realms of experience, and fosters intrinsic learning about oneself in relation to the world. Boxhill believes that when the cycle of awareness is broken, imbalance develops in the psychophysiology of the individual. Music can help restore the continuum of awareness. Boxhill's method uses intrinsic learning, active participation on the part of the client, and a trusting client-therapist relationship to enable developmentally handicapped individuals to restore balance and thereby grow in the value of self-awareness.

Guided Imagery and Music

Bonny and Savary (1983) developed a music therapy based on developing altered states of consciousness. Known as Guided Imagery and Music (GIM), they suggested techniques for listening to music that would enable the conscious mind of the ordinary individual to experience its full expanded potential, as it is understood by 20th century psychology. .

Bonny and Savary introduced a new mind schema based on Assagioli's psychosynthesis model of the mind. According to Bonny and Savary (1983, pp. 152-156), the mind has four levels: the lower unconscious, the unconscious, the ordinary consciousness and the supra-conscious or transpersonal. These four levels comprise a large

circle. The lower unconscious, the bottom part of the circle, contains the elementary physiological or psychosomatic activities which direct the coordination of bodily functions, fundamental desires and the roots of various pathological states such as phobias, obsessions, compulsions, and delusions. Images and symbols encountered at this level express conflict and struggle; feelings and images need to be changed to bring about a restoration of normalcy. This is the level with which music therapy is most involved.

The next level of mind, the "unconscious," contains the impulses, habits, and conflicts of which one is unaware. Its psychological counterpart controls motor coordination. Bonny and Savary contrast this level to waking consciousness. "Ordinary consciousness" is the normal waking state of consciousness also as understood in Maharishi's Vedic Psychology. "Ordinary consciousness" is not explained by Bonny and Savary except to say that it is a very small level when seen in the large perspective of mind.

Supra-conscious or transpersonal refers to that state from which creative insight and higher orderliness is derived. It comprises the upper part of the circle. "It is the source of higher feelings, of genius, of higher psychic functions, and spiritual energies" (Bonny and Savary, p.155). From the perspective of Maharishi's Vedic Psychology, this would pertain to Transcendental Consciousness, the source of creative intelligence in man and nature, although Bonny and Savary do not express a clear idea that this is the source.

The circular boundary of the entire mind-set is said to be like a porous membrane that can be stretched into vaster regions, which Bonny and Savary term "cosmic consciousness."

According to Bonny and Savary, the conscious self is like a small circle found within the bigger circle of the mind. This smaller circle of conscious self represents "that part of the personality with which we are in touch, including the images, feelings, ideas and desires which we can directly experience, observe, analyze and judge" (p. 155-156). They suggest using relaxation and concentration techniques while listening to music. This

purportedly will expand the smaller circle of the conscious self until it realizes its full potential as the larger circle of conscious mind. "With new techniques, persons can learn to expand their awareness of self into both the upper and lower levels of consciousness, so that the self learns to move freely from one dimension to the other" (p.156).

Again, compared to the complete picture presented in Maharishi's Vedic Psychology, I suggest that the regions which Bonny and Savary consider to be lower and upper levels of consciousness represent only a partial picture of the totality of mind. As outlined in Maharishi's Vedic Psychology, these four levels are actually lively levels of the conscious thinking mind. The regions are neither lower nor higher, but rather more abstract levels of the mind and they are already involved in the processes of normal waking consciousness. Through Maharishi's Technology of the Unified Field (TM), these levels become actualized automatically, without concentration, resulting in the realization of higher states of consciousness including cosmic consciousness.

Similarly, through the use of *Maharishi Gandharva Veda* music, balance and harmony are purported to be automatically restored to all levels of the mind and body and peace brought to the whole environment. In contrast to the technique of Guided Imagery and Music (GIM), one does not have to make a conscious effort to relax, nor a conscious effort to concentrate. Improvements happen automatically with Maharishi's methodologies. Given these parallels and differences, we see that Maharishi's schema of mind and Maharishi's *Gandharva Veda* music bring fulfillment in a most natural way to Bonny and Savary's Guided Imagery and Music.

2. Feeling

Recall the definition in Maharishi's Vedic Psychology regarding feeling. "Although affective processes extend throughout all levels of the mind, feeling is illustrated between

the ego and intellect to denote the subtle and refined affective processes involved in intuition, creativity, and basic values of the individual" (Orme-Johnson, 1988). Music therapy on this level is concerned with affective communication processes. Two types of music therapy fit this role.

Supportive Music Psychotherapy (Bruscia, 1989, p. 120) is used to stimulate or support emotional adjustment or growth. Its object is to bring the patient to an emotional equilibrium so that he/she can resume appropriate normative behavior. An example of this modality is Heimlich's Paraverbal Therapy wherein sound and music are used to provide a means of communication both on the intrapersonal and interpersonal levels in order to stimulate emotional interpersonal adjustment or growth, by relying largely on the client's existing resources. Heimlich notes that sound and music foster intrapersonal communication by putting the client into direct contact with his/her own emotions—intensifying them until they are brought to the surface, connecting them until they are owned, and clarifying them until they are understood. Music also stimulates fantasies, images, memories, and associations which underlie emotional conflicts that need to be examined and integrated. At the same time, music influences the client's feelings.

Bruscia (1987) describes a second therapy that focuses on emotions or feelings: Insight Music Psychotherapy. This is a modality that brings insights into the client's emotional or interpersonal life and thereby stimulates the necessary changes therein. It is used for improving one's emotional life.

3. Intellect

Orme-Johnson (1988) defines intellect as that level of mind "responsible for the functions of discrimination, decision making, and controlling the allocation of attention." In terms of music therapy, this level deals with problem-solving and crisis resolution.

Thaut and Smeltekop (in Unkefer, 1990) describe the therapeutic effects of music on the cognitive functioning of the mentally ill client:

> The cognitive aspects of functional behavior in the mentally ill patient are utilized and enhanced by music stimuli and experiences. The structure of music follows organizational principles that are based in objective reality. The fact that music is ordered in a time frame helps and requires a patient to perceive and respond to it in an organized manner as external reality. Basic sensory information, such as high and low pitch or fast and slow tempo, must be conceptualized with a degree of accuracy for adequate musical response.
>
> The mathematical nature of rhythm, the spatial relationships in notation, the temporal sequence of musical events, and the logic of musical form are all used to aid in reintegrating the disorganized thinking of the mentally ill patient. Additionally, the cognitive skills of memory, concentration, learning, processing sequential information, and logical problem-solving are all exercised in music activity (p.86).

Two examples of a cognitively-based music therapy approach follow, one for the client and one for the therapist. The Riordan Bruscia model of music therapy resembles a laboratory situation wherein the variables in music and dance are controlled, manipulated, and allowed to vary freely. This allows the client to engage in problem-solving situations. The problem-solving event involves finding ways to integrate and balance polarities such as: product versus process, self versus other, control versus freedom, and will versus responsibility.

According to Bruscia (1989):

> ...in music therapy, the process of solving 'musical problems' is conceived as similar to the process of resolving 'life problems,' and the skills learned through finding musical resolutions are believed to generalize to life situations (p. 26).

Bruscia gives an example of improvisational music therapy in which the client works on "discovering possibilities, inventing new options, choosing and testing alternatives, energizing, and projecting efforts through time." Although these efforts take place within a musical framework, they are seen as a metaphor for what the client needs to learn or accomplish in life (pp. 26 -27).

Improvisation Assessment Profiles developed by Bruscia (1987) are models of clinical assessment based on client observation. This model aids the therapist is decision-making and in determining or assessing the needs of the client. Bruscia describes this model as an aid to the therapist in ascertaining a global perspective on the client's problems and assets and thereby offering insights about the client for facilitating therapy. In this method, the therapist uses objective methods of data collection to stimulate assessment of the psychological problems thus facilitating the therapist's ability to decide the correct form of therapy.

4. Mind

According to Maharishi's Vedic Psychology, the level of Mind deals with association, memory, and apprehending relationships (Orme-Johnson, 1988).

In terms of the listener, associated with this level are development of musical knowledge and skills in musical memory.

Boxhill (1987) lists cognitive skills that can be reinforced and stimulated through the use of music. These include memory/recall/retention through the repetition of songs and knowledge of the structure of music, and comprehension through the stimulation of mental processes involved in all modes of therapeutic music activities—singing/chanting, instrument playing, and music movement. (Boxhill, p. 230). Several formal methods can be identified that lend to increased musical knowledge and skill.

The "Orff-Schulwerk" model applies music education to therapy. Originally designed to teach music to non-handicapped school children, this model is now widely used for special education. It is based on the universal and primordial tendency of human beings to make music spontaneously, using the natural rhythms of movement and speech. Its major goal is to create a complete immersion into music within which the child can express

himself, experience himself as a person, and make music with others." Within specific music education settings, the general goals of Orff-Schulwerk may be oriented towards gaining specific musical knowledge and skills.

An off-shoot of the Orff-Schulwerk models is the Bitcon model of music therapy. A model of operant learning, it also was originally designed as an approach to music education. It is based on prominent theories of music education and music therapy. It uses the rondo form of music both in singing and in playing instruments to allow the freedom of individual response within a framework of shared group experience (Hanser, 1987). Its goal is to develop an understanding and acceptance of one's self and to achieve a personal and interpersonal identity. Another goal is to develop creativity, spontaneity and playfulness in using the various expressive modalities and media.

Bruscia (1989) explains that the process of music therapy is "educational" when the sequence of changes or interventions is indigenous to the curricular subject matter or skill being learned, whether it be musical or non-musical. For the client, this means learning things in steps according to levels of difficulty, starting from the simpler aspects of the material or task, and progressing to greater complexity. For the therapist, this means following the goals and learning activities of a curriculum or course of study.

Alley (1977) considers the music therapist's role in the educational setting to be a specialist who helps resolve those problems which prevent a student from participating in or benefiting from his/her educational opportunities (p. 54).

Bruscia (p. 108) discusses music therapy in special education wherein music learning is secondary to academic learning. He explains that in this modality a teacher or therapist uses music to help handicapped students gain nonmusical knowledge and skills that are essential to education.

Bruscia describes other types of music therapy modalities which focus on development of the mind, including adaptive music instruction, therapeutic music therapy,

instructional music therapy and therapeutic music instruction. In adaptive music instruction, learning techniques are adapted to meet the special needs of the handicapped student. In therapeutic music therapy music is used to sharpen one's attention, memory, or perception, and/or to develop one's creativity to the fullest. Although instructional music therapy and therapeutic music instruction both use private music lessons primarily as a means for music learning, they also provide individual psychotherapy and problem-solving therapeutics. For more information on these music therapy modalities see Bruscia's (1989) excellent review of improvisational music therapy.

5. Desire

According to Maharishi's Vedic Psychology, this level of mind is concerned with fulfillment of personal desires (Orme-Johnson, 1988). In terms of music therapy, this translates as motivational mechanisms. One example of such a modality is Analytical Music Therapy (the Priestly Model).

Bruscia (1987) defines Analytical Music Therapy as "the use of words and symbolic music improvisations by the client and therapist for the purpose of exploring the client's inner life and providing the proclivity for growth" (p. 162). Bruscia asserts the main aim of this modality is the removal of obstacles which prevent the client from achieving personal goals. "Removing these obstacles involves accessing unconscious material, gaining insight, freeing up defensive energy, and redirecting it toward positive aims, and developing balance and creativity" (p. 162).

The Grinnell Model (a developmental therapeutic process) is another modality that uses expressive performance techniques to build self-confidence, motivation, and positive focus for attention. Grinnell believes that using goal-oriented performances of composed and improvised music with movement helps to focus attention.

In Creative Music therapy (Norff-Robbins Model) music is used as therapy in order to help the individual create and actualize personal goals. The type of goal amenable to this treatment depends on the client's responses to and applicability of the music.

6. Perception

In Maharishi's Vedic Psychology, the function of the five senses is to process environmental information appropriate to each sense. The senses act as channels connecting the inner knower, the Cosmic Psyche to the environment (Orme-Johnson, 1988). In Maharishi's Vedic Psychology, there is a point in the development of the individual where sensory perception is refined, and an individual begins to perceive subtler levels of creation. This development of God Consciousness contains a much richer understanding of what is possible for musical refinement of the senses to accomplish. In terms of music therapy this level of mind is associated with multisensory modalities which help improve perceptual processes. Music therapy multisensory modalities include guided music imagery and eurhythmy.

Bruscia (1987, p. 426) explains this area in terms of sensorimotor functioning: how well the individual organizes, controls, and coordinates visual, auditory, tactual, and motor functions in time.

According to Peters (1987):

> Music is a powerful form of sensory stimulation, a multisensory experience. Music consists of sounds which can be heard (auditory stimulation) and vibrations which can be felt (tactile stimulation). Live performances of music may also add visual stimulation, while moving to music can add kinesthetic and proprioceptive stimulation to the experience (p. 51).

Steiner's eurhythmy (in Bruscia, 1987, p. 426) is a concept of movement described best as visible speech and visible song. This modality has become widely accepted, especially in Europe, as an independent art form.

Guided Imagery and Music (GIM) (Bonny & Savage, 1973) also uses sight and sound in therapy. The therapist encourages a client to visualize a proscribed image while listening to music, thus the term "guided imagery." In the GIM procedure, the music acts as a catalyst to evoke unconscious thoughts and feelings, "expanding self-awareness into the upper and lower levels of consciousness."

Other multisensory modalities are music improvisatory modalities that involve all the senses in the therapeutic situation. For instance, Bruscia (1987, p.588) suggests that "In holding and manipulating an instrument, the improviser feels the shape and texture of the instrument, receives kinesthetic feedback on his/her motor movements, and feels the sound vibrations being produced." I suggest that all of these activities enliven and strengthen perceptual processes in the Musical Psyche.

Bruscia explains that the sensory experiences involved in musical improvisation are important aspects of the dynamics of therapy. "Sensory stimulation brings physical gratification and pleasure, motivates physical interaction with the environment, and provides opportunities for psychomotor, cognitive, and affective learning (p. 559).

C. Level Three: The Body and the Listener's Musical Psyche

The next two topics both describe functions of the level of the body. The first focuses on physiology; the second deals with behavior.

1. Physiology

This refers to the adaptive and homeostatic processes of the body responsible for conditioning and learning the mechanics by which pure subjectivity, the Cosmic Psyche, expresses itself in the objective world (Orme-Johnson, 1988). The area of music therapy associated with physiology is motor coordination and periodic body function. Often, music

therapy modalities associated with this level are used along with other forms of therapy such as physical therapy and occupational therapy. Examples of music therapy modalities include Vocal Improvisation (the Sokolov Model) and Vibroacoustic Therapy. It is interesting to note that music therapy has also been used to help hearing impaired clients perceive sound.

According to Boxhill, (1985) music can provide support that develops rhythmic, harmonious motor functioning. Examples of areas in physical therapy which incorporate musical therapeutics include: gross motor skills, eye-hand coordination, perceptual motor skills, mobility, agility, balance (dynamic and static), posture, gait, and physical coordination. Action songs and words are especially useful in increasing bodily control and motivating both locomotor and non-locomotor behavior.

The occupational therapist and the music therapist work together to develop fine motor skills through the use of instruments and music movement activities. Boxhill explains that many mentally retarded individuals have difficulty in grasping or using the fingers to manipulate small objects. "When offered a mallet, rhythm sticks, or a flutophone, such clients can often be motivated to manipulate a variety of instruments in response to musical stimuli. Singing songs that indicate fine motor activity is especially beneficial" (Boxhill, 1985, p.230).

The Sokolov Model uses breathing, toning, vocal improvisations, singing, body alignment, touch, verbal imagery and psychotherapeutic techniques in order to restore the client to "wellness."

Vibroacoustic Therapy (Skille, 1989) uses the actual energy of musical sound waves applied directly to the body to produce relaxing physiological as well as psychological effects. Some of the cases for which vibroacoustic therapy has been used are spastic conditions, asthma/cystic fibrosis, cerebral palsy, sport injuries, circulatory deficiency, parkinsonism, multiple sclerosis and muscular psoriasis as well as depression.

Michel (1976) explained the four uses of music with the hearing impaired:

> the use of vibration, especially the organized vibrations of music, to gain and expand attention; (2) the use of music and its wide range of frequencies to assist in the diagnosis of hearing loss and development of hearing potential; (3) the use of the rhythmic pulsation of music to help develop social relationships in movement with others, such as in a dance or instrumental group activity (rhythm bands); and (4) to regulate speech mechanisms in the development of language, i.e., in learning discrimination of pitch range (high and low), or in rhythmic patterning and pitch inflections of speech (p.38 quoted in Peters, p. 75).

Peters points out that the multisensory property of music allows hearing impaired clients to "feel" (tactile vibrations) the music as well as hear it.

2. Behavior

The area of music therapy which focuses on improving behavior is that of behavioral management. Types of music therapy modalities involved in this area are Behavioral Music Therapy, and Behavioral Music Psychotherapy.

Bruscia (1989) suggests that therapists involved with behavior modification use music to increase, decrease, modify, and/or reinforce carefully defined target behaviors.

Behavioral music therapy uses music to manage behaviors. Managing behaviors refers to increasing or modifying appropriate behaviors and decreasing or eliminating inappropriate behaviors. "Music may be used as a positive or negative reinforcement, a group contingency, a conditioner of other reinforcers, or a behavioral antecedent or cue for other behaviors (Hanser, 1987).

Musical behavior can reflect deficiencies in behavior and thus can be used as a diagnostic tool in psychotherapy. Wilson (in Unkefer, 1990) explains that musical expression in playing a musical instrument may correlate to certain pathological conditions:

> Steinberg, Raith, Rossinagle, and Ehen (1985) found that endogenously depressed patients could be distinguished from neurotically depressed patients by the weakened motoric qualities in their playing. Schizophrenics

> tended to display performance difficulties in the area of musical logic and order (Unkefer, p. 133).

In Behavioral Music Psychotherapy, the therapist uses music as an adjunct in treating such behavioral disorders as anxiety, phobias, sexual dysfunctions, psychosomatic complaints, substance abuse, etc. (Bruscia, 1989).

D. Level Four: The Psychology of Human Development

As in Maharishi's Vedic Psychology, the development of the individual psyche to its full potential is the general goal of most music therapy modalities. The knowledge and application of the Maharishi Transcendental Meditation and TM-Sidhis program purports to not only enhance the development of the Musical Psyche and the individual psyche, but also to restore balance to all levels of mind and body for the individual and through the individual, for society and the world. This leads into the topic of the next two levels of the Psychology of Music Unified Field Chart which deal with society and the world—collective consciousness. Level 5, Society, has four sublevels; level 6 has one.

E. Level Five: Society and the Listener's Musical Psyche

1. Interpersonal Relations

According to Maharishi's Vedic Psychology this area of collective consciousness looks at interactions between two individuals. In terms of music therapy, this is understood as interpersonal and dyadic music interactions.

Bruscia (1989) suggests that

> music therapy is an interpersonal process when the sequence is based on stages in developing relationships with people. For the client and therapist, this means establishing rapport, making contact, exploring limits, gaining trust, defining roles, resolving conflicts, helping, separating, etc. (p. 49).

Several types of music therapy modalities use dyadic interactions. Dyadic is defined as a situation in which two therapists work with one client or one therapist works with two clients—a ratio of two to one. Bruscia (1987, p.310) notes that clients are seen in dyads when their relationship serves as either the focus or context for therapeutic treatment. Examples of dyadic relationships are child-parent, husband-wife, brother-sister, employer-employee, etc.

When the clients are related, the dyadic therapy can focus on improving the mutual relationship or in enabling one client to help solve the problems/needs of their counterpart. When the clients are unrelated, such as in work partners, the dyadic structure serves as part of the treatment itself.

Interpersonal relations develop as the client works with the therapist, or as a client works with another client. Interactions on this level are considered intimate; it gives the clients an opportunity to play different behavioral roles; it provides a situation in which the therapist can build self-esteem in the client through reward for successful behavior.

An example of a dyadic-based music therapy is Metaphoric Improvisation Therapy, a model developed by Katsh and Merle-Fishman. It uses music and psychotherapy to help the client gain a sense of independence in decision-making processes (Bruscia, 1987, p. 334).

2. Family and Group Relations

According to Bruscia (1987), family therapy involves both parents and children; it is used either when one member of the family is experiencing some problem or need or when the family as a whole has difficulty interacting.

Group therapy is common in music therapy modalities. It involves three or more clients. Bruscia (1987, p. 510) considers group therapy appropriate when: 1) the client

needs to develop a social identity; 2) when clients need to develop peer relationships or group skills; 3) when the client will gain more from peer interaction than from therapist-client interaction; 4) when the client needs to develop self-sufficiency from the therapist; and 5) when the client has difficulty interacting with the therapist.

For music group therapy to work, it helps if the client can follow directions and imitate a model, which requires high functioning clients with established language skills. Group therapy sessions usually involve homogeneous groups—homogeneity being based on developmental stages, general functioning level, severity of disturbance, and musical or activity preferences. Group size varies from three to 25 members with 7–12 being ideal. Group size often depends upon the type of activity occurring during the session: for more unstructured activities, a smaller size is preferable; for a task involving less activity larger groups are fine.

Types of music group therapy include: Moreno's Musical Psychodrama, Interactive Music Group Therapy, Catalytic Music Group Therapy, Supportive Music Group Therapy, Instrumental Group Improvisation, Instrumental Performance Ensembles, Group Singing Therapy and Vocal Performance Ensembles.

3. Social Relations

Many of the characteristics of group therapy exist as well for cultural or social groups. In this instance, the size of the group may be quite large, even as big as the size of an audience listening to a performance. According to Alvin (1975):

> Man can respond only to music of his culture, which conveys to him some meaning and emotion. His culture is not only ethnographical, since even in the same society people's responses to artistic experiences vary according to their social or educational background. In the same society we may find people who have been deprived of certain musical contacts—or have had music forced on them; others have discovered music by themselves without any guidance. Some ignore or accept only a certain kind of music, out of personal or social prejudices. Good listeners may be trained or born; they

> are not necessarily discriminating. These factors are among the many which may help or hinder the work of the music therapist who tries to offer his patients an enjoyable and effective means of communication.
> In therapy the best music *of its kind* is likely to be more effective, since any function is best fulfilled by the best suitable means. The best here is defined as what succeeds, not according to an orthodox assessment of 'good' or 'bad' music, but to the response it can elicit from the patient. Whatever its kind or its aesthetic value, all music possesses the same (essential) elements.... (pp. 74–75).

Music therapy in social relationships occurs in several contexts, as follows: rehabilitative programs in prisons (Elliot and McGahan, in Pratt, 1987, p.170); music education programs in schools, not only for "urban advantaged" neighborhoods but also for "urban disadvantaged areas" [(Orff-Schulwerk therapy) Mittleman, 1969]; rehabilitation programs in hospitals, both physical and mental; and cultural musical programs which help to culturally identify and create self-esteem for ethnic groups existing within culturally-mixed nations.

4. International Relations

Moreno (1988) considers music a multicultural phenomenon and therefore suggests that music therapists have a general familiarity and working knowledge of the music of representative world cultures. He also recommends using a multicultural music therapy for helping both those individuals born of different ethnic backgrounds and those individuals for whom the standard music used in therapy has no beneficial effect. Moreno points out that:

> When dealing with clients from non-Western backgrounds, the use of their ethnic music in therapy may...elicit more than the ordinary musical and extramusical associations. The music may reach the client on the deepest possible level of culture and values and a shared world view (p.27).

Music therapy programs have recently been organized for bringing harmony to international relations. Boxhill (1988) recently created an organization known as Music Therapists for Peace whose sole purpose is to organize music therapists around the world

for promoting world peace. By working in unison with a common goal, Boxhill believes music therapists can restore harmony and integrity to international relations, if not politically, at least culturally by restoring balance to the individuals who comprise that culture. Boxhill's organization reports on intercultural and intracultural group events that strive through music making and music listening to bridge the gulf between cultures. Some activities have included music performances at the United Nations, and music therapy education classes in universities world-wide.

F. Level Six: Applied Areas and The Listener's Musical Psyche

The last level displays the various applied areas of society which music therapy can help. Industry has found that background music increases productivity; rehabilitation has found music helps substance abusers, prisoners, and the mentally deficient. Geriatrics, children, and teens as well as adults respond well to music therapy. Music therapists have been able to help musicians overcome performance anxiety and physical handicaps. Almost every area of society benefits from the application of music therapy which in turn provides a benefit for collective consciousness upholding all areas of national life, including those administering Government, and ultimately, including the head of state.

This brief review of the Psychology of Music (the knower), *Maharishi Gandharva Veda* music (the process of knowing), and music therapy (the known) has merely glimpsed the depth of knowledge embodied in these three disciplines. Books could be written on each discipline separately, linking the entire field of music perceived from that point of view to Maharishi's Vedic Psychology, and even then the information provided would not do justice to each field. Further research is needed to fully disclose this potential encyclopedia of musical knowledge, its theories and effects.

VIII. The *Richo Akshare* Verse of *Maharishi's Vedic* Science— Extending the Knowledge and Application of Natural Law in Modern Science

This chapter has presented *Maharishi's Vedic* theory of the origins of sound and its emergence as music in the physical world, the concept of the Musical Psyche as that feature of the individual psyche which is involved with the production/ perception/reaction to music, and the effects of music which is attuned to natural law on both the individual and society. The question remains, what value does *Maharishi's Vedic* Science have in furthering the understanding of the mechanics of natural laws described in pre-existing models of modern disciplines? And, is it possible to apply the knowledge of *Maharishi's Vedic* Science in order to uncover the fundamentals of modern science? According to Maharishi the answer is an emphatic "yes" to both questions. He explains that by applying the knowledge of his *Vedic* Science to modern science, the fundamental relationships between the unified field and the discipline become more readily apparent. This juxtaposition of two views of science, the subjective and the objective, enables scientists to better see how to access and apply laws of the discipline for the betterment of the individual and society.

Recall that the *Rk Veda* is considered in Maharishi's Vedic Science to be the most fundamental level of natural law—pure knowledge. Working with scholars from many field, Maharishi has shown that the sequential progression of the *Richo Akshare* verse of the Rk Veda displays the archetypical pattern of natural law that describes the unfoldment of natural law in all the major theories in every field of the sciences and humanities. From the perspective of modern science the knowledge inherent in this verse has enriched such disciplines as physics[23], mathematics, chemistry, physiology, and psychology. Literature

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23 See *Modern Science and Vedic Science* (1987) Volume 1, for complete descriptions of these unified field charts.

and education from the field of the humanities and education and art and music from the field of fine arts have also benefited. In this section, I am applying the knowledge of the *Richo Akshara* verse to the three field of psychology of music, music therapy, and *Maharishi Gandhara Veda* music theory.

According to Maharishi, the following *richa* from the *Rk Veda Samhita* sheds light on the self-interacting dynamics of consciousness and natural law from the perspectives of both his *Vedic* Science and modern science:

Richo akshare parame vyoman
Yasmin deva adhivishve nisheduh
Yastanna Veda kimricha karishyati
Ya ittadvidus ta ime samasate
(*Rik-Ved* 1,164,39)

The verses [richas] of the *Veda* exist in the collapse of fullness
(the *Kshara* of A) in the transcendental field,
In which reside all the *devas*, the impulses of creative intelligence,
the laws of nature responsible for the whole manifest universe.
He whose awareness is not open to this field,
what can the verses accomplish for him?
Those who know this level of reality
are established in evenness, wholeness of life (p. 101).

This *richa* can be divided into two parts as shown in the English translation. The first part describes the self-interacting dynamics of the *Veda* in the unified field of pure consciousness. The second part explains how direct experience of the *Veda* in human awareness makes this knowledge useful. According to Maharishi, this verse defines a fundamental relationship between consciousness and natural law both at the level of the unified field and also at its more manifest level—the expressions of natural law found in modern science. He has explained that the principles contained in this verse facilitate the understanding of how direct cognition of the *Veda* brings fulfillment to the objective goals of modern science.

What is this relationship? Maharishi explains:

> The first two words, *Richo akshare*, describe the flow of pure knowledge, the flow of *Veda*, which it says, is in the indestructible, non-changing field of *Akshara*. We see the same thing in the structure of scientific law, which is seated in the non-changeability of the law, on the ground of non-change. Even though the law administers change, it has its seat in non-change. It is a constant and therefore it becomes a law. The hymn [verse] of *Rig-Veda* calls the laws *Richas*, and the flow of law is in *Akshara*, in the indestructible.

Where is the indestructible? Maharishi suggests it cannot be in the relative just because it is non-changing, and non-change does not have its "breath" in the relative. It belongs to the transcendental value—*parame vyoman*—it transcends all activity. Here is the seat of the non-changing, on the ground of which is the flow, the structure of the law.

The hymns of the *Veda*, considered as the expressions of the laws of nature, have their seat in the indestructible field of consciousness according to *Maharishi's Vedic* Science. Someone who does not know this field of consciousness is not able to associate the indestructibility with the law, and if the law is not indestructible, self-sufficient, and constant, then it is not of much value for all times. The emphasis here is in the knowledge of the indestructible, in the knowledge of the non-changing field.

Further on the hymn says, "He who knows the indestructible, the field of non-change, is seated in evenness of life." That means, he whose awareness has gained that level of evenness is seated in all the laws of nature at once, his awareness is lively in terms of all the laws of nature. "So here is a lively picture of the structure of pure knowledge in the self-referral value of pure consciousness" (Maharishi, 1980, pp. 77-78).

As Maharishi points out, this passage indicates that although every law of nature is a non-changing principle, the reality of non-change at the basis of that law can only be known, in modern science, through inference from the changing expressions of that law. He points out that the non-changing reality of natural law, at its unified basis, can only be completely known and applied to enrich human life when the consciousness of the knower

is established in the structure of pure knowledge. This is the link between subjective and objective knowledge provided by Maharishi's Vedic Psychology, and its concept of the Cosmic Psyche. This link has been brought into the realm of the study of the effects of music through the parallel concept of the Musical Psyche.

This quoted passage indicates that although every law of nature is a non-changing principle, the reality of non-change at the basis of that law can only be known in modern science, through *inference* from the changing expressions of that law. Maharishi points out that the non-changing reality of natural law, at its unified basis, can only be completely known and applied to enrich human life when the consciousness of the knower is established in the structure of pure knowledge (p. 144). I suggest that we can call this the "Musical Psyche."

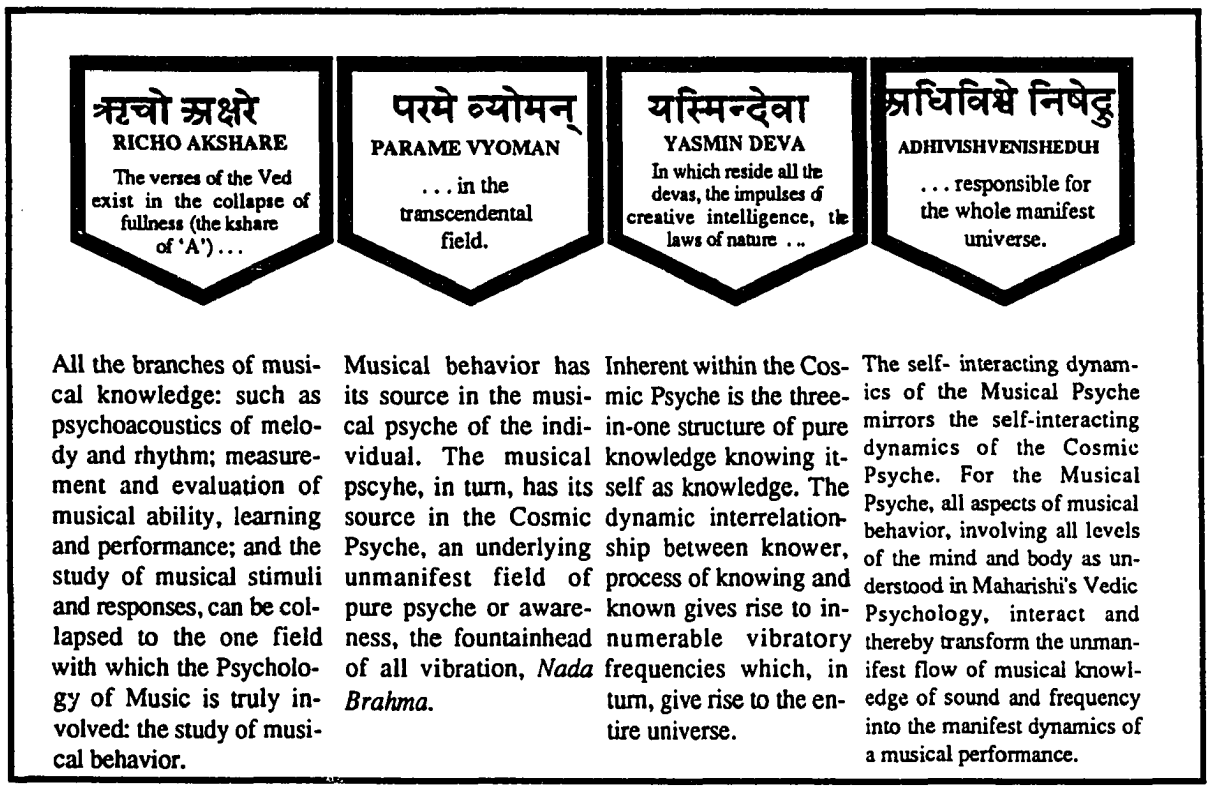
The same applies for knowledge about music and its effects. To understand the applications of the unified field dynamics involved in music production, it is crucial for the composer, the musician, and the scientist to have their awareness established in the non-changing reality of natural law. Only when the Musical Psyche is established in the Cosmic Psyche can the quality of music nourish and enhance psychophysiological balance and growth in the individual, eliminate stress in the atmosphere and thereby bring peace to the whole world.

In Figure 1-4, this *richa* has been applied to the three fields of music portrayed in the unified field chart: the *rishi* or known— the psychology of music, *devata* or process of knowing—*Maharishi's Gandharva Veda* music as the representative of all music types, and *chhandas* or known—music therapy. These *Richo Akshare* charts express the self-interacting dynamics of consciousness and natural law found in the fields of music.

In the next section, I will review the different means of measuring the effective response to music (Chapter Two) followed by a description of the questionnaire used in the present research (Chapter Three).

Richo Akshare Chart of Vedic Psychology of Music

Psychology of Music

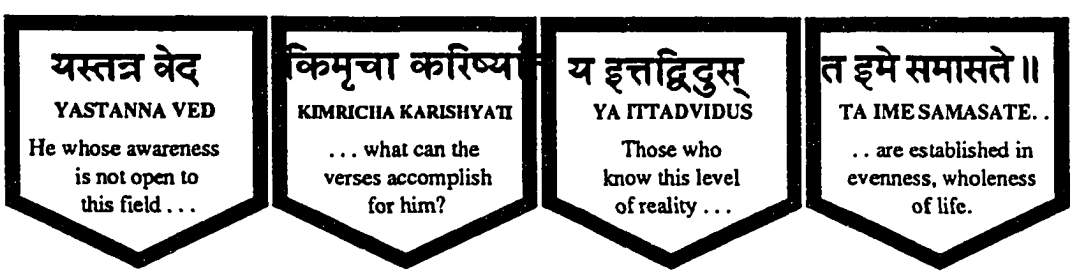


All the branches of musical knowledge: such as psychoacoustics of melody and rhythm; measurement and evaluation of musical ability, learning and performance; and the study of musical stimuli and responses, can be collapsed to the one field with which the Psychology of Music is truly involved: the study of musical behavior.

Musical behavior has its source in the musical psyche of the individual. The musical pscyhe, in turn, has its source in the Cosmic Psyche, an underlying unmanifest field of pure psyche or awareness, the fountainhead of all vibration, *Nada Brahma.*

Inherent within the Cosmic Psyche is the three-in-one structure of pure knowledge knowing itself as knowledge. The dynamic interrelationship between knower, process of knowing and known gives rise to innumerable vibratory frequencies which, in turn, give rise to the entire universe.

The self- interacting dynamics of the Musical Psyche mirrors the self-interacting dynamics of the Cosmic Psyche. For the Musical Psyche, all aspects of musical behavior, involving all levels of the mind and body as understood in Maharishi's Vedic Psychology, interact and thereby transform the unmanifest flow of musical knowledge of sound and frequency into the manifest dynamics of a musical performance.



The musician who is unaware of the Musical Psyche and of its source in the Cosmic Psyche cannot access the dynamics of sound in its purest form, and, therefore, cannot manifest the full value of music in a performance.

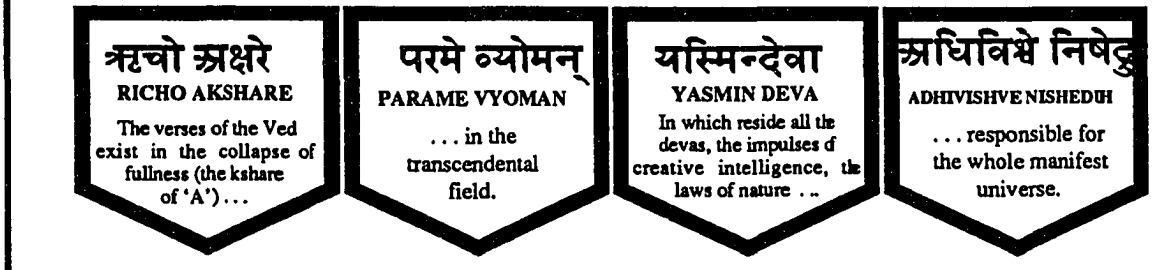
For a musician who has not completely accessed the Musical Psyche, knowledge of musical structure remains partial, the perceptual processing of notes and the intricate displays in scales and modes remains incomplete, and the ability to perform these melodies may be far from satisfactory.

The musician, whose Musical Psyche is vibrant in the qualities of the Cosmic Psyche, can access the full value of music—from its unmanifest level as an aspect of Nada Brahma, through the feeling and cognitive levels of the Musical Psyche- wherein the concept of music gets transformed into the written notes and scales of a musical compostition, until, on the level of senses and physiology, the unmanifest sound manifests as concrete melodies and rhythms in the musician's performance.

Such a musician is capable of producing music that is in accord with the frequencies generated by the laws of nature, and thus can create music which brings both psychophysiological balance and enlightenment to the performer and listener, harmony and progress to society; and peace to the whole world.

Richo Akshare Chart of Vedic Psychology of Music

Gandharva-Veda Music

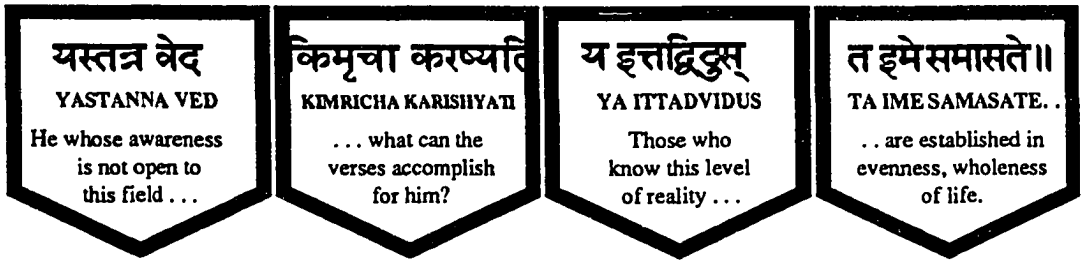


For the *Raga* in *Gandharva-Veda* music, all its particulate features- types and combintions of scales (*melas*); notes (*svaras*) and their microtones (*srutis*); the ornamental application of notes (*alamkaras* and *gamakas*); and use of rhythm (*tala*) to augment the melody- can be collapsed to one fixed tonic, *Sa*, upon which the entire *Raga* is based.

Sa represents the manifest sound value (*ahata*) of *Nada Brahma. Nada Brahma* literally means: the Creation, the Cosmos, the World is sound. *Nada Brahma* is the one transcendental singularity, the indivisible oneness of all beings. In its self-referral value, it is the primal sound of the Unified Field.

Nada Brahma has two aspects: *ahata*, the manifest value of sound and *anahata*, the unmanfest value of sound. Thus, it could be said that *Nada Brahma* contains within it all the possible combinations of vibratory frequencies...

...which are in turn responsible for structuring the entire manifest creation. In this way *Nada Brahma* is the primary cause of the phenomenal world.



The musician who does not know how to access *Nada Brahma* lacks the ability to create music that is in accord with the laws of nature.

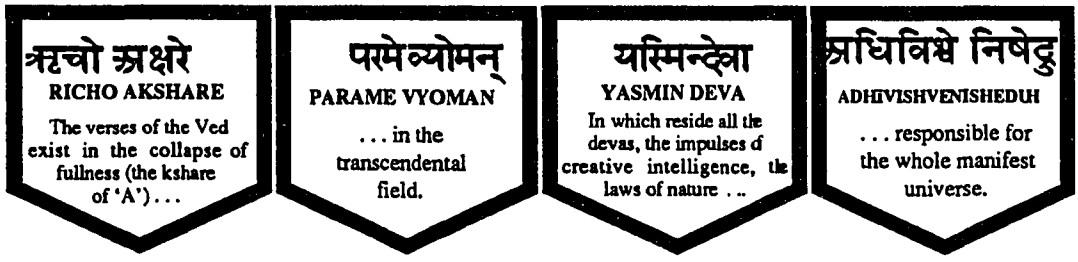
Such a musician produces life-less music -- music that is life-damaging rather than life-supporting. Such music does not promote balance and leads to chaos and disharmony in both the individual and society.

The musician whose awareness is open to the level of *Nada Brahma* has the ability to create music whose frequencies are in accord with natural law.

By creating music that is life-supporting, whose frequencie are in accord with natural law as embodied in Maharishi's Gandharva-Veda *Ragas*, the musician can restore balane and thus bring enlightenmen to both the performer and th listener, resulting in the crea tion of ideal societies and th descent of heaven on earth.

Richo Akshare Chart of Vedic Psychology of Music

Music Therapy

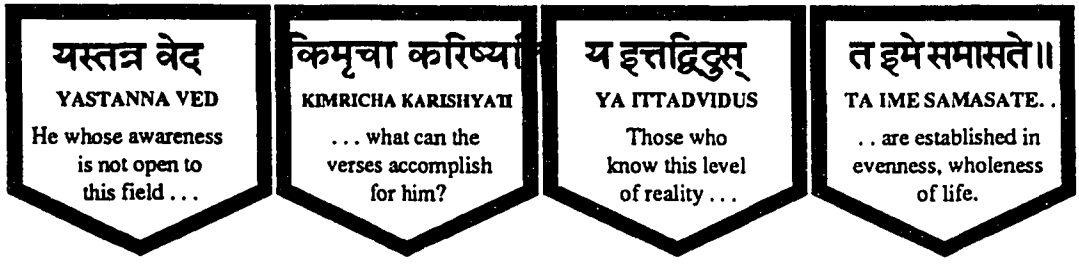


Music as art and science collapses to music as therapy when music is applied by a professionally trained therapist in a treatment condition to aid in the restoration, maintenance, and growth of balance and well-being in a client's physiological, mental and socio-emotional psyche.

Ideally, music as or in therapy reenlivens all levels of a client's musical psyche in the singularity of the self-referral dynamics of the Cosmic Psyche.

The cosmic psyche--the unified field of all the laws of nature -- is the home of infinite frequency, the primordial hum of creation....

...which contains within it all the healing frequencies of natural law. These, in turn, give rise to the healing melodies and rhythms found in manifest creation.



The therapist who is not aware and therefore cannot access these healing melodies of natural law generated from the unified field of natural law—the Cosmic Psyche...

...how can that therapist apply these profound melodies and rhythms in a therapeutic session in order to maximize the healing process in the client?

The therapist, whose individual awareness is fully attuned to cosmic awareness—the Cosmic Psyche—whose musical behavior flows in the healing melodies and rhythms of the infinite, is, in the true sense of the word, an enlightened musician and therapist.

Such a therapist can bring to the therapeutic session the full value of the Cosmic Psyche interacting with the musical psyche, thereby enabling the proper application of music for maximum healing benefits to the client, to society, and to the world.

CHAPTER TWO
MEASURING THE AFFECTIVE EFFECTS OF MUSIC— A LITERATURE REVIEW

The previous chapter presented a theoretical overview of a new psychology of music based on Maharishi's Vedic Science. It offered one of many possible perspectives for integrating the branches of music psychology, music theory, and music therapy into a holistic unified theory. This unified theory has its basis in Maharishi's Vedic Science which proffers the theory of the Unified Field of Natural Law as the common source of all branches of knowledge and disciplines (Maharishi, 1985) both music related and otherwise. Many disciplines including psychology have been charted to demonstrate the relationships among their components relative to the Unified Field of Natural Law.

Recall that the Unified Field Chart of Maharishi's Vedic Psychology identified "levels of mind", one of which was called the level of feeling (see the Chapter One section on "The Musician and Feeling"). It is commonly accepted by eminent researchers in the field of the psychology of music and music therapy that music influences the feelings or affect of the individual, with measurable effects both physiologically as well as psychologically (Gaston, 1968; Berlyne, 1974; Ruud, 1980; Boyle and Radocy, 1987; Boxhill, 1989; and Scartelli, 1989). During the past seventy years, researchers have sought adequate methodologies for measuring these affective responses. This chapter reviews such methodologies in light of the desire to study the effects of *Maharishi Gandharva Veda* music on the individual. The reader is directed to other, excellent reviews by Radocy and Boyle (1988), Eagle (1971) and Martin and Venables (1980).

This chapter will first review existing definitions of music-related affect and its physiological counterpart, music-related arousal. It will discuss the various approaches which exist for measuring affective response. Last, the different types of questionnaires used to measure affective responses will be discussed.

A detailed discussion of *Maharishi Ayur-Veda* and its perspective on affective response will follow in Chapter Three. A new questionnaire, based on the concepts found in *Maharishi Ayur-Veda* and called the Maharishi Ayur-Veda Affective Response Questionnaire (MAARQ) will be presented in Chapter Three as a new approach for studying affective responses to music.

Defining the Expressions of Affect

Researchers agree that affect has many connotations (Radocy and Boyle 1988; Eagle, 1971; and Martin and Venables, 1980). It is a term used to describe complex psychophysiological responses and consequently can be defined from different perspectives. In order to understand more precisely the meaning of affect as it will be used here, it is important to understand how it differs from and overlaps similar terms such as feelings, temperament, emotions, mood, arousal, and temperament.

Price (1986) presents a glossary of terms used in affective response literature with references to other authors as well. He defines aesthetic experience as "Intense subjective and personal experience." It requires "perception, experience of feelings and reactions, and psychological involvement." Price writes that "reaction involving feelings and emotions" is a definition of affective response. He further defines affective response as "Learned behavior resulting from a life history of interactions with musical stimuli; encompassing mood-emotional, preference, and taste responses." Thus we see that feelings or affective responses are defined as a major component of the aesthetic response and can be a learned behavior as well as a mood.

Feeling or affect come in different flavors. For example, Young (1973) outlined eight classes of affective processes:

- simple feelings of pleasantness or unpleasantness in response to sensory stimuli;
- organic feelings such as hunger and thirst;
- activity feelings such as enthusiasm or aversion;
- moral, aesthetic, religious or social sentiments and attitudes based on previous

experiences;
- persisting moods such as cheerfulness, elation, grief;
- pathological affects of deep depression, apathy or hostility;
- emotions such as fear, anger, embarrassment, laughter;
- and temperaments.

Of these eight classes, feelings, temperament, emotion, and mood will be further discussed.

Feelings

As in the expression "how do you feel?", feelings generally refer to the physical manifestation of the "emotional process" (Eagle, 1971). Thus, feeling has also been understood in terms of moods (Borgatta, 1961 and Murphy, 1958) or as particular bodily sensations (Ryle, 1949).

Radocy and Boyle (1988, p. 196) explain that feeling has a variety of meanings including: tactual perception, cognitive belief, emotion, and the pleasantness/ unpleasantness of an experience.

Temperament

Whereas feelings change from moment to moment, temperament is considered a long-term property of the nervous system. But temperament still has an influence on affect. Eagle (1971) defined temperament as the physiological hereditary make-up of a person "from which personality seems to evolve". Similarly, Allport (1961) considered temperament to be those "characteristic phenomenon of an individual's emotional nature" which are dependent upon the individual's constitutional make-up and "therefore, largely hereditary in origin" (p.34).

Emotion

Emotion may be an extra intense feeling. Emotion, according to Young (1973, p. 750), is a "disturbed affective process or state which originates in the psychological situation and which is revealed by marked bodily changes in smooth muscles, glands and gross behaviors". Radocy and Boyle (1988) add that emotion is a relatively temporary state which involves perception, memory, and an environmental factor from the past or present.

Allport (1961) understands emotion as a "stirred up condition of the organism"; Eagle (1972) considers Allport's definition to equate with affect as defined by the American Psychiatric Association (1969).

Mood and Arousal

Emotion may be a special case of mood, with both terms reflecting aspects of affect. Young (1973) notes that emotion differs from mood in two ways: first, in terms of its disruptive ability, and second, in duration. Whereas a mood is relatively free from behavioral disruptive activity, an emotion reflects disruptive activity in the psyche of the individual. Secondly, Young indicates that emotion is of relatively brief duration whereas mood is less intense and lasts longer. According to Young, "An emotion often quiets down into a mood as when fear becomes a persistent mood of anxiety, anger becomes resentment, love becomes cheerfulness..." (Young, 1973, pp. 311 - 312).

Cattell (1965) distinguishes between mood traits and states. He states that although one's overall "instability of mood" can be considered a trait, the experience of a particular mood at a particular time should be considered a state (p. 27).

Nowlis and Nowlis (1956) note that moods persist longer than emotions. In their research, Nowlis and Nowlis studied the social, emotional, and motivational behavior of

individuals under the influence of drugs and in varying degrees of experimental conditions. They concluded that mood adjective check lists could be an evaluative means for researching behavioral changes for mood but not for measuring the onset of emotion. Nowlis and Nowlis explained that mood being less intense than emotion is more readily available for introspection and report, and can be observed with some reliability.

Arnold and Gasson (1968, p. 210) consider intense feelings to be emotions and lasting emotions as moods. Lehmann (1968, pp. 41 - 42) considers "changed organic sensations as the content of mood".

Eagle (1971, p. 19) sums up the understanding of mood in the following way:

> Although differing in approach, behaviorists, existentialists, and psychoanalysts seem to agree that moods are a basic and consequential aspect of an individual's way of life and are closely related to the way one feels and acts."

Eagle defines moods as "transient feeling states, having aspects of emotions or affects, which can be cognized by individuals and designated with words" (1971, p. 19). Thayer (1988) links moods to states of arousal, perhaps governed by at least two dimensions—energetic-arousal (sleep/wake) and tension-arousal (calm/tense). Thayer's approaches are particularly interesting to the current research and will be covered in Chapter Three.

The Study of Affective Response

Given the above definitions, the study of affective response to music may best be related to changes in mood, as opposed to changes in emotion or temperament. Emotion, thus defined, appears too fleeting an experience to be of significance to initial research. Temperament is defined as a function of heredity and thus may be unamenable to experimental treatment. However, it must be recognized that emotions can serve to change a mood and that temperament may limit the range, frequency, and duration of

moods for a given individual. Thus, although less important than mood and affect in general, emotions and temperament cannot be ignored in the study of affect.

A very important element in the study of the effects of music concerns the identification of particular mood states with a music experience. The literature indicates that familiarity with a given type of music influences the relationship between affect and music. Radocy and Boyle (1988, p. 203) comment that "There is no question but what music can elicit mood response; further, within a given cultural context there tends to be agreement among many individuals as to the mood elicited by certain types and examples of music." Learning underlies all musical behavior, affective or otherwise, as in the recognition of songs from childhood, parade songs, lovers' remembrances, motion picture music, etc.

Thus, affective response to music partially depends on recall of prior experiences. Meyer (1956, pp. 13-32) takes this notion a step further in his theory of how music arouses emotions. Meyer explains that an emotion arises whenever an individual's tendency to respond is "arrested or inhibited." In regard to music, Meyer explains that an individual's tendency to respond originates from one's previous musical experience. One's tendency to respond to musical stimuli depends upon one's expectation of what will come next in the musical phrase. If what one anticipates does not occur, one's tendency is arrested, or inhibited; hence, tension or emotion gets aroused.

Radocy and Boyle (1988) note that this theory is consistent with the contemporary psychological view that emotion is a relatively temporary disruption of a normal state. Furthermore, they make an important inference regarding *unfamiliar* music.

> Music that does not arouse expectation of a subsequent musical consequence is meaningless for the listener. Because expectation is so much a product of stylistic experience, music in a style with which the listener is totally unfamiliar is meaningless (p. 233).

Given this viewpoint, a primary research question arises relative to the use of *Maharishi Gandharva Veda* music. Can western audiences, unfamiliar with it, experience positive affective results upon listening to it? This question is particularly important in light of the expected benefits to mood and personal well-being as opposed to mere entertainment from the music. The question will be addressed in Experiment One of Chapter Four. The remaining portion of the current chapter reviews methodological issues surrounding identification and measurement of affective responses to musical stimuli.

Methodologies for Measuring Affective Response

According to Radocy and Boyle (1988) there are basically four major approaches to measuring affect: physiological, adjective descriptors, philosophical inquiry, and experimental aesthetics. The physiological and adjective descriptor approaches will be reviewed briefly as they directly relate to the design of the experiments on Maharishi Gandharva Veda music described in Chapters Three, Four, Five, and Six.

Physiological

While researchers agree that music can evoke changes, they disagree as to whether these changes reflect an affective response. Radocy and Boyle (1988, p. 204) point out that affective behaviors are psychological behaviors, while measures of bodily processes are physiological behaviors. The study that interrelates the two is called psychophysiology. "If one is seeking to understand affective responses to music through study of changes in the rates of certain bodily processes, then one is engaged in psychophysiological research" (p. 205).

Radocy and Boyle suggest that physiological research generally stops short of examining the interrelationships between psychological behavior and bodily processes.

Rather, they generally involve the presentation of a musical stimulus as the independent variable and use polygraph data on various measures for the dependent variable. "The underlying hypothesis of most studies is that the frequency and/or amplitude of the various bodily processes controlled by the autonomic nervous system reflect affect response to music" (p. 205). Dependent variables have included: heart rate, respiration rate, electrodermal activity, electroencephalography—a measure of brain wave activity, electrogastography—a measure of gastrointestinal response, electromyography—a measure of muscle tension, pupillography—a measure of pupil size, patellar reflex—knee-jerk response, and the philomotor response—movement of hairs on the skin.

Reports on physiological oriented research on affective responses to music began in the 1920's with summaries given by such authors as Schoen (1927, 1940) and Diserens and Fine (1939). One of the first studies to report physiological changes took place in the 1880's. Dogiel discovered that music influences blood circulation, heart rate and respiration. In 1924 Hyde studied the effects of different kinds of musical selections on the cardiovascular responses of three different types of individuals: those who liked music, those who were indifferent to music, and those who came from different nationalities. She found that individuals responded unfavorably to "tragic, mournful tones" and favorable to "gay, rhythmical melodies".

In a review of heart rate studies Dainow (1977) found that seven out of eight studies failed to elicit any statistically significant changes in heart rate. Hodges (1980) reviewed EEG research on music and found that (a) musicians produce more alpha brain waves than non musicians when listening to music, (b) children spend more time in alpha brain wave production during silence that during any of several conditions of aural stimuli, (c) musicians' and non musicians' brain waves are slightly more desynchronized during complex pitch discrimination tasks, and (d) there are significant variations in brain wave tracings both within and between musician and nonmusical groups (pp. 195 - 224).

Dainow and Hodges suggest reasons why physiological research has provided little insights into the affective response to music most of which are methodological in origin. "Particular concerns include instructions to subjects, loudness of the musical stimuli, subject attention, and possible suppression of response due to fear of disturbing the electrodes" (in Radocy and Boyle, p. 209).

Adjective Descriptors

According to Eagle, Professor of Music Therapy and Head of the Department of Music Therapy: Medicine and Health at Southern Methodist University, (1971, p. 19) mood refers to "relatively transient states...which can be cognized by individuals and designated with words". Moods are traditionally measured through the use of adjective descriptors. Literature reviews by Farnsworth (1969), Lundin (1967) and Eagle(1971) have discussed the use of adjective descriptors.

According to Eagle (pp. 27 -80) there are three basic methods for studying the affective responses to music: the adjective checklist, the semantic differential, and various types of rating scales such as the Likert scale and the Positive Affect, Negative Affect Scale (PANAS). The most commonly used method, however, is the adjective checklist. Following is a brief review of research conducted on these approaches. Note: not all the studies on this subject will be reported here. For a more thorough review, please see the review articles by the authors cited above.

Adjective Check Lists

Adjectives may differ; however, they may also be perceived as different ways of describing the same feeling. Therefore, it could be said that adjectives cluster together in various circumstances of measurement.

Meddis (1972) explains the research problem.

> The problem for the researcher is to identify the main mood dimensions as well as the mood adjectives which correlate highly with them. Considerable headway towards this goal has already been made by a number of people using similar techniques (Nowlis, 1965; Borgatta, 1961; McNair & Lorr, 1964; Thayer, 1967). Basically these involve presenting a long mood adjective check list (MACL) to large numbers of individuals, whose scores are intercorrelated and factor analyzed, yielding groups of adjectives which are presumed to be related to each other and to a major mood factor. A smaller set of these adjectives which load reliably on the various factors is then used in the final checklist. The procedure is similar to that used in the development of personality inventories (pp. 178 - 179).

The concept of an adjective check list existed even prior to the computer age of statistical correlation. One of the first researchers to attempt categorizing music according to mood was the inventor Thomas Edison. He hired a group of experts to classify 589 available musical recordings by mood. These experts labeled 112 of the recordings as "true mood music" in the following categories:

> the stimulation and enrichment of imagination; peacefulness of mind, joyousness of mind; wistfulness; jolly, good fellowship; energetic; love, dignity, and grandeur; tender memory; devotion; stirs the spirit; and 'to catch the childish fancy and make it merry with glee' (In Farnsworth, 1969, pp. 94 -95).

There was no confirmation of categories by research analysis.

Schoen and Gatewood (1927) presented 10 musical selections, five instrumental and five vocal, to 32 females on two separate occasions under similar testing conditions. Subjects were asked to mark those adjectives which best described their moods during the music. The purpose of the study was to see if differences would exist between the adjective descriptors chosen from two testing occasions. A statistical analysis was done on the frequency for which a certain adjective was used per selection. Results indicated that for the two conditions, the adjectives which subjects checked were similar. Schoen and Gatewood concluded that "a given musical selection will arouse a certain definite reaction and will arouse the same reaction on different occasions". Thus affective response could be viewed as part of a cause-and-effect system rather than as an outcome of subject "whim".

Gatewood (1927) presented 12 adjective descriptors to 35 females and asked them to check the adjectives which best described the moods elicited by each of ten musical selections. The purpose of the study was to compare the influence of rhythm, melody, harmony, and timbre with stated mood effects. Analysis of data consisted of a frequency count. Gatewood concluded 1) that mood effects are dependent on definite musical elements and 2) rhythm is most important in arousing happiness, excitement and stir. In this case, verbal account can discriminate causal elements of a complex auditory stimulus (music). See Figure 2-1 for an example of his list of adjectives.

Figure 2-1
Gatewood's Adjective Check List

sad
serious
like dancing
stirred, exciting
devotional
gay, happy
rested
amused
sentimental
longing
patriotic
irritated

Heinlein (1928) presented adjectives to 30 musically trained and untrained subjects. The purpose of the study was to understand the response to major and minor chords and to intensity and pitch register. He presented 48 major and minor chords. Subjects were asked to report mood responses by checking adjectives such as bright, dull, joyful, and sad. He found that major chords were described with joyful adjectives while minor chords were described with melancholic adjectives. He also found that chords played loudly were not considered soothing regardless of modality while chords played softly were. Furthermore, loudness did not affect the responses of the musically trained. He also discovered that higher pitch register made a difference for determining which

adjectives were checked. Thus, adjectives empirically confirmed the moods typically associated with musical convention (loud, soft, major, minor, etc.).

Hevner (1935, 1936) developed an adjective check list to investigate mood responses to musical stimuli. Hevner's Adjective Check List (ACL) was thought to characterize various mood responses to music. Hevner's list used a circle formation with 67 adjectives grouped into clusters of eight adjectives. The eight clusters were arranged in a clockwise manner, with the assumption that as one proceeds "around the clock" mood similarity would steadily decrease until the opposite cluster was reached and then mood similarity would steadily increase from that point back to the starting cluster. Each cluster contained adjectives with approximately the same meaning (an early analog to factor groups, but organized intuitively).

Listeners were asked to check whichever adjectives best described the mood of the music. Analysis consisted of a frequency count. Her results showed a general consistency among subjects in the adjectives checked for short compositions, but not for long ones. See Figure 2-2 for an example of the Hevner Adjective Check List.

Follow-up studies were done by Hevner on mood responses to modality, rhythm, tempo, harmony, melody, and pitch. 200 subjects listened to ten or more musical selections. She created two versions of each musical selection which were identical in every way except for the item under study. For example, with pitch, the two versions were played at different octaves, one higher than the other; for melody the ascending or descending lines were played differently. Each subject heard only one of the two versions. She found that the major mode is described as happy, graceful and playful; the minor mode as sad, dreamy and sentimental; firm rhythms are considered vigorous and dignified; flowing rhythms are happy, graceful, dreamy and tender. Slow tempos express dignity, calmness and sadness while fast tempos express restlessness and happiness. Complex dissonant harmonies are happy, graceful, serene, and lyrical. With melodic lines

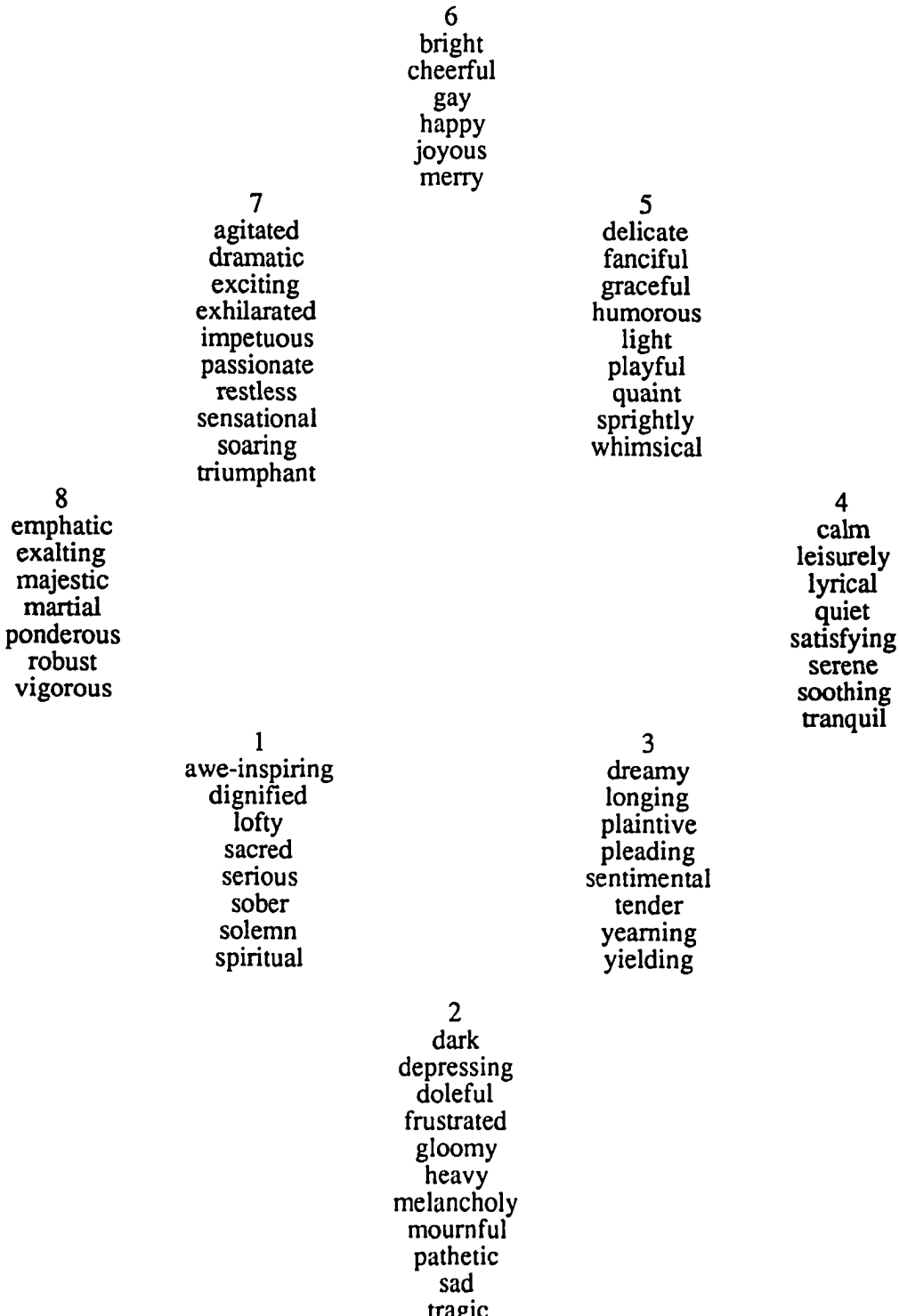


Figure 2-2. The Hevner Adjective Circle. Taken from Radocy and Boyle (1988) *Psychological Foundations of Musical Behavior, Second Edition.*

the differences were not clear cut. However, ascending melodies are dignified and solemn while descending melodies are exhilarating and serene. Hevner observed that her responses were consistent for all kinds of listeners. Note that this type of research studied the musical elements for their individual effects. These are called the "collative variables" of the musical stimulus. The research on *Maharishi Gandharva Veda* music reported in Chapter Four examines the effects of the music as a whole in contrast to Hevner's research.

Interest continued in refining Hevner's instrument. Were the adjective clusters truly empirical or merely apparent groups? Farnsworth (1954) tested the internal consistency of the clusters within the Hevner Adjective Check List. 200 randomly selected subjects listened to 56 musical phrases in 50-minute testing sessions, recording mood responses with Hevner's Adjective Check List. He performed two 145 rank-order correlations among Hevner's 67 adjectives. He observed that several of the clusters did not describe internally consistent mood patterns and therefore could not justify Hevner's concept of a clock-face arrangement. He did rearrange 50 of the 67 adjectives into ten or more consistent categories that fitted a circular form, but even this he found lacking. Figure 2.2 presents Farnsworth's modification of the Adjective Check List (ACL).

Other uses of the ACL were found. Sopchak (1955) wanted to ascertain whether Hevner's Adjective Check List would reveal the "emotional makeup" of subjects prior to hearing the music as well as after. He asked 553 college sophomores first to classify their moods using a three point rating scale ranging from cheerful to neutral to gloomy. Then fifteen musical selections were played. After each selection, subjects checked as many or as few applicable adjectives as desired on a 12-category ACL. Using a rank order correlation, Sopchak found that cheerful subjects responded to cheerful adjectives whereas gloomy subjects responded more to sorrow, joy, calm, love, eroticism, jealousy, wonder, and cruelty,. This lead Sopchak to conclude that gloomy people have many

tensions and thus may more readily project into the music, whereas cheerful subjects may have less need to project. He also found that musically trained subjects were more reactive to all types of music compared to non musically trained subjects; that different types of music, such as classical, popular or folk music, elicit different kinds of responses; and that there is a definite relationship between the subject's statement of mood and subject's response to music. A further factor which Sopchak uncovered is that the subject's familiarity with the musical selection influences the subject's affective response.

A	B	C	D	E
cheerful	fanciful	delicate	dreamy	longing
gay	light	graceful	leisurely	pathetic
happy	quaint	lyrical	sentimental	plaintive
joyous	whimsical		serene	pleading
bright			soothing	yearning
merry			tender	
playful			tranquil	
sprightly			quiet	

F	G	H	I	J
dark	sacred	dramatic	agitated	frustrated
depressing	spiritual	emphatic	exalting	
doleful		majestic	exciting	
gloomy		triumphant	exhilarated	
melancholic			impetuous	
mournful			vigorous	
pathetic				
sad				
serious				
sober				
solemn				
tragic				

Figure 2-2. Farnsworth's modification of the Hevner Adjective Circle. Taken from Radocy and Boyle (1988) p. 214.

Capurso (1952) conducted one of the more intensive studies of mood responses to music. The outcome led to what might be called a recommendation for "music therapy"

in a cultural setting. He first asked 134 subjects to match the mood created by different music selections to six categories of mood descriptors. From this ,105 musical selections were indicated that had been listed most frequently. He then played the 105 musical selection to 1, 075 nonmusical subjects who categorized them according to mood. Results indicated that 61 selections had listener agreement at least 50% of the time. From this study Capurso created a list of musical selections which he suggested would be suitable for producing a "desired emotional effect" on listeners. He suggested that this list be used for selecting background music on radio and television programs. See Figure 2.3 for an example of Capurso's ACL.

Adjective Check List

1. Happy, gay, joyous, stimulating, triumphant
2. Agitated, restless, irritating
3. Nostalgic, sentimental, soothing, meditative, relaxing
4. Prayerful, reverent
5. Sad, melancholy, grieving, depressing, lonely
6. Eerie, weird, grotesque

Figure 2-3. Capurso Adjective Check List

Another study was done by Van Stone (1960). He wished to determine if there were mood differences associated with the tonal quality of the music. He asked six judges "experienced in recognizing mood representation in music" to select eight musical excerpts to represent each of the eight clusters in Hevner's ACL. The eight selections were then orchestrated so that they could be recorded by three instrumental groups consisting of four strings, four woodwinds, or four brasses, with no changes in pitch between the three groups.

Twenty-five subjects and the original judges listened to the three orchestrated selections and marked the ACL. Using a variation of the chi-square test, Van Stone compared the responses of the judges to the responses of the subjects. He found no significant differences between the two for the three groups. Woodwinds were labeled as

whimsical; brasses as serious and majestic, while strings did not represent any one mood. One criticism of the study is that the *orchestrated* selections were not resubmitted to the judges. If they had been, would the ACLs have been marked differently?

Benefit of the Bipolar Adjective Format

One of the major difficulties with the Adjective Check List is that its monopolar structure ascribes one adjective for each possible mood without taking into consideration the fact that moods may swing from one extreme to another. Consequently, when subjects report two moods to a musical selection, the two experiences may in reality reflect an expression of one mood expressed differently. Hence, Meddis (1972) recommends using a bipolar adjective check list as it may have "a better correspondence with everyday conceptions of the nature of mood and mood change" (p. 178).

Example: Bipolar Adjective Scale

Happy	_____	_____	_____	_____	_____	Sad
Light	_____	_____	_____	_____	_____	Heavy
Humorous	_____	_____	_____	_____	_____	Solemn

Figure 2-4. Example of a bipolar adjective check list . (Taken from Radocy and Boyle, 1988, p. 214).

Meddis suggests this may reduce the number of reported moods as well. The current study adopts the bipolar adjective check list method for the above reason.

When subjects indicate the *strength* of their selection by choosing a position on a bipolar scale, summation of results is possible, statistical analysis is made easier, and the results make intuitive sense. The model assumes that each item is monotonically related to the factor-related trait, and that the total score among items is approximately linearly related to the trait. This model is called a "Likert scale".

Example: the Likert Scale

The rhythm was accurate.	SA	A	N	D	SD
The tempo was appropriate.	SA	A	N	D	SD
The phrasing was tasteful.	SA	A	N	D	SD

Figure 2-5. An example of the Likert Scale. The letters stand for strongly agree, agree, neutral or uncertain, disagree, and strongly disagree. Taken from Boyle and Radocy (1987) p. 178.

The Likert scale assumes a continuum running between two extremes. The current study uses a "0" as the middle value, with -3, -2, -1, and +1, +2, and +3, making a total of seven choices, thus creating a Likert scale with the bipolar adjectives.

In contrast to the adjective check list that uses only one stimulus word or phrase, the use of a bipolar rating scale anchored at each end with antonyms falls within the topic of "Semantic Differential".

The Semantic Differential

The Semantic Differential (SD) is a relatively recent rating scale that presents any number of bipolar adjectives generally on a seven-point rating scale. Subjects are called upon to discriminate among the nature and strength of their feelings, relative to a given topic depicted in a scaled, bipolar questionnaire. The ratings of the scales can then be summed and submitted to various statistical analyses to create a subjective semantic space (factors that summarize the groups of adjective ratings). The factor dimensions tend to compensate for the variety of individual interpretations that may be assigned to the antonymic scales.

Osgood, Suci, and Tannenbaum (1957) were the first to demonstrate that the bipolar Semantic Differential technique is a viable tool for assessing affective response. Interestingly, the adjectives tend to group in certain factor patterns when given enough words in the corpus. The authors found underlying recurrent factors in which all adjectives appear to have some degree of loading. Three principal factors or dimensions

seem to account for most of the loadings in factor analysis of semantic differential scales: evaluative, potency and activity.

Example: The Semantic Differential

	1	2	3	4	5	
melodious	___	___	___	___	___	cacophonous
exciting	___	___	___	___	___	depressing
rhythmic	___	___	___	___	___	arrhythmic
accurate	___	___	___	___	___	inaccurate
sonorous	___	___	___	___	___	harsh
blended	___	___	___	___	___	unblended
sensitive	___	___	___	___	___	insensitive
in tune	___	___	___	___	___	out of tune

Figure 2-6. An Example of the Semantic Differential. Taken from Boyle and Radocy (1987) p. 178.

Edmonston (1966) used the Semantic Differential (SD) format to determine aesthetic evaluations of ten musical selections. Seventy-four subjects listened to ten musical selections and completed the SD. From his study, Edmonston concluded that 1) rhythm was the major element involved the aesthetic evaluation of music, and 2) neither gender nor musical training influenced affective responses. Note that the bipolar adjectives used for this study, the musical selections, and the methodologies employed were not reported.

Keil and Keil (1966) wanted to research perceptions of moods to East Indian, Western, and Afro-American music by American students. They had 87 high school and college students listen to several Indian *Ragas*, a two-part Bach invention, a blues-style song, and a jazz performance. Subjects were asked to record their responses to each selection using a semantic differential consisting of 22 adjective pairs. Keil and Keil then performed a factor analysis on the data using a principal axis method with varimax orthogonal rotation. Results indicated different types of music are interpreted by Americans in different ways. That is, the adjectives loaded differently on the factors

according to the type of music used as a stimulus. Note that a similar analysis will be accomplished on data from the current study. I will compare the factor structure of fifteen adjectives evaluated after subjects listen to *Maharishi Gandharva Veda* music and after listening to Western Baroque music.

Lieberman and Waters (1968) questioned whether repeated listening to classical music would increase one's enjoyment of it. 32 subjects of both genders listened to 9 classical musical selections from different historical periods during 10 experimental sessions. Subjects were asked to complete the Semantic Differential scale after each selection. The adjectives were adapted from the list of factor analyzed adjective pairs from Osgood, Suci and Tannenbaum (1957). A tally was made of increases, decreases, and ties between the first and tenth sessions. Chi-square statistics were performed to test for significant changes in each scale when evaluated *across all musical selections together*. Results showed significant changes occurred for meaningful, pleasant, interesting, sweet, tense, good and beautiful. It is interesting to note that with the exception of the one adjective "tense" all changes were found in only one of the three Osgood et. al. dimensions of meaning—"evaluation"—in contrast to "potency" and "activity". Thus, one can infer that repeated listening does not changes the listener's impression of the music's potency or activity, merely the manner in which it is evaluated.

In a second experiment using the same data, Lieberman and Waters examined changes *for each selection* by comparing the means of the sixteen scales on the first two sessions with the same scales on the last two sessions. He found that all music types, except Stravinsky, showed significant increases on at least two of the scales. According to the authors the exception of the Stravinsky piece refutes the idea that repetition brings about a general increase in liking for *all* types of music and it also refutes the idea that the results "are the responses of obliging subjects who were merely trying to please the experimenters (1968, p. 894). The current study will also investigate the possibility of

effects related to social compliance and lack of familiarity to the music. See Experiment 2 in Chapter 4.

In his dissertation research, Eagle (1971) was among the first to use the Semantic Differential scale to study the effects of mood on music perception. He wanted to answer three questions: (1) does existing stated mood influence rated mood response to music? (2) Does order of presentation of musical stimuli influence rated mood response to music? and (3) Do similarly rated mood responses hold true for both vocal and instrumental music?

Eagle asked 274 undergraduate and graduate music majors to rate their own present mood on a ten-step scale and then respond to 20 music selections in terms of five bipolar adjectives (good-bad, pleasant-unpleasant, bright-dark, depressed-elated, and happy-sad). The 20 selections consisted of ten vocal excerpts and ten instrumental excerpts. Eagle found that (1) the existing mood of the listener does influence mood response to music, but order of presentation does not significantly affect mood response; and (2) a person responds differently to vocal music than to instrumental music, although both may seem to reflect the same mood qualities (Eagle, 1971, p. 171). In reviewing the literature on the use of semantic differentials, Eagle found that

> rhythm seems to be the primary element in evaluating mood responses to music. Happiness was the term used most often to describe fast tempi, major mode, consonant harmonies, and tunes pitched in high registers. Excitement or agitation described dissonant harmonies (Eagle, 1971, p. 79).

Note that Eagle and others have empirically derived their lists of adjectives from the prior musical literature or empirical research to insure that they represent a range of factors. The current study, however, draws upon an *a priori* theory that constrains the selection of adjectives to those that describe what are called "*Ayur-Vedic doshas*". Chapter Three provides a detailed account of the development of the new instrument.

Other research in the effects of music reinforce the notion of dimensions of effects, as follows.

The Dimensional Rating Method

Radocy and Boyle (1988) consider the dimensional approach as equivalent to the adjective check-list. Specifically, it does not depend on the antonymic pairs adjectives used in a bipolar scale.

According to McMullen (1976) the dimensional approach suitably relates verbal responses to musical stimuli. It is closely related to Hevner's Adjective Check List in that both approaches seek to define verbally the affective domain or stimulus variables that influence the response dimensions. This particular approach seeks a statistical grouping of adjectives that contain similar meaning for the response dimension, while the Hevner approach uses individual, intuitively grouped adjectives to form a collective mood pattern. Furthermore, both approaches seek to define the collative variables *within* the musical stimulus that influence the responses. Interestingly, the dimensional approach seeks to define general dimensions (e.g. activity/uncertainty) which could apply to many art forms whereas the Hevner approach is applicable for musical structure analysis only (McMullen, 1976, p.2).

Crozier and McMullen each have identified two dimensions of affective meaning based on subjects' semantic differential responses to musical stimuli. Crozier (1974) isolated pleasingness and interestingness as two dimensions. McMullen (1976, 1980, 1982) examined the dimensions found in the Hevner Adjective Check List and found that the adjectives were connected to Osgood, Suci, and Tannenbaum's standard: evaluation, potency, and activity. Together, these dimensions suggest the means by which listeners obtain "meaning" from their musical experience.

Pleasing, beautiful and good were associated with evaluation. Interest, powerful and rugged were associated with potency. And complex, clear and order were associated with activity. McMullen concluded that Hevner's arrangement offers two dimensions of semantic space, that of evaluation and potency, and that the third of activity would have emerged if more adjectives associated with that dimension had been used.

Asmus (1985) created a Nine-Affective Dimensions (9-AD) scale which he defines as a multidimensional instrument for the measurement of affective response to music. This is another attempt to allow description of the meaning of a musical experience. Note that the methodology has no systematic theory that gives rise to the nature of the adjectives included in the corpus, except to draw upon results of prior music research. This contrasts with attempts to use a theoretical approach, such as Thayer (1988), who sough to create an adjective check list that reflects varying types of activation or arousal in the subject. Likewise, the current study uses a theoretical approach drawn from expected analogs to the *Ayur-Vedic doshas.* Both of these latter techniques are discussed in Chapter Three.

To create his scale, Asmus first reviewed the ACL literature and collected all adjectives used by previous authors. In addition he had 87 musically experienced college students list terms indicative of affective reactions to music. This combination of items resulted in an initial pool of 296 adjectives. Those terms describing musical rather than affective characteristics were then removed, leaving a list of 165 affective adjectives.

This number was further reduced by first selecting the 60 adjectives common to previous ACLS for use. Then 26 musically expert judges were asked to select 40 more from the remaining 105 items. When 14 or more judges agreed, that adjective was then used. This resulted in an overall list of 99 adjectives.

The 99 affective adjectives were rated by 2, 057 subjects in response to three musical excerpts. Principal component factor analysis identified nine dimensions of affect

occurred in 75 per cent of the variance. The nine dimensions are: evil, sensual, potency, humor, pastoral, longing, depression, sedative, and activity. Forty one terms which loaded highly on these factors were rearranged into an affective response measurement. which he called the 9-Affective Dimensions instrument. Gabrielsson (1973, 1979; Hargreaves and Coleman (1981), Hylton (1981) and Gfeller and Coffman (1991) have used Asmus' 9-AD scale in their research studies.

Hargreaves (1986, p.125) cautions about weaknesses in the dimensional approach. According to Hargreaves, "Any dimensional model is ultimately restricted by the range of musical stimuli on which it is based, as well as on the subjects and response measures adopted".

He holds that interpretations of dimensions is based on subjective judgments by the researcher and suggests that "dimensional approaches do not yet provide an adequate basis for drawing any firm conclusions about the broad dimensions of responses to music". Chapter Three of the current study investigates this issue by comparing "group norms" to each dimension associated with the selective response.

Furthermore, I suggest that the tri-*dosha* typology of *Maharishi Ayur-Veda* may address this weakness by offering at least three dimensions for measurement based on ancient Vedic scriptural texts linked to the oldest continuous tradition of an accepted system of health care and not based in subjective interpretation. See Chapter Three for a more complete consideration of this approach.

Dimensional Research and Musical Meaning

McMullen (1980; 1982a) describes the theoretical model taken primarily from dimensional research. That is, he suggests that a focus be removed from the qualities of the music as imputed by results of scores on adjective descriptors. Instead, he advocates an "interpretive paradigm" in which the dimensions of response reflect the "musical

meaning" derived from the experience. He suggests that the perceived dimensions of *energy* and *structure* are experienced as forms of *activation* or arousal. That is, considering the dimensions of meaning of adjectives, the dimensions will reflect low to high activation and positive to negative evaluation. "When connotative labels (either in prose form or individual words) are used as descriptors of responses to music, these labels represent some combination of the two covert dimensions—activation and evaluation" (McMullen, 1982a, p. 52).

This insight provides a clear connection to the themes that will be covered in detail in Chapter Three. It will be shown that much study of the effects of music can be reviewed in light of changes in arousal in two or more dimensions.

For example, Nowlis and Green (1957) have suggested that several of the extracted factors that describe feelings and moods may be related to a hypothetical continuum which can be called arousal or activation. The extracted factors number three and are related to anxiety, fatigue and vigor. In turn, Thayer (1963, 1967) has refined the activation descriptors originally found by Nowlis. Thayer's work aimed first to revise what he considered to be the imprecise and poorly defined activation descriptors used by Nowlis and second, to create a self-report measure of arousal which would eliminate the need for Nowlis's test.

In Chapter Three, Thayer's work will be used to calibrate a new instrument developed for this study to measure the effects of music. The new instrument will orient towards a psychophysiological frame of reference that allows comprehension of the meaning of the musical experience in terms of an age-old system of health care called *Ayur-Veda.*

CHAPTER 3
THE *MAHARISHI AYUR-VEDA* AFFECTIVE RESPONSE QUESTIONNAIRE (MAARQ): A NEW RATING SCALE FOR MEASURING THE IMMEDIATE EFFECTS OF MUSIC ON THE INDIVIDUAL

Introduction

Claims regarding the beneficial effects of music on the mind and body have appeared even before ancient Greek and Roman cultural traditions. Pratt (1989), a noted music therapist, gives a brief history of music and medicine to the present, beginning with instances of Egyptian papyri from more than four thousand years ago that show various diseases of the time being treated with music and drug therapy. Throughout the history of music therapy, the exponent has always been faced with the issue of explaining the mechanism by which the benefits accrue, and when the scientific climate prevails, starting in the late 17th century, the exponent has been faced with the issue of quantifying the therapeutic outcome.

This chapter examines various issues surrounding development of a suitable scientific instrument that is capable of measuring the effects of music on individuals. One issue concerns the authoritative explanation existing behind the rationale for developing a new instrument. If the authoritative system of explanation is acceptable, then the adoption of the instrument and its conclusive findings is more likely to occur.

For our western culture, it has been suggested (Pratt, 1989) that a medico-physiological explanation may be most suitable. Given this understanding, this dissertation will outline a possible rationale for adopting the approach of *Maharishi's Ayur-Veda* as a medico-physiological explanation for evaluating the effects of *Maharishi's Gandharva Veda* music.

Many explanations have been offered to explain the therapeutic effects of music. For example, the psychosomatic "healing" explanation is based on the listener's expectation of

a healing influence in association with music. In the ancient Greek tradition the god Apollo was identified as the therapeutic agent. As Pratt indicates,

> In addition to his jurisdiction over the musical arts, another of his many duties was to cleanse man of disease, guilt, and evil. The Greeks believed that this cleansing process restored harmony to the soul....(Pratt, 1989, pg. 1)

Both sick and healthy "patients" were taken to the temples of Apollo's son, Aesculapius, the "enlightener" of the art of medicine that had been invented by Apollo.

> The patients and pilgrims who came to the temples to be cured may actually have been healed because of their implicit faith in the gods and in the ritual involved (Pratt, 1989, p. 1).

However, the "expectation" principle is inherently unsatisfying in our modern context[1]. More recent history has brought us increasingly sophisticated theories of physiological function, which in turn can support more testable and sustainable hypotheses regarding the manner by which music affects the human being. Pratt cites the growth of medical interest in music therapy during World War II, particularly stimulated by the "overcrowded conditions of military hospitals and the need for programs to occupy the time of convalescing soldiers" (p. 8). Psychiatrists and neurologists, among others, theorized about the physiological mechanisms by which music produces healing effects. In 1948, according to Pratt, one doctor suggested that the thalamus is the seat of aesthetic reactions, affected directly by musical stimulus, bypassing the cerebral interpretive relays. Thus, even psychiatrically disturbed patients could gain amelioration through music.

More recent theories of the psychophysiology of the effects of music have been reviewed by Scartelli (1989). Among other mechanisms, Scartelli points out that auditory information shaped by a rhythmic structure directly affects the medulla, the portion of the brain stem that controls autonomic functions such as the heart rate and respiration. He cites

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[1]Except for those advocating "placebo therapy."

various writers who speculate on influences such as the effects of rhythm on the reticular formation (which controls wake/sleep arousal levels) and the subsequent control of such rhythms over widespread EEG, both cortically and sub-cortically generated.

Similarly, Scartelli suggests that emotional responses are elicited through the interplay of cortical and limbic systems, with the "hypothalamus as mediator" (p. 22). Others researchers (Achterberg & Lawlis, 1980) note that the hypothalamus modulates autonomic responses to stress. "The connection between music, guided imagery and progressive muscle relaxation and health is very likely a mechanism involving a (neural) hypothalamic-frontolimbic loop and a (neuroendocrine) hypothalamic-immunologic loop." (Achterberg and Lawlis, 1980, cited in Scartelli, 1989).

The point of this introduction is to indicate that only a sufficiently rich intellectual framework will provide a truly systematic explanation for the vast potential which music has to soothe, balance and heal. A psychophysiological context offers rich opportunities for investigating the causal mechanisms associated with the effects of music. For example, Rider, Floyd, and Kirkpatrick (1985) studied the effects of the combination of music, progressive muscle relaxation, and guided imagery using measures of stress hormones (urinary corticosteriods) and circadian rhythms (body temperature). They also evaluated the circadian entrainment of these two variables. Subjects were nurses who engaged in shift-work during three 4-5 day intervals over a 1-month period. The stress effects of shift work on the circadian rhythm were ameliorated with the combined treatment. The authors suggest that because of the close relationship between corticosteroids and the immune system, physical health in general may benefit from techniques that utilize music and relaxation.

The *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ)

As mentioned in Chapter 1, *Maharishi Gandharva Veda* music is one of twenty approaches which Maharishi has identified for restoring balance to the psychophysiology.

The twenty approaches collected together is considered a "complete science of health" (Glaser, 1988), and is known as *Maharishi Ayur-Veda*. I propose that *Maharishi Ayur-Veda* is a system of health care that can provide a systematic explanation for the effects of *Maharishi Gandharva Veda* music. Consequently this dissertation suggests that the best means to measure the effect of *Maharishi Gandharva Veda* music will come from this system.

Developed in India thousands of years ago, *Ayur-Veda* [2] as a system of health care has been the focus of reinterpretation and clarification by Maharishi since 1980. *Ayur-Veda* is recognized by the World Health Organization as an effective system of traditional health care, and is widely used in India (Sharma, 1993). Its origins are given by Glaser (1988):

> The word *Ayurveda* comes from the Sanskrit root *ayu,* which means span of life. So *Ayurveda*, Maharishi emphasizes, means the knowledge of the whole span of life. Traditionally, *Ayurveda* is specifically intended to promote longevity, but there are also many ancient tomes dealing with the full spectrum of medical disciplines, including surgery, pediatrics, obstetrics, toxicology, internal medicine, and many other branches of medicine. Maharishi identifies the three most important ancient texts as *Caraka Samhitia, Sushruta Samhita,* and *Vagbhata Samhita.* Making the knowledge in these texts available to contemporary medical practice require a great seer, a person of Maharishi's vision. (p. 90, italics added)

It is reasonable to apply the concepts underlying *Maharishi Ayur-Veda* in attempting to describe the effects of *Maharishi Gandharva Veda* music. They both arise from the same *Vedic* tradition. That is, if our requirement for characterizing the effects of *Maharishi Gandharva Veda* music includes a systematic and scientific approach to psychophysiological cause and effect, as well as a theoretical context that honestly characterizes *Maharishi Gandharva Veda* music on its own terms, then the best intellectual guidance will be given in the context of *Maharishi Ayur-Veda.* As indicated by Sharma (1993),

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[2]Please recall that when Maharishi's name does not appear before a Vedic theory, it indicates a general theory developed by authors other than Maharishi.

> *Maharishi Ayur-Ved*, ...despite its ancient roots, is notably modern in its systematic and scientific approach...*Maharishi Ayur-Ved* works by correcting subtle imbalances in the body before they erupt as disease. By correcting these imbalances, it strengthens the body's immune system and innate homeostatic self-repair mechanisms, so the body naturally resists disease. Many medical doctors have taken training in *Maharishi Ayur-Ved.* They comment that the treatments are not only efficacious, but also easy to apply, free from side effects, and notably cost effective. (p. 272).

Recall the putative mechanisms of music therapy given by Scartelli and Rider et. al., above, each involving the immune system in relation to endocrine (homeostatic) functions as modulated by brain systems that underlie emotion and relaxation. A fundamental part of the theory of *Maharishi Ayur-Veda* is the concept of psychophysiological body types, which also have been shown related to endocrine functions. Patients are not all the same, and thus must be treated according to a typology. According to Sharma (1993), individuals partake of different ratios of

> three components of the unified field of intelligence: *Rishi* (knower), *Devata* (process of knowing), and *Chhandas* (known). Maharishi Ayur-Ved indicates that when the self-referral interaction of *Rishi, Devata,* and *Chhandas* have become sufficiently dynamic and complex, the three appear as *doshas*—subtle metabolic principles that underlie every activity of the human physiology (p. 273)

The details of *dosha* properties will be covered in more detail below. However, for now, note that the constitutional type governs how a person will respond to various foods, climates, activities, and food supplements or *rasayanas* (Sharma and Dash, 1976, cited in Blasser, 1988). Research has attempted to correlate the characteristics of each *dosha* with familiar western variables. Schneider, Wallace, Kasture, Averbach, and Robinson (1985) report, for example, that high *Pitta* subjects scored significantly higher on Type A behavior in the Jenkins Activity Survey, while high *Kapha* subjects scored significantly higher on Type B behavior. This study used self-report on behavioral attributes.

A second study by the same authors looked more closely at physiological markers of *dosha* types. The *Pitta* group demonstrated significantly higher levels of hemoglobin and hematocrit, as well as protein and albumin. The *Vata* group demonstrated significantly

lower mean levels of protein and albumin. The *Kapha* group demonstrated higher protein, albumin, and blood lipids. Other significant differences between the three constitutional types were found in uric acid, calcium, creatinine, and BUN.

Singh, Singh, and Udupa (1980) found different levels of neurotransmitters among the *dosha* types. The *Pitta* group had greater acetylcholine, the *Vata* group had greater catecholamines, and the *Kapha* group had greater histamine levels. The authors suggest these *dosha* patterns were consistent with current understanding of the roles assigned to the different neurotransmitters.

The concept of "balance" in *Maharishi Ayur-Veda* refers to maintenance of the proportion of each *dosha* that best fits the constitution of the individual. Imbalance leads to disease. Sharma (1983) reports that *Vata dosha* governs movement, including breathing and blood circulation. *Pitta dosha* governs energy production, metabolism, heat, and other chemical reactions in the body. *Kapha dosha* governs the structural basis of the body including physical substance and fluid balance. "All must work smoothly together to produce optimal health" (Sharma, 1983, p. 274). According to Sharma (1993, p. 301), *Maharishi Ayur-Veda* begins with the concept of

> ideal health—mind and body perfectly balanced and integrated. Such a state of perfect health produces an inner experience of exhilaration and joy, an experience which, in its fulfilled state, is referred to as bliss.
>
> Each *dosha* expresses a different aspect of this inner happiness or bliss:
> *Vata*: exhilarating, alert, cheerful, optimistic
> *Pitta*: content, joyous, chivalrous, pleasant, clear-minded
> *Kapha*: steady, strong, forgiving, courageous, generous, affectionate, serene [3]

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[3]As scientists understand more of the "translation" of the original *Ayur-Vedic* texts, certain adjectives have shifted in their connotation for each *dosha*. The list given in Sharma (1993) differs in the association of certain positively valued adjectives with the *dosha* when compared to the adjectives used in the MAARQ (created in 1990). The MAARQ assigns these adjectives differently: Serene=*Pitta*, Alert and Exhilirated=*Kapha*. While this appears to be contradictory, note that the negative value adjectives associated with the same *dosha* are not directly contradictory. Thus, subjects using the MAARQ are evaluating their

Given these affective characterizations of the *doshas,* it becomes possible to create a questionnaire that allows individuals to indicate the current strength of each affect-related adjective, thus indicating the current degree of balance in which each *dosha* is being experienced. Low rating for the affect-related adjective would reflect a negative emotional experience, thus indicating a lack of balance in the associated *dosha* . More importantly, however, improvement in a rating following a given experience, such as a musical stimulus, would indicate increased balance for the *dosha.* Note that responses on the questionnaire should be independent of the subject's *prikriti,* or natural *dosha* typology, since optimum balance should lead to the same experience of improved affect, leading to "bliss", as given in Sharma.

TABLE 3-1
The Doshas and Their Qualities

Vata dosha	Settled/Restless	***Kapha dosha***	Alert/Dull
	Calm/Nervous		Exhilarated/Drowsy
	Composed/Agitated		Playful/Lethargic
	Tranquil/Strained		Enlivened/Depressed
	Harmonious/Frazzled		Energetic/Heavy
	Smooth/Rough		
Pitta dosha	Cold/Hot	***Rasas***	Romantic/Intellectual
	Peaceful/Annoyed		Heroic/Cowardly
	Serene/Irritated		Compassionate/Uncaring
	Soothed/Upset		Happy/Angry
	Happy/Angry		Tranquil/Strained

In 1990, an expert in the application of *Maharishi Ayur-Veda* was enlisted to aid in the development of an affective response questionnaire. This approach is in accord with Jackson's (1970) model of item construction by experts. According to Jackson, experts

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affective responses in light of two adjectives (positive and negative) rather than just one adjective. This should diffuse the impact of the changes in definitions, and appears to be the case in fact, given the results of the Cronbach alpha test and factor analysis, reported below. In both of these cases, the MAARQ adjectives reasonably group within the *dosha* to which they were assigned.

should have a conceptual foundation for the selection and interpretation of questionnaire items and practical experience in the application of the model. According to the *Ayur-Vedic* text known as *Carika Samhita* different affect or subjective feelings may be associated with each of the three *doshas*. In 1990, with the expert help of Dr. Stuart Rothenberg, M.D., Co-Director of *Maharishi Ayur-Veda* International and Dean of the College of *Maharishi Ayur-Veda* at MIU, a list of feelings associated with each *dosha* was created. Based on this list, a set of bipolar adjectives was made that reflected the most balanced *(prakriti)* and imbalanced *(vikriti)* states associated with each feeling. The test was structured as a bipolar adjective questionnaire using a Likert-type scale from -3 to +3 (see below). Sixteen pairs of adjectives were used to describe the three *doshas*. An additional four pairs of adjectives were used to describe the *rasas*, or sentiments theoretically expressed both in the composition and performance of traditional Indian performance (music, dance, theatrical, etc.), and theoretically experienced both by the performer and the audience. (The *rasas* were ultimately not studied.) The adjectives selected to represent the three *doshas* are in table 3-1.

The actual questionnaire follows:

TABLE 3-2
The *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ)

Directions: Please circle the number which most accurately describes how you feel at present. For example, if you feel enlivened, circle +2 on item #15; if you feel its opposite, a little depressed, circle -1. Please be sure that you **circle one number for each** of the words listed below.

How do you feel right now?

1. settled	3	2	1	0	-1	-2	-3	restless
2. calm	3	2	1	0	-1	-2	-3	nervous
3. composed	3	2	1	0	-1	-2	-3	agitated
4. tranquil	3	2	1	0	-1	-2	-3	strained
5. harmonious	3	2	1	0	-1	-2	-3	frazzled
6. smooth	3	2	1	0	-1	-2	-3	rough
7. cold	3	2	1	0	-1	-2	-3	hot
8. peaceful	3	2	1	0	-1	-2	-3	annoyed
9. serene	3	2	1	0	-1	-2	-3	irritated
10. soothed	3	2	1	0	-1	-2	-3	upset
11. happy	3	2	1	0	-1	-2	-3	angry
12. alert	3	2	1	0	-1	-2	-3	dull
13. exhilarated	3	2	1	0	-1	-2	-3	drowsy
14. playful	3	2	1	0	-1	-2	-3	lethargic
15. enlivened	3	2	1	0	-1	-2	-3	depressed
16. energetic	3	2	1	0	-1	-2	-3	heavy
17. romantic	3	2	1	0	-1	-2	-3	intellectual
18. heroic	3	2	1	0	-1	-2	-3	cowardly
19. compassionate	3	2	1	0	-1	-2	-3	uncaring
20. marvelous	3	2	1	0	-1	-2	-3	bland

Evaluation of Criterion Validity

It is useful to consider the *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ) in light of the various types of validity established in psychometric studies such as criterion, content, and construct validity. The first involves "criterion validity" which is determined by the degree to which the instrument in question quantitatively predicts an outcome that can be accurately measured by some other, usually more complex, method (the criterion).

The science of *Maharishi Ayur-Veda* identifies "pulse diagnosis" as a criterion measure of *dosha* typology. Pulse diagnosis is traditionally known by the Sanskrit term *nadi vigyan. Dosha* typology and associated imbalances can be directly detected by an individual trained in evaluating the *Ayurvedic* pulse as well as in physical examination. Thus, an *Maharishi Ayurvedic* physician can identify the individual's normal typology and any imbalances, and then can consequently prescribe therapeutic and preventative strategies to restore the *dosha* to its ideal state of balance.

According to Sharma (1988), the use of pulse diagnosis is a very sophisticated technique, best used by a *vaidya (Ayurvedic* physician) well-trained and experienced in *Maharishi Ayur-Vedic* diagnostic procedures. Although various attempts have been made to develop a written questionnaire that would substitute for pulse diagnosis, no self-report questionnaire has yet been devised that gives results as detailed as pulse diagnosis. Hence, criterion validity is only partially established for *Maharishi Ayur-Veda dosha* questionnaires. The precise definition of cognitive and affective traits associated with the pulse diagnostics are still under refinement, and the present work must be considered as only one step in the direction of formal operationalization of the *doshas* (Dr. Fred Travis, personal communication, 1995). Further evaluation of the validity of the MAARQ will depend on measures of the internal consistency and a theory to support content and construct validation.

Evaluation of Internal Consistency

Measurement of the internal consistency answers the question of whether or not the test items truly sample the "universe" they are claimed to represent. In the case of the MAARQ, for example, we can ask whether the individual bipolar adjective items correlate adequately with the *dosha* to which they were assigned. This may be done statistically with the Cronbach's alpha test.

Cronbach's Alpha

Cronbach (1984, p. 169) describes the "alpha coefficient" that tells how well scores obtained by one item (e.g., settled - restless) represent the group scores (e.g., average of the six items representing *Vata dosha).* Cronbach's alpha coefficient provides a test of internal consistency of the test instrument. Using data from 871 subjects attending five *Maharishi Gandharva Veda* and five Western Baroque concerts as described in Chapter 4, Cronbach's alpha coefficient tests were conducted on the adjectives constituting each of the three *dosha* average scores. See Table 3-3. See Appendix 3-1 for complete results of the tests including item correlation matrices.

Results of the test showed that for *Vata dosha* the reliability coefficient for alpha was .9394, and for *Kapha,* .9008. When the questionnaire item "cold/hot" was included with the *Pitta* adjectives, the reliability coefficient was .5170. However, removing the cold/hot item resulting in a higher *Pitta* reliability alpha coefficient of .5573.

In order to determine the correlation of the hot/cold item to the other *Pitta* adjectives, Pearson's *rho* was computed, $r = .054$. This indicated a lack of correlation to the other adjectives. Thus, the cold/hot adjective pair was dropped from further analysis.

The *Pitta* adjectives demonstrated a relatively low alpha coefficient. One possible explanation may be that the *Pitta* group contained fewer adjectives than *Vata* and *Kapha.* The *Vata* group contained five adjectives and the *Kapha* group contained six, compared to four in the *Pitta* group (Cf. the Standardized Item Alpha). Another explanation relates to the questionnaire item "serene/irritated". It correlates to the other three items less than the other pairs. The range of r for the 3 pairs that include serene/irritated is .18-.24 while the range for the other 3 other pairs is $r = .64$-$.76$. Apparently the notion of "irritated" is only loosely related to other aggravated *Pitta* adjectives (annoyed, upset, angry) or the notion of serene is not perceived the same as balanced *Pitta* adjectives (peaceful, soothed, happy).

Additional research is need to determine how individuals interpret the words "serene" and "irritated".

Overall, however, the results indicated sufficient internal consistency of the items, meeting standards for internal consistency. In a related vein, the results of factor analysis for the items will be given later in the context of evaluating construct validity and test -retest reliability.

TABLE 3-3
Results of Tests of Internal Consistency of MAARQ *Dosha*-related Adjectives

			Reliability Coefficients	
Dosha	N	Adjectives	Alpha	Standardized Item Alpha
Vata	870	6	.9394	.9403
Pitta	871	4	.5573	.7648
Kapha	877	5	.9008	.9013
*Pitta**	869	5	.5170	.6784

*With "cold/hot" included

Content Validation

Beyond identification of their internal consistency, items must be evaluated in terms of the degree to which they represent the universe of characteristics they purport to represent. Typically this is done by recourse to expert opinion. As mentioned above, expert opinion was enlisted in the original selection of adjectives for the MAARQ. The following discussion uses other sources of expert opinion for comparison and critique.

Thus, evaluating the content validity can be accomplished by cross-referencing the MAARQ bipolar adjectives with published descriptions of the *doshas*. Note, however, that the concept of the *doshas* extends well beyond just affective responses. It includes cognitive, motor, and other physiological characteristics as well as other body type indicators. These are collectively termed as "constitutional type" or "temperament".

Furthermore, the concept of *dosha* balance includes not only a typology *(prakriti)* but also variation among the member traits within the typology *(vrikriti)* . The *prakriti* aspect of the *doshas* represents the "the natural state of balance of the *doshas* (that is, the relative proportion of *Vata, Pitta,* and *Kapha)*" (Wallace, 1993). Wallace adds that the individual's basic "type" demonstrates some portion of each of the three typologies. The *vrikriti* aspect of the *dosha* refers to the daily or situationally induced imbalances experienced by the individual *within* a *dosha* type, i.e., changes that reflect different degrees of expression along a particular trait within the typology. Typically, the *vrikriti* aspect represents some imbalance or "aggravation" of the *doshas.*

The following questionnaire published by *Maharishi Ayur-Ved Products International, Inc.* (1994, p. 14) uses 12 trait indicators to help individuals assess their own typology or primary *dosha prakriti.* For each *dosha,* the reader sums the items that personally apply. The highest scoring *dosha* or *doshas* is the one the reader needs to "monitor" the most to avoid over-activation of that *dosha* (termed "aggravation of the *dosha").* Note that while all three *doshas* are always active, typically one or two will dominate. While the MAARQ focuses only on the affective traits that belong to the respective *doshas,* I include here all the published traits for the sake of conveying the vast range of psychophysiological traits of *dosha* typology. This theme will be developed below in the context of physiological arousal systems hypothesized to underlie dimensions of and changes in affect (Thayer, 1989).

TABLE 3-4
Qualities of the Doshas

Assign one point to each item that applies to you:

	Vata	Pitta	Kapha
Type of hair	♦ dry	♦ fine, thinning reddish, prematurely gray	♦ thick, oily
Skin	♦ dry, rough	♦ soft, ruddy	♦ oily, moist
Mental activity	♦ quick mind, restless, imaginative	♦ sharp intellect, efficient, perfectionist	♦ calm, steady, stable
Memory	♦ quick to learn, quick to forget	♦ good general memory	♦ good long-term memory
Weather	♦ aversion to cold weather	♦ aversion to hot weather	♦ aversion to damp, cool weather
Sleep	♦ interrupted, light sleep	♦ sound, medium length	♦ sound, long, heavy sleep
Reaction to stress	♦ excites easily, anxious, worried	♦ angers easily, irritated, critical	♦ not easily ruffled, stubborn
Body size	♦ small frame	♦ medium frame	♦ large frame
Weight	♦ hard to gain	♦ medium frame	♦ gain easily
Hunger	♦ irregular	♦ sharp	♦ can easily skip meals
Walk	♦ quick	♦ determined	♦ slow and steady
I would like to change	♦ restlessness, worry	♦ intensity, irritability	♦ slowness, depression
Moods	♦ change quickly	♦ intense, slowly changing	♦ steady, non-changing
Totals	Vata:	Pitta:	Kapha:

Dosha questionnaire taken from *The Total Health Catalog - Authentic Ayurvedic Health and Beauty Products*, Vol 3. Spring, 1995, page 14. Published by Maharishi Ayur-Ved Products International, Inc., Colorado Springs.

Note that the *dosha* typology refers to the "trait" that characterizes an individual. However, transient moods can reflect a *dosha*-oriented "state" for a given period of time. Such state-related mood shifts will not be picked up by the following questionnaire; therefore; it is not suitable for study of the effects of music. However, it does contribute to our evaluation of the content validity of the MAARQ.

The MAARQ conforms with, but also contrasts with the above questionnaire. The MAARQ serves as a diagnostic tool that characterizes only the current affective states associated with each *dosha*. The above questionnaire is oriented to long-term traits and experiences. With the MAARQ, the subject is expected to vary in the degree a given affect

is subjectively experienced at a given moment in time. Thus, when experiencing greater balance in a *dosha,* the subject will score the bipolar adjective high (toward the positive MAARQ poles). When experiencing imbalance, the subject will score the bipolar adjective low (toward the negative MAARQ poles). Thus, the subject by scoring less than the maximum on any adjective pair, is demonstrating a disorder in the *dosha,* known as the *vikriti,* or "deviation of the *doshas* from the ideal state of balance" (Wallace, 1993, p. 78). We can judge the face validity of the MAARQ on the basis of a published checklist *(Maharishi Ayur-Ved Products International, Inc.,* 1994, p. 15) of *vrikritis* that characterize imbalanced *doshas* as follows.

TABLE 3-5
Published Characteristics of the *doshas.*

Vata	Pitta	Kapha
When in balance: vibrant clear and alert mind flexible exhilarated imaginative, sensitive talkative quick to respond	**When in balance:** warm, loving, contented enjoys challenges strong digestion lustrous complexion good concentration articulate and precise speech courageous, bold sharp wit, intellectual	**When in balance:** affectionate, compassionate forgiving emotionally steady, relaxed slow, methodical good memory good stamina natural resistance to sickness
When out of balance: restless, unsettled light interrupted sleep tendency to over-exert fatigued constipated anxious, worried underweight	**When out of balance:** demanding perfectionist tendency toward frustration, anger tendency toward skin rashes irritable and impatient prematurely gray hair, or early hair loss	**When out of balance:** complacent, dull oily skin, allergies slow digestion lethargic possessive, overattached tendency to oversleep overweight

The Vata, Pitta and Kapha Checklist taken from *The Total Health Catalog - Authentic Ayurvedic Health and Beauty Products,* Vol 3. Spring, 1995, page 15. Published by Maharishi Ayur-Ved Products International, Inc., Colorado Springs.

For the sake of rapid visual comparison, the MAARQ adjectives are listed in a similar format:

TABLE 3-6
MAARQ Adjectives and the *Doshas*

Vata	Pitta	Kapha
When in balance:	**When in balance:**	**When in balance:**
settled	cold	alert**
calm	peaceful	exhilarated**
composed	serene**	playful
tranquil	soothed	enlivened
harmonious	happy	energetic
smooth		
When out of balance:	**When out of balance:**	**When out of balance:**
restless*, unsettled	hot	dull*
nervous	annoyed	drowsy
agitated	irritated*	lethargic*
strained	upset	depressed
frazzled	angry*	heavy
rough		

List of adjectives used in the MAARQ.
*These items are matched in the 1995 document, represented above.
**These items contradict the 1995 document. See footnote 1 for discussion.

Regarding influences that may affect *dosha* balance, I include the following table from the MAPI Catalogue (p. 15). Although not mentioned, we must assume that music can have either aggravating or ameliorating effects, and thus could as well be added to the table.

TABLE 3-7
Sources of Aggravation to Dosha Balance

What aggravates Vata:	What aggravates Pitta:	What aggravates Kapha:
irregular routine	excessive heat or exposure to the sun	excessive rest and oversleeping
staying up late	alcohol, smoking	overeating
irregular meals	time pressure, deadlines	insufficient exercise
cold, dry weather	excessive activity	too little variety in life
excessive mental work	too much spicy, sour or salty food	heavy unctuous foods
too much bitter, astringent or pungent food	skipping meals	cold, wet weather
traveling		
injury		

The Vata, Pitta and Kapha Checklist taken from *The Total Health Catalog - Authentic Ayurvedic Health and Beauty Products,* Vol 3. Spring, 1995, page 15. Published by Maharishi Ayur-Ved Products International, Inc., Colorado Springs.

Wallace (1993, pp. 80-81), also discusses the properties of each *dosha* both in terms of its *prakriti* (positive), type related characteristics, and its *vrikriti* (negative), state-related imbalances. The above review of the MAARQ contents indicates close affiliation with the published descriptions of the *doshas* as in Wallace, thus establishing a reasonable degree of "content validity" with regard to the concepts being measured.

The question arises whether a subjective self-evaluation, such as the questionnaire given above, or the MAARQ, could possibly give an objective evaluation of an individual's *doshas*. Affirmative evidence comes from Glaser's (1987, cited in Glaser, 1988) study of 95 healthy male graduate students who scored themselves on 17 questions regarding subjective preferences, cognitive style, and behavior, i.e., food preferences and eating habits; patterns of memory, fear, and coping mechanisms; working and learning speed; and sleep, dream, and digestive patterns. These responses were correlated with the outcome of evaluation by an expert trained in *Maharishi Ayur-Veda* diagnosis. The expert used 23 objective physical criteria including qualities of sclerae, orbits, teeth, joints, veins, tendons, and hair; skin color, texture, and markings, body physiognomy; and qualities of the pulse. The subjective and objective scores were significantly correlated for *Vata* and *Kapha prakritis* ($r = .458$ and .304 respectively, $p < .05$), and insignificantly correlated for *Pitta prakriti* ($r = .134$). These results indicate that self-report is a viable method of determining current *dosha* balance.

The next question concerns the construct validity of the MAARQ. The following discussion relates the MAARQ to other typologies with known properties, including a measure of mood state, the Thayer Activation-Deactivation Check List.

Construct Validation

Construct validation is an analysis of the meaning of the test scores in terms of the psychological underlying concepts or constructs (Cronbach & Meehl, 1955). It evaluates

how well the proffered theoretical explanations are able to satisfactorily account for the test results. From this perspective, it could be said that the construct validity of the MAARQ depends first upon the construct validity of *Maharishi Ayur-Veda* theory. Therefore, this section of the chapter first will review the historical context surrounding the use and nature of typologies in psychology and then will discuss the MAARQ, specifically with reference to typologies that structure mood feelings in western psychology.

Western Typologies and *Maharishi Ayur-Vedic* Body Typing

Considerable precedent exists in western research which has attempted to classify humans according to "type". In particular, several of these approaches relate changes in mood to ongoing characteristics that constitute a psychophysiological type.

Current work such as the two volume collection, *The Biological Bases of Personality and Behavior* (Strelau, Farley, Gale, 1985, 1986) has brought much needed attention to the relationship between physiology and psychology, which together, is often labeled as "temperament", among other terms. A significant question, of course, has evolved in considering the number and types of temperaments, and their nature as traits and/or states. Furthermore, much has been speculated regarding the physiological origins of differences in temperament, particularly with regard to systems associated with "arousal" and/or "activation" (e.g., Pribram and McGuiness, 1975; McGuiness and Pribram, 1985).

Ayur-Veda medicine may date back to 3000 BC or more, based on reports of a flourishing "Vedic civilization" about that time (Maharishi, personal communication, 1980). Outside of that system, the other earliest reported attempt at typology was the effort of Galen (ca. 130-200 AD), personal physician to Emperor Marcus Aurelius. Galen systematized the "humors" of Hypocrates (ca. 460–ca. 370 BC) into a personality theory,

with corresponding implications for medical treatment. The combination of humors in the body were considered to be established by a certain configuration of the stars at birth.

Hippocates' humors in turn were based on Empedocles' four elements[4], as follows:

TABLE 3-8
Humors, Elements and *Doshas*

Elements	Attributes	Humors	Temperaments	Traits
Earth	Cold, dry	Black Bile	Melancholic	Sad, fearful
Air	Warm, moist	Blood	Sanguine	Cheerful
Fire	Warm, dry	Yellow bile	Choleric	Fiery, quick to anger
Water	Cold, moist	Phlegm	Phlegmatic	Slow

The impact of this initial effort was significant in several ways. First, it acknowledged the physical basis of psychological phenomenon, and second, it has reappeared in several recent reformations. Whereas "typology" as such has been rejected in modern psychology, it did not consider situational pressures, or learned associations that presumably may override any innate tendencies of an individual. It may be that these objections arise out of the assumption that behavior is solely determined by these functions.

Other recent advances, such as psychoendocrinology, have shown that behavior in many cases has a physiological, "causal" component that cannot be ignored. The authoritative *Encyclopedia of Psychology* indicates "There is unequivocal experimental, clinical, and naturalistic evidence that hormones do indeed play a vital role in determining various behavior patterns in people and animals" (Misiak, 1984, p. 94). Of interest in the

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[4] Recall mention of the *"Tanmatras"*, an aspect of Maharishi's Vedic Science from Chapter One, which appear to enjoy the same historical origin(s) as Empedocles' four elements. *Tanmatras* form the basis of the five objective elements of creation: *akasha* or vacuum, air, fire water, and earth. The *Tanmatras* take on psychological meaning by their association with perception. Maharishi Vedic Psychology indicates the *Tanmatras* constitute the essences of the objects of the five senses of perception. Thus, the *Tanmatras* match Empedocles' four elements, with the addition of *akasha*, otherwise translated as "space" or "vacuum", usually referring to the field that underlies physical reality across time and being accessible to the duly trained mind (Cf Patanjali's *Yoga Sutras*). Tracing the possible historical interactions between humoral theory and *dosha* theory would be worthy of another dissertation.

context of controlling or modifying the effects of such endogenous influences, the same article also suggests that "On the other hand, it has also been demonstrated that behavior, experience, and psychological stimuli and states exert influence on the functioning of the endocrine system and secretion of hormones" (Misiak, 1984). Recall the research cited at the beginning of this chapter in which music, combined with relaxation techniques, was shown to entrain circadian corticosteriod and temperature rhythms that were otherwise desynchronized through the irregularities of shift work by nurses (Rider, et. al. 1985).

Galen's formulation has enjoyed currency throughout history, with Kant adopting it as well, his version being doctrinal until the end of the nineteenth century. A characteristic of this early formulation of type was the mutual exclusivity of membership in a type. An individual belonged to one or another of the categories. Modern typologists, on the other hand, recognize gradations in which an individual could be placed on a continuum or characterized by a mixture of types. Wundt (1896), for example, suggested that two of the four types demonstrated high emotionality (cholerics and melancholics), while the other two showed low emotionality, thus, implying a dimension of "emotionality". Similarly, Wundt suggested another independent dimension, with cholerics and sanguines being "changeable" and melancholics and phlegmatics being "unchangeable". Eysenck (1972), in *The Encyclopedia of Psychology,* depicts Wundt's dimensional hypothesis combined with the Galen-Kant theory of the four temperaments as follows:

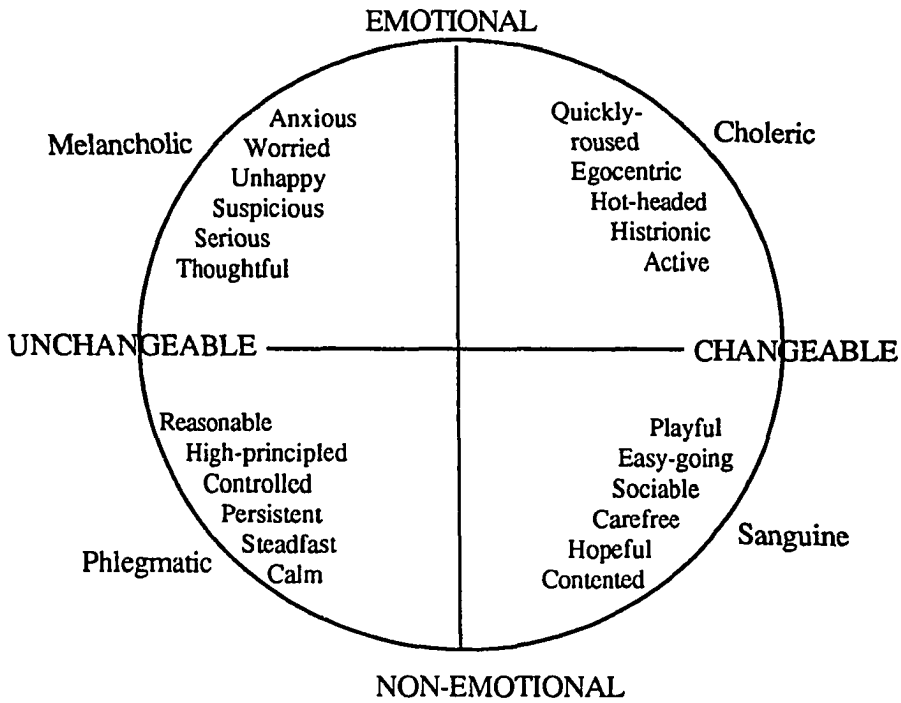

Figure 3-1. Diagram showing a "classical typology" resulting from Wundt's dimensional hypothesis combined with the Galen-Kant theory of the four temperaments. (taken from Eysenck, 1967)

More recent investigations have focused on either a clinical/intuitive/experiential approach to conceptualizing patterns of personality (e.g., "dispositional sets", among other terms) or a mathematical approach, typically using factor analysis. Kefir (1984, in the *Encyclopedia of Psychology)* suggests that a remarkable degree of uniformity appears if, when examining the work of philosophers and clinicians, one corrects for differences in language. "Despite the fact that there is not one term in common out of the 20 terms...," according to Kefir, "it seems evident that these individuals have come to mutual agreement" (p. 383) Kefir's analysis is given here, together with their possible relationship to the three *dosha* types.

TABLE 3-9
Comparison of Models of Temperament

Source	Type 1	Type 2	Type 3	Type 4
Hippocrates (Temperaments)	Sanguine (cheerful)	Choleric (fiery, quick to anger)	Melancholic (sad, fearful)	Plegmatic (slow)
Adler (Life styles)	Useful	Ruling	Avoiding	Getting
Horney (Traits)	Toward	Against	Away from	
Lewin	Democratic	Autocratic	Laissez faire	
Sheldon (Somatype temperaments)	Affection (Viscerotonic - happy, cheerful, sociable, jolly)	Assertive (Somatotonic - vigorous, athletic, energetic)	Privacy (Cerebrotonic - shy, intellectual, thinking)	
(Kefir) Consensus*	ACCORD	CONFLICT	EVASION	
*Maharishi Ayur-Veda dosha***	Balanced Vata, Pitta, Kapha	Aggravated Pitta	Aggravated Vata	Aggravated Kapha

Representation of major typologies, after Kefir (1984).
*Consensus represents the outcome of Kefir's analysis of the other systems, and purports to capture the underlying similarity among the systems. Kefir adds a fourth quality, "NEUTRAL". If the three were represented as points on a triangle, Kefir places NEUTRAL at the center.
**Assignments of the *Maharishi Ayur-Vedic dosha* typology to the types in the table is approximate, primarily driven by qualities that appear upon aggravation or imbalance of each *dosha*. One might conclude that sanguine represents the condition of balance in the *doshas* since "cheerful", and the adjectives given for Sheldon's somatypes can be ascribed to the sense of "inner bliss" mentioned above and found in Sharma (1993).

In a sense, the study of psychology could be considered the study of typologies whenever sufficient data accumulates to stimulate the researcher to create a taxonomy. Shapiro (1983) comments that there are different sorts of typologies. "Temperament" perhaps best describes the *dosha* theory, and Shapiro makes interesting distinctions for temperament[5]. He indicates that "temperament" derives from humoral theory and was

[5] Other terms enjoy currency as well, in referring to biological bases of behavior. "Constitutional type", or "somatype" was championed by William Sheldon and colleagues who classify individuals by body type (endomorphy, mesomorphy, and ectomorphy) to aid understanding of their behavioral patterns. The corresponding temperaments were defined. Extreme viscerotonia exhibits affection, sociability, love of comfort, and gluttony. Extreme somatotonia exhibits a love of risk and chance, a callous ruthlessness, and can be

picked up by Kretschmer (1925), Sheldon and Stevens (1942) in theories of inherited body form or physique. Although most psychologists emphasize the role of inheritance in determining temperament, Shapiro comments that at its least, temperament can be considered a "pattern of enduring traits characterizing an individual" (p. 410). Thus, temperament is different than personality, which is more oriented to the "why" of behavior, than the "how" of behavior. Temperament consists of "the style or manner of behavior, of the expressive rather than the instrumental" (p. 410) which lasts across the life span. Shapiro (1983) notes that some investigators have looked at how a particular temperament expresses itself at different ages. An infant who has an intensely reactive style may later use intense anger in response to criticism. Thus, focus has gone beyond strict heritability to a definition that characterizes individuals over the life span, and can include temperamental differences across a wide span of psychological systems, including perceptual, cognitive, emotional, and social.

Carl Jung (1923) substituted the term "type" for temperament, with type consisting of a combination of an attitude and a function. Subsequently, according to Shapiro, Eysenck attempted to demonstrate a physiological basis for Jungian attitudes, relating it to traits that could be measured. For example, Eysenck (1967) noted that extroverts have higher thresholds of ascending reticular activation system activity, thus exhibiting lower cortical arousal.

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associated with a lust for power. Extreme cerebrotonia exhibits inhibition, shrinking from social contact, and excessive restraint. Kefir (1984) conceives of "dispositional set" as patterns of personality traits that fit into clusters. Coan (1984) reviews numerous typologies under the heading of "personality types" suggesting that "every personality variable that has captured the interest of psychological theorists has been incorporated into a typology at some time". He suggests that typologies aim to understand people as "total entities", but grant that a given typology is an idea form, used as a point of reference for describing people "to the extent that they approximate it". Last is the debate between "type" and "trait" theories. See text below.

> This leads immediately to the deduction that EEG alpha activity will be of greater amplitude, and characteristically of lower frequency. Similarly, it can be predicted that sedation thresholds are low in extroverts, high in introverts. Both predictions have in fact received strong support. Psychological prediction derive from knowledge of behavioral consequences of high and low arousal states; conditioning is facilitated by high arousal, impaired by low arousal, and introverts do as predicted show better conditioning than do extroverts on eyeblink or GSR conditioning. Many other predictions relating to orienting responses, figural after-effects, sensory thresholds, reminiscence, blocking, vigilance, tolerance of pain and sensory deprivation, rote learning, time errors, perceptual defense, motor movements, level of aspiration, autonomic reactions, and so on have been tested in efforts to provide evidence relating to the causal hypothesis mentioned, usually with positive results (Eysenck, 1967, cited in Eysenck, 1972, p. 362).

Eysenck (1972) adds that measurement of component traits allows scientific, empirical investigation of types, which is otherwise too intuitive, impressionistic, or too all embracing a concept. Objection to the study of "traits" is given by behaviorists who hold that all "stimulus-response bonds or habits are specific, and that consequently general traits cannot exist" (p. 339)[6]. However, where there is consistency in behavior, it can be attributed to a trait, according to Eysenck. And consistency can be studied in terms of statistical correlations, whether as test-retest reliability or inter-test correlations. Furthermore, according to Eysenck's review, traits are not independent, "they tend to correlate and give rise to higher-order factors (superfactors) which resemble the types of writers like Jung and Kretschmer" (p. 344)[7]. "Typologies are created to account for the observed intercorrelations between traits" (p. 358), Eysenck writes. He suggests his own work contributes to a general typology for psychology, finding agreement with Cattel and Guilford, all presenting evidence of dimensions for extroversion-introversion and emotionality-stability, with "a good deal of agreement on psychoticism" (p. 361). An individual's placement within this minimum number of dimensions can define a "type",

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[6]See Campbell (1984) for review of the debate on the value of trait theories.
[7]Kretschmer presaged the somatypology of Sheldon.

with allowances for Eysenck's conclusion that differences are really more along a continuum rather than categorical (p. 361).

Regarding the contribution of hereditary versus environmental to individual differences in these three dimensions, study of monozygotic and dizygotic twins (identical vs. fraternal) by Eysenck and others led him to conclude that the average contribution of heredity is roughly 75%, similar to values found in the case of intelligence tests (p. 361). Thus, according to Eysenck, typology appears to be a function of both heredity (physiologically inducted traits) and environment (conditioned response habits).

The next question concerns the construct validity of the MAARQ itself as it relates to other measures of affective responses that have known properties, including a correlation study done with the Thayer Activation-Deactivation Check List.

Uncovering the Affective Dimension of *Maharishi Ayur-Vedic* Body Typing and Comparison to Thayer's Activation-Deactivation Check List (AD ACL)

As Cronbach (1984, pg. 149 ff.) has explained, construct validation requires that a theory or test make sense in a larger, common-sense context of psychological theory and experience. The theory must explain differences between high and low scores as well as possible causal influences on the scores.

The previous section briefly described the larger body of theory describing typologies and the place held by *Maharishi Ayur-Veda* among typologies. This section focuses on one aspect of the *Maharishi Ayur-Veda* typologies, the affective component, which in turn provides the basis for measuring shifts in *dosha*-related moods or affect resulting from listening to music.

Recall that the goal of *Maharishi Ayur-Veda* is "perfect health", and as indicated by Sharma (1988) above, "Such a state of perfect health produces an inner experience of exhilaration and joy, and experience which, in its fulfilled state, is referred to as bliss" (p.

301). Sharma also indicates how each *dosha* expresses a different constituent of this bliss (p. 301):

> *Vata*: exhilarating, alert, cheerful, optimistic
> *Pitta*: content, joyous, chivalrous, pleasant, clear-minded
> *Kapha*: steady, strong, forgiving, courageous, generous, affectionate, serene

Consequently, it is reasonable to evaluate an individual's phasic, or changing, approximation to bliss by having them do a self-report on the current mood. The results of the self-report, theoretically, should give an indication of the degree to which the *doshas* have attained their optimum balance, regardless of the individual's predisposition to a certain combination of *dosha* values. That is, regardless of the native *dosha* combination, an individual who attains optimum balance should feel "bliss", as evidenced by experience of its sub-components listed above. The MAARQ is a list of *dosha*-related adjectives that allows subjects to rate the degree to which they feel they are experiencing the positive pole of a bipolar Likert-type scale.

The test of the construct validity of the MAARQ was done using a factorial analysis performed on pre-music MAARQ scores from 931 subjects attending 5 Maharishi Gandharva Veda concerts (N=675) and 5 Western Baroque concerts (N=217). See Chapter Four, Table 2, for detailed descriptions. The purpose of this analysis was to determine whether the adjectives grouped with one another according to their predicted *dosha* membership. Furthermore, as a form of test-retest reliability check, the pre-music MAARQ factors were compared to the improvement score factors. Likewise, as a form of check on group differences in MAARQ "norms", factors derived from audiences attending *Maharishi Gandharva Veda* concerts were compared with those of audiences attending Western Baroque concerts away from MIU. This allowed study of differences in audience responses relative to the practice of TM, i.e. the make-up of the *Maharishi Gandharva Veda* factor analysis consisted of nearly 100% practitioners of Maharishi's Transendental

Mediation program while audiences for the Western Baroque analysis consisted of nearly 100% non-TM practitioners.

An additional test of construct validity was accomplished by comparing the *dosha* structure of the MAARQ with an empirically derived "structure of mood" questionnaire as presented by Thayer (1989). Much research has been accomplished with Thayer's "Activation-Deactivation Adjective Check List" (AD ACL), making it a near standard in its field (Cf. Purcell, 1982, and Watson and Tellegen, 1985). Thayer's research hinges on the concept of psychophysiological arousal and its manifestation in one's affective condition[8]. Thayer has found, for example, that measures of physiological arousal correlate better with the subjective self-report of mood than with one another. This improved predictability is an outcome of "controlled introspection" in which the observer is the best monitor of the integrated outcome of the various bodily functions. However, as Thayer indicates, mood and its physiological substrate interact, one does not have causal primacy over the other:

> It is not uncommon to encounter the implicit assumption that mood is nothing more than a response caused by cognitive, physiological, and/or biochemical events. In other words, subjective feelings are somehow regarded as the last processes in a chain of more important physiological changes. In my view, however, subjective feelings, thoughts, and psychophysiological and biochemical processes all interact together, and each has its own necessary function in ongoing behavior. Therefore, one process is no more influential that the others, and all are necessary for moods to occur....Furthermore, these reactions do not occur independently of ongoing life events (Thayer, 1989, p. 5).

Factors Constituting the MAARQ

We have already reviewed the results of quantitative tests for Cronbach's alpha coefficient. Results of the test confirmed that the adjectives listed for each *dosha* reflected that particular *dosha* and not another. Beyond the notion of internal consistency of the

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[8] See Mackay's (1980) excellent review on arousal dimensions, as well as Thayer's (1989) book.

items, we must examine the notion of *dosha* typology. Do the adjective pairs group into three factors, or more, or fewer? This is a question of construct validity

In a quantitative test similar to the methodology used by Thayer (1978), data from 10 concerts were subjected to factor analysis to determine the number of dimensions that constitute the MAARQ. It was predicted that the adjectives would group according to the three dimensions of *Vata, Pitta,* and *Kapha doshas*. The test used Varimax rotation as a means of obtaining orthogonal axes, following the methodology used by Watson and Tellegen (1985). These authors reanalysed 8 studies of self-reported mood (including Thayer's) and found that...

> Positive and Negative Affect consistently emerge as the first two Varimax rotated dimensions in orthogonal factor analyses or as the first two second-order factors derived form oblique solutions....Because this same two-dimensional configuration has also been consistently identified in all of the other major lines of mood research, it is now firmly established as the basic structure of English-language affect at the general factor level (p. 219)

For this test MAARQ pre-music scores[9] from the 931 subjects were tested across 10 concerts, both Western Baroque and *Maharishi Gandharva Veda* [10].The variety of concerts minimizes the chance of getting results that were unique to characteristics of a single group. A variety of affective states were provided by differences in locations (Fairfield-MIU vs. other cities and campuses), audience membership (TM vs. nonTM practitioners, students vs. employed, male vs. female), times of day (afternoon vs. evening) and differences in individuals' life experiences on the test days. If the factor structure of the adjective set followed the *dosha* patterns, it was assumed that the MAARQ indeed measures self-reported affect for each dosha, that is, the MAARQ would demonstrate content validity. It could also be assumed that the MAARQ measured self-report affect that one could interpret

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[9] The factored adjectives did not include "Cold/Hot" which had been excluded from the analysis due to wide-ranging interpretations of the word.

[10] See Chapter Four, experiments one and two for details on concerts and subjects.

from the perspective of Maharishi Ayur Veda. That is, the MAARQ also would demonstrate construct validity relative to Maharishi Ayur Veda theory.

The MAARQ was administered to concert attendees prior to any musical performance (pre-music), as well as after the musical performance (post-music). This first factor analysis used data from the "pre-music" scores, thus getting the factor structure of the adjectives as they were scored prior to any externally imposed influence.
Varimax orthogonal rotation was used, following practices indicated in Watson and Tellegen (1985). The number of factors for the test was set at three on the basis of their psychological meaningfulness compared to results of tests using more or less factors. Only coefficients .35 or greater were considered members of a given factor. See Table 3-10 for the factor loadings and percent of total variance accounted for by each factor. Look at the columns marked "All" for the factor loadings in this test and the rows marked "Pre" for pre-music loadings.

TABLE 3-10
Factor Analyses of the *Maharishi Ayur-Vedic* Affective Response Questionnaire for Three Populations

Dosha Factor:			*Vata**			*Kapha*			*Pitta*		
Group:		All	MGV	WB	All	MGV	WB	All	MGV	WB
N:		931	100	126						
V	**calm**	**Pre**	**.91**	**.87**	**.90**						
		Imp	.90	.88	.85						
V	**composed**	**Pre**	**.90**	**.89**	**.87**						
		Imp	.86	.83	.81						
V	**tranquil**	**Pre**	**.87**	**.90**	**.87**						
		Imp	.86	.84	.82						
V	**settled**	**Pre**	**.84**	**.74**	**.76**						
		Imp	.82	.73	.72						
V	**harmonious**	**Pre**	**.76**	**.78**	**.81**					**.48**	
		Imp	.67	.63	.74						
V	**smooth**	**Pre**	**.75**	**.81**	**.70**					**.43**	
		Imp	.71	.74	.53						
P	**peaceful**	**Pre**	**.75**	**.76**	**.77**				**.40**	**.45**	**.41**
		Imp	.67	.53	.80				.46	.75	
P	**soothed**	**Pre**	**.70**	**.60**	**.70**				**.40**	**.61**	**.40**
		Imp	.62	.52	.69				.50	.67	
P	**happy**	**Pre**	**.51**	**.44**	**.53**	**.48**		**.38**	**.35**	**.68**	**.41**
		Imp	.44		.54	.45		.46	.40	.70	
P	**serene**	**Pre**		**.75**	**.71**					**.50**	**.51**
		Imp		.56	.77					.72	
K	**energetic**	**Pre**				**.84**	**.66**	**.90**			
		Imp				.81	.68	.56			.50
K	**exhilarated**	**Pre**				**.82**	**.73**	**.81**			
		Imp				.81	.76	.87			
K	**playful**	**Pre**				**.80**	**.80**	**.69**			
		Imp				.76	.87	.63			
K	**enlivened**	**Pre**				**.75**	**.79**	**.73**			
		Imp				.61	.75	.49			.71
K	**alert**	**Pre**				**.70**	**.71**	**.73**			
		Imp				.70	.57	.73			
	% of total variance	**Pre**	**38.3**	**40.4**	**40.0**	**24.7**	**20.8**	**22.8**	**4.2**	**10.6**	**6.0**
		Imp	33.6	31.8	36.5	20.9	20.9	17.6	5.4	11.8	6.8

*Only coefficients of .35 or greater are included. "Pre" identifies loadings derived from the MAARQ administered prior to the audience hearing the music. "Imp" identifies loadings derived from the improvement score (post music MAARQ scores minus pre music MAARQ scores). The theoretically assigned *dosha* affiliation for each adjective is given in the leftmost column (V, P, K).

The three factors are labeled with their defining characteristics. The second factor was the most clear, with all the *Kapha* adjectives loading solely on the factor. Therefore, it is

called the *Kapha* factor. It accounted for 24.7% of the total variance. The first factor appears ambiguous. Both *Pitta* and *Vata* adjectives loaded on the first factor, accounting for 38.3% of the total variance. However, note that the *Pitta* adjectives load less (.51 - .75) than the *Vata* adjectives (.75 - .91). Also note that the *Pitta* adjectives reappear as a separate, third factor, with loadings less than found in the *Vata/Pitta* factor, but substantial nevertheless (.4 - .5). Therefore, this factor is called *Vata*. While factor 3 accounted for only 4.2% of the total variance, it is quite distinct. Within each of the three factors, the differences in loadings that define the factor are small. Therefore, the underlying *dosha* is probably best defined by use of all of the listed adjectives rather than some subset.

A special case must be made for the *Pitta* adjectives "serene" and "happy". "Serene" does not appear in any loading. Its highest loading was .25 on factor one, *Vata/Pitta*, with negligible loadings on factors 2 and 3. However, in two other tests made to check group norms "serene" reappears in factor 1 and 3 as described below. Therefore, "Serene" remains acceptable for the *Pitta* factor. "Happy" loads also on factor two, indicating it covaries with the *Kapha* adjectives, as well as *Vata* and *Pitta*. While this may appear somewhat an embarrassment to attaining the goal of "pure" factor structures, it is also a signpost that the three factors *together* point in the direction of "bliss", as defined above by Sharma (1993)—assuming that "happy" is an adequate surrogate for the affective state of "bliss".

Test-Retest Reliability

Although no formal test-retest reliability study was accomplished, the next best approach consisted of studying the factor structure imposed by the "post-music" test, and reflected in the improvement scores calculated as post-test minus pre-test. See the columns marked "All" and the rows marked "Imp" for the associated factor loadings. The pattern of

these loadings matched those of the pre-music test, thus satisfying inquiry into test-retest reliability.

While it may appear that "improvement" scores would mathematically depend somewhat on the pre-scores, it is reasonable to suggest that this dependence is no less than the dependence of post-scores by themselves on the pre-scores. More precisely, I suggest that the "improvement" factor structure should theoretically remain independent of the pre-music factor structure.

An added feature of studying improvement factors is the potential for making inferences about the effects of the music on the audience. In this case, it appears that the effects of the music are experienced in terms of *dosha*-related affective structures (factors).

Group Norms and Construct Validity.

The predicted structures were found using heterogeneous subject pools across 11 concerts. However, it was also important to determine whether the factor structure held up when examining a single group with distinct characteristics. This led to an examination of the robustness of the factor structure in the context of "group norms". That is, if the MAARQ is used on a particular group at some other time, the tester should have some idea of the "normal" affective responses and their structures to aid in interpretation of the results. Therefore, factor structures were examined for one *Maharishi Gandharva Veda* audience at MIU, where it was assumed all members practiced TM, (N=100). Another group was examined that combined all the Western Baroque concerts except in the one concert held in Fairfield. Thus, the group was assumed to consist of all non-TM practitioners (N=126). The factors structures appear on Table 3-9 under the columns MGV and WB. As above, the "test-retest" reliability of the factor structures can be examined by comparing the pre-music loadings and the improvement score loadings. In most cases, the

loadings provide a satisfying similarity between groups (MGV and WB) as well as within groups (Pre and Imp).

The *Pitta* factor loadings deserve some comment and provide an example of the value of the "group norms". Note that the improvement score loadings for Western Baroque do not show up for the *Pitta* adjectives. However, the *Kapha* score loadings show up in the *Pitta* factor. This suggests that the Western Baroque audience (non-TM practitioners) tended to score the *Kapha* -related adjectives in a way that created a third factor—probably associated with the *Pitta*-related adjectives. Meanwhile, the *Pitta* adjective improvement scores were sufficiently correlated with the *Vata* improvement as to lose or mute their independent standing. Thus, we can suggest that the non-TM audience discriminated less than the TM audiences with regard to the nuance of *Pitta* improvement as distinct from the nuance of *Vata* improvement. The *doshas* are experienced as relatively the same.

Note that it is possible that TM subjects were previously familiar with the *Maharishi Ayur-Vedic* classification system of cognitive and affective attributes associated with the three *dosha,* based on their acquaintance with the written literature. If so, then these subjects may have scored their MAARQ responses similarly across both the *Vata* and *Pitta* adjective groups, thereby creating a correlation between the corresponding factors. As a conscious effort, however, this appears far-fetched. However, another reason may account for the overlap. Maharishi (in Wallace, 1993) describe the phenomenon of *"Vata* leading *Pitta* towards greater balance." In explanation, Maharishi has said that "*Vata* is the culprit that imbalances the other two *doshas." Vata* may have indirectly affected *Pitta's* balance more than *Vata's* opposite value, *Kapha.* According to *Maharishi Ayur-Vedic* theory, the *doshas* are not totally independent from one another, but continuously interact in a dynamical manner. Thus, based on Maharishi's description of the causal relationship between *Vata* and *Pitta* balance, we can reasonably expect the adjectives to load on both factors. The two are not independent theoretically, nor as we see, empirically.

Calibration Norms Using Thayer's Activation-Deactivation Adjective Check List

Cronbach (1970) suggests that "in the future", test norms may be created by calibrating the new test against another test that is already normed. In the case of studying affect, Thayer's AD ACL comes close to being a norm for the study of mood. Its particular value is the stated goal of relating self-reported mood states to the underlying physiological mechanisms that support arousal. His theory is of sufficient value to the current research as to merit a repeat of the abstract to a major summative article "Toward a Psychological Theory of Multidimensional Activation (Arousal)" (1978):

> The traditional physiologically defined activation or arousal continuum, which ranges from intense emotion and vigorous activity on one extreme to calmness and sleep on the other, is rejected in favor of a psychological model with two activation dimensions and a single continuum of energy expenditure. One activation dimension ranges from subjectively defined feelings of energy and vigor to the opposite feelings of sleepiness and tiredness. Activation states associated with this dimension regularly vary in a circadian rhythm, and this dimension underlies gross physical activity and many aspects of cognition. The second dimension ranges from subjective tension to placidity and quietness, and it probably underlies a variety of emotions (e.g., anxiety) and stress reactions (e.g., effects of loud noise). While the two dimensions are positively correlated at moderate levels of expenditure, they are negatively correlated at high levels of expenditure; therefore, tension is lowest when energy-vigor is greatest and vice versa. Vulnerability to tension increases at late night, early morning, and at other times when effort and stress have increased tiredness and reduced vigorousness. Extremely low activation on either dimension de-energizes the whole system. Although only two dimensions are assumed, the possibility of four or more activation dimensions is discussed (p. 1).

Numerous studies have used the AD ACL to investigate the mediating effects of physiological arousal levels in relation to cognitive, stylistic, and affective behaviors (Thayer, 1967, 1970, 1978a, 1978b, 1986, 1989; Thayer and Cox, 1968; Hicks, Green, and Haleblian, 1989; Mackay, 1980; Purcell, 1982, and Watson and Tellegen, 1985). In the course of evaluating the MAARQ arrangements were made to administer both the MAARQ and the AD ACL to individuals meeting with a physician at a traditional medical clinic that also offered *Maharishi Ayur-Veda* consultation. Twenty-one subjects completed

both questionnaires. The individual averages for the respective dimensions used on each instrument were correlated using Pearson's *rho*. The correlations indicate that the average of the *Vata dosha* adjective ratings relates to General Tension (see the second dimension in the quotation above) the most out of the three *doshas* $r = -.82$, an inverse relation. However, *Pitta* is a close second, $r = -.73$. *Kapha* is much less related to General Tension, $r = -.46$. Therefore, *Vata* and *Pitta* "aggravation" can be seen to share the properties of the General Tension dimension. Thayer's General Activation dimension appears related most to *Kapha dosha* adjectives with an $r = .72$, a positive relationship. Meanwhile, it is related to *Vata* and *Pitta* adjective means with $r = .47$ and $r = .54$, respectively. (All correlations above are significant at least to $p \leq .0015$.) Note that General Tension correlated with General Activation $r = -.31$. See Table 3-11 for the questionnaire used to administer Thayer's AD ACL (modeled after Thayer, 1978a). See Table 3-12 for partition of the two bipolar dimensions into their four unipolar component factors.

TABLE 3-11
Thayer's Activation-Deactivation Adjective Check List

Patient Code No.____

Each of the words below describes feelings or mood. Please use the rating scale next to each word to describe your feelings at this moment.

Example:		
relaxed	1 2 3 4	If you circle 1 it means that you feel **definitely** relaxed at the moment.
relaxed	1 2 3 4	If you circle 2 it means that you feel **slightly** relaxed at the moment.
relaxed	1 2 3 4	If you circle 3 it means that the word **does not apply** or **you cannot decide** if you feel relaxed at the moment.
relaxed	1 2 3 4	If you circle 4 it means that you are **definitely not** relaxed at the moment.

Work rapidly, but please mark all the words. Your first reaction is best. This should only take a minute or two.

1. active	1 2 3 4
2 placid	1 2 3 4
3. sleepy	1 2 3 4
4. jittery	1 2 3 4
5. energetic	1 2 3 4
6. intense	1 2 3 4
7. calm	1 2 3 4
8. tired	1 2 3 4
9. vigorous	1 2 3 4
10. at-rest	1 2 3 4
11. drowsy	1 2 3 4
12. fearful	1 2 3 4
13. lively	1 2 3 4
14. still	1 2 3 4
15. wide-awake	1 2 3 4
16. clutched-up	1 2 3 4
17. quiet	1 2 3 4
18. full-of-pep	1 2 3 4
19. tense	1 2 3 4
20. wakeful	1 2 3 4

TABLE 3-12
Four Major Factors of the Activation-Deactivation Adjective Check List

General Activation (energetic arousal)		General Tension (tense arousal)	
General Activation	Deactivation-Sleep	High Activation	General Deactivation
full-of-pep	drowsy	tense	placid
active	sleepy	jittery	at-rest
vigorous	tired	clutched-up	calm
energetic	wide-awake	intense	still
lively	wakeful	fearful	quiet

Note: Three of these words directly map into the MAARQ. Energetic and drowsy appear in the *Kapha* group; Calm appears in the *Vata* group. To correlate results of the AD ACL with the MAARQ *dosha* averages, the average scores for Deactivation-Sleep and General Deactivation were reversed and added to their complementary factors. Thus, two bipolar scores were created out of the four factors, following Thayer's recommendation. (Thayer, 1978)

Recall the outcome of Watson and Tellegen's investigation in which they claim that positive and negative affect constitute the basic structure of English-language affect at the general factor level. It appears that the positive affect dimension is represented in *Ayur-Vedic dosha* typing by *Kapha dosha* adjectives. The negative affect dimension is represented by *Vata* and *Pitta* adjectives. Thayer's comments that positive and negative affective tone may represent these dimensions, but he would prefer to take into account the physiological mechanisms of arousal and "even on the basis of a simple analysis of apparent meaning, energetic and tense arousal would appear to be more appropriate names for these dimensions" (Thayer, 1986, p. 609). For example, Thayer notes the AD ACL terminology for energetic arousal (the first dimension given in the lengthy citation above) includes "active, peppy, drowsy, sleepy". For the tense arousal (the second dimension), the terminology includes "fearful, jittery, at rest, calm, and placid".

It is of great interest to attempt placement of the *Pitta dosha* adjectives within Thayer's scheme. Thayer addresses the apparent simplicity of his model by indicating that the two dimensions may actually represent at least four independent dimensions that combine into

two dimensions at one time and operate separately at other times. For example, Thayer writes

> For these two investigators [Watson and Tellegen], the dimensions labeled positive and negative affect are thought to be orthogonal. In comparison, I have hypothesized a relationship between energetic and tense arousal that *appears* to be orthogonal, but actually is a complex mixture of positive and negative correlations at different levels of intensity (Thayer, 1989, p. 134).

Given this, Thayer(1978b, 1989) speculates on the physiological mechanisms supporting manifestations of mood, borrowing from Routtenberg (1968). Regarding possible brain functions, he suggested that the reticular activating system should be seriously considered as the "neural underpinning" of energetic arousal. He suggests that the most obvious mediator of tense arousal would probably be the limbic system "based on the substantial amount of evidence identifying this general system with emotion and emotional expression.... Tension, anxiety, and fear—the main characteristics of tense arousal—are widely assumed to be mediated by structures in the limbic system" (p. 125). Note that Thayer leaves the door open to other possibilities such as control of the two arousal systems lying within the limbic system altogether, or being related to lateralized cerebral functions. Other candidates include neurotransmitter systems and their associated chemical systems. Mechanisms associated with skeletal-muscular systems may play a role as well in moderating the two systems. Thayer (1989) covers several models of arousal including those of Eysenck, Gray, and Mandler.

In the spirit of similar speculation, I suggest that the *Pitta dosha* adjectives in the MAARQ relate to a third "axis" of brain function: frontal control. Note that the MAARQ adjectives representing aggravated *Pitta* appear to be directed outward, goal directed, as though toward some object of attention: "annoyed, irritated, upset, and angry". This is in contrast to the adjectives for aggravated *Kapha* which appear more "inward" and non-directive: "restless, nervous, agitated, strained, frazzled, and rough". While on the one hand these adjectives share in the notion of "tense arousal", the *Pitta* adjectives definitely

add a second connotation of being other-directed. This would explain the results of the factor analysis in which the *Pitta* adjectives loaded both on the *Vata* factor and a third factor of their own. A supportive observation was given by Purcell (1982) who commented on one of four dimensions that arose out of a multi-dimensional scaling of activation and emotion states.

> This dimension would appear to differentiate between emotions which are predominantly centered on the individual such as jumpy, restless, calm, tired, alert and energetic and those which are the result of interaction with other people such as affectionate, warm-hearted, sad and regretful. The dimension can therefore be regarded as referring to feelings and emotions that are individual vs. other-directed or centered (Purcell, pp. 238-239).

The control of selective attention, including setting of goals, priorities, and control of affect, is a well-known frontal function. Recent and previous research has shown that enhanced frontal function is associated with frontal alpha EEG coherence patterns that also characterize developmental patterns associated with chronological development as well as the regular practice of Maharishi's Transcendental Meditation (see review in Sorflaten, 1994). Since the effects of *Maharishi Gandharva Veda* music have been suggested to arise from the same mechanisms as those involved in Maharishi's Transcendental Meditation practice (Maharishi, personal communication, 1991), it is reasonable to expect that the results would be similar, including enhanced frontal function[11]. Thus, improved balance in the *Pitta dosha* could represent reduced tension arousal with the added benefit of improved outward directed selective attention, i.e., reduction of other-directed anger, etc.

In any event, the correlations of the MAARQ with the dimensions of arousal given by Thayer are helpful for interpreting the nature of the effects of music. *Kapha* clearly relates to the energetic arousal system (sleep-wake), and *Vata/Pitta* clearly relate to the tension arousal system. Inferences can be made from the body of work surrounding the study of

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[11]See Chapter Five, pilot study two for investigation into EEG and *Maharishi Gandharva Veda* music which looks at this issue.

emotions and mood, and applied to findings that arise from use of the MAARQ. Thus construct validity of the MAARQ is confirmed.

Reflecting on his book on personality types, Thayer captures the profundity of the study of affect when he says:

> The position taken in this book is that moods are naturally occurring signal systems of underlying bodily processes; they are not disembodied subjective states with no biological function. In a general sense, the moods of energy and tension provide useful information about the most elemental states of being. They indicate readiness for activity, or the need for rest and recuperation; they warn of danger, or they provide indications of safety. (Thayer, 1989, p.128)

Particularly appropriate to the present dissertation, Thayer (1978) suggests that:

> many problems involving anxiety might be better understood with reference to the present model. As a case in point, occupational and other kinds of activity therapies have long been successful employed....With a thorough understanding of the parameters of this [model] it may be possible to design activity-based therapies more effectively (p. 31).

Likewise, the system of *Maharishi Ayur-Vedic* medicine not only provides a model for understanding the effects of music (via effects on the *doshas)* but also provides a model for bringing balance to the physiology through a complete system of healing. In this regard, study of *Maharishi Gandharva Veda* music will benefit from use of the *dosha*-based instrument, the MAARQ.

The next chapter presents research on *Maharishi Gandharva Veda* music using the MAARQ.

CHAPTER 4
THE EFFECTS OF A LIVE PERFORMANCE ON AN AUDIENCE (PRE-POST COMPARISON)

Purpose of the Study and Operational Definitions

The purpose of the study was to test for relationships between exposure to live performance of *Maharishi Gandharva Veda* music and changes in feelings associated with *Ayur-Vedic doshas*. To this end, a *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ) was created[1] and distributed to members of audiences attending live concert performances of *Maharishi Gandharva Veda* music[2]. Experiment 1 measured the effects of *Maharishi Gandharva Veda* music in an audience comprised of TM practitioners. Experiment 2 compared the effects of music on two types of audiences: subjects that practiced Transcendental Meditation and those that didn't. The two experiments will be discussed in sequence.

Maharishi Gandharva Veda Music

Sharma (1993) defines *Maharishi Gandharva Veda* music as the *Vedic* "traditional classical music" of India. Recall that Maharishi (1991) defined the purpose of *Maharishi Gandharva Veda* music is to "create balance in nature, eliminate stress in the atmosphere, and produce a healthy influence for the individual and peace for the world family." As noted earlier, *Maharishi Gandharva Veda* music is the classical music of the ancient *Vedic* civilization, which is recorded to have enjoyed heaven on earth. Being music that is in alliance with natural law, "it upholds the natural rhythms that prevail at different times throughout the day and night". In addition, "*Maharishi Gandharva Veda* music makes a

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[1]See Chapter 3 and below
[2]Experiment 1

precious contribution to the creation of world peace—the use of sound, melody, and rhythm to restore balance and harmony in the mind, body, behavior, and environment" (Maharishi, 1991).

Maharishi Gandharva Veda music differs from Indian classical music in several ways. According to Professor Deba Prasad Banerjee, one of India's most renowned *Gandharva Veda* bamboo flute players and a former professor of music at Rabindra Bharati University in Calcutta, even the main purpose of *Maharishi Gandharva Veda* music differs from that of Indian classical music (Banerjee, 1987, private conversation). Banerjee agrees with Danielou (1958) in suggesting that, in general, Indian classical music is for entertainment, for sensual pleasure (Cf. the concept of *desi* mentioned in Chapter One), while *Maharishi Gandharva Veda* music is for enlightenment, for creating spiritual joy or bliss (Cf. the concept of *margo* mentioned in Chapter One). Also, *Maharishi Gandharva Veda* follows a rigid set of rules while Indian classical music focuses more on improvisation (Chaudhuri, 1990).

Contrasts with Western Baroque Music

Maharishi Gandharva Veda music differs from western classical music in its use of the tonic and its resulting scale(s), in ornamentation and in rhythm (Banerjee, 1987, private conversation). These differences characterize the parameters to which subjects must accommodate when listening to *Maharishi Gandharva Veda* music.

In regard to the tonic, the tonal center of the scale, western music uses the Do, Re, Mi, Fa, Sol, La, Ti, Do eight-note even-tempered scale with fixed intervals between each note. *Maharishi Gandharva Veda* music uses a five-, six- or seven-note, unevenly-tempered scale consisting of the notes: Sa, Re, Ga, Ma, Pa, Dha, and Ni with varying intervals for each note. In addition, the ascending and descending order of notes in a scale

may vary for each melody (Chaudhuri, 1990).

The use of ornamentation differs between the two music types. *Maharishi Gandharva Veda* music makes use of 22 microtones or *shrutis* in an octave; western classical music uses only 12. Elmker (1989), Professor of Music and Co-Chairman of the Music Department at Maharishi International University, explains that these microtones are created through the process of *alamkara* (ornamentation) as the musician or singer slides from one frequency into another, thereby creating a "melting" effect in sound. In western music, the ornamentations, rather than structuring these melting frequencies, create "frozen" tones which the performer keeps separate from one another at all times.

According to Chaudhuri (1990) the *Maharishi Gandharva Veda* performer uses ornamentation to structure the different influences in the music that create melodies suitable only for a certain time of day, season, or even for a very particular effect on the environment. Thus, "time theory" is featured in *Maharishi Gandharva Veda* music as discussed earlier, whereas it is not a standard feature of western music.

Rhythm also differs between the two systems. Whereas classical western music uses rhythm in a fixed way, *Maharishi Gandharva Veda* music is far more developed and complex (Chaudhuri, 1990). Rhythmical cycles, called *talas*, involve a fixed number of beats which can then be combined to create complex musical phrases or *bols*. The first beat of the *tala*, the *sam*, is the most important beat; it serves as both the starting point and the ending point of the cycle. This creates a cyclical structure to the *tala* which is missing in the more linear form found in western music. This cyclical structure may be reminiscent of the rhythms of nature, according to Chaudhuri.

Western Baroque music was chosen as a control in studying the effects of *Maharishi Gandharva Veda* music because previous research had shown it to have healing, soothing effects on listeners (Ostrander and Schroeder, 1990). Details will be discussed below.

TABLE 4-1
Comparison of Musical Features

Maharishi Gandharva Veda	Western Baroque
Tonic and Scales	
5-, 6-, or 7-note scale	8-note scale
Varied temperament (varied intervals between notes)	Even temperament (fixed intervals)
Ascending order may not match descending order	Ascending and descending scales use the same notes (except the minor scale)
Ornamentation	
22 microtones (*shrutis*) per octave	12 tones per octave (includes sharps/flats)
"Sliding tone" ornamentation	Discrete tone ornamentation
Type of ornamentation changes the melody for a particular time of day, season, or effect on the environment (i.e., "time theory").	No "time theory"
Rhythm	
Fixed number of beats combined into complex phrases	Fixed rhythmic beat used as a fixed, linear form.
First beat is also the last beat of the preceding phrase	First beat is not related to the preceding phrase
Cyclical structure	Linear structure

Experiment 1: *Maharishi Gandharva Veda* Music, *Maharishi Ayur-Vedic Doshas* and the Concept of Psychophysiological Balance

As discussed earlier, Maharishi (in Wallace, 1993) explains that according to the knowledge found in the ancient *Vedic* texts of *Maharishi Ayur-Veda* there exist three *doshas* in the body of every individual which constitute one's basic body type. These *doshas* represent the fundamental metabolic and psychophysiological principles underlying the functioning of the body, respectively: movement, metabolism, and structure. In *Ayur-*

Vedic terms, these three fundamental principles are known as *Vata, Pitta* and *Kapha. Maharishi Ayur-Veda* describes *Vata* as being quick, cold and dry by nature; it governs motion, breathing, circulation, elimination and the flow of nerve impulses to and from the brain. *Pitta* is described as being hot and precise by nature; it governs digestion and metabolism and the processing of food, air and water throughout the body. *Kapha* is described as solid and steady by nature; it governs structure and fluid balance and forms muscle, fat, bone and sinew (in Wallace, 1993, pp. 80–81). According to *Maharishi Ayur-Veda*, each person has a different proportion of these *doshas* at birth. Although all three *doshas* are present in everyone, most people have primarily a combination of two of the three, with one *dosha* predominating. Diet, weather, and age may all influence the *doshas* in addition to other lifestyle factors. When the *doshas* remain in their ideal proportion, an individual remains healthy. When the *doshas* become imbalanced, out of proportion, disease can occur.

The goal of *Maharishi Ayur-Veda* is to recreate balance in *Vata, Pitta*, and *Kapha*. "When the *doshas* are balanced, the inner intelligence of the body is reflected more completely at all levels of physiological functioning" (Maharishi in Wallace, 1993).

Maharishi Gandharva Veda music is one of the twenty[3] approaches of *Maharishi Ayur-Veda* used for restoring balance to the *doshas*. According to Wallace (1993), a notable authority on *Maharishi Ayur-Veda*, the goal of *Maharishi Gandharva Veda* is to help attune the body to the underlying harmony and orderliness of nature and thereby re-establish physiological balance.

> The whole purpose of *Maharishi Gandharva Veda* therapy is to create happiness and bliss, to nourish the senses, and to clear away imbalances. *Maharishi Gandharva Veda* therapy also attunes us to the natural rhythms and cycles of nature. It divides the day into eight important three-hour time periods and prescribes specific types of

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[3]The number of approaches of *Maharishi Ayur-Veda* may increase as time allows further investigation into *Vedic* knowledge.

> music to attune us to the laws of nature in each of these periods. These periods are known to be governed by the different *doshas;* listening to the appropriate *Maharishi Gandharva Veda* music at each time is meant to bring balance to the *doshas* in the physiology (Wallace, 1993, p. 103).

As discussed earlier, different affect or subjective feelings may be associated with the three *doshas* . In 1990 with the expert help of Dr. Stuart Rothenberg, M.D., Co-Director of *Maharishi Ayur-Veda* International and Dean of the College of *Maharishi Ayur-Veda* at MIU, a list of feelings associated with each *dosha* was created. Based on this list, a set of bipolar adjectives was made which reflected the most balanced or unbalanced state associated with each feeling. This new set of bipolar adjectives was then placed on a Likert-type scale for rating purposes. This bipolar adjective rating scale became the *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ). For more information on the questionnaire please refer to Chapter 3, as well as the methods section of the current chapter.

Hypotheses

The three hypotheses of experiment 1 address questions surrounding the immediate effects of *Maharishi Gandharva Veda* music.

Hypothesis 1a

Maharishi Gandharva Veda music is expected to increase balance in the three *doshas, Vata (V), Pitta (P),* and *Kapha (K),* as indicated by more positive post-scores compared to on the *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ), i.e., *Maharishi Gandharva Veda* post V, P, K > *Maharishi Gandharva Veda* pre V, P, K. In subsequent hypotheses, the change will be called "improvement" (post-score minus pre-scores).

Hypothesis 1b

Previous research (Hart and Cogan, 1973) has indicated gender differences in music response, with greater responses to music by females (Beardslee and Fogelson, 1958). Hence, it is predicted that *Maharishi Gandharva Veda* music will produce significantly greater pre-post differences for females compared with males; i.e., pre-post improvement for female V, P, K > pre-post improvement for male V, P, K.

Hypothesis 1c

Recall Wallace's explanation that the eight three-hour periods of the day are governed by different *doshas*. According to this theory, *Vata dosha* dominates between 2 p.m. and 6 p.m. while *Kapha dosha* is prevalent from 7 to 10 in the evening. If *Maharishi Gandharva Veda* music is indeed precisely designed to have a positive effect on *dosha* balance (Sharma, 1993), it is hypothesized that *Maharishi Gandharva Veda* music heard in the afternoon will have a more balancing effect on *Vata dosha*, while *Maharishi Gandharva Veda* music heard during the evening hours will be more balancing for *Kapha dosha*; i.e., Pre-post improvement (afternoon) V > pre-post improvement (evening) V; pre-post improvement (evening) K > pre-post improvement (afternoon) K.

Method

Subjects

The MAARQ was distributed at five *Maharishi Gandharva Veda* concerts. See Table 4-2 for details. 398 subjects attended one afternoon concert while 211 attended the four evening concerts. Total subjects with usable data numbered 609; 314 males, 295 females. One afternoon and three evening concerts took place at Maharishi International University (MIU) in Fairfield, Iowa; the other evening concert took place in Cleveland, Ohio. There

was no significant difference in age between male and female subjects, mean ages 40.8 and 40.7 years respectively. Ninety-eight percent of the subjects indicated they practiced the TM technique.

TABLE 4-2
Experiment 1: Concerts and Subjects Participating

Performance			Number of Surveys		
Date	Time	Location	Distributed	Collected	Percent Collected
6 Jul 1990	Night	MIU	300	85	28
13 Jul 1990	Night	MIU	150	32	21
3 Aug 1990	Night	Ohio	200	40	20
14 Sep 1990	Night	MIU	200	85	40
19 Oct 1990	Afternoon	MIU	450	409	90[4]
All concerts			1300	651	50.1

*Analysis used 609 subjects for whom there was no missing data

Test Materials

Maharishi Ayur-Veda Affective Response Questionnaire (MAARQ).

For the survey a *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ) was created to measure changes in feelings associated with the three *Ayur-Vedic doshas.* Recall that in consultation with Dr. Stuart Rothenberg[5] a bipolar adjective rating scale was created that described both balanced, positive feelings, and their imbalanced opposite, negative feelings, associated with each *dosha.* The list was a Likert scale ranging from -3 to +3 with positive scores indicating greater balance in the *dosha.* The total number of bipolar pairs was 16. In addition, another bipolar group of adjectives were added to the list of 16,

[4]The dramatically greater rate of return of the questionnaire for the afternoon subjects has no ready explanation. Speculation suggests that in the afternoon, audience members were less fatiqued and therefore more cooperative. There were no procedural differences.

[5]Director of *Maharishi Ayur-Veda* International and Dean of the College of *Maharishi Ayur-Veda* at MIU.

resulting in a total of 20 bipolar paired adjectives. The latter group describes the *rasas* or sentiments expressed both in the composition and performance of traditional classical Indian music and theoretically experienced both by the performer and the audience. See Chapter Three for a copy of the questionnaire.

For *Vata dosha*, the six paired adjectives were: settled/restless, calm/nervous, composed/agitated, tranquil/strained, harmonious/frazzled, and smooth/rough. The five paired adjectives for *Pitta dosha* were: cold/hot, peaceful/annoyed, serene/irritated, soothed/upset, and happy/angry. The five paired adjectives used to describe feelings associated with *Kapha dosha* were: alert/dull, exhilarated/drowsy, playful/lethargic, enlivened/depressed, and energetic/heavy. The adjectives for the *rasas* included: romantic/intellectual, heroic/cowardly, compassionate/uncaring, happy/angry, and tranquil/strained. Initial analysis and subject interviews revealed ambiguities in the questionnaire. Of the 20 pairs, two were found confusing by the subjects and consequently dropped from the final analysis (cold/hot for *Pitta dosha* and romantic/intellectual for *rasas*). For this study, analysis was not done on adjectives depicting the *rasas*.

The first page of the MAARQ contained a brief description of the study and a request for consent to participate. The same page requested brief biographical data. The second page presented the bipolar adjective list for the pre-music condition. Each item allowed one of seven choices: -3, -2, -1, 0, +1, +2, +3, with positive values indicating greater balance. The third and subsequent pages presented the same list for the post-music condition(s). As *Maharishi Gandharva Veda* concerts can be quite lengthy, consisting of two or three *ragas*, or compositions, each lasting 45 minutes or longer, the post-music pages were titled selection one, selection two and selection three. For analysis, only selection one was used since data on other selections was sporadically completed by the subjects. As Western Baroque selections are generally shorter in length, selection one was defined as the first half of the performance or 45 minutes in length, whichever came first.

Stimulus Materials: The Concerts

A key proposition regarding *Maharishi Gandharva Veda* is that music structured or styled for a particular time of day will have the most therapeutic or balancing effect on an individual (Wallace, 1993). If music is not correctly played for the given time of day, the individual will feel uncomfortable, out of balance, or irritated. The expertise of the performers insured that this guideline was followed.

Some of the performances were vocal and some were instrumental. Theory indicates that the same therapeutic effects can be expected from either type of performance. Therefore, both vocal and instrumental presentations were analyzed together. Given that subjects elected to pay and attend the concert, it was assumed that the type of music presented was a preferred music type. No differential bias for or against one performance or another is expected. This should account for any differences in subject responses that would otherwise arise from differences in music style or presentation. The availability of expert performers guaranteed the authenticity of playing style and interpretation of the *ragas*.

One or the other of two individuals was a principle performer in each of the *Maharishi Gandharva Veda* concerts: Professor Debu Chaudhuri and Professor Deepak Chatterjee. Internationally renowned master sitarist Devabratta Chaudhuri, more popularly known as Debu, has been honored by Maharishi Mahesh Yogi with the title of *Sangeet Chudamani*—one who has reached perfection in music. Debu was trained from an early age at the *Senia Gharana*, one of India's most prestigious and traditional music schools. He received the prestigious *Padma Vibhushan* Award of India. Professor Chaudhuri is also Dean of the Faculty of Music and Fine Arts and Head of the Department of Music at Delhi University, India. He is the leading exponent of *Maharishi Gandharva Veda* music and has traveled extensively throughout the world giving concerts for the previous 20 years.

Professor Deepak Chatterjee is a renowned Indian vocalist and teacher of Indian

music at Allahabad University. Professor Chatterjee was on leave teaching voice at MIU for one year.

Please see Table 4-3 for a complete list of performers and melodies used for the study.

TABLE 4-3
Experiment 1: List of Performers and *Ragas* for *Maharishi Gandharva Veda* Concerts

Date	Time	Performer	Raga	Identifying Characteristics
6 Jul 1990	Night	Chaudhuri	*Jhinjhoti*	Consists of all natural notes, without Ni komal *Arohi*: Sa, Re, Ma, Pa, Dha, Sa *Abrohi*: all notes
13 Jul 1990	Night	Chaudhuri	*Bageshree*	Ga and Ni flattened, remaining notes are *suddha*, no Pa
3 Aug 1990	Night	Chatterjee	*Bihag*	Uses 7 beats, *vepak tal* *Arohi*: 5 up *Abrohi*: 7 down
14 Sep 1990	Night	Chatterjee	*Puriya Kaliyan*	Two ragas mixed together: lower octave=*puriya*, upper octave=*kaliyan*, Re flat, Ma sharp for both. *Arohi:* 5 up *Abrohi*: 7 down
19 Oct 1990	Afternoon	Chaudhuri	*Sudha Sarang*, or *Shudsinai*	Ma both sharp and flat, rest on *suddha*, no Ga. Third note silent in scale.

Procedure

As the subject entered the concert hall, he/she was handed a questionnaire and a pencil which the subject then took to his/her seat. Instructions for completing the forms were provided on the first page of the MAARQ. A few minutes before the performance

commenced, a moderator or concert host announced that those participating in the survey should finish completing the first two pages (the brief biographical data sheet and pre-music MAARQ). Questions regarding correct completion of the forms were answered at this time.

Subjects were then instructed to put pencils down and not complete the rest of the questionnaire until told to do so.

After the performance of selection one of *Maharishi Gandharva Veda*, the performer or host asked the subjects to complete the rest of the questionnaire. Questionnaires and pencils were then put down. In order to not disturb the concert ambiance, questionnaires were collected at the end of the concert by two survey administrators who stood at the exits with boxes into which participants deposited their forms. In addition, a box was left in the back of the hall in full view, without an administrator holding it, from the end of selection one for those who either left the performance early or preferred turning in the questionnaire after the performance.

Statistical Analysis

For experiment 1 (dealing with *Maharishi Gandharva Veda* music), the dependent variables were MAARQ improvement scores for each of the three *dosha* types: *Vata*, *Pitta*, and *Kapha*. The independent variables, or grouping factors, are gender and time of performance (afternoon and evening). This design suggests using a classical multivariate ANOVA, using the general linear model as implemented in SYSTAT, Version 5.2, (Wilkinson, 1992), with the three *doshas* as the independent variables. Upon overall evaluation with the multivariate test to control for inflation of type I error, univariate tests were used in follow-up evaluations of the individual *dosha* variables where appropriate.

It is important to note that multivariate and univariate tests are robust to violations of

the assumption of normality. The Lilliefors test (Wilkinson, 1992, p. 464) for normality of the distributions fails for each dependent variable. See Appendix 4-H for descriptive statistics and results of the Lilliefors tests on the pre music, post music, and improvement scores. While the pre-music scores are roughly normal in distribution, the post-music scores are skewed. Visual inspection of the normal probability plots indicate that scores drop off rapidly at the high side of the curve; a "ceiling" effect occurs with many scores at "3" for the post-music MAARQ. This suggests use of non-parametric tests. However, a non-parametric test such as Wilcoxon's test for two matched samples only tests for statistical independence of two populations, with no conclusion regarding the difference in the means being possible (Hayes, 1973, p. 782). Nevertheless, as a backup to the various tests, Wilcoxon's test was also applied. There were no discrepancies between the parametric and non-parametric tests. Therefore, the non-parametric results will not be reported.

The multivariate/univariate statistics are useful in this current research in order to test for differences in the means between the various groups given in the hypotheses, with the general linear model constructing least-squares estimates of the means when several effects are tested at once.

The tests use Type III sums of squares as discussed in Wilkinson, 1992, p. 144. Type III sums of squares for a given effect or interaction represent the difference between the sums of squares for the full model and the model without the effect or interaction. This allows the effect or interaction to be interpreted as the outcome of analysis where the other effects are partialled out, or held constant. In both experiments, the model includes tests for all the main effects as well as interactions (the full factorial model). This will be useful when generalizing the results to other populations with different ratios of male vs. female, TM vs. non-TM participants, or subjects attending afternoon vs. evening concerts. The complete computer output for the tests is presented in Appendices 4-B through 4-I. Only

the pertinent test results are given in this chapter.

For all tests, the α significance level is set at .05 for type I error.

Results and Discussion

A multivariate analysis was done on the data for 609 subjects consisting of 314 males and 295 females who attended *Maharishi Gandharva Veda* concerts. As noted earlier, out of the 609 subjects, 398 subjects attended afternoon concerts and 211 attended the evening concerts.

The univariate and multivariate analyses used type of music, time of day, and gender as independent variables and MAARQ improvement scores for each *dosha* as the dependent variables[6]. The computer output for the tests appears in the Appendices B and C. The results of the tests follow.

Hypothesis 1a: *Maharishi Gandharva Veda* Post V, P, K > *Maharishi Gandharva Veda* Pre V, P, K

Maharishi Gandharva Veda music is expected to increase balance in the three *doshas (Vata, Pitta,* and *Kapha)* as indicated by more positive post scores compared to pre scores on the *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ). The test result for the within-subject effect "improvement score" (post minus pre) was highly significant,

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[6]The question may arise whether it is better to use analysis of covariance for the tests, covarying for scores on the pretest. ANCOVA is not advised for the current study. Preliminary evaluation indicated that the data failed to support the assumption of homogeneity of slopes. There was a significant *Vata* pre X gender interaction ($F(1,601) = 4.42$, $p = .04$) and a *Pitta* pre X gender X time significant interaction ($F(1,601) = 7.30$, $p = .007$). In addition, there was a significant interaction of *Kapha* pre X time $F(1, 601) = 4.21$, $p = .04$, as well as a significant *Kapha* pre X time X gender interaction, $F(1,601) = 4.28$, $p = .04$.

Furthermore, where all subjects are considered together, the question of using ANCOVA to equate groups does not arise. Next, in the case of gender comparisons, ANCOVA is not appropriate since it is a fixed factor that is not possible to randomize (Maxwell and Delaney, 19xx).

$p < .0001$, Wilkes' Lambda = . 7349, F (3,182) = 21.8839 using a multivariate test with all three *doshas* together. Univariate repeated measures tests for each *dosha* individually showed similar significant differences for each *dosha: Vata,* F(1, 184) = 56.0823, $p <$ .0001; *Pitta,* F(1,184) = 59.8162, $p < .0001$; *Kapha,* F(1,184) = 9.4941 $p = .0024$. See Table 4-4 for means and standard deviations for the *Maharishi Gandharva Veda* pre and post music evaluations of each *dosha.* Note that the mean post score is highest for *Vata,* lowest for *Kapha,* with the mean *Pitta* score falling between them. See Appendix 4-B for the test of the full factorial model. The results apply to hypothesis 1a, 1b, and 1c.

TABLE 4-4
Maharishi Gandharva Veda Means and Standard Deviations for *Dosha* Scores

Dosha	Pretest Mean (SD)	Posttest Mean (SD)	Improvement	*p*
Vata	1.41 (1.07)	2.07 (.93)	.66 (1.18)	<.0001
Pitta	1.34 (1.05)	2.03 (.92)	.69 (1.09)	<.0001
Kapha	0.76 (1.08)	1.46 (1.18)	.70 (1.29)	.0024

Interestingly, it appears that live *Maharishi Gandharva Veda* concerts balance all the *doshas.* The mean change scores show that *Vata* increased .46, *Pitta* increased .69, and *Kapha* increased .70 (see Table 4-4). The effect size is .62, .66, and .65 standard deviations for *Vata, Pitta,* and *Kapha* respectively. This means that after listening to the *Maharishi Gandharva Veda* music, the top 50% of the audience subsequently felt as balanced in each *dosha* as the top 26–27% of the audience felt prior to listening to the music[7]. Note that many or all the subjects could have experienced some improvement. The high significance levels imply consistency across subjects. See Figure 4-1.

[7]This estimate assumes a normal distribution.

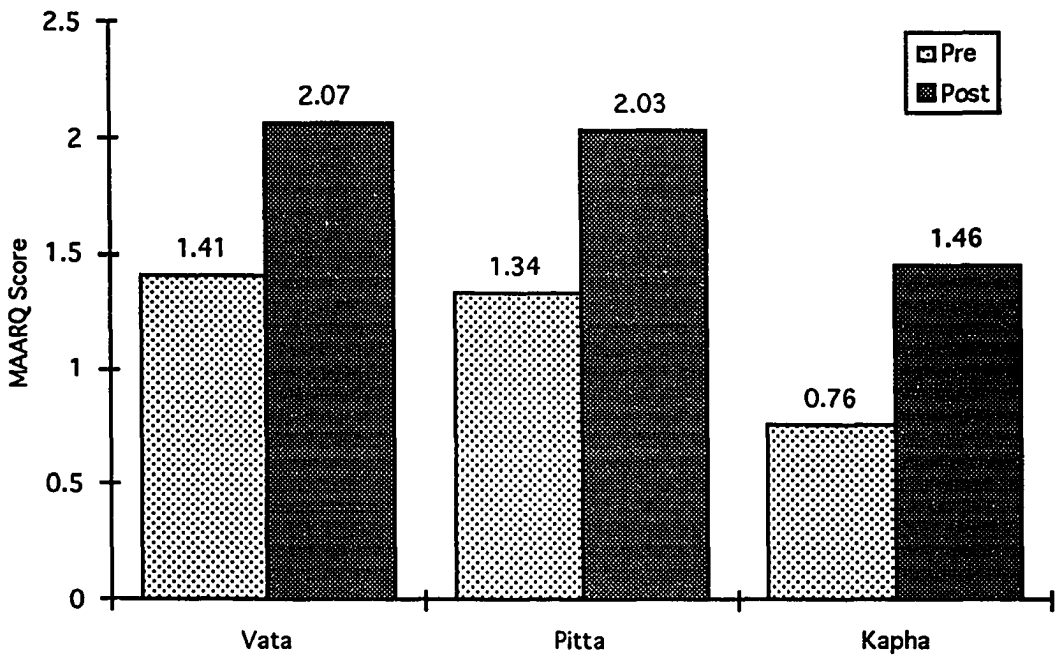

Figure 4-1. Comparison of pre and post MAARQ scores (post-pre) during live *Maharishi Gandharva Veda* music concerts (N=609).

Note: collectively and individually, the post scores are significantly greater than the associated pre score, $p < .0001$ and $p < .01$ respectively. The effect size is .62, .66, and .65 standard deviations for *Vata*, *Pitta*, and *Kapha* respectively. This means that after listening to the *Maharishi Gandharva Veda* music, the top 50% of the audience subsequently felt as balanced in each *dosha* as the top 26–27% of the audience felt prior to listening to the music. (This estimate assumes a normal distribution.) Note that many or all the subjects could have experienced some improvement.

Of the three *doshas*, *Vata* demonstrated the highest post score, indicating it was most in balance at the conclusion of the music. Note that Maharishi has suggested that *Maharishi Gandharva Veda* music affects primarily *Vata dosha*, which in turn automatically brings *Pitta* and *Kapha doshas* into balance[8]. Therefore, according to Maharishi's theory, even though in this experiment *Vata* did not increase as much as the other *doshas*, it could be suggested that the high post score for *Vata* balance was sufficient enough to catalyze the

[8]See Chapter One for discussion.

improvements in *Pitta* and *Kapha dosha*. Investigation of exact causal mechanisms remain for future research.

Relative to the Thayer dimensions of activation-deactivation[9], the greater rating of *Vata* compared to *Kapha* and *Pitta doshas* indicates that reduction in "tension"[10] is subjectively greater than reduction in "sleepiness" (a *Kapha*-related mood factor). This suggests an insight into the meaning of "*Vata* leading" the other *doshas*. That is, reduction in "tension" is prerequisite to improvements in other mood areas including reduction in sleepiness[11]. The relationship of *Pitta* tendencies to the Thayer scales is less clear, therefore generalizations will not be made here.

Hypothesis 1b: Pre-post Improvement (Female) V, P, K > Pre-post Improvement (Male) V, P, K.

Based on the literature regarding the gender effects of music (e.g., Beardlee and Fogelson, 1958), it is predicted that *Maharishi Gandharva Veda* music will produce significantly greater balance for females more than males. The test result for the within-subject interaction improvement X gender was significant, $p = .0185$, Wilks' Lambda = .9836, $F(1,603) = 3.3595$ using a multivariate test.

To determine which *doshas* were changed pretest to posttest, the MAARQ improvement scores were examined for each *dosha* individually. These tests indicated a significant improvement X gender interaction for *Vata dosha*, $F(1,605) = 7.9445$, $p = .0050$ and for *Pitta dosha*, $F(1,605)=8.6362$, $p = .0034$. *Kapha dosha* failed to demonstrate an interaction, indicating that males and females experienced roughly the same improvement effect. The MAARQ average for *Vata* adjectives improved .85 for females

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[9]See Chapter Three.

[10]A mood factor identified by Thayer that is highly correlated with *Vata dosha*

[11]E.g., one cannot get sleep related rest if one is disturbed by tension related thoughts.

whereas it improved .58 for males. The MAARQ average for *Pitta* adjectives improved .87 for females whereas it improved .60 for males. The MAARQ average for *Kapha* adjectives improved .76 for females and .73 for males, not significantly different. See Table 4-5 for means. These results suggest that compared with males, females are apt to experience a greater range of therapeutic effect of *Maharishi Gandharva Veda* music, with particular regard to the *Vata* and *Pitta doshas*. An alternative explanation may be differences in response style in self-reporting of feeling. This could be another area for future research.

TABLE 4-5
Means and Adjusted SE for Female and Male MAARQ Scores

		Pre	Post	Improvement
	Dosha	Mean SE	Mean SE	Mean SE
Female				
	Vata	1.29 (.0622)	2.14 (.0555)	.85 (.0689)*
	Pitta	1.25 (.0617)	2.12 (.0548)	.87 (.0641)**
	Kapha	.73 (.0645)	1.50 (.0703)	.76 (.0768)
Male				
	Vata	1.38 (.0638)	1.94 (.0569)	.58 (.0707)
	Pitta	1.30 (.0633)	1.91 (.0562)	.60 (.0657)
	Kapha	.73 (.0662)	1.46 (.0721)	.73 (.0788)

*Significantly greater than male counterpart $p = .0050$
**Significantly greater than male counterpart $p = .0034$

Similar to other research into the effects of music, the current study found significant differences between male and female groups. The differences were associated with *Pitta* and *Vata doshas* in which females experienced a greater range of improvement than males. These results may reflect the generally accepted greater affective sensitivity to music associated with female groups compared to male groups (Beardslee and Fogelson, 1958). Future research could also investigate the degree to which *Vata* and *Pitta* may reflect more gender related aspects of temperament than *Kapha dosha*.

Last, while Thayer's research does not indicate gender differences in the intensity of

activation-deactivation, the current findings can be interpreted to suggest that females experience greater reduction of "tension" (reduced *Vata* aggravation) than males when listening to *Maharishi Gandharva Veda* music. The relationship of *Pitta* tendencies to the Thayer scales is less clear, therefore generalizations will not be made here.

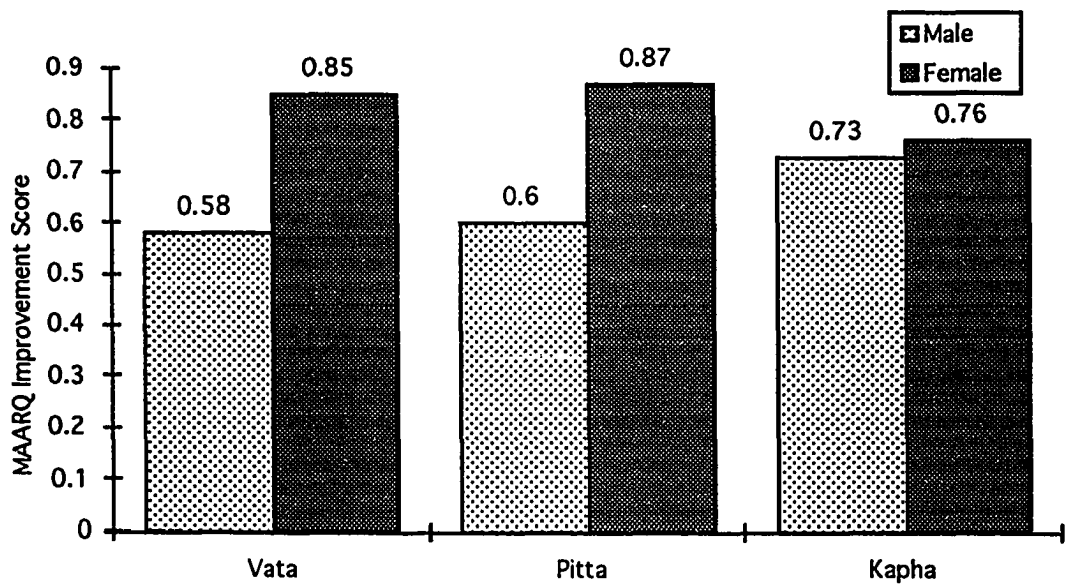

Figure 4-2. Comparison of male and female MAARQ improvement scores (post minus pre) during live *Maharishi Gandharva Veda* music concerts (N=609).

Note: Improvement in female MAARQ scores is significantly greater than improvement in male scores for *Vata*, $p = .0050$, and *Pitta*, $p = .0034$.

Hypothesis 1c: Pre-post Improvement (Afternoon) V > Pre-post Improvement (Evening) V; Pre-post Improvement (Evening) K > Pre-post Improvement (Afternoon) K

The hypothesis predicts that *Maharishi Gandharva Veda* music heard in the afternoon will have a more balancing effect on *Vata dosha* than the other *doshas*, while *Maharishi Gandharva Veda* music heard during the evening hours will be more balancing for *Kapha dosha*. Inspection of the mean improvement scores shown in Table 4-6, indicates that the hypothesis was not supported. In the afternoon, *Vata* improvement was not greater than

Pitta or *Kapha*[12] In the evening, *Kapha* improvement was not greater than *Vata* or *Pitta*[13].

Follow-up tests were conducted to compare afternoon and evening improvement scores. The test result for the between subject effect of time on improvement scores was significant, $p = .0008$, Wilks' Lambda = .9727, F(3,603) = 5.6416 using a multivariate test. Tests of the individual *doshas* also indicated significant effects of time: *Vata* F(1,605) = 20.4572, $p = .0001$, *Pitta* F(1,605) = 13.3943, $p = .0007$, *Kapha* F(1,605) =8.0247, $p = .0281$. See Figure 4-3. All *doshas* demonstrated greater improvement during the evening concerts.

Note that the issue of gender differences in response to *Maharishi Gandharva Veda* music reappears in an almost statistically significant interaction associated with time of performance: improvement X time X gender (Wilks' Lambda = .9887, F (3, 603) = 2.2986, $p = .0764$). However, the nature of the Type III tests used here controls for such interaction allowing the main effects to be studied. For this reason, the tests with time as a variable for hypothesis 1c can be interpreted without recourse to separate tests for each gender. That is, the current result can be compared with future research using any other ratios of male to female assuming Type III tests are used in such future cases.

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[12] *Vata* showed the least improvement of the three.
[13] *Kapha* showed the least improvement of the three.

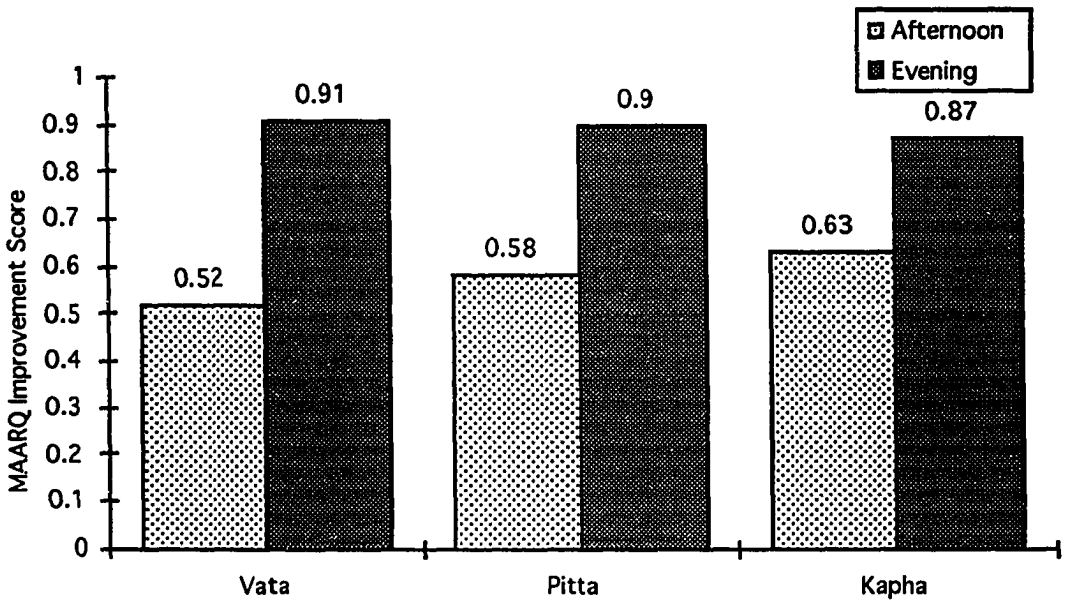

Figure 4-3. Comparison of afternoon and evening MAARQ improvement scores (post minus pre) during live *Maharishi Gandharva Veda* music concerts (N=609).

Note: Effect of time of day on improvement score is statistically significant, multivariate $p = .0008$; *Vata* $p = .0001$, *Pitta*, $p = .0007$, *Kapha*, $p = .0281$. However, contrary to the *Maharishi Ayur-Veda* time of day prediction, improvements in *Vata* and *Kapha* MAARQ scores were not greater in the afternoon and evening, respectively.

TABLE 4-6
Means and Adjusted SE for Afternoon and Evening Performances

	Dosha	Pre Mean SE	Post Mean SE	Improvement Mean SE
Afternoon	N=398			
	Vata	1.59 (.0524)*	2.11 (.0468)	.52 (.0581)
	Pitta	1.47 (.0520)*	2.05 (.0462)	.58 (.0540)
	Kapha	0.80 (.0544)	1.43 (.0593)	.63 (.0648)
Evening	N=211			
	Vata	1.08 (.0720)	1.98 (.0643)	.91 (.0789)*
	Pitta	1.08 (.0714)	1.98 (.0634)	.90 (.0742)**
	Kapha	0.66 (.0747)	1.54 (.0814)	.87 (.0890)***

*Significantly greater than time of day counterpart $p = .0001$
**Significantly greater than afternoon counterpart $p = .0007$
***Significantly greater than afternoon counterpart $p = .0281$

See Table 4-6 for means, standard deviations, and difference scores for the pre and post MAARQ averages of each *dosha*, listed by time of performance.

Although the tests indicated a significant difference in the degree of *dosha* improvement scores between afternoon and evening performances, no particular *dosha* experienced statistically greater effect than the others. However, inspection of the mean *dosha* improvement averages in Table 4-6 indicates that subjects may have experienced greater improvement in balance in the evening. Review of the means indicates that the greater increase in balance is due to lower *pre-music* means for the evening performances compared with the afternoon performances, multivariate Wilks' Lambda = .9478, F(3,603) = 11.0592, ($p < .0001$)[14]. The lower pretest scores are to be expected in light of expected greater fatigue at the end of the workday.[15] Individually examined, *Kapha* scores were not significantly less in the evening ($p = .1441$). However, both *Vata* and *Pitta* were less at $p < .0001$, *Vata* F(1,605) = 32.4239, *Pitta* F(1,605) = 19.2908. See Figure 4-4.

The posttest scores are roughly equivalent when visually comparing the afternoon means for each *dosha* with its respective evening means. Interestingly, these results suggest that *Maharishi Gandharva Veda* music restores *dosha* balance to an "absolute" level rather than a "relative" level. That is, the balancing effects of *Maharishi Gandharva Veda* music contribute to restoration of the *doshas* to a base line of functional effectiveness rather than merely improving them by a given amount.

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[14]See Appendix 4-C for tests of the full model.

[15]Note that the audience attending the afternoon concert was drawn from attendees to an MIU World Peace Assembly, during which it is expected that attendees will take advantage of opportunities for additional deep rest. This may be a confound when comparing afternoon and evening improvement scores.

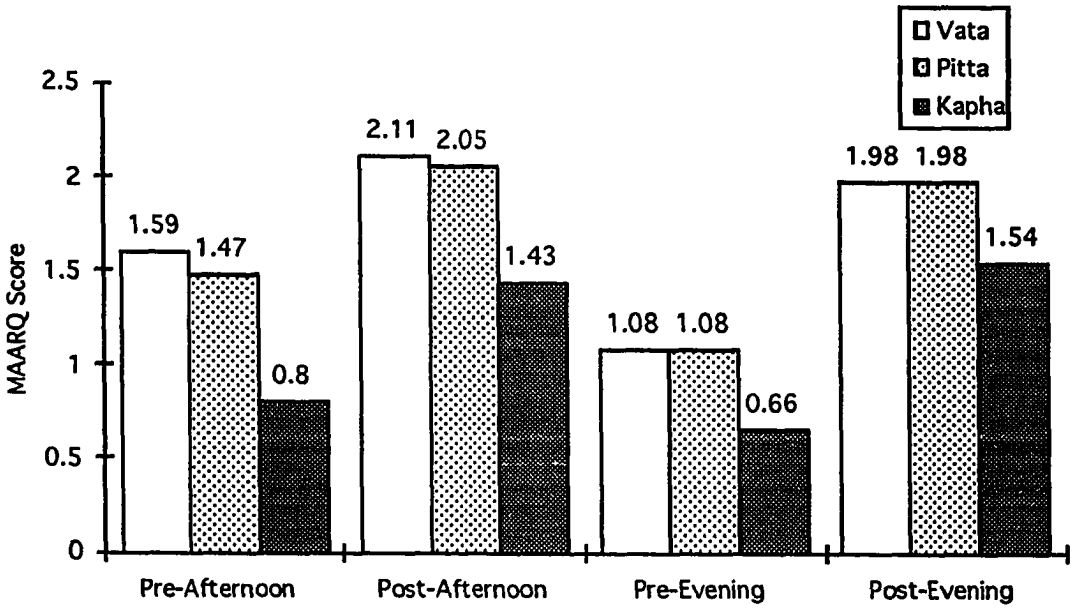

Figure 4-4. Comparison of afternoon and evening MAARQ scores during live *Maharishi Gandharva Veda* music concerts (N=609).

Note: Subjects experienced lower pre-test MAARQ means in the evening, compared to afternoon, probably due to workday fatigue, multivariate $p < .0001$, *Vata*, $p < .0001$, *Pitta* $p < .0001$. Post-music MAARQ scores in the evening are nominally equivalent to post scores in the afternoon. This may indicate that *Maharishi Gandharva Veda* music contributes to restoration of the *doshas* to a base line of functional effectiveness rather than improving them a given amount.

Re-balancing the *doshas* may then represent restoration of the nervous system to that greater level of subjective self-efficacy. This phenomenon gives substance to the notion of "expansion of full potential", in that higher levels of consciousness may reflect the "resetting" of the nervous system to function at higher absolute levels of self-efficacy (Sorflaten, 1994, p.186).

It should be noted, however, that the mean post-test scores for both afternoon and evening were approximately "2" on a scale of -3 to +3. According to *Maharishi Ayur-Vedic* theory, perfect balance would correspond to "+3", e.g., most "settled", most "happy". Thus, over all subjects on average, the one session of *Maharishi Ayur-Vedic* music did not produce *perfect* balance. Thus, although there was significant and meaningful improvement

in balanced affect, there was still room for additional "resetting" of the nervous system.

Experiment 2: Investigation of Possible Confounds

The second experiment examines issues associated with possible confounds that could influence the interpretation of tests for the first three hypotheses. The first part of the second experiment examines the effects of the practice of TM vs. non-TM on the self-reports given in the MAARQ. The second part of the experiment examines the effects of an unfamiliar type of music such as *Maharishi Gandharva Veda* music in comparison to a more familiar type of music, such as Western Baroque, among subjects who practice the TM technique.

Hypotheses

Hypothesis 2a

Experiment one can be interpreted as showing that *Maharishi Gandharva Veda* music balances affect directly through balancing the *doshas*. Since, in theory, this change is based on physiological functioning, it could be considered a non-cognitive phenomenon. If this is so, then theoretically *Maharishi Gandharva Veda* music should influence non-TM subjects as much as TM subjects.

However, general findings in research on the effects of the TM technique indicates that greater physiological flexibility (e.g., Orme-Johnson, 1973; Dillbeck and Orme-Johnson, 1987) and greater cognitive flexibility and appreciation of others develops with practice of the TM technique (Griggs, 1976; Russie, 1975; Suarez, 1976; Holeman, & Seiler 1979; Wrycza, 1982; and Jedrczak, Cos and Cunningham, 1982). Translated to a musical performance, this suggests that practitioners of the TM technique attending a musical concert may be more open and appreciative of the music's positive balancing effects than audience members who had no TM experience. While on the one hand this

reflects greater capacity to "appreciate" the music, positive responses could also be attributed to a "social compliance" effect.

In the case of Experiment 1, tests for the efficacy of *Maharishi Gandharva Veda* music, most of the subjects (98%) practiced the TM technique. Thus, the effects of subject selection is an unknown confound when attempting to generalize the effects of *Maharishi Gandharva Veda* music to non-TM audiences and in gauging the "true" effect size of the *Maharishi Gandharva Veda* music experience. That is, part or all of any pre-post improvement in MAARQ scores could be interpreted as a result of the TM subjects' increased flexibility and appreciation of *any* music rather than as a result of the predicted therapeutic influence of *Maharishi Gandharva Veda* music in particular. Also, TM subjects could possibly recognize the nature of the MAARQ as a measure of *dosha* balance, and therefore, accede to desire for social compliance, an artificial confound. Thus, TM subjects may indicate greater improvement than non-TM subjects, without reflecting the true affect of the intervention, *Maharishi Gandharva Veda* music.

It was impossible to find a reasonably-sized sample of non-TM *Maharishi Gandharva Veda* audience members to compare improvement scores with TM subjects. However, we can evaluate the effect of TM social compliance effects and TM "appreciation" effects without *Maharishi Gandharva Veda* music. That is, we can test for the degree to which TM subjects respond to *some other* music in comparison with non-TM subjects. Any significant positive difference would indicate an "amplifier" effect available from the practice of TM or represent a social compliance effect.

In American culture, music therapists regularly find positive effects with Western Baroque music (Ostrander and Schroeder, 1990). Therefore, the MAARQ was administered at several Western Baroque concerts accumulating a roughly 50/50 ratio of TM and non-TM participants. The pre-post improvement (changes) in MAARQ scores were compared. It was hypothesized that for Western Baroque concerts, TM practitioners

would experience a similar or greater balancing effect, as indicated by similar or significantly more positive pre-post improvement scores on the MAARQ than would non-TM practitioners; i.e., Western Baroque (TM) V, P, K ≥ Western Baroque (non-TM) V, P, K.

Hypothesis 2b

A general finding in music therapy research links familiarity with a particular type of music to the degree to which its influence is felt as soothing (Radocy and Boyle, 1987). Therefore, it is possible that western audiences unfamiliar with the melodies of *Maharishi Gandharva Veda* music may in fact find it unsettling. Any "bias" against unfamiliar music could confound the experimental design. Theoretically, however, *Maharishi Gandharva Veda* music restores balance to the psychophysiology regardless of prior familiarity, thus eliminating this potential confound. Given these two opposing generalizations, it is predicted that the balancing effect of *Maharishi Gandharva Veda* music on western audiences will overcome any bias due to unfamiliarity. Therefore, the improvement in *Maharishi Gandharva Veda* MAARQ scores is predicted to be at least equal to that produced by a more familiar and acknowledged form of therapeutic music: Western Baroque; i. e., pre-post improvement with *Maharishi Gandharva Veda* music V, P, K ≥ pre-post improvement with Western Baroque V, P, K.

Method

Subjects

The first part of experiment 2 used subjects attending scheduled Western Baroque concerts in Iowa. Out of five Western Baroque concerts surveyed (total N = 188; 99 females, 89 males), one afternoon concert was held at Grinnell College (N = 53) in Grinnell, Iowa; one evening concert was held at Mount Mercy College (N = 22) in Cedar

Rapids, Iowa, and one other evening concert was held in Dubuque, Iowa (N = 39). The other two concerts took place in the evening at MIU in Fairfield, Iowa (combined N = 74). Mean age for males was 37.9 years and for females, 37.0 years. 49.5% of the males practiced the TM technique and 48.5% of the females practiced the TM technique. Although some subjects may have attended more than one Western Baroque concert, only data from their first concert attendance was used. For a breakdown of concerts, number of subjects participating and performers, please see Table 4-7.

For the second part of experiment 2, a subset of twenty-one subjects, (nine females and twelve males, 20 to 73 years of age) was selected using MAARQ scores from individuals who attended both a *Maharishi Gandharva Veda* and a western concert. Attendance at each concert was separated by a 2 to 4 month period. The group of subjects practiced the TM technique for a mean of 15.95 years, S.D. 5.41 years. Due to the small number of subjects, Student's *t*-tests were used rather than a repeated measures multivariate design.

TABLE 4-7
Experiment 2: List of Western Concerts and Subjects Participating

Performance			Number of Surveys		
Date	Time	Location	Distributed	Collected	Percent Collected
9 Mar 1991	Afternoon	Grinnell	75	53	70
10 Mar 1991	Night	MIU	125	111	88
11 Mar 1991	Night	Cedar Rapids	50	22	44
13 Mar 1991	Night	Dubuque	50	39	78
12 May 1991	Night	MIU	14	14	100
All concerts			314	239	76.1

Test Material

The *Maharishi Ayur-Veda* Affective Response Questionnaire (MAARQ) was used to collect data. This instrument is the same as described above for experiment 1.

Stimulus Material: The Concerts

Two sets of expert performers gave all the western concerts. David Burgess, guitar virtuoso, has performed throughout North and South America, in Europe and the Far East, and has recorded for CBS Masterworks and the Musical Heritage society. He also won top honors in international guitar competitions in Mexico City, Toronto, and Munich, and was the first to receive the prestigious Andres Segovia Fellowship in New York City. Mr. Burgess, who was touring Iowa during the spring of 1991, kindly consented to having the MAARQ distributed during his concerts. At the end of session one, he personally reminded subjects to fill in the post music condition page.

James and Kathryn March are accomplished duo pianists who performed at MIU in May 1991. Note that Mr. Burgess and the Marches all practice the TM program as do the performers of the *Maharishi Gandharva Veda* music. This eliminates a potential confound when comparing performances for the Western Baroque versus the *Maharishi Gandharva Veda* music experiences for hypothesis 2b.

In the case of Western Baroque music, the subjects paid to attend the concerts. It was assumed that subjects expected the music to provide a pleasurable experience. No differential bias for or against one performance or another is expected. Please see Table 4-8 for a complete list of performers and melodies used for the study.

TABLE 4-8
Experiment 2: List of Performers and Melodies for Each Concert

Date	Time	Performer	Works Performed
9 Mar 1991	Afternoon	Burgess	Guitar solos: Fantasia XL - Louis Milan Fantasia 111 - Louis Milan Fantasia X - Alonso Mudarra Canarios - Gaspar Sanz Fantasie Op. 4 - Fernando Sor Cordova Leyenda - Isaac Albeniz
10 Mar 1991	Night	same as above	same as above
11 Mar 1991	Night	same	same
13 Mar 1991	Night	same	same
12 May 1991	Night	March couple	Jesu, Joy of Man's Desiring - Bach/Hess Hungarian Dances - Brahms • No. 1 in G minor • No. 3 in F major • No. 5 in F-sharp minor • No. 7 in A major Fantasia in F minor - Schubert (Opus 103, D. 940)

Procedure

Essentially the same procedures were followed as given for experiment 1. The performer or host asked the subjects to complete the rest of the questionnaire after a period of time had elapsed during the Western Baroque concert comparable to the first *raga* in the *Maharishi Gandharva Veda* concert, about 30-45 minutes. During intermission for the Western Baroque performances, the survey administrator walked down the aisles with a box in which to collect completed forms and pencils. The box was left in the back of the hall in full view for those who preferred turning the form in after the performance.

Statistical Analysis

The analysis of experiment 2a is similar to experiment 1. The independent variables

were type of music (Western Baroque), gender, and TM practice. The dependent variables were improvement scores for the three *doshas, Vata, Pitta,* and *Kapha* on the MAARQ. The analyses used a grouping factor that distinguishes subjects on the basis of whether or not they practice the TM technique. This replaces the grouping factor of time of day. The two factors could not be used together since there were no subjects that both practiced the TM technique and attended the Western Baroque concert in the afternoon. The absence of time of day analysis is not a problem because, according to Elmker (MIU professor of music, private conversation, 1992), it is not an issue that western music be played in a particular style during a particular "time of day". Rather, the composer and performer creates the music with the intention of portraying a feeling or mood—regardless of the time of day. Music composed during the baroque era borrowed heavily from Greek, Egyptian and Indian music theory, but did not incorporate time of day theory. Note that even "nocturnes" are performed in afternoon concerts by western musicians.

For hypothesis 2a, MANOVAs and ANOVAs use Type III sums of squares as discussed in Wilkinson, 1992, p. 144.

Note that the comparison of *dosha* scores for *Maharishi Gandharva Veda* music versus Western Baroque (hypothesis 2b) is accomplished with paired sample *t*-tests rather than a repeated measures MANOVA. Note that the distributions of the MAARQ scores are not normal[16]. Thus, the scores would generally merit a non-parametric test such as the Wilcoxon test for two matched samples. However, the Wilcoxon test only tests the null hypothesis that the two populations for the samples are identical. It cannot test, by itself, the equality of means, which is the statistic of interest in this experiment. The statistics authority William Hayes writes that the Wilcoxon test is "equivalent to a classical test of the hypothesis that the true *means* of two groups are equal only when the assumptions

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[16]See Appendix 4-J.

appropriate to *t* are true....Without these assumptions, the rejection of Ho implies only that the populations differ in *some* way, but the test need not be equally sensitive to all ways that population distributions might differ" (Hayes, 1973, p. 782). Thus, a test for the difference in means requires the ability to use a *t* test, according to Hayes.

Given this dilemma, it was decided to use students' *t* test to allow comparison of the paired sample means (pre music and post music MAARQ scores). Hayes indicates this may not be a bad choice even given failure to meet assumptions of normal distribution and homogeneity of variance. Regarding the assumption of a normal distribution for the *t* test, Hayes writes: "By and large, however, this assumption may be violated almost with impunity provided that the sample size is not extremely small." Regarding the assumption of homogeneity of variance, Hayes also writes that "for samples of equal size relatively big differences in the population variances seem to have relatively small consequences for the conclusions derived from a *t* test" (Hayes, 1973, p. 410). The current experiment meets this latter requirement with the *paired* sample *t* test with N=21.

For all tests, the α significance level is set at .05 for type I error.

Results and Discussion

Comparisons with Experiment 1

Although the hypotheses that used Western Baroque as the stimulus music did not ask the same questions as given in experiment 1 for *Maharishi Gandharva Veda* music, it is reasonable to see how well Western Baroque "performed" in producing greater balance. Therefore, the following points cover tests analogous to those used for hypotheses 1a, 1b, and 1c[17].

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[17]The tests for the full model can be found in Appendix 4-G. Descriptive statistics are in Appendix 4-H for experiment 2.

The test that was analogous to hypothesis 1a demonstrated a statistically significant improvement in MAARQ post scores for subjects listening to Western Baroque music. This indicates that the audience indeed experienced balancing effects from the music as expected, multivariate Wilks' Lambda = .7349, $F(3,182) = 21.8839$, $p < .0001$. Univariate tests also showed each *dosha* to be individually improved by the music, *Vata* and *Pitta*, $p < .0001$, *Kapha*, $p = .0024$ Vata, $F(1,184) = 56.0823$, *Pitta*, $F(1,184) = 59.8162$, *Kapha*, $F(1,184) = 9.4941$. This compares well with the results of tests using *Maharishi Gandharva Veda* music. See Table 4-9 for means and standard error scores.

TABLE 4-9
Western Baroque Means and Standard Deviations

Dosha	Pre Mean SD	Post Mean SD	Improvement Mean SD
Vata	1.22 (1.19)	1.84 (0.91)	.62 (1.07)*
Pitta	1.24 (1.15)	1.93 (0.88)	.69 (1.03)*
Kapha	0.96 (1.12)	1.39 (0.99)	.43 (1.09)*

N = 188 subjects: 99 females, 89 male; 92 TM, 96 non-TM; 45 afternoon attendees, 143 evening attendees.
*Multivariate and univariate tests significant, $p < .0001$.

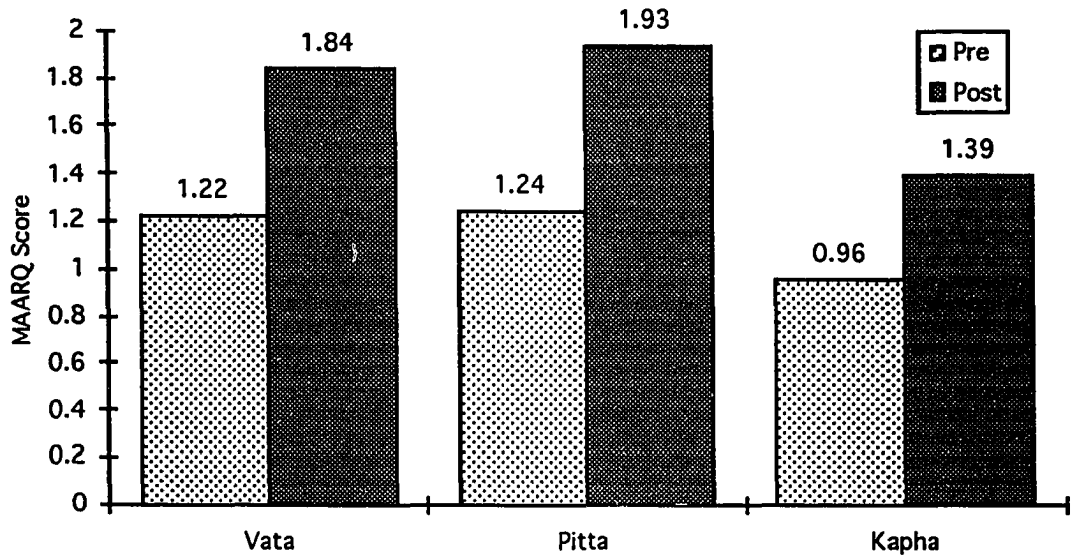

Figure 4-5. Comparison of pre and post MAARQ scores during live Western Baroque music concerts (N=188). 99 females, 89 male; 92 TM, 96 non-TM; 45 afternoon attendees, 143 evening attendees.

Note: collectively and individually, the post scores are significantly greater than the associated pre scores, $p < .0001$ in all cases.

Experiment 1b demonstrated greater effects for females in an overall multivariate tests and in univariate tests for *Pitta* and *Vata doshas*. However, the multivariate test using Western Baroque music revealed no main effect of gender. Nor was there any interaction between gender and classification of TM group membership (practitioner or non-practitioner). Normally, no further investigation would be conducted on gender. However, since females experienced greater improvement than males in *Pitta* and *Vata doshas* upon listening to *Maharishi Gandharva Veda* music, univariate tests were conducted for the Western Baroque experiment. The univariate tests indicated that females experienced greater mean *Pitta dosha* improvement (.79) than males (.57), $p = .0496$, $F(1,184)=3.9059$. See Table 4-10. This compares well with the tests for *Maharishi Gandharva Veda* music in which females demonstrated significantly greater improvement in

Pitta dosha with a mean of .87 compared with a mean of .60 for males, $p = .0034$. Note that *Maharishi Gandharva Veda* music gave additional improvement in *Vata dosha* for females (.85) compared to males (.57), $p = .0050$. This gender effect for *Vata* was not found for Western Baroque music, indicating a potential qualitative difference in the balancing effects of the two forms of music.

TABLE 4-10
Means and Adjusted SE for Gender and Time of Day

	Dosha	Pre Mean SE	Post Mean SE	Improvement Mean SE
Female	N=99			
	Vata	1.22 (.1199)	1.91 (.0917)	.69 (.1083)
	Pitta	1.24 (.1160)	2.02 (.0885)	.79 (.1040)*
	Kapha	.92 (.1133)	1.40 (.0981)	.48 (.1088)
Male	N=89			
	Vata	1.22 (.1264)	1.76 (.0967)	.54 (.1142)
	Pitta	1.25 (.1223)	1.83 (.0933)	.57 (.1096)
	Kapha	.99 (.1195)	1.39 (.1034)	.40 (.1147)
Afternoon	N=45			
	Vata	.86 (.1761)	1.69 (.1354)	.82 (.1600)
	Pitta	1.09 (.1721)	1.77 (.1301)	.68 (.1534)
	Kapha	1.04 (.1679)	1.03 (.1442)	-.02 (.1587)
Evening	N=143			
	Vata	1.33 (.0990)**	1.88 (.0761)	.56 (.0899)
	Pitta	1.29 (.0967)	1.98 (.0731)	.68 (.0862)
	Kapha	.93 (.0943)	1.51 (.0810)	.58 (.0892)***

*Significantly greater than male counterpart $p = .0496$
**Significantly greater than afternoon counterpart $p = .0233$
***Significantly greater than afternoon counterpart $p = .0013$

The results of experiment 1c showed that the audiences attending the *Maharishi Gandharva Veda* music concerts reported a greater improvement in the evening compared to the afternoon. It is of interest to test whether similar effects can be found in audiences for Western Baroque music because in the *Maharishi Gandharva Veda* music study, a potential confound may have influenced the results. The afternoon subjects probably obtained

greater rest from the World Peace Assembly which they had been attending compared to the evening subjects[18], and thus had less opportunity for "rejuvenation" during the afternoon concerts.

For the Western Baroque subjects, the multivariate test for a main effect of time of day showed that the mean improvement score were collectively greater in the evening compared to the afternoon, $p = .0012$, Wilk's Lambda =.9165, $F(3,182) = 5.5242$. This was similar to experiment 1 with *Maharishi Gandharva Veda* music. However, the univariate tests revealed that only *Kapha dosha* demonstrated significantly greater improvement in the evening (.58) compared with the afternoon (-.02), $p = .0013$, $F(1,184) = 10.7079$. See Table 4-10. See Appendix 4-G for the tests of the full model. In contrast to these results, experiment 1 demonstrated statistically greater improvement in all three *doshas* for the evening performance compared to the afternoon improvement. This difference in results implies that at least *Kapha dosha* may not have been influenced by the greater rest that attendees to the World Peace Assembly might have received prior to attending the *Maharishi Gandharva Veda* concert. Or, the difference may have been due to differences between *Maharishi Gandharva Veda* music and Western Baroque music.

Interestingly, in experiment 2 with Western Baroque music, comparison of the *pre-music* MAARQ scores for afternoon versus evening Western Baroque attendees shows only *Vata dosha* balance to be significantly greater in the evening, $p = .0233$, $F(1,184) = 5.2341$. See Table 4-10. The overall multivariate also showed significant differences, $p = .0425$, Wilks' Lambda = .9562, $F(3,182) = 2.7798$. Although not statistically significant, pre-music *pitta dosha* balance was also greater in the evening, but *Kapha dosha* balance was less than the afternoon group mean[19].

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[18]Most of whom were not on the assembly.

[19]See Appendix 4-D for tests of the full model.

Recall that the *Maharishi Gandharva Veda* pre-music tests indicated statistically less balance in the evening for both *Vata* and *Pitta doshas* compared to afternoon means. These differences plus inspection of the means in Tables 4-6 and 4-10 indicates that the Western Baroque audiences were more balanced in all three *doshas* in the evening, and less balanced in the afternoon for *Vata and Pitta* than the *Maharishi Gandharva Veda* music audiences.

However, when comparing *improvement* scores between afternoon and evening groups, the Western Baroque music resulted in only *Kapha dosha* exhibiting significantly greater improvement in the evening, $p = .0013$. This was largely due to a near-zero improvement score for the afternoon (-.02). In contrast, *Maharishi Gandharva Veda* music resulted in significantly greater improvement in the evening for all three *doshas* compared to afternoon scores.

In conclusion, the time of day resulted in a different pattern of pre-music scores for experiment 2 compared to experiment 1. It appears that audiences can vary in the degree of *dosha* balance exhibited in the pre-music MAARQ score means.

Hypothesis 2a: Western Baroque (TM) V, P, K ≥ Western Baroque (non-TM) V, P, K.

In hypothesis 2a it was predicted that for Western Baroque concerts, TM practitioners would experience a similar or greater balancing effect, as indicated by similar or significantly more positive pre-post improvement scores on the MAARQ than would non-TM practitioners[20]. The investigation revealed no effect of TM by gender interaction. The result of the main effect test of TM versus non-TM was only marginally significant, Wilks' Lambda = .9618, $F(3,182) = 2.4125$, $p = .0683$ using the multivariate test. Last, there was no main effect of gender.

To locate the possible source for the marginal TM effect, individual tests were

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[20]The tests of the full model are given in Appendix 4-F.

conducted for each *dosha*. Only *Kapha dosha* demonstrated statistically significant differences in the effect of TM, $F(1,184) = 5.3692$, $p = .0216$. See Table 4-11 for means and standard errors for pre, post, and improvement *dosha* scores classified by TM practice.

TABLE 4-11
Means and SEs for Group Classified by TM Practice

	Dosha	Pre Mean SE	Post Mean SE	Improvement Mean
TM				
	Vata	1.34 (.1244)	1.90 (.0952)	.56 (.1124)
	Pitta	1.31 (.1204)	2.00 (.0918)	.69 (.1079)
	Kapha	0.96 (.1176)	1.58 (.1018)	.62 (.1129)*
Non-TM				
	Vata	1.10 (.1219)	1.77 (.0933)	.68 (.1101)
	Pitta	1.18 (.1180)	1.85 (.0900)	.67 (.1058)
	Kapha	0.96 (.1153)	1.21 (.0997)	.26 (.1106)

N= 188; 92 TM subjects, 96 non-TM subjects.
*TM significantly greater than non-TM $p = .0216$.

Hypothesis 2a reflects a concern related to possible differences in response to music among subjects who practiced the TM technique compared to subjects who had no experience with TM. This question is important when attempting to generalize the current results to other audiences, since almost the entirety of the *Maharishi Gandharva Veda* audiences consisted of TM practitioners. The current test results indicated that for Western Baroque musical performances composed of roughly 50% TM and 50% non-TM audiences, TM subjects did not demonstrate any greater response reactivity in *Vata* and *Pitta* MAARQ scores. TM subjects demonstrated significantly greater improvement only in *Kapha dosha* compared to non-TM subjects. See Figure 4-6. Since two of the *doshas* demonstrate no significant differences, it appears that hypothesis 2a is upheld. That is, neither an "amplifier" effect nor a "social compliance" effect was not demonstrated, at least for *Vata* and *Pitta doshas*. By extension, it is assumed that the greater improvement in

Kapha dosha scores were due to "true" effects of TM rather than confounding effects. In general, the results suggest that the effects demonstrated in experiment 1 can be generalized to a non-TM population.

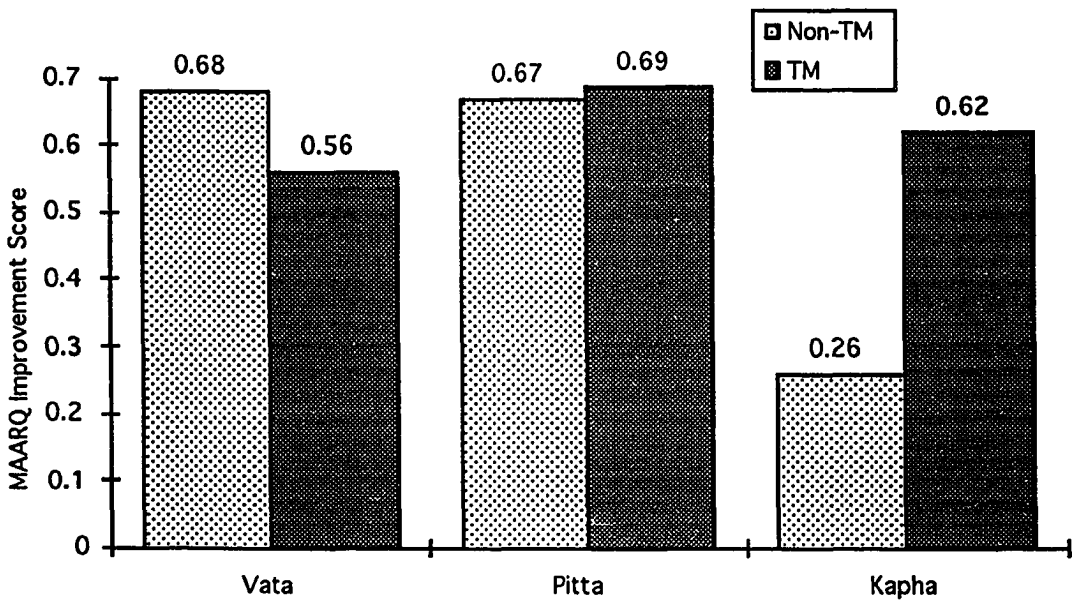

Figure 4-6. Comparison of TM and non-TM group MAARQ improvement scores (post minus pre) during live Western Baroque music concerts (N=188).

Note: The MAARQ improvement scores were equivalent for TM and non-TM groups in all *doshas* except *Kapha* for which the TM group demonstrated significantly greater improvement, $p = .0216$. The equivalence for *Vata* and *Pitta* suggest the absence of confounds such as a TM "amplifier" effect or a "social compliance" effect. Thus, the results of experiment 1 may reasonably be generalized to a non-TM population.

Note that the pretest scores for *Kapha dosha* were almost identical for both groups of subjects. See Figure 4-7[21]. Therefore, the increased responsivity of the TM group may reflect a possibly higher "absolute" level of *Kapha* balance available to the TM group, as discussed for hypothesis 1c, above. That is, the experience of transcendental consciousness, the unique element of the practice of Maharishi's Transcendental Meditation program, may give rise to greater capacity for balance. According to theory in *Maharishi*

[21]Tests of the full model are reported in Appendix 4-E.

Ayur-Veda, Kapha dosha is the most difficult of the three *doshas* to change because it depends on the most physical aspect of the system *(chhandas,* see Chapter One). This implies that practice of Maharishi's TM program increases flexibility in this theoretically most intractable aspect of affect.

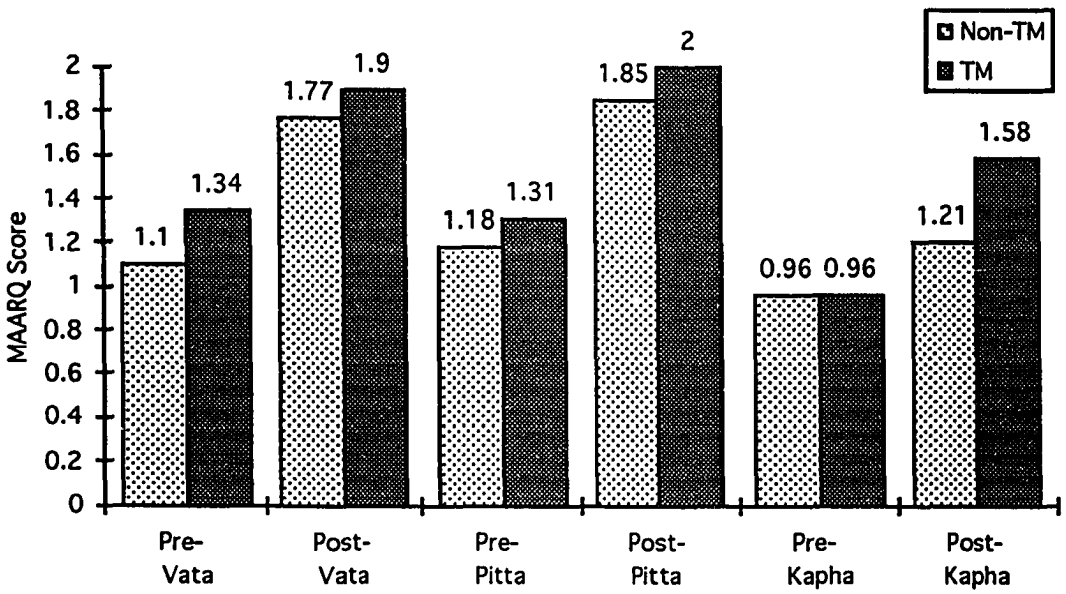

Figure 4-7. Comparison of TM and Non-TM group MAARQ scores during live Western Baroque concerts (N=188).

Note: The pretest scores for *Kapha dosha* are almost identical for both groups. Although both groups demonstrate post-music scores that are greater for *Kapha,* the TM group demonstrated a significantly greater MAARQ mean for *Kapha, p* = .0216. This reflects a possible higher "absolute" level of *Kapha* balance available to the TM group.

In terms of the Thayer dimension of mood, the greater improvement in *Kapha* suggests that regular practice of Maharishi's Transcendental Meditation technique repeatedly allows greater recovery from the exhaustion due to high "energy arousal" states compared to non-TM practitioners[22]. This recovery could be expected to rebalance the

[22]Recall that in Chapter Three the second Thayer dimension of mood, "tension arousal", was shown to correlate with *Vata dosha* .

nervous system and be the source from which a subjectively reported greater sense of *Kapha dosha* rejuvenation can ultimately arise.

Hypothesis 2b: Pre-post Improvement With *Maharishi Gandharva Veda* V, P, K ≥ Pre-post Improvement With Western Baroque V, P, K

Improvement in *Maharishi Gandharva Veda* MAARQ scores is predicted to be at least equal to that produced by a familiar and acknowledged form of therapeutic music: Western Baroque.

Paired sample *t*-tests on subjects who practice Maharishi's TM demonstrated the equivalence of the Western Baroque and *Maharishi Gandharva Veda* MAARQ *dosha* scores during pretest using two-tailed tests: (a) *Vata*, t (20) = 0.69, p = .50; (b) *Pitta*, t (20) = 0.10, p = .92; and (c) *Kapha*, t (20) = -0.15, p = .88.

Based on the equivalence of the pretest scores, paired samples one-tailed *t*-tests were performed for each *dosha* using posttest scores. One-tailed tests were deemed appropriate since the hypothesis maintained that *Maharishi Gandharva Veda* music was at least equivalent in effect to Western Baroque and because *Maharishi Gandharva Veda* had previously demonstrated balancing effects (Experiment 1). Results showed significantly greater *Vata* balancing at posttest for the *Maharishi Gandharva Veda* music when compared to Western Baroque music t (20) = -1.96, p = .032. *Pitta* and *Kapha* balance at posttest were marginally greater for *Maharishi Gandharva Veda* music compared with Western Baroque: (a) *Pitta*, t (20) = -1.42, p = .086; (b) *Kapha*, t (20) = -1.11, p = .138. See Table 4-12 for descriptive statistics.

TABLE 4-12
Means and SDs for Subjects* that Heard Both Western Baroque and *Maharishi Gandharva Veda* Music

Dosha	Pre Mean SD	Post Mean SD	Improvement Mean
Western Baroque			
Vata	0.90 (1.136)	1.54 (1.18)	.64
Pitta	1.12 (1.18)	1.79 (1.12)	.67
Kapha	0.67 (1.02)	1.57 (0.95)	.90
Maharishi Gandharva Veda			
Vata	1.15 (1.11)	2.12 (0.90)	.97
Pitta	1.08 (1.07)	2.20 (0.98)	1.12
Kapha	0.70 (0.85)	1.93 (1.04)	1.23

*N= 21 , mean age 40, nine females, 12 males. All practiced Maharishi's Transcendental Meditation for a mean of 15.95 years.

The results indicate that the lack of familiarity with *Maharishi Gandharva Veda* music definitely does not hinder its balancing value, specifically when compared with Western Baroque music, a musical style that other research indicates has therapeutic value. This is demonstrated by the fact that none of the *dosha* means was significantly less for the *Maharishi Gandharva Veda* group than the Western Baroque group.

The findings also indicate that *Maharishi Gandharva Veda* exceeds Western Baroque in balancing *Vata dosha*, as is shown in Figure 4-8. Interestingly, Maharishi has postulated that the processes of balance arising from *Maharishi Gandharva Veda* music begin with *Vata dosha*, move to *Pitta* and finally to *Kapha dosha* (Maharishi, personal communication, 1989, MIU). Ranking the effects given here, in contrast with Western Baroque, suggest the *same* order of efficacy: *Vata* (t = -1.92), *Pitta* (t = -1.42), and *Kapha* (t = -1.11). Additional research is needed to evaluate statistical differences in the order of effect size.

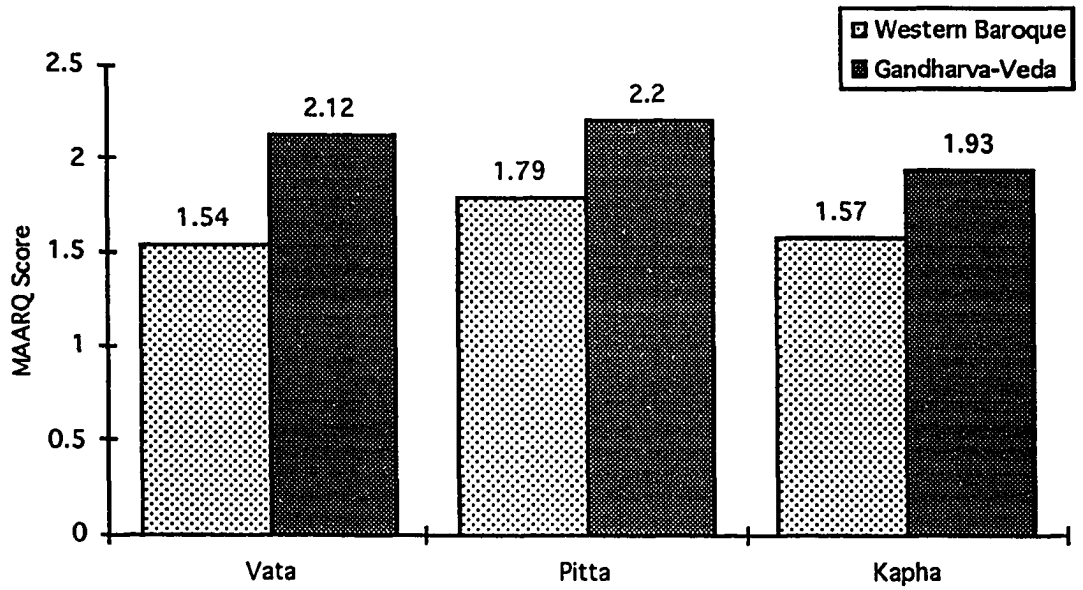

Figure 4-8. Comparison of Western Baroque and *Maharishi Gandharva Veda* post music MAARQ scores given by subjects attending both concerts (N=21).

Note: Results indicate marginally greater post-music scores on the MAARQ for *Maharishi Gandharva Veda* music for *Pitta* and *Kapha doshas*, $p = .086$ and $p = .138$, respectively, and a significantly greater post-music mean for *Vata*, $p = .032$. Note that the greatest difference *(Maharishi Gandharva Veda* score minus Western Baroque score) is in *Vata dosha*, indicating that *Vata* may "lead" the balancing of the other two *doshas* when *Maharishi Gandharva Veda* music is heard.

However, it should be noted that the final level of balance achieved on Vata (2.12) was of similar magnitude to *Pitta* (2.2) and *Kapha* (1.93) indicating that it was the consistency of change in *Vata dosha* due to *Maharishi Gandharva Veda* music compared to Western Baroque that gave the significant result.

Note that this group of subjects is characterized by a preference for classical music over rock, big band, and folk music (see Table 4-13). It is unknown if individuals with other music preferences will experience the same therapeutic value as this experimental group. Also note that the findings are generalizable only to subjects who practice TM. Also, the TM subjects may have been familiar with *Maharishi Gandharva Veda* music, in which case they would not be a good population on which to test this hypothesis. However, even if they were familiar with it, that fact remains that it is not a culturally

familiar stimulus compared to music with which they were raised. In support of this, note that subjects indicated a preference for classical music as well as "Other" (presumably including *Maharishi Gandharva Veda* music). Furthermore, the audience had a negligible number of members originating from cultures that provide regular exposure to the tonalities and techniques of Indian classical music. (The audiences were predominately North American in origin.) Thus, the study shows that at the least, *Maharishi Gandharva Veda* music did as well as or better than a preferred music from their own culture. In any event, additional research is needed to study the comparative effects for non-TM practitioners.

TABLE 4-13
Music Preference for Group that Heard Both Western Baroque and *Maharishi Gandharva Veda* Music

	Rock	Classic	"Other"	Big Band	Folk
Mean	2.05	3.78	3.59	1.89	2.83
SD.	(1.43)	(1.63)	(2.00)	(1.32)	(1.20)

Note: "Classic" and "Other" music preferences were not significantly different from each other. A paired *t*- test indicated $t(16) = 0.37$, $p = .72$. (17 out of the 21 cases gave information on music preference.)

Hypothesis 2b investigated the concern that subjects may fail to benefit from *Maharishi Gandharva Veda* music because of its unfamiliarity. Tests indicated that subjects experienced significantly greater balance of *Vata dosha* with *Maharishi Gandharva Veda* music when compared with the effects of Western Baroque. Marginally greater balance was experienced for *Pitta* and *Kapha*, as well, with *Maharishi Gandharva Veda* music. Therefore, the results indicate that cultural differences do not prevent the balancing influence of *Maharishi Gandharva Veda* music, at least among subjects who practice *Maharishi's* TM technique and who, as a group, prefer classical and "Other" music. Other qualifications were given for these results, such as the possibility that audience members

indeed had prior "familiarity" with *Maharishi Gandharva Veda* music. However, lack of life-long exposure to classical Indian music would seem to mitigate this influence.

Overall, the results of tests for hypothesis 2a and 2b suggest that the potential confounds do not influence the conclusions drawn from the results of Experiment 1.

Discussion of Both Experiments

In combination, the findings of both experiments taken together suggest that *Maharishi Gandharva Veda* music can be used for its intended purposes of restoring "balance and harmony in the mind, body, behavior and environment" (Maharishi, 1988). In experiment 1a the self-reported improvements for the *doshas* experienced by *Maharishi Gandharva Veda* audiences were shown to attain statistical significance. The effect sizes were meaningful as well. That is, after listening to the *Maharishi Gandharva Veda* music, the top 50% of the audience subsequently felt as balanced in each *dosha* as the top 26-27% of the audience felt prior to listening to the music[23]. This represents about 100% improvement in the number of people feeling as balanced as the top quarter percentile felt prior to listening to the music. Experiment 1b found that females were statistically more improved than males in balancing *Vata* and *Pitta doshas*, but not *Kapha dosha*. Experiment 1c found that the balancing influence of *Maharishi Gandharva Veda* music was sufficient to compensate for lower pretest scores in the evening, bringing the posttest scores up to those experienced by afternoon attendees. Thus, the improvement for the three *doshas* together and individually was statistically greater for the evening concerts than the afternoon concerts.

Experiment 2 examined the effects of two possible confounds: bias introduced by affiliation with the practice of Maharishi's TM technique and bias introduced by exposure

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[23]Assuming a normal distribution of MAARQ scores.

to culturally unfamiliar music. The potential for bias was tested using Western Baroque music with both Maharishi TM and non-TM subjects. The test results indicated that the practice of *Maharishi's* TM by audience members did not introduce any bias into the MAARQ responses on *Vata* and *Pitta* compared to responses by members who did not practice TM. This was indicated by the fact the *Vata* and *Pitta dosha* means were not significantly greater for the TM compared to the non-TM group. Those who practiced TM did experience greater improvement in *Kapha dosha* balance than the non-TM subjects.

While this finding may indicate greater flexibility in "appreciation" for the TM group, we must acknowledge that the response bias *may* apply *only* to *Kapha*-related affect. However, this kind of selective reactivity appears to stretch the imagination. Likewise, *Vata* and *Pitta dosha* results could represent greater "appreciation" in TM subjects, since without it they *could* have otherwise scored lower on *Vata* and *Pitta* affect than the non-TM group. However, again, it stretches the imagination to think that Western Baroque music would create a negative impact on affect in association with the practice of TM, when the "appreciation" affects were removed.

Tests for the effects of culturally unfamiliar music were made among subjects who practiced TM. The results demonstrated that MAARQ changes reported upon listening to culturally unfamiliar music *(Maharishi Gandharva Veda)* were at least equivalent to self-reported changes upon listening to the more familiar Western Baroque music.

Limitations of the Experiments

The research in experiment 1 has indicated the efficacy of *Maharishi Gandharva Veda* music as a means of addressing affective imbalance, with possible therapeutic effects at least as strong as Western Baroque music, as given in the results of tests in experiment 2b. The main remaining issue concerns the generalizability of the research findings. A fundamental question concerns the criterion validity of the MAARQ. While many aspects

meet the requirements of face validity[24], further research is required to investigate the correlation of MAARQ responses to the results of *Ayur-Vedic* pulse diagnosis.

Other questions follow regarding the internal validity of the study. The subjects used for the *Maharishi Gandharva Veda* concerts predominately practiced TM (98%). Are the results generalizable to a non-TM audience? While we may reasonably speculate that it should generalize based on the results of experiment 2a, we have no empirical evidence. Along similar lines, a question arises regarding the ratio of "first time" audience members to "self-selected" attendees familiar with *Maharishi Gandharva Veda* music. This factor could skew the results in the direction of disfavor, assuming that some of the "new" audience members found they really did not like the music upon first hearing and would refuse to attend again. Future research should gather data on the prior familiarity of the subject with the type of music being heard.

Although many of the audience who practice TM may not have heard *Maharishi Gandharva Veda* music before, and were scoring the MAARQ adjectives as a "first time" listener, an additional confound can skew the results in the direction of "favoring" the music. Since the TM organization explicitly advocates that individuals should listen to *Maharishi Gandharva Veda* music for its personal and societal benefits, it could be said that a strong "social compliance" effect operated to enhance positive responses to the MAARQ.

Similar to the above limitations, subjects are self-selecting by virtue of agreeing or disagreeing to turn in the MAARQ. It is unknown, at this time, whether self-selection biases the results reported here.

The preceding points raise interesting issues regarding subject selection. That is, *must* we reasonably expect results from a totally "unbiased" audience such as a non-TM audience which had no expectation of the type of music being played and therefore could be said to

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[24]See Chapter Three.

be "non-self-selecting"? It is reasonable in light of the current research into music therapy to suggest that subject preferences and familiarity with a particular type of music[25] are an integral part of the "therapeutic" process (Hanser, 1980). As such, it may be reasonably claimed that rather than being confounds, all the above "limitations" are actually integral components of the therapeutic process and constitute part of the experiment itself. In this view, the therapeutic process is not just the music disembedded from other factors. It includes the practice of Maharishi's Transcendental Mediation and the expectation that *Maharishi Gandharva Veda* music would be beneficial.

Another category of limitations concerns the MAARQ instrument. Construct validity was discussed in Chapter 3. Beyond that, however, we must note that the group scores in many cases do not fulfill the assumption of normal distribution. Examination of histograms of the scores reveals a "ceiling" effect, particularly with regard to the post-music scores. That is, many subjects select the topmost score, "+3", thus lumping the responses at the extreme value, obviating a normal distribution. One solution may be to invent labels for the values that would preclude selection of the maximum score in all but a few cases (mimicking the normal distribution). Another solution, however, may be to accept the non-normal distribution (as we did), with the realization that any study of the post-music group means will necessarily reflect a *conservative* estimate of the true means. That is, if a higher score *were* available, some portion of the subjects would probably have selected that alternative. Thus, the bunching of scores represents failure to observe a rating of the adjective that in reality would have resulted in a *higher* post-score mean than the observed mean.

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[25]And, we might add, subject expectations.

A Report on Experiences of Audiences Attending Live *Maharishi Gandharva Veda* Concerts

Research into subjective experience can become abstract; and, by the requirements of the scientific processes of "objectification", it can also become "lifeless." Use of adjectives to describe mood has, as we have seen in the case of Thayer and others[26], given rise to two and possibly three dimensions of mood. The concept of *Maharishi Ayur-Vedic* body types gives rise to three *doshas*: *Vata, Pitta,* and *Kapha,* which can also be described with an appropriate set of adjectives and a "score" indicating the degree to which the adjective applies to a subject.

Such abstractions, which are necessarily imposed by the quest for quantitative expression of "effects" of some stimulus, resulting in subjective changes in mood, can also miss the point of scientific investigation. Therefore, the scientist must necessarily include some description of the process or phenomenon under investigation in a way that the reader can recognize what is being studied in "real-life" terms. To support this requirement, I report experiences that were written by members of the audience during several of the *Maharishi Gandharva Veda* music concerts. On the one hand these descriptions give substance to the adjectives used in the MAARQ to capture subjective experience; while, on the other hand, the descriptions transcend the limited capacity of the MAARQ to describe human experience. I hope that the reader is inspired by this glimpse into the full range of experiences obtained by listening to *Maharishi Gandharva Veda* music.

The experiences presented here were drawn from all the *Maharishi Gandharva Veda* concerts listed in Table 4-2. Experiences came from all *ragas* performed at each concert rather than from just the first selection. Each quote signifies a different type of experience although the same subject may be quoted more than once. The subject's initials, gender,

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[26]See Chapter Three.

age, occupation and state/country of residence are provided whenever available. As this information was given on a volunteer basis, not all subjects provided complete biographical data, nor did all subjects offer reports. Also, recall that all participants of *Maharishi Gandharva Veda* concerts were practitioners of Maharishi's Transcendental Meditation program.

The experiences are divided into three main categories: 1) physiological effects, 2) psychological effects and 3) effects of the music on human development; i.e., experiences of higher states of consciousness as defined by Maharishi Mahesh Yogi (Maharishi, 1969).

Physiological Effects

According to Maharishi, *Maharishi Gandharva Veda* music is an eternal melody of nature that uses the vehicle of sound, melody, and rhythm to restore balance and harmony in the mind, body, behavior and environment. Its style of melody matches with the swings of nature responsible for the passage of evolution in waves of bliss.

As discussed earlier *Maharishi Gandharva Veda* music is music that is in alliance with natural law, upholding the rhythms of nature's activities which prevail at different times throughout the day and night (Maharishi, 1991). Maharishi suggests that its powerful melodies, which are designed for listening any time, "from morning till morning", can neutralize the negative trends and tendencies born of the violation of natural law by the whole population.

Maharishi has described the expected benefits[27]. By neutralizing stress, disharmony and negative tendencies, he indicates, *Maharishi Gandharva Veda* music can clear the channels of human perception, create a state of deep relaxation in the physiology, produce the experience of happiness and bliss, and allow for the nervous system to settle down to a

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[27]See Chapter One.

state of least excitation of consciousness, pure consciousness or transcendental consciousness, even in the midst of dynamic activity. In this way, the nervous system is revitalized and strengthened, giving rise to a more integrated and efficient state of functioning and a greater clarity of perception. As can be seen by the following reports, these characterize some of the experiences which participants listening to *Maharishi Gandharva Veda* concerts have.

D.Q., a 57-year-old female teacher from Iowa wrote that "I felt my body coming more into balance—similar to what I feel in [Transcendental] Meditation."

E.B., a 46-year-old female teacher from Iowa commented that the effect of the music was, "More physical—appeal to the heart—perhaps more energizing".

Several concert goers remarked on the experience of bliss produced by the music:

"Expansion of heart" (P., female, 44 yrs., teacher, Iowa).

"Blissful, particularly around the heart" (C.Y., male, 37, teacher, England).

"Moving bliss in the body—in spinal...areas especially: Joyous" (A.S., male, 42, teacher, Iowa).

One of the qualities of balanced *Pitta dosha* is a balanced homeostatic temperature. If a person is unnecessarily hot, as *Pitta dosha* balances, a feeling of being cooler results. Conversely, if one is too cold, with increased *Pitta balance*, one would warm up. While listening to a *Maharishi Gandharva Veda* concert, C.W., a 33-year-old male student in Iowa reported "In the middle [of the *raga*] I felt very hot for some time and then I cooled down again. I wanted to sleep at times".

Another concert-goer could feel shifts even on the "cellular level". J., a female teacher from Iowa said, "This was celestial. Dropped deeply into the transcendent instantly. Can feel bodily—cellular shifts within the different notes. Very powerful. Pulse changed."

One individual noticed the energizing effects of the music. "Lots of upward flowing energy and blissful thoughts of past (experiences). Felt like dancing spontaneously at

certain moments." "It blessed, then energized, then vibrated me by the clapping....In the end I feel tired and slightly more settled," commented T.K., a 35-year-old male laborer from Iowa.

L.H., a 44-year-old male manufacturing representative in Ohio, noticed certain changes occurring in the physiology which resulted in greater appreciation of his own inner silence: "I felt channels being opened in my brain and heart. As the music increased in speed, the silence deepened."

And, S.M., a 35-year-old male educational administrator in Iowa, commented on how the music affected digestion. "Much less full (I was too full) feeling in my stomach."

Normalization

According to Maharishi (1969) there is an intimate connection between mind and body. Consequently, the quality of the subjective experience will differ depending upon the condition of the body. If the nervous system is already fresh and well-rested, free of stress and in a state of balance, the subjective experience of the music will be more deeply appreciated. If, however, the opposite is the case, then the evolutionary nature of *Maharishi Gandharva Veda* music will naturally take over, thereby bringing the body into a state of balance. It should be noted that during the process of restoring balance to the physiology, some individuals may experience some restlessness, irritability, deep fatigue, sleepiness or dreaminess. I suggest that contingent upon the degree of imbalance going into the concert, some amount of normalization will occur during the concert. However, as most participants remarked, even though some normalization was experienced during the concert, on the whole they felt much better, more alert afterwards. This suggests that experiences of normalization, while not subjectively settling, are in fact good experiences in that they are an indication of the growth of balance in the system, leading to more refined and fulfilling

experiences of human development later on. Following are some examples of such experiences.

Regarding the balancing effect of *Maharishi Gandharva Veda* music on sleep and fatigue, T.A., a 27-year-old female teacher from Canada noted "Alternating moments of deep, restful, almost drowsy, with enlivened alertness". M.S., a 38-year-old female teacher from Iowa, wrote that "I felt more alert and less drowsy towards the end of the *raga.*" Another 38-year-old female commented that "Even though tired, I feel much more rested and alert than before". And J.R., a 37-year-old male administrator in Iowa, commented simply that he "fell asleep."

A 42-year-old female reported that she "Felt extremely relaxed." She added,

> I slept...during most of the *raga,* or at least I was unable to move, from the beginning. Sat up towards the end but was slumped over—a lot of tiredness coming out. The music was transcendental and extremely charming.

One way in which the music normalizes is in an increasing sensitivity to the environment. D.K, a 44-year-old manufacturing representative from Ohio, wrote, "At the *same* time I was feeling totally rejuvenated, I felt a need to withdraw from the captivation of all the sounds of nature."

Others found that while some discomfort occurred during the playing of the composition, a general sense of well-being prevailed afterwards. J., a female teacher from Iowa, commented "Much more smooth and even after the *raga.* However, it took awhile to 'get into it'." And H.H., a 31-year-old male health technician in Iowa noted that "During the piece I felt somehow drowsy but towards the end I became more enlivened and alert. Also, I had periods of transcending during the piece."

Transcending is a phenomenon most commonly experienced during the Transcendental Meditation technique (Maharishi, 1969). Given that Maharishi's Transcendental Meditation and *Maharishi Gandharva Veda* music are two of twenty approaches of *Maharishi Ayur-Veda* used for optimizing human development, it would

seem natural that both would produce similar experiences. It is not unusual, although not necessary, that periods of transcending, characterized by breath suspension and other variables, may be followed by brief periods of normalization. Following are some experiences which reflect the development of transcending along with experiences of normalization. More will be said about transcending, breath suspension, and transcendental consciousness in the Human Development section further on.

P.T., a 28-year-old male teacher from Canada, wrote, "Had suspension of breath. Was feeling twinges as stress was released from the arms and shoulders." E.M., a 44-year-old female teacher from England noticed that:

> After the first third, I had strong experiences of transcending on and off most of the time. A feeling of numbness in my neck and throat which passed and then very nice feelings of expansion in my forehead and up through the top of my head.

Other subjects commented that they did not enjoy the mixture of audio accompaniment with live performance; that clapping and children playing interfered with the pleasure of the concert; that vocal performances were not their favorites; that photograph-taking during the concert was distracting. Following are some of those experiences.

> I found the vocal music a little too enlivening and had a few uncomfortable feelings of pressure around my heart. I enjoyed the singing very much, but just felt that I was initially, perhaps, a little too settled to thoroughly appreciate such exhilarating music. (E.M., 44, female, teacher, England).

"There were moments when it was too LOUD, and I would feel agitated/strained at those moments," wrote T.A., a 27-year-old female teacher from Canada. S.D., a 48-year-old teacher from U.K. commented that, "I was bored. It was too noisy."

And, C.F., a 38-year-old female homemaker from Iowa explained that "The picture-taking and movement of the children were the only things that kept this from being totally blissful."

Psychological Effects

Psychological experiences refer to experiences on the level of ego, feeling, intellect, mind, desire and senses as explained in the Vedic Psychology Unified Field Chart (Orme-Johnson, 1988). Generally, when discussing subjective experiences as they pertain to the effects of music, reports focus more on how the music generated certain feelings or attitudes.

A 41-year-old male wrote that this was "The very best concert I ever enjoyed. I feel powerful, exhilarated and inspired." Others commented on the sense of peacefulness and happiness produced by the concert. "General sense of peacefulness. Great tranquillity and exhilaration, wrote a 73-year-old female. P.M., a 35-year-old male school administrator in Iowa commented that "It was very sweet and enlivening". J., a 37-year-old teacher in Iowa exclaimed, "The singing was fantastic. What bliss!" A.D., a 48-year-old female university professor reported, "Singer with *tabla*: celestial concert. I felt very happy during this one. Uplifted, full." And as M.S. a 38-year-old female teacher in Iowa explained it, "Very enlivening, resonant. I don't usually like vocals, but I enjoyed this very much."

Another commented on the quality of emotion generated during the concert. "I experienced a variety, a wide variety of positive and negative emotions. I'll plan to enjoy this type of music in the future, wrote J.Y., a 35-year-old male insurance representative in Ohio. It could be said that this comment showed the balancing effects of *Maharishi Gandharva Veda* music in that although both positive and negative affects were experienced, yet the participant wished to enjoy more of the music.

Others commented on the settling quality of the music. "It is amazing to me that one could feel so settled and silent during the solo of any rhythm instrument—the *tabla* is like the rain on the roof or the cicadas in the trees", wrote M.E., a 38-year-old female teacher from Iowa. And from J., a 37-female teacher from Iowa, "First concert I've ever been to!

Felt enlivened, alert, yet soothed and serene, particularly when the drums were being played....When rhythm changed I felt exhilarated and wanted to hear more."

In summary, psychologically, of those who made comments, concert-goers noticed both the enlivening nature of the music, its sweetness and joy, and its soothing qualities: i.e., the music seemed to generate both a sense of peace and exhilaration. They seemed to enjoy the music and wanted to experience more of it at a later date.

It should be noted that comments regarding the desire to hear more may have been an attempt to bias the report on the part of TM practitioners. Further research studies could investigate the return-rate of attendees at *Maharishi Gandharva Veda* concerts in an attempt to verify if the music does become more enjoyable with additional concerts and if people really do return for more.

Effects on Human Development:
Experiences Associated with Higher States of Consciousness

Extensive scientific research shows that experiences of higher states of consciousness have their basis in a coherent and balanced state of physiological functioning[28]. By establishing awareness on the deepest levels of mind and body through the medium of the *raga, Maharishi Gandharva Veda* music facilitates the natural flow of inner communication, enlivening the body's inner intelligence and producing a profound level of physiological balance and coherence that is capable of giving rise to higher states of consciousness (Maharishi, 1991).

Higher states of consciousness are the natural and ultimate outcome of the development of a state of perfect balance in the mind and body (Maharishi, 1969). Just as *Maharishi Gandharva Veda* music can be said to re-enliven all levels of the musical psyche

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[28]For a complete presentation of scientific research, please refer to *Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers, Volumes 1 - 6.*

in the individual, so too it can be posited that the natural frequencies of this music are capable of enlivening pure consciousness, the Cosmic Psyche (see Chapter 1), on the deepest level of awareness of the listener, systematically unfolding higher states of consciousness through the direct experience of pure consciousness.

As reviewed earlier, one of the 20 approaches of *Maharishi Ayur-Veda, Maharishi Gandharva Veda,* restores perfect balance to the individual and nature as a whole (Maharishi, 1991). It makes use of the sense of hearing and the melodic sequences of *Vedic* sound to reconnect the mind and body at their deepest levels, creating a unique channel to restore balance at the interface between consciousness and matter (Maharishi, 1991). One individual, B.P., a 24 year-old male from France noted the inter-connectedness of *Maharishi Gandharva Veda* music to some of the other approaches of *Maharishi Ayur-Veda* when he wrote, "Had deep experience of fatigue leaving and connection of [*Maharishi*] *Gandharva* [*Veda*] music with our TM-Sidhi program and flying technique."

However, Maharishi suggests that development of higher states usually does not occur overnight. Each state of consciousness has its own style of neurophysiological functioning. As it may take a while for a new style of neurophysiological functioning to develop, it may be that individuals will have momentary experiences of higher states of consciousness before the new stage becomes stabilized. The experiences reported in this section are of that nature: temporary experiences indicating the growth of higher human development.

Maharishi's Vedic Psychology considers consciousness as the basic constituent of all experiences—as a field of intelligence awake within itself, whose self-interacting dynamics generate observed objective reality and subjective experience (Maharishi, 1994).

Waking, sleeping and dreaming states of consciousness are familiar to everyone, and there is a consensus as to their attributes. Yet even these states of consciousness will be experienced differently by each individual depending on the state of their nervous system,

which physiologically supports the experience of consciousness (Alexander and Boyer, 1989). While a tired, or stressed nervous system might support a dull state of wakefulness, a restless state of sleep, and a vague sense of dreaming, a calm and rested nervous system would support a much clearer, more refreshing experience of these states.

The technologies of Maharishi's Vedic Science make use of this intimate connection between mind and body to neutralize stress and restore balance to the system, thereby revitalizing and strengthening the nervous system, giving rise to a more integrated and efficient state of functioning and greater clarity of perception.

According to common understanding, the experiences of waking, dreaming and sleeping remain on the level of the senses and the mental activity associated with these states are linked to outside stimuli or internal thoughts—a color, sound, form, touch, thought or feeling. Such experiences are localized in value. However, as described earlier, Maharishi identifies a more fundamental level of cognitive structure which is unlocalized in value, a level of "pure consciousness" that forms the basis of higher states of human consciousness.

Transcendental Consciousness—the Fourth State of Consciousness

Maharishi (1991) describes *Maharishi Gandharva Veda* music as the most "refined evaluation of the sound value, or frequency," and that "Ultimately it is a reverberation of "the self-referral dynamics of consciousness, which is infinite frequency." He adds that "Infinite frequency is on the level of the unified field of natural law." Maharishi posits that the human nervous system has the unique ability to experience this field of intelligence as infinite frequency in the simplest form of human awareness; i.e., in transcendental consciousness. This experience of the simplest form of human awareness has been termed as a fourth major state of consciousness characterized as a hypo-metabolic state of restful

alertness (Wallace, 1970, 1993).

Maharishi describes transcendental consciousness as unbounded wakefulness. It is unmixed with any localized content or mental activity. It is "a state of unboundedness, in which the mind is free from the boundaries or limitations of space, time and particular experience. It is purely the experience of 'the Self', free from any outside influences" (Maharishi, 1977, p.3).

Transcendental consciousness is a self-referral experience in which consciousness is its own experiencer (knower) and object of experience (known), as well as the process of experiencing (knowing). "It is complete unity and yet, because it is awake, it has these three qualities" (Maharishi, 1994). When "The intelligence aspect of consciousness locates its three-in-one structure, [then] unity, through its own self-interacting dynamics, becomes diversity" (Maharishi, 1991); this self-interacting dynamics produces the hum of infinite frequency in pure unbounded awareness.[29] According to Maharishi (1966) this state of pure consciousness always underlies ordinary thought and behavior. It can be accessed through Maharishi's Transcendental Meditation and TM-Sidhi programs. The process by which it is accessed is called transcending.

Maharishi (1966) describes this process of transcending in the following way:

> The individual psyche settles down from the excited state of ordinary waking to transcendental consciousness by experiencing less and less mental activity until the state of least mental excitation is reached.

He has identified two fundamental principles regarding the nature of the mind that permits effortless transcending: 1) that the natural tendency of the mind is to go to a field of greater happiness, and 2) that less excited states of the mind are more enjoyable. Maharishi's Vedic technologies utilize these principles.

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[29]See Chapter One for a more thorough explanation of the self-interacting dynamics of the field of pure consciousness.

During the practice of Maharishi's Transcendental Meditation, an individual experiences the body settling down to a state of deep rest and relaxation while the mind is fully awake and alert (Wallace, 1993). "Subjects show a decrease in heart rate, respiration rate, oxygen consumption, and plasma cortisol and lactate levels, and EEG coherence" (Wallace, 1993, p. 34). Also, some people, while transcending, experience temporary respiratory suspension that can last up to 60 seconds in duration. According to Wallace, "Respiratory suspension is a pattern often found in classical descriptions of the experience of transcending: a slowing or cessation of breathing and a sense of connectedness to the silence that upholds all nature" Wallace, 1993, p.35). A similar experience seems to have happened while listening to *Maharishi Gandharva Veda* music. F.M., a 52-year-old female teacher from Iowa, wrote that "I hardly breathed the whole *raga*; yet I feel enlivened and thrilled. A wonderful experience."

For Maharishi (1991), *Maharishi Gandharva Veda* music is "...that eternal melody of nature which is ever lively in transcendental consciousness".

Several concert-goers commented that hearing the music produced experiences of transcendental consciousness. J.F., a 43-year-old female housewife from Iowa noted, "Deep, deep experience of depth of transcendental consciousness." "Transcending, light, lightness, joy," was how V.B. a 43-year-old female technical writer from Iowa put it: "I felt an eternal timeless quality. I didn't want the music to ever stop. A lot of energy flowing and bliss, as if the music is pulling me inward," wrote M.W., female, 41, teacher, Iowa. P.M., a 39-year-old female healing arts practitioner from Ohio, commented,

> I felt like I was transcending up and down and in and out along with the music. I felt great pleasure when the musicians 'connected with each other', like I could feel their happiness. My breathing became lengthened. Time went very slowly for the first ten minutes; I thought the clock on the wall had stopped.

Cosmic Consciousness— The Fifth State of Consciousness

According to Maharishi (1969), the fifth state of consciousness is referred to as cosmic because it is all-inclusive; it includes the entire range of experience from the deep silence of transcendental consciousness to the ever-changing states of life. It is brought about by the alteration of transcendental consciousness with the regular daily cycle of waking activity, dreaming and sleep. In cosmic consciousness, unbounded pure consciousness provides an eternally stable internal frame of reference from which the changing phases of sleep, dreaming, and waking life are silently *witnessed* or observed (Alexander and Boyer, 1989). This experience is qualitatively different from the fourth state, in which consciousness is fully awake within itself, but the physiology is not yet capable of sustaining this experience in daily activity.

> The state of cosmic consciousness is inclusive of transcendental consciousness as well as consciousness of the relative order; it brings cosmic status to the individual life. When the individual consciousness achieves the status of cosmic existence then, in spite of all the obvious limitations of individuality, 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 (Maharishi, 1969, p. 145).

According to Maharishi, individual awareness seeks out unbounded awareness because of the principle in nature which says that it is the natural tendency of the mind to seek fields of greater happiness. The experience of pure consciousness is traditionally characterized as one of supreme "happiness" or "bliss" (Maharishi, 1977, p. 197). As Maharishi says, "The element of bliss, of more and more, must be nature's activity.

> It must belong to nature's habit to move in waves of bliss. The eternal harmony of nature must be a pattern of bliss—the whole of nature always swinging in the waves of bliss. This comes as the passage of evolution, which means more and more and more—more knowledge, more happiness, more progress...[*Maharishi Gandharva Veda* music] is that style of melody which matches with the swings of nature that control the passage of evolution in waves of bliss (Maharishi, 1991).

This principle, that the natural tendency of the mind goes in the direction of increasing charm (Maharishi, 1972) also explains the stabilization of cosmic consciousness.

According to Maharishi, the mind naturally seeks to maintain the blissful experience of transcendental consciousness as long as possible. However, due to accumulated stress, the nervous system may not initially display sufficient adaptability and functional integration to maintain this silent inner state during daily activity (Orme-Johnson, Dillbeck et al., 1994). With continued familiarity and continual neutralization of stress through *Maharishi Vedic* technologies, the physiology eventually achieves a mode of functioning that spontaneously maintains the bliss of transcendental consciousness 24 hours a day. When this experience is fully established, it can be termed the state of cosmic consciousness. With the establishment of this state, contentment, security, and inner freedom are not overshadowed by external events; the unbounded, blissful nature of Self becomes a permanent and unshakable experience in the midst of the boundaries of daily life (Maharishi, 1977, p.174). Traditionally referred to as "Self-realization", cosmic consciousness is considered the first stable stage of enlightenment.

Several concert goers experienced qualities pertaining to cosmic consciousness during these concerts, particularly "witnessing", the experience of pure consciousness along with ordinary waking activity, perception, thinking and feeling. For example, during the *Maharishi Gandharva Veda* music concert, a 37-year-old male reported feeling "Refreshed, contented, blissful, unbounded. I felt like I was established in the transcendent during the activity of listening; witnessing quality was very lively. The impulses of the music seemed to be just the waves of my Self."

A.D., a 48-year-old female professor from Iowa, wrote: "Transcending during entire performance. Very settled inside. Witnessing music a lot. As though the *Veda* were unfolding." C.S., a 35-year-old female writer from Iowa noted weightlessness of body and unbounded body, " while a 39-year-old female "felt increasingly fluid in mind and body."

Refined Cosmic Consciousness (God Consciousness)—the Sixth State of Consciousness

Once the Self (pure consciousness) is fully realized in the state of cosmic consciousness, it is initially experienced as separate from everything else, including the activities of waking, dreaming and sleeping. Awareness has fathomed the deepest levels of the mind, however the appreciation of everything and everyone in the environment remains comparatively superficial (Maharishi, 1969).

In the sixth state of consciousness, awareness of the Self as the stable underlying basis to the activities of daily life continues, as in cosmic consciousness. The unique characteristic of the sixth state, however, is a growing refinement in the value of perception. Maharishi explains that sense objects are perceived in their most refined values and the emotions achieve their full development (Maharishi, 1969).

Maharishi defines refined perception as the ability to appreciate the underlying harmony between objects. In his discussion of *Maharishi Gandharva Veda* Maharishi (1991) speaks of "all the infinite number of items in the universe" as "different frequencies or sounds" with "one frequency melting into the other". He suggests that this eternal harmony of nature must be a pattern of bliss.

As the perception continues to refine and the experience of harmony begins to dominate on the surface level of life, the separation or gap between the Self and the non-Self, characteristic of cosmic consciousness, begins to close.

> In this state of [cosmic] consciousness, the Self is experienced as separate from activity. This state of life in perfect non-attachment is based on bliss consciousness, by virtue of which qualities of the heart have gained their most complete development....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 (Maharishi, 1969).

Inherent in *Maharishi Gandharva Veda* melodies is the most harmonizing and integrating influence of nature which get actualized in the listener and the listener's environment (Maharishi, 1991). These qualities of harmony and integration Maharishi

considers as the experience of refined cosmic consciousness.

> In such a state of integrated life where behavior is in perfect harmony and...universal love for everything flows...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 (Maharishi, 1969).

Maharishi points out that the affective experiences of the individual enjoying the sixth state of consciousness is dominated by the most refined emotional qualities of life, such as service, reverence, and love. It is for this reason that refined cosmic consciousness is traditionally known as God consciousness (GC).

Several concert goers reported qualities that appear to pertain to God consciousness such as waves of bliss associated with perception and profound feelings of devotion, For example, during the *Maharishi Gandharva Veda* concerts, a 46-year-old female felt that the music "Pushes bliss into the far reaches of unbounded consciousness". P.M., a 39-year-old female healing arts practitioner from Ohio wrote, "I felt more love in my heart and a closeness to God." And D.A., a female teacher from England, reported that "Almost as soon as the *raga* had started, I had transcended. Waves of bliss just kept on and on washing over me—absolutely wonderful!"

Unity Consciousness—the Seventh State of Consciousness

Every tradition, at every point throughout time, has held to the truth that love is unifying. Unity consciousness, therefore, is a natural step of evolution from the state of God consciousness—that state in which the rigid boundaries between the subject, knower, and object, known, begin to dissolve in waves of unrestricted love and appreciation. When the refinement of perception is developed to its maximum value in the seventh state of consciousness—unity—the gap between the knower and the known is said to be completely bridged (Maharishi, 1969). This state of consciousness is the state of complete knowledge.

> 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 (Maharishi, 1972).

According to Maharishi, the value of infinite frequency can be equated with the self-referral dynamics of consciousness. He describes unity consciousness as the "experience of the unmanifest value of pure consciousness underlying and pervading all manifest values of the mind and matter, resulting in a complete unification of subject and object within the wholeness of the unified field of consciousness" (Maharishi, 1969). Unity consciousness is considered the state of complete enlightenment.

> The seventh state of consciousness, traditionally referred to as unity consciousness, is the pinnacle of human development—complete enlightenment. In the state of unity, inner and outer realities are seen in terms of their most universal and unbounded nature—the Self. One knows pure consciousness to be the underlying reality not only one one's own subjective nature, but of every object of perception in the objective world. One comprehends change and non-change, the two fundamental aspects of life, simultaneously and sees that they are nothing other than the expression of unbounded pure consciousness—the wholeness of the unified field of natural law moving within itself. (Wallace, 1993, p.29).

Furthermore, Maharishi (1991) states, "The intelligence aspect of consciousness locates its three-in-one structure and this is how the unity, through its own self-interacting dynamics, becomes diversity...*Maharishi Gandharva Veda* music is that eternal melody of nature which is ever lively in transcendental consciousness. From there it reverberates and constructs different levels of creation." Therefore, with the complete development of human consciousness—unity consciousness—one becomes fully awake to the field of pure consciousness, the Self, interacting within itself at the basis of the whole creative process in nature.

"One sees the Self in all beings, and all beings in the Self" (Maharishi, 1969, p. 441).

Following are some experiences indicative of a state of temporary experiences which

may pertain to unity consciousness which concert participants had during *Maharishi Gandharva Veda* concerts. J.Y., a 35-year-old male insurance representative from Ohio commented, "I experienced a sense of joy and release, similar to a very liberating meditation. I also experienced a sense of harmony, oneness with the music of the musicians." A 40-year-old female housewife in Iowa wrote, "More energy, inspiration—[I] feel connection with universe and laws of Nature. Unity with religious feeling. It was as if he (the musician) talked to the Laws of Nature—calling them, soothing them". And L.B., a 37-year-old female pre-school director from Iowa, commented that it was "Lots of fun to listen to and watch. I felt like he [the musician] was stirring the unified field and creating from within this field."

We may speculate from these experiences that *Maharishi Gandharva Veda* music is evolutionary for all levels of consciousness. If a person in waking state is drowsy, or stressed, listening to *Maharishi Gandharva Veda* music normalizes the stress. If the person who is listening to *Maharishi Gandharva Veda* is well rested, it induces transcending. If the person is well established in the experience of Transcendental Consciousness, *Maharishi Gandharva Veda* appears to stabilize the experience of Transcendental Consciousness in activity, giving an experience in the direction of Cosmic Consciousness (CC). It also stirs experiences of bliss and evolution, characteristic of God Consciousness (GC), as well as unity experiences. This interpretation is consistent with the theory that *Maharishi Gandharva Veda* music originates in the most fundamental self-referral dynamics of consciousness at the basis of natural law, bringing these dynamics out to the perceptual level, so that hearing it harmonizes, resonates, restructures, and attunes every level of the individual psychophysiology with the infinite organizing power of the unified field of natural law.

In conclusion, subjective reports given by audience members at *Maharishi Gandharva Veda* concerts indicate profound, balancing effects on the physiology, psychology and

human development of the individual members. Further research on subjective affective response may help to pinpoint exact psychophysiological parameters of change which lead to these experiences.

CHAPTER FIVE
MEASURING THE EFFECTS OF *MAHARISHI GANDHARVA VEDA* MUSIC ON THE PHYSIOLOGY OF THE INDIVIDUAL—EEG AND PULSE

Introduction

The previous experiment has attempted to ascertain the beneficially balancing effects of *Maharishi Gandharva Veda* music on an individual through a survey of subjective reports collected at live concerts. In general, the music has been found to profoundly and positively influence the individual's feelings as indicated by significantly increased positive scores on the Maharishi Ayur-Veda Affective Response Questionnaire.

What has not been addressed is the effect which this music may have on the physiology. The purpose of this pilot study is to determine what effects *Maharishi Gandharva Veda* music may have on the physiology of a normal individual, specifically in the areas of heart rate, pulse, galvanic skin response (GSR), and EEG.

Effects of Music on Heart Rate, Pulse and Other Physiological Factors

Previous research on the effects of music has determined that music creates an emotional arousal which in turn leads to a physiological change. Hyde and Scalapino (1918) found that cardiovascular functions such as pulse rate, blood pressure, and velocity of blood flow were affected by the type of music played. Ellis and Brighouse (1952) found that different types of music affect changes in respiration and heart rate; although heart rate taken at certain times (e.g., before music, a few seconds during music and after music condition) and not taken throughout the entire session may not indicate a change. Music also affects muscle tonus (Sears, 1958), blood pressure (Washco, 1933; Light, Love, Benson & March, 1954) and gastric motility (Wilson, 1957). Landreth and Landreth (1974) found that learning a new music selection increased heart rate while

repeated exposure to one selection of music significantly reduced heart rate. They also found that listening to sedative or calming music significantly reduced heart rate as well.

Effects of Music on GSR

Researchers have measured the effects of music on galvanic skin resistance (hereafter referred to as GSR), but findings have been inconsistent. Martin and Venable (1980, p. 7) define GSR as "the phasic response of the skin measured exosomatically". GSR is a measure of the electrical resistance of the skin to a low voltage potential applied between electrodes. Changes in resistance to current flow reflect differential activity of the underlying eccrine glands. While eccrine glands on the other parts of the body are involved in thermo-regulation, those on the palms and soles of the feet respond to psychologically significant stimuli. They are solely enervated by the sympathetic nervous system. Therefore, they mirror sympathetic activity. Changes in GSR inversely indicates changes in arousal. Increased sympathetic activity leads to increased sweat gland activity which results in decrease GSR measures.

Decreased skin resistance has been cited as an indication of increased emotional response, such as observed during attending to stimuli, effortful thinking, and pertinent to the current inquiry, audition of exciting music (Zimney and Weidenfeller, 1963). The following review covers the use of GSR as an indicator of physiological arousal when studying the effects of music.

Phares (1934) found that GSR correlated with verbal self-report of affective change. Wolfle and Wolfle (1948) found that increased familiarity with music type and music training significantly correlated with decreased GSR scores, indicating that music preference and music training affected one's emotional response to music. Henkin (1957)

found clear relationships between decreased GSR and music familiarity but no significant correlation between GSR and musical style, composition and orchestration.

Traxel and Wrede (1959) tested GSR reactions to three different music types: classical, "entertaining," and jazz. GSR significantly correlated inversely with the jazz listening condition; however, the majority of subjects indicated a music preference for classical which showed no change in the GSR. Because there was no significant correlation between GSR and music *preference* (viz. classical music) the authors assumed that conventional group values had affected the subjects' subjective reports. Thus, GSR measured actual physiological arousal to musical stimuli (jazz), but did not reflect the subject's subjective preferences (classical).

From the perspective of Maharishi's Vedic Psychology, the results of Traaxel and Wrede could be interpreted as indicating that subjects may not prefer music that arouses them (e.g., jazz, or "familiar" music, as given above), but rather that soothes them (e.g., classical); i.e., music that changes their physiology in the direction of transcending, as in one study that showed calming music and well learned music reduced heart rate (Landreth, 1974). The direction of "transcending" has been related to increased GSR in studies of subjects practicing Maharishi's Transcendental Meditation program (Orme-Johnson, 1973), as well as reduced heart rate (Wallace, 1970). The subjective experience of TM is typically reported as calming and pleasant.

While the relationship between the calming effect of music and the concept of "transcending" appears tenable, the evidence is not consistent across various physiological markers of arousal. For example, Zimny and Weidenfeller (1963) found that exciting music increased emotional arousal as indicated by decreased GSR but not by heart rate measures. Meanwhile, neutral and calming music had no effect on either variable.

Given these qualifications, the effects of music as related to the concept of transcending is an interesting topic for further evaluation, and will be the perspective employed in the present study. It is important to recognize the role of individual differences in responses to music. Various studies indicate a strong influence of individual differences, suggesting that physiological responses may be less linked to subjective preference than to typology or some physiological bases for affective response such as state-related levels of anxiety existing prior to the musical experience.

Ries (1969) found that GSR reactions were apparently influenced by personality styles. He tested introverted, extroverted, and ambiverted individuals using the Maudsley Personality Test for GSR and breathing amplitudes. Subjects listened to seven selections and immediately rated each selection after its presentation on a five-point Likert-type scale which indicated subject preference for that selection. Results indicated that GSR was not significantly correlated with how much the subject liked or disliked the music but rather with how much the music affected him/her. Ries also found that changes in breathing amplitude significantly correlated with subjects' perceptions of how the music affected them and thus concluded that breathing amplitude is a better measure than GSR for measuring the effects of music.

Peretti (1975) found that for non musically-trained females, decreased GSR levels, brought about by anxiety induced situations, increased significantly when music was introduced, indicating reduced anxiety. Peretti concluded that music may increase arousal as indicated by decreased GSR, but if an individual is already anxious, then listening to music may produce a calming effect as indicated by increased GSR.

Music and EEG

Neurological research into musical processing began during the late 1800's. At that time the general understanding regarding hemispheric localization for specific tasks centered around the idea that man as a highly evolved species had higher order processing needs for language and cognition. In order to meet these processing needs, the cerebral hemispheres of the human brain had developed specialized neural sub-processing systems. To confirm this concept, early researchers such as Head (1926) and Sougres and Baruk (1926) attempted to isolate the precise location of these specialized functions in the brain, looking first for the origins of language processing and then for musical processing. Speech production already had been associated with Broca's area (frontal) and speech understanding with Wernicke's area (temporal-parietal) in the left hemisphere of the brain. Musical processing, however, proved more difficult to locate. Today, researchers such as Damasio and Damasio (1977), Zaidel (1979), Rainbow and Herrick (1982) and Peretz and Morais (1988) agree that musical processing is not relegated to one specific area of the brain but rather uses subsystems from both hemispheres of the brain. The following brief review of research into cerebral musical processing systems outlines the development of this theory regarding bilateral hemispheric involvement as it evolved during the last one hundred years.

Generally, investigators looked at music perception and music cognition in working memory as well as music production to understand musical processing. Four basic methodologies were used most often (and still are) to study these systems: 1) neurophysiological measures on diseased or damaged human patients in order to isolate the actual areas responsible for musical processing; 2) dichotic listening tasks on both damaged and normal humans to determine laterality; 3) EEG measures on power spectra and event related evoked potentials to understand the types of effects which music had on

the brain; and most recently, 4) Positron Emission Tomography (PET) for studying musical functions of the brain, Magnetic Resonance Imaging (MRI) for studying musical structures, and Topographic Brain Mapping measures for pin-pointing the temporal and spatial EEG patterns involved with music. Among the musical stimuli used for these studies are pitch discrimination, interval discrimination, timbre discrimination, and tonal memory for melodic recognition or harmonic progression.

Psychophysiological research on music has had five major concerns: 1) isolating the precise cerebral location of musical processing in the brain; 2) determining inter vs. intra hemispheric dominance in musical processing; 3) measuring EEG power spectra during presentation of musical stimuli; and 4 isolating the event-related potentials of aural signals to the brain. Following is a brief review of these areas as they pertain to the evolution of the study of music and EEG, and to the pilot studies presented here.

1) Locating the Source of Musical Processing in the Brain

Early researchers attempted to locate the precise origins of music by studying individuals who had brain damage, lesions or complications which affected musical ability. These studies necessarily focused on brain damaged or brain-diseased musically trained individuals. Studies in this area have continued to the present day. According to Schweiger (1985) these studies ranged from the anecdotal to the most detailed of scientific studies on lesions. Early findings indicated that musical processing was primarily a right hemisphere function (Milner, 1962; Gordon and Bogen, 1974; Kimura, 1964; and Shankweiler, 1966). This led investigators to hypothesize that just as the left hemisphere was responsible for language processing, so too the right hemisphere was responsible for musical processing. As we shall see, more contemporary investigations

conclude that music processing requires an interaction of both hemispheres, each operating according to its own specialization (Gates and Bradshaw, 1977).

Steinhals (1871) coined the term "amusia" to identify those brain lesions which impair musical processing. Amusia was defined as "an impairment in premorbid musical abilities following brain damage" (Schweiger, 1985). Wallaschek (1893) classified amusia as (a) "motor amusia", or expressive amusia as it is now called, which referred to difficulty in singing or writing music and in instrumental performance and (b) "sensory amusia" which referred to the inability of a person to hear, read or understand music. The anatomical loci of amusias have been located in the thalamus, temporal lobes, the planum temporale, and in the superior temporal gyrus areas of the brain. Wertheim (1963, p. 179) suggested that musical functions had a bilateral hemispheric representation. He suggested that amusias on the left hemisphere interfered with lyrical processing while amusias on the right hemisphere interfered with melodic processing. According to Henson (1977, p.18)

> with music, as with speech, appropriately sited lesions may interfere with the basic individual psychological, sensory and motor events which combine in musical experience. Diffuse brain disease impairs musicality through intellectual deterioration and altered emotional response, apart from any derangement stemming from lesions affecting specific areas.

Research eventually shifted from studying only brain damaged/diseased individuals to studying normal individuals due to the concern that certain subsystems involved with musical processing may have been altered by cerebral interactions which developed in brain damaged/diseased individuals and by the possibility that the intact hemisphere may have taken over certain functions of musical processing from the damaged hemisphere (Gates and Bradshaw, 1977, p. 407) thus leading to incorrect identification of homolateral musical processing functions.

Scheid and Eccles (1975, p. 33) suggested that the size of the right planum temporale in normal subjects was "a measure of musical ability"--the larger it was the

more innate musical ability the subject had. In 1994, Schlaug et al. found the opposite. They discovered through Magnetic Resonance Imaging (MRI) that the planum temporale--a brain structure associated with auditory processing--was larger in the left hemisphere of highly musically trained individuals than in the right. The musicians also had a thicker corpus callosum than did non musicians. Schlaug et al. (1994) suggested that the thicker corpus callosum may improve communication between the hemispheres for speedier musical processing and that the larger planum temporale indicated improved overall musical ability. These findings leave open the question of causality. It is unknown if the musically talented would have demonstrated these organic advantages without musical training. The converse is also unknown: whether the musically non-endowed will increase the organic dimensions upon regularly applied musical training.

2) Intra vs. Inter-Hemispheric Dominance

Cerebral laterality studies have used dichotic listening tasks and EEG measures to determine which hemisphere dominates in musical processing. Some of the key studies were done by Kimura (1964), Bever and Chiarello (1975) and Gates and Bradshaw (1977). Efron (1990), however, casts doubts on the functional significance of such studies, as we shall see.

Kimura (1964) adapted Broadbent's (1954) dichotic listening techniques to try and determine the relationship between cerebral laterality and music. According to Noffsinger (1985, p.128) dichotic listening offers a means for evaluating hemispheric asymmetry for various acoustic signals. In dichotic listening methodologies, two different stimulus sequences are presented simultaneously, one to each ear. Kimura wanted to determine which hemisphere was more involved with melody identification. Kimura's basic paradigm consisted of dichotic presentations of two stimuli (one stimulus directed to each

ear) followed by binaural presentation of four alternatives from which the subject was to recognize the two heard previously. She found that when the two sequences presented to each ear were speech sequences, the message tended to be better perceived by the right ear (known as the right ear advantage or REA) and thus processed by the left hemisphere (LH). However, when they were musical sequences, the left ear (known as the left ear advantage or LEA) perceived better, indicating right hemisphere (RH) activation. Further research by Kimura (1967), Bartholomeus (1974) and King and Kimura (1972) supported this finding.

Research on melodic recognition by Gordon (1970) found a left ear (RH) advantage for chords, but not for melodies. His results showed that subjects with lower overall scores had higher left ear (RH) scores while subjects with higher overall scores in melodic recognition had higher right ear (LH) scores, but only for melodies. He concluded that different components of music are analyzed in different hemispheres of the brain and then suggested that both the left and right hemispheres participate in the perception of music as a whole.

Similarly, in looking at three groups of subjects--dance, music and math college students--Piro (1993) found that the music group showed a left ear advantage (right hemisphere) for dichotic chords and a right ear advantage (left hemisphere) for dichotic melodies while neither the mathematically oriented nor dance oriented students showed any similar task dependency ear asymmetry for either chords or melodies.

Bever and Chiarello (1975) used the dichotic listening task strategy on two groups of subjects, musically trained and musically non trained subjects, to assess the impact of musical training on hemispheric dominance. Musically trained was defined as an individual having at least five years of music lessons and currently involved with singing or playing an instrument. For the study only right-handed subjects were used.

The subjects listened to a tape of specially prepared melodies and were asked to identify which melody had occurred before in the sequence. Half the subjects had the repeating melody presented to the right ear; half to the left ear.

The study found that musically trained individuals were better able to correctly identify the repeating melody with the right ear (LH) whereas musically non trained or non musicians were better with the left ear (RH). The authors adopted Heinz Werner's (1948) theoretical concept of an analytic versus holistic distinction to the processing of musical stimuli by musicians and non musicians. Bever and Chiarello suggested that musicians adopted an analytic strategy (LH) when processing musical stimuli while non musicians adopted a holistic strategy (RH).

Confirming evidence comes from alternative research methodologies. Mazziotta, Phelps, Caron, and Kuhl (1982) used Positron Emission Tomography (PET) scanning to measure and quantify ongoing cerebral hemispheric activity in musically non-trained subjects and two trained musicians. Results showed that for musically non trained subjects the highest metabolic activity occurred in the right hemisphere while for musically trained subjects, highest metabolic activity occurred in the left hemisphere. Mazziotta et al. suggested that the processing strategy used by trained musicians involves metabolic activity similar to that used for language.

Other research by Schweiger and Maltzman (1985), Levy (1974), and Sperry (1974) supported these findings. It should be noted that Werner regarded the music perceiver as having the ability to perceive both the parts (analytical) and the whole (holistic); that is, the perceiver can move back and forth between the two strategies. Shanon (1982) and Schweiger and Maltzman (1985) found that musicians may have dynamic shifts in dominance from left to right, depending on the complexity of the task at hand: the more complex the task, the greater the tendency for left hemispheric dominance.

All of the above studies that utilized Kimura's dichotic listening paradigm must be re-evaluated in light of Efron's (1990) attack on the hypothesized mechanisms of the observed so-called 'laterality effects'. Efron suggests that the actual source of many dichotic listening results stems from physiological differences in the "peripheral auditory system: An ear dominance for pitch can arise from a right/left difference in the cochlear frequency tuning functions or in the brain-stem where the frequency information from the two ears is combined" (Efron, 1990 p. 43). Most important, the mechanism proposed by Kimura would not be a reliable candidate, given Efron's findings. That is, in the case of pitch discrimination, both hemispheres appear to perceive the dichotic stimuli identically -- in normal as well as split brain subjects. Thus, there is no evidence of Kimura's hypothesized "suppression of the ipsilateral by the contralateral input in either hemisphere' (p. 42). That is, there is no evidence in the dichotic listening paradigm for higher-order "laterality" effects related to the cerebral hemispheres. According to Efron, evidence to support this critical review of "laterality" is also provided in studies of brain-stem evoked potentials (Efron, 1990, p. 38).

Given Efron's (1990) findings of sub-cortical influences in so called lateralization effects, it is important to note that measures of asymmetries can arise from many other factors, typically involving performance strategies, as well as measurement methods. According to Efron (1990, p. 53) twenty five factors divided into three categories of subject, stimulus, and method, influence hemispheric asymmetry in visual and auditory modalities in normal subjects. Among these factors are: 1) for subject -- gender, age, handedness, education, language, set, strategy, practice, attention and imagination; 2) for stimulus -- energy, location, contrast, size, complexity, threshold, number of stimuli, difficulty, verbalizability and duration; and 3) for method -- name, match to sample, localize, detect, reaction time, randomization, concurrent tasks, evoke potential, recognize and selective report.

Gates and Bradshaw (1977), in studying music perception and cerebral asymmetries, concluded that differential laterality effects are a function of the subject's training or adopted strategies and therefore the way musical information is processed is important for determining hemispheric "mediation". They are inherent signal processing attributes of the hemispheres. According to the authors:

> In a normal music situation, perception depends on the synthesis of pitches and rhythms, and thus, both processes are involved, not in terms of the specialization of one hemisphere 'dominant' for music, but as an interaction of both hemispheres, each operating according to its own specialization, in the complex process of music perception (Gates and Bradshaw, 1977, p. 423).

According to Zaidel (1979) specialization falls "on a continuum from left to right" with both hemispheres participating to differing degrees in most musical functions. He cited research which showed that musicians tended first to use holistic processing (RH) which then shifted to analytical processing (LH). He suggested (p.130) that for trained musicians, changing listening styles might be possible since the differentiated perceptual field can be attended to in various ways contingent upon the musical task at hand (e.g. pitch discrimination, listening to melodies etc.).

In their study on hemispheric specialization for pitch and rhythm in melodies, Rainbow and Herrick (1982) found that musicians used a bilateral strategy involving both right and left hemispheres within a melodic context while non musicians showed a right hemispheric processing strategy.

Peretz and Morais (1988) concluded that attributing music processing to the right hemisphere and language processing to the left is "an oversimplification" that should be abandoned by neuroresearchers as well as the idea that left and right hemispheric processing can be characterized as analytic and holistic respectively (p.158).

In the case of hemispheric specialization music may not be the only variable which can affect the EEG signal. According to Gunther, Stiltz and Rondot (1992) hemispheric

specializations are dependent not only on the nature of the music stimulus but also on other variables such as the subject's gender, previous musical training, familiarity with the musical selection, preference for the music selected, expectancy for melodic completion and even the subject's cultural background.

Mazziotta, Phelps, Caron, and Kuhl (1982) used positron emission tomography (PET) scanning to measure and quantify ongoing cerebral hemispheric activity in musically non trained subjects and two trained musicians. Results showed that for musically non trained subjects the highest metabolic activity occurred in the right hemisphere while for musically trained subjects, highest metabolic activity occurred in the left hemisphere. This supported the research done by Bever and Chiarello and also supports Schlaug et al.'s findings. Mazziotta et al. suggested that the processing strategy used by trained musicians involves metabolic activity similar to that used for language.

The results of these types of investigations during the last 100 years have led to the general conclusion that unlike language processing, there are no major regions in the brain that are specifically designed for musical processing alone. Rather, there exist sub-systems within the major cerebral systems of the brain which are involved with processing music perception and production (Damasio and Damasio, 1977). The subsystems are engaged according to the processing strategies developed by the subject. For the musically untrained, musically processing first actively engages the right hemisphere, while for the musically trained, music engages more the left hemisphere.

In conclusion, it could be said that music "massages" the entire brain. Since *Maharishi GandharvaVeda* music is a classical form of music albeit from another culture, it would stand to reason that it too "massages" the entire brain. If *Maharishi Gandharva Veda* music does indeed effect the entire brain rather than some portion such as the right hemisphere alone, then it is reasonable to postulate a balanced psychophysiology would be the result of listening to this classical music from the ancient *Vedic* civilization of

India. This prediction is in accord with the traditional view of *Gandharva Veda* music brought to light by Maharishi that it is a means of evolution of consciousness, a process which begins with transcending active thinking to the subtlest level of the mind, Transcendental Consciousness, the Cosmic Psyche.

3) EEG Power Spectra and Music

Research in this area investigates metabolic activity involved with hemispheric laterality and music, and the EEG power spectra that are produced when different music stimuli are present.

Bruya and Severtsen (1984) and Steinberg, Stiltz and Rondot (1992) conventionally characterized the various brain-wave frequencies as seen in Table 5-1.

TABLE 5.1
Brain-Wave Spectra and Their Characteristics

Spectra	Frequency Range	Characteristic
alpha	8 - 12.5 Hz	Produced when brain is in a conscious, receptive, relaxed state of wakefulness
beta	12.5 - 31.5 Hz	Produced during conditions of problem-solving in daily life
theta	4 - 7.5 Hz	Produced in states of drowsiness/sleepiness. Also produced during pleasurable relaxation.
delta	0.5 - 3.5 Hz	Produced at deeper levels of sleep

Steinberg, Stiltz and Rondot (1992) further explain that beta can be subdivided into three separate frequency ranges: beta 1 (13 - 18 Hz), beta 2 (18.5 - 24 Hz) and beta 3 (24.5 - 31.5 Hz).

Conventionally, when collecting data, the 10/20 system of electrode placement upon the skull is used with 16, 32 or even 60 electrodes being applied in the standard EEG positions. Using this system, the following researchers have reported changes in alpha and theta in subjects listening to music.

Breitling, Guenther and Rondot (1987) studied the brain electrical activity maps of 14 right-handed non musicians, seven male and seven female, as they listened to a note, a scale and a melody recorded on magnetic tape. Two minutes of relaxation and 45 sec of each stimulus condition were recorded for analysis. Results showed significant bilateral differences between conditions, with a left mid temporal activation predominance for the note and scale conditions, but a right mid temporal and frontal predominance for the melody. The authors suggest that the perception of different musical stimuli depends on

> the information processing levels according to the time characteristics and 'redundancy' of the stimuli perceived. While the monotone and scale conditions have a time and order structure easily predictable, the components of the melody vary in speed and order and are much less predictable (Breitling, Guenther and Rondot, 1987, p.773)

Steinberg, Gunther and Stiltz (1992) compared four similar independent studies of EEG mapping correlates recorded during music perception. Results across ali four studies showed that both music training and gender affected the brain wave during music. Non musicians showed an alpha power augmentation over the whole skull and a beta increase in the acoustical areas of the brain when listening to monotonously structured, simple sounds. Theta diminution was seen over the left rolandic and occipital-parietal sides of both hemispheres. Perception of classical and light music led to a considerable decrease of theta and alpha power, primarily in left frontal-temporal electrodes, whereas a beta 1 decrease in prefrontal areas seemed to be restricted to males. Also, an increase of higher beta frequency over temporal and parietal-occipital parts of the skull was revealed. Musically trained subjects, who were studied separately in one study, showed more pronounced results, primarily in an ample left-sided alpha suppression when compared to resting conditions, indicating discriminative processing in the left hemisphere, concomitant with the dichotic listening results and consistent with results of PET scans.

Katayama, Hori, Inokuchi, Hirata and Hayashi (1992) reported on five young musically trained women listening and playing classical piano pieces. For the study

subjects first rested with eyes open and then with eyes closed for 3 minutes respectively, then listened to the music attentively with eyes open and then again with eyes closed, followed by playing the selection on the piano, followed by resting with eyes open and then with eyes closed for 3 minutes respectively. The authors found that during the piano playing condition, theta activity increased in the frontal midline area with maximal amplitude primarily in the FZ area and the frequency ranging from 5 to 7.5 Hz. [1] Theta increased whenever the subjects' concentration increased, whether listening to music or playing the selection on the piano. For some subjects, an increase in alpha also occurred in the bilateral parietal areas while they were listening to music, suggesting to the authors that alpha activity was involved with appreciation of music.

Ramos and Corsi-Cabrera (1989) found that while subjects listened to music, relative theta power increased in the bilateral, central, temporal and parietal areas. Alpha power in P3 and P4 increased when listening to music with eyes closed.

McKee, Humphrey, and McAdam (1973) found that more alpha was found in the right hemisphere for all tasks, indicating that the more difficult the linguistic or musical task, the greater the alpha suppression in the left hemisphere. They also found that the left/right hemispheric ratios of alpha were largest for a musical task compared to

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[1] This finding is similar to that of Hebert and Lehmann (1977, p. 404) on Maharishi's Transcendental Meditation technique which found that during the practice intermittent prominent bursts of frontally dominant theta activity occurred in 21 of 78 people. The authors said that the theta bursts occurred about every 2 min, had an average duration of 1.8 sec, and an average maximal amplitude of 135 μV. Typically, the bursts were preceded and followed by alpha rhythm. The functional similarities between the practice of Maharishi's Transcendental Meditation and piano activity can only be speculated. However, it is suggested that the theta bursts may be associated with the level of vigilance or arousal which a subject may be experiencing. Herbert and Lehmann (1977, p. 402) suggest that theta bursts arising during Maharishi's Transcendental Meditation occur at a midpoint on what they term a "continuum of arousal" between sleep and wakefulness where "there is inward attention, realistic situational orientation and partially controlled ideation" but no experience of drowsiness or sleep.

linguistic tasks. Studies by Moore (1979), Dumas and Morgan (1975), and Robbins and McAdam (1974) support this finding.

Bruya and Severtson (1984) looked at the effects of two different kinds of soothing music on 47 adult normal subjects, 40 women and 7 men, mean age of 30 years, at a nursing college in the state of Washington. 31 were students, the rest were administrative staff, faculty or therapists at the college. Subjects were divided into two groups: Group A which heard one sequence of music and Group B which heard the same sequence in the reverse order. Music selections were Steve Halpern relaxation music tapes, and Chopin. The actual titles of the selections were not given. Subjects in both groups had a 1 minute pretesting session with no music before the actual experiment. Then subjects in Group A first heard Halpern with 5 minutes eyes open followed by 5 minutes eyes closed. These subjects then heard Chopin with eyes open for 5 minutes and then with eyes closed for 5 min. The second group heard the same music in a counterbalanced sequence thus removing any effects due to order of presentation. Each group ended with a 30 sec counting task. EEG was run continuously throughout. Results of the study indicated each music type produced different brain wave activity in the beta and alpha ranges when examined for individual subjects. However, the authors concluded that neither type of music was more soothing, as defined by its ability to generate a greater percentage of time spent in alpha brain wave activity for a group of subjects, than the other and therefore no one particular type of music could be considered therapeutic for all types of subjects. They recommended that personal preference be considered when choosing a music for therapeutic purposes.

Fried (1990) found that with certain types of music breathing deepens and relaxation occurs more quickly. EEG showed decreased average theta and increased alpha with the music. Mikhailova, Monosova and Beliaev (1990) compared two types of music, classical and rock, on the emotional reactivity of depressed patients and normal healthy

subjects. The authors found that classical music produces an "activation effect" with positive emotional outcome in depressed patients as indicated by changes in the EEG and in a questionnaire used to determine emotional reactions. No further details were available in the English abstract of the article.

Behne et al. (1988) correlated cerebral activity of ten music students (considered the musically trained group) with ten medical students (considered the musically non trained group) while listening to twenty-four different types of music. Subjects' preference for tempo, volume, and music style was correlated with music aptitude and EEG mapping data. The findings indicated that the musically trained group (i.e., the group which had increased analytical familiarity with the music) showed significantly decreased alpha activity along with increased beta activity. This suggests that the musically trained group, being more expert in music from the beginning, used more of a controlled processing strategy whereas the musically non trained group used more of an automatic processing strategy and hence exhibited more alpha in brain-wave activity.

Wang (1975) tested fourteen musically trained students for pitch discrimination and EEG changes at the F8 - T4 position on the scalp. The number of males/females used in the study were not mentioned. Changes were found in alpha, theta and beta frequencies when pitch discrimination took place. Wang also found that EEG amplitude decreased when pitch intervals became as small as a quarter step but remained the same at intervals of a whole step. Wang suggests that musicians can effortlessly determine pitch changes at a whole step or a half step but must work harder to discriminate at quarter step changes or smaller. Due to not noting gender differences, it is unclear whether females discriminate better than males or vice versa or whether gender is irrelevant in regard to pitch discrimination and bilaterality.

Walker (1977) had 24 subjects, half male and half female, half musically trained and half musically non trained, listen passively to three conditions, one of silence and two

of instrumental musical selections, one classical and one rock. The subjects subsequently reported on their subjective reactions to the music. The order of the music sequence was counterbalanced between subjects. Walker found that self-reports of attentiveness, while listening to classical music, correlated significantly with the incidence of both occipital theta and alpha. These correlations suggested that increased theta production was associated with decreased attention while increases in alpha were associated with increases in self-reports of attentiveness. These findings were significant for classical music, but not for rock music. The findings are consistent with the generalization in the EEG literature that within the lower range of the inverted U shaped curve for increased arousal, alpha frequencies can gain amplitude and theta frequencies diminish amplitude.

It is interesting to note that these findings were directly contradicted by the later 1992 study of Katayama et al. (1992) which reported increased theta with attentiveness along with increased alpha while listening to music. However, the theta changes in Katayama et al.'s experiment was in the frontal area, in contrast to the changes in the occipital area by Walker, which may have accounted for the differences. Also, there may have been differences in how the researchers defined "attention".

Walker also found that high familiarity with the music was correlated with greater incidence of theta and beta activity while reports of low familiarity were associated with higher incidence of alpha. Walker suggested that Grossman's theory (1973), which is based on principles from physiological psychology, presented a possible explanation for this finding. According to Grossman a new stimulus or novel stimulus produces an increase in EEG frequency, but with repeated stimulus presentation, the EEG habituates to that stimulus and produces alpha synchrony. Walker suggests that with the presentation of the music stimulus, the subjects' EEG desynchronized upon presentation of the new stimulus but then habituated with repeated exposure to the stimulus. Alpha accompanied low familiarity with the stimulus. The EEG shifted to theta with increased familiarity.

Note that in this instance the "desychronization" in EEG frequency that Walker associates with the novel stimulus, is from theta to alpha, rather than the more familiar desynchronization from alpha to beta.

In a later study by Walker (1980) additional findings brought further insights into the nature of arousal accompanying music stimuli. He looked at 12 right-handed musically non trained subjects during presentation of a series of piano melodies. The subjects were asked to indicate which melodies had been presented earlier. Responses on the music recognition task were scored and classified as true positive, false positive, true negative and false negative. EEG was taken at O1 and O2 for alpha, beta, and theta activity. Results indicated that during a melodic recognition task, alpha activity at occipital sites decreased significantly when stimuli classified as positive (true or false) were presented compared to higher alpha for stimuli classified as negative (true or false). No significant changes in theta were found. Walker suggests that these findings indicated an arousal on the part of the subject to correctly identify the melody, with a suppression of alpha during the arousal situation.

4) Event Related Potentials and Music

According to Frisina, Walton and Crummer (1988) event-related potentials such as the P3 can provide insights into the neurophysiological processes of music cognition. The P3 component of the event related potential is believed to be a neurophysiological measure of context updating.

Crummer, Hantz, Chuang, Walton and Frisina (1988) had subjects listen to timbre and chord discriminations in order to determine correlating psychophysical task performances with the underlying neural activities of musicians and non musicians. Results showed that the width of the P3 component, which was associated with

discrimination of a change in chord structure, was significantly broader for chords. The authors suggested that this reflects either an activation of other areas of the brain or sustained processing within the same structures that produce P3 by musical stimuli.

Klein, Coles and Donchin (1984) tested the abilities of two groups of musically trained subjects to discriminate between two sine tones. One group had absolute pitch; the other did not. All subjects, as expected, performed well on the task. The group without absolute pitch exhibited increased P3 brain-wave amplitude when correctly identifying a target sound. However, the group with absolute pitch showed significantly reduced P3 amplitude. These results suggested to the authors that normal musicians compare the sound on each trial with their current perception of the standard sound residing in their working memory, whereas musicians with absolute pitch compare the sound to a permanent pitch template stored in long term memory, thus requiring less attentional resources with consequently reduced P3 amplitude.

Dalbokova, Kolev and Kristeva (1988) used a dichotic listening task to study selective attention in the presence of a pleasurable but distracting stimulus such as music. Seven right-handed, non musically trained, female subjects listened to six instrumental allegro selections. Different tasks were presented: one was a passive listening task; in the other, subjects had to keep a running mental count of the number of deviant stimuli (targets) occurring in a sequence of standard stimuli while listening to music. Subjects were also given tones in the unattended ear as well. Targets consisted of silence, a 70 dB tone lasting 50 ms at 1550 Hz (standard tone), and a 70 dB tone lasting 50 ms at 1000 Hz (identical tone). All stimuli were delivered via headphone to the left or right ear. Each target was repeated twice, without and with the presence of music. EEG was recorded monopolarly from Fz, Cz, Pz, C3 and C4. Results indicated that in the presence of music both the standard and deviant stimuli (whether passively heard, attended to or not attended to) elicited a broader N1 component of lower amplitude and prolonged latency,

compared to stimulus registration without music. However, N1 amplitude was greater in the attended ear than in the unattended ear and both of these produced greater N1 amplitude than the passive listening task. The greater attention-related N1 enhancement in the attended ear was accompanied by an increase in the early PN (processing negativity), which occurred within the time range of the N1 peak. The authors suggested this could be related to increased processing strategies necessary for performing the discrimination tasks in the presence of music.

In summary, music researchers have found the following: Studies of stimulus-related laterality effects show music to be processed in many cases in the right hemisphere. However, researchers such as Efron (1990) have cast doubt on this research paradigm, suggesting that the results arise from non-centrally mediated functions such as brain-stem processes.

Other behavioral studies of laterality indicate that musical phenomena use both hemispheres in varying degrees depending on many variables, such as subject training in music, familiarity with the music, cognitive strategies for processing music (e.g. holistic vs. analytic), as well as details of the musical stimuli (chords, rhythm, pitch, melody, etc.)

These conclusions are in great degree substantiated in direct neurophysiological measures such as EEG power spectra and evoked potentials. These findings enhance our confidence that the proposed study of EEG changes in a single individual can indicate meaningful variation in subjective experience as well as allow a behavioral interpretation.

The purpose of the current study presented in this dissertation is to determine what general effects *Maharishi Gandharva Veda* music might have on the power spectra of the brain concomitant with its correlation to *Maharishi Ayur-Veda* pulse diagnosis (as explained below). Given that the physiological mechanics underlying the effects of *Maharishi Gandharva Veda* have been identified as similar, if not identical, to the physiological mechanisms underlying the effects of Maharishi's Transcendental

Meditation (Maharishi Mahesh Yogi, January 1990, personal communication) it is reasonable to review some of the EEG power spectra research that utilized subjects practicing Maharishi's Transcendental Meditation technique. Following is a brief review of *Maharishi Ayur-Veda*, its main component, Maharishi's Transcendental Meditation program, and some of the EEG research on subjects practicing Maharishi's TM program.

Maharishi Ayur-Veda—Pulse Diagnosis and EEG Findings

Maharishi Ayur-Veda

In the pilot studies on *Maharishi Gandharva Veda* and EEG reported in this Chapter, I used *Maharishi Ayur-Veda* pulse diagnosis as an independent means of assessing balance during the music and EEG measurement.

As described earlier, according to Maharishi (in Sharma, 1993) *Maharishi Ayur-Veda*, whose heritage stems from ancient India, is one of the oldest medical systems still practiced today. It is also recognized by the World Health Organization as a bonafide medical system. Bodeker (1990) describes *Maharishi Ayur-Veda* as being primarily oriented toward prevention and to the promotion of improved health by enhancing immune functioning and physiological homeostasis.

Maharishi defines *Ayur-Veda* as the knowledge or science of life. Its main purpose is to restore physiological balance (Maharishi, 1986). Sharma, an expert medical practitioner and researcher into the benefits of *Maharishi Ayur-Veda*, (1991, p. 2634) points out that balance by *Ayur-Vedic* standards means "the condition that maximally enhances homeostatic and self-repair mechanisms". Maharishi (1986, pp. 108 -115) explains that *Maharishi Ayur-Veda* is concerned with four major areas of life: body, mind, behavior and environment. According to Sharma (1991) each patient receives recommendations for each of the four areas.

Sharma (1993, p. 272) holds that "the significant contribution of *Maharishi Ayur-Veda* is that it treats disease at its source, rather than merely pacifying symptoms. It focuses on prevention, though it also provides treatment. It is health care— care that promotes health."

Bodeker (1990) explains that over the centuries *Ayur-Veda*[2] has been exposed to various external constraints and conceptual foreign influences which resulted in a loss of important theoretical knowledge and proper clinical applications. This suppression of the pure value of the knowledge led to misapplications of its clinical therapeutics and loss of public acknowledgment of its value.

Maharishi recently initiated a revitalization of the original *Ayur -Vedic* theoretical and methodological principles and techniques. Known as *Maharishi Ayur-Veda,* this modern revival takes into account the many approaches available in the classical texts. According to *Maharishi Ayur-Veda,* there are twenty approaches[3] or therapeutics which the physician may utilize to restore balance. Among these are Maharishi's Transcendental Meditation technique (TM) and *Maharishi Gandharva Veda* music. Table 5-2 presents a complete list of the twenty approaches of *Maharishi Ayur-Veda.*

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[2] Recall that whenever Maharishi's name does not appear before a Vedic body of knowledge, it refers to theory that is not based on his principles.

[3] Note: This list of the twenty approaches of *Maharishi Ayur-Veda* is currently under revision to include another seven or more approaches.

TABLE 5-2
The Twenty Approaches of *Maharishi Ayur-Veda*

1. Consciousness: Maharishi's Transcendental Meditation and TM-Sidhi programs	11. Physiological Purification
2. Primordial Sound	12. Diet
3. Intellect	13. Herbs and Minerals
4. Emotions	14. *Rasayana*
5. Language	15. Behavior
6. *Maharishi Gandharva Veda*	16. Pulse Diagnosis
7. Senses	17. *Jyotish*
8. Psychophysiological Integration	18. *Yagya*
9. Neuromuscular Integration	19. Environment
10. Neurorespiratory Integration	20. World Health/World Peace

Adapted from *Maharishi Ayur-Veda Association of America, 1988.*

Recall from Chapter One that Maharishi (1967, p. 470) describes his Transcendental Meditation technique as a simple, natural mental technique that allows one to effortlessly experience less excited, increasingly refined levels of mental activity until the mind transcends the subtlest state of thought and arrives at the source of thought, Transcendental Consciousness. Maharishi's TM-Sidhi program is said to foster the ability to think and perform activity from within Transcendental Consciousness and thereby enhance mind-body coordination to effortlessly achieve intentions and accelerate growth of higher states of consciousness (Maharishi, 1980, p. 39).

It is suggested that since Maharishi Mahesh Yogi has indicated that the beneficial effects of Maharishi's Transcendental Meditation program and *Maharishi Gandharva Veda* music operate by similar neurophysiological mechanisms (Maharishi Mahesh Yogi, January 1990, personal communication), then it may be possible to postulate that research findings on Maharishi's Transcendental Meditation may shed light on the research findings on *Maharishi Gandharva Veda.*

Presently there is little if any research on *Maharishi Gandharva-Veda* music, hence the purpose of this dissertation. However, there is a large body of research available on the effects of Maharishi's Transcendental Meditation technique on the EEG of normal

individuals. It may be that if *Maharishi Gandharva-Veda* music restores balance to the psychophysiology of a person, then a similar EEG pattern such as that found in Maharishi's Transcendental Meditation will emerge.

EEG and TM

The first question for this hypothesis asks for a definition of the EEG characteristics associated with the practice of Maharishi's Transcendental Meditation. Research into this question dates from 1970. In his doctoral thesis, Dr. R. K. Wallace (1970) was the first to delineate the EEG characteristics produced during the practice of Maharishi's Transcendental Meditation program. Its most distinguishing feature was an increase in regularity and intensity of slow alpha (8-9 Hz) in the central and frontal regions of the brain. In another study, which looked at 36 subjects who served as their own controls, Wallace (1971) found that in some subjects, an increase in alpha was accompanied by occasional trains of theta (5 - 7 Hz) in the frontal channels. The theta wave was characterized as a dominant, rhythmical, amplitude modulated wave present in both occipital and frontal regions of the brain. This theta was different from that associated with drowsiness which was indicated by "a flattening of alpha activity to low voltage, mixed frequency waves, with a prominence of activity in the 2 - 7 Hz range" (Wallace, 1970, p. 54).

Banquet (1973) looked at twelve practitioners of Maharishi's Transcendental Meditation technique and compared their EEG to twelve non practitioners. He had subjects press a button to indicate on the polygraph readout when the subject felt a "deep experience" such as "transcending" had taken place. Looking at the data Banquet found three distinct stages occurred during the TM technique: The first stage showed increased alpha amplitude; the second stage showed that alpha slowed 1 - 2 Hz to become theta

which was accompanied by theta bursts front and back; and the third stage showed global 20 - 40 Hz along with alpha activity during button pushes. Note that only four of the twelve TM practitioners demonstrated this third stage.

Wescott (1973) looked at six TM subjects compared to six subjects who practiced a relaxation technique and another six subjects who served as a control group by sitting with eyes closed. Electrodes were placed on P3, P4, F3, F4 with Cz as reference. Subjects sat with 5 minutes eyes open (EO), 5 minutes eyes closed (EC), 20 minutes practice of Maharishi's TM technique followed by 5 minutes EC and 5 minutes EO. Wescott found greater alpha symmetry associated with right/left correlation and increased power balance with the TM group compared to the other two groups.

Banquet and Sailhan (1974) found that during the practice of Maharishi's Transcendental Meditation program, alpha activity slows down and becomes more diffuse. This activity is highly synchronized between the hemispheres and symmetric in that it is equal in phase and amplitude throughout.

Tebecis (1975) looked at P3, P4 bipolar events in 28 subjects: 14 TM practitioners and 14 controls. He found high intersubject variability occurred with the TM subjects. Theta increased more for the TM group compared to controls. He also found more theta at the end of TM compared to the beginning of the practice.

Glueck and Stroebel (1975) did a matched comparison study between TM and controls. There were 187 subjects in each group with a grand total of 374 subjects participating in the study. Electrodes were placed on frontal, central, parietal and occipital areas of the brain. The pre-post design looked at EEG and GSR changes. Glueck and Stroebel found that during the TM sessions, GSR increased as did alpha. They also noticed that alpha spread from the dominant hemisphere to the other hemisphere.

Hebert and Lehmann (1977) set criterion for theta bursts associated with a deep experience of Maharishi's Transcendental Meditation as having greater than 100

microvolts and lasting longer than one second. Most theta bursts are characterized by their frequency, amplitude, and location, having the highest amplitude in frontal areas during TM and occuring in about a third of the subjects.

Levine, Hebert, Haynes and Strobel (1977) found increased interhemispheric and intrahemispheric coherence of alpha and theta activity in the frontal and central areas of the brain during Maharishi's Transcendental Meditation.

Rouzere, Badawi and Hartmann (1979) noted the following distinctive features of EEG associated with Maharishi's Transcendental Meditation:

1) increased intensity of alpha activity with slow high amplitude alpha activity extending to anterior channels (also reported by Banquet, 1973);

2) rhythmic amplitude modulated and synchronized beta waves present over the whole scalp (cf. Banquet, 1973);

3) theta activity different from sleep or drowsiness, characterized by unusually high voltage and frequency of occurrence and associated with subjective experiences of inner wakefulness and contentment (cf. Banquet, 1973 and Hebert and Lehmann, 1977).

Given that Maharishi's Transcendental Meditation produces EEG changes in theta and alpha, especially in the frontal and central areas, it is suggested that a corollary approach of *Maharishi Ayur-Veda— Maharishi Gandharva Veda* music— will produce similar changes in the EEG but perhaps to a lesser intensity. Specifically, it is suggested that changes in theta and alpha bursts in the frontal and central regions of the brain will occur while an individual is listening to *Maharishi Gandharva Veda* music.

Pulse Diagnosis

Maharishi Ayur-Veda presents an alternative method to what is commonly understood as pulse diagnosis. Generally, a physician trained in western methodology

will measure the radial pulse of an individual in order to determine heart rate. When a physician trained in *Maharishi Ayur-Veda* takes one's pulse, however, it enables the physician not only to determine heart rate, but also to diagnose diseases, detect minute imbalances, resulting from the disruption of homeostatic or immune mechanisms, and ascertain the individual's mental and emotional state of mind. This is accomplished by assessing the dynamical patterns of blood flow that constitute the pulse (Sharma et al., 1991).

According to Sharma (1993) there are three irreducible physiological principles that regulate the different functions of mind and body. These three principles are called *doshas* and reside in the junction point between body and mind. Each specific *dosha* has its own name and general area of responsibility: *Vata dosha* controls movement in the body; *Pitta dosha* governs metabolism; and *Kapha dosha* regulates the structure of the body (see also Wallace, 1994). These three *doshas* are present in everyone at birth but in varying proportions. The exact proportion of *doshas* at time of birth constitutes an individual's physiological body type, and it is this body type which can be determined by taking the pulse. Examples of these body types include *Vata* body type, *Vata/Pitta* body type, and *Vata/Pitta/Kapha* or *tridosha* body type. Altogether, there are ten classic physiological body types (Sharma et al., 1991) which the physician tactically examines as patterns of specific bumps and rhythms in the radial pulse.

To take the pulse the *Ayur-Vedic physician* puts his hand over the radial pulse.

> Just below the radial stylus, the index finger is placed over the *Vata* pulse, the middle finger is placed over the *Pitta* pulse, and the ring finger is placed over the *Kapha* pulse. The skill of pulse reading depends on the training, practice, and alertness of the diagnostician. (Sharma et al., 1991)

In addition to ten combinations, the three *doshas* can be further subdivided into numerous *subdoshas* which in turn regulate various functions throughout the mind and body. *Maharishi Ayur-Veda* theory identifies five *subdoshas* associated with each of the

three *doshas* shown in Table 5-3. Each *subdosha* is purportedly associated with a particular location in the body and when imbalances occur there, specific disorders result. These also can be diagnosed through the pulse.

TABLE 5.3
The Three Doshas of *Maharishi Ayur-Veda* and Their Associated Subdoshas

Dosha	**Vata**	**Pitta**	**Kapha**
Subdosha 1	*prana*	*pachaka*	*kledaka*
Subdosha 2	*undana*	*ranjaka*	*avalambaka*
Subdosha 3	*samana*	*sadhaka*	*bodhaka*
Subdosha 4	*apana*	*alochaka*	*tarpaka*
Subdosha5	*vyana*	*bhrajaka*	*shleshaka*

Another aspect of the physiology which can be diagnosed through the pulse is the health of the *dhatus* or tissues of the body. According to Wallace (1994) *dhatus* are one of the seven basic constituents of the body. They can be either well formed or imbalanced. If imbalanced, the tissues are generally diseased.

According to *Maharishi Ayur-Veda* theory, when the three *doshas* are in dynamic equilibrium, they are considered to be in balance. When they are out of balance it indicates that mind and body are not perfectly coordinated, or in tune with the natural processes of evolution, and disease can develop. Disease then is an indicator of imbalance in the system.

Imbalances can be very subtle and may exist far ahead of the actual manifestation of disease. *Maharishi Ayur-Veda* pulse diagnosis allows an individual to prevent disease from occurring first by enabling one to know what subtle imbalances exist and then by providing *Maharishi Ayur-Vedic* therapeutics to dissolve these root imbalances.

Although a physician trained in *Maharishi Ayur-Veda* pulse diagnosis can with practice determine balances and imbalances in *doshas* and *subdoshas*, each physician may have his or her own method for scoring these changes on paper.

Dr. David Sands, the *Ayur-Vedic* physician who participated in this study, had developed his own personal notation system. It enabled him not only to record the type of imbalance present but also its intensity. Tables 5-4 and 5-5 in the results section of this paper present a summary of notations for each session. For each two minute period, he would 1) mark the time, 2) note personal comments followed by pulse notation, 3) record marks (when he button pressed for the EEG paper record) and 4) record the *dosha*. Under pulse he would note the letter of the *dosha*, subscript the number of the particular *subdosha* and superscript its intensity level. For example, if the subject's pulse indicated a strong intensity in the *prana subdosha*, he would note V_1^{2+}. According to Dr. Sands, imbalances in the pulse were perceived as inequalities in the pulse -- as a "bump" or a "spike" in the wave.

In regard to comments, Dr. Sands attempted to describe the experiences which he felt while taking the pulse. According to Sands (1990, private conversation) when a *Maharishi Ayur-Vedic* physician takes the subject's pulse, it is as if strong experiences of the subject flow through the pulse to the physician. "The examiner feels what the subject is feeling. This happens because the subject and the examiner are intimately connected via the pulse at the junction point of subjectivity and objectivity—the junction point between mind and body." For instance, if the subject were experiencing bliss or an intensely happy feeling, the physician, who is connected to the subject through the pulse, would also have a sensation of bliss. The "junction point" metaphor suggests that the physician allows empathy and expert intuition to enhance the diagnosis, in addition to the technically rigorous criteria for defining the pulse.

Research on Physiological Effects of Recorded *Maharishi Gandharva Veda* Music

Little research has been conducted on the effects of *Maharishi Gandharva Veda* music on the physiology. If *Maharishi Gandharva Veda* music can increase *dosha* balance throughout the mind and body, as found in the results given in Chapter 4, then this increased balance should also be present in the EEG. Corollary evidence should also appear in improvements in the measures of the *Ayur-Vedic* pulse. There is no previous research on EEG and pulse changes while listening to *Maharishi Gandharva Veda* music. Therefore, the following hypotheses will be examined in a single-subject setting.

Hypothesis

An individual listening to *Maharishi Gandharva Veda* music played at the appropriate time of day will experience increased physiological balance or homeostasis as indicated by changes in EEG, specifically global alpha and theta activity, during the subject's deepest experience. Increased balance will also be indicated in the subject's pulse by specific reports of increased balance, unbounded awareness and increased well-being as diagnosed by a physician trained in *Maharishi Ayur-Veda.*

The independent variable was the music at one condition. Dependent variables were EEG paper recordings, *Ayur-Vedic* pulse diagnosis, GSR, and heart rate. The experiment was a case study of a single individual.

Method

Subject

A right-handed 47-year old male with normal hearing, attending an introductory theory course on *Maharishi Gandharva Veda* music, volunteered for the study. The

subject had been a practitioner of Maharishi's Transcendental Meditation for 22 years, and had taken one and a half years of formal musical training in western music as a child. His preferred music for listening included New Age, Native American, and Indian Classical.

Apparatus

EEG was recorded on Grass 7P511-J amplifiers, using a low-filter setting of 1 Hz and high filter setting of 1 KHz. GSR and HR were recorded on a Grass 78D polygraph. Paper records were taken for later analysis.

A Sony CFS-W360 Stereo Cassette-corder connected to a Realistic SA-10 solid state stereo amplifier with a 3 ft shielded y-adapter audio cable and two technics SB L32 speakers connected by a 12-ft shielded audio extension cable were used to play the music. A closed circuit video camera was used to monitor the subject's movements during the sessions. Music levels were measured with a Realistic 33-2050 Sound Level Meter.

Music Stimulus

The music used for the study was a cassette recording of *Maharishi Gandharva Veda* performed by Amar Nath, a world renowned Indian musician. Mr. Nath is the lead floutist for the National Orchestra of India and has been featured on several world concert tours and in many recordings of *Gandharva Veda* music. The instrument which Mr. Nath plays in the bamboo flute. This particular flute recording was of the *raga* suitable for 1 p.m. - 4 p.m. Its name was not given on the cassette label[4].

[4] The complete set of 8 audio cassettes or 8 CDs of Amar Nath's Bamboo Flute music for the appropriate time of time may be ordered from Maharishi Ayur-Ved Products International, Inc. U.S.A. Telelphone number: 1-800-255-8332.

Procedure

The study took place in MIU's EEG laboratory over three sessions. The subject was prepped for EEG, GSR, and HR recording in an outer room adjacent to a 5 ft. by 7 ft. sound attenuated cubicle. The cubicle contained two comfortable chairs and one small desk table upon which the subject could comfortably rest his arm. A *Maharishi Ayur-Vedic* physician skilled in pulse diagnosis sat behind the table. On the table was a soft cloth pad to cushion the subject's arm, a small microphone for the physician's use, and one of the two speakers. A push button marker was taped to the side of the table so that the physician could mark diagnostic time events on the EEG paper record.

The two Technic speakers were positioned approximately 16 inches on either side of the subject and were approximately 2 ft high. A Panasonic video camera was positioned on a small elevated shelf in front of the subject so that movements made by the subject during the session, such as head bobbing in time to the music, drowsiness, head lying back against the wall, etc., could be monitored. Prior to the first session, western classical music was played to determine a comfortable listening level for the subject. Sound pressure level for all sessions was set at 70dB.

During the first session the subject entered the outer adjoining room and first completed a brief biographical data sheet and signed a written consent form. Technicians then attached electrodes using the Electro-cap system for Fp1, Fp2, F7, F3, F4, F8, T3, C3, C4, T4, T5, P3, P4, T6, 01, 02 referenced to linked mandibles. At all electrodes, impedances were below 5 K ohms.

GSR was recorded using two silver silver-chloride electrodes attached one each to the middle phalanx of the middle and index fingers. HR measurements were recorded from plate electrodes attached on the left wrist above the pulse. Measures for GSR and HR were continuous.

After the electrodes were attached, the subject was led into the sound-attenuated cubicle and sat on a comfortable chair with the cloth-covered table to his right. A medical doctor, Dr. David Sands, trained in *Maharishi Ayur-Veda* Pulse Diagnosis sat across from the subject behind the cloth-covered table. The subject was instructed to place his right arm on the cloth and leave it there throughout the session. This enabled the doctor to take the subject's pulse every two minutes during the session without much disturbance nor discomfort. The doctor made a written description of pulse changes directly after taking the pulse. The pulse descriptions included the subject's constitutional body-type, the *dhatus,* and the *subdoshas.*

The subject's EEG was taken once a week on either Tuesday or Wednesday between 1 and 4 p.m. for three consecutive weeks. EEG, GSR, and HR were taken during a 2-minutes Eyes Open (EO), 2-minutes Eyes Closed (EC), 20-minutes music, and 2-minutes EC period. Rather than continuous recording, EEG was recorded in 30-sec epochs bracketing significant shifts in the music. Approximately ten epochs were recorded per session. Every two minutes the physician took the pulse, recorded its characteristics on a sheet of paper and signaled to the polygraph with a button press so that it appeared on the record. The technician also marked shifts in music on the paper record.

After each session and removal of the electrodes in the adjoining room, the subject was invited to complete a brief experience questionnaire (see Appendix).

Results and Conclusion

One of the three sessions was excluded due to technical difficulties and therefore results are based on the remaining two sessions. The physiological data were visually

analyzed, attention being given to comparison of significant shifts in theta and alpha waves, in relation to changes in the pulse and *Maharishi Gandharva Veda* music.

Pulse Diagnosis: The subject's constitutional body type remained *Pitta Kapha* throughout both sessions. *Dhatus* remained well formed throughout both sessions. *Subdoshas* varied between sessions as well as within each session.

While taking the pulse the doctor referred to several descriptions of experiences. He later defined these terms as the following:

• The pulse is "smooth". This refers to the regularity in the shape or structure of the pulse wave form. It indicates that all three *dosha* waves are smooth.

• The pulse is "incoherent." When this occurs, the pulse "feels" like white noise, static, the snow seen on a TV set. Random frequencies are found in the pulse. If imbalances and white noise are mixed together then the doctor first perceives "little bits of imbalances intermixed with the static". As the white noise diminishes the imbalances become more clearly perceived.

• The pulse is "coherent". The white noise quality in the pulse has diminished and the amplitudes of all the frequencies become smoother and clearer. The wave form settles into a smoother form.

• The pulse becomes "deeper" or "crystal clear". As the wave becomes smoother, the doctor feels as if he could "see right through it". The pulse becomes more transparent.

• The pulse becomes "fuller". This refers to the pulse becoming stronger. The pulse is swelling and contracting evenly. Fuller also indicates a more relaxed flow with no tension in the subject's body. This results in a very smooth pulse.

• Gives the "experience of bliss". This refers to the experience of the physician as he takes the pulse. As mentioned earlier, the physician explained this as follows: "One assumes that the subject is feeling what the examiner is feeling and vice versa. One takes

the pulse at the junction point of objectivity and subjectivity, at the level of the quantum mechanical body, which is not restricted to physiological boundaries in time and space."

• Gives the "experience of unbounded awareness". This indicates that the wave form is more integrated, smoother. The physician did not feel "all the little stuff going on in the pulse; rather it became very smooth, settled." "It's like a lake surface rippling with a breeze. The breeze stops and the lake becomes smooth. This smooth lake is like a smooth pulse; subjectively, it feels unbounded, transcendental."

Following is a brief description of changes in pulse and EEG for session one. In general the doctor found the pulse to improve, with all imbalances briefly disappearing at the end of the music. This progressive change was accompanied by a pattern of alpha arousal, followed by theta, including alpha/theta bursts of approximately 7-9 Hz. The subject reported the growing experience of relaxation and wholeness throughout the experience. These changes parallel those reported in Chapter 4 as discovered with the MAARQ in the context of live *Maharishi Gandharva Veda* concerts.

Results Session One

Before the music began the S had lots of artifacts both in EEG and pulse, indicating restlessness and a sense of being unsettled. His eyes were blinking and there were many eye movements. Heart rate was 84 beats per minute. In the pulse, five of the *subdoshas* were unbalanced (see Table 5-3); however the *dhatus* were well-formed indicating general good health. EEG showed mixed frequencies, no alpha (see Figure 5-1).

At the onset of *Maharishi Gandharva Veda* music, the beginning of the *alap* or introductory section in which there is no rhythm, a one second 9 Hz global alpha burst occurred. EEG began to slow down, and EM artifacts disappeared. Heart rate slowed to 78 beats per minute (see Figure 5-2).

Three minutes into the music, the pulse became smoother, more coherent, flowing more as one wave which the physician said gave "the experience of unboundedness". EEG showed a slowing down with a 6 Hz theta low amplitude sequence lasting 4 second dominating the activity in the frontal lobes and 8 Hz alpha occurring throughout except at FP2. Heart rate returned to 84 beats per minute (see Figure 5-3).

Soon thereafter the S's head began to bob indicating that the S may have became drowsy. 30 seconds later EEG showed front to back alpha symmetry, indicating that the subject had re-awakened.

Four minutes into the music, one second bursts of 10 Hz alpha started to dominate followed by theta and some delta. The pulse indicated that background activity or white noise diminished allowing clearer perception of *subdosha* imbalances. The intensity level of the *subdoshas* dropped. The subject settled down as indicated by fewer eye and general movement artifacts. Theta, delta, and alpha were fairly generalized. At this point the physician's report of decreased 'white noises' in the pulse corresponded to the reduction of artifacts in the EEG record, indicating diminished background activity in both measures.

Six minutes into the music the pulse became fuller indicating more coherence among the *doshas*. Simultaneously in the EEG, diffuse alpha spindles occurred in all regions including the frontal regions.

Eleven minutes into the music the *subdosha* imbalances shifted with *Pitta subdosha* imbalance disappearing altogether. The *Pitta subdosha* imbalance did not return until just before the music ended. *Kapha subdosha* imbalance increased in intensity to 2+. At this time the S leaned his head against the back wall thereby losing most of the EEG signal to movement artifact. However, EEG did record 10 Hz alpha activity of 2 second duration. Temporal alpha was found over the right ear and behind the left ear.

Thirteen minutes into the music when the *jor* or 2nd movement began, the physician noted that the music entered a lower register while the rhythm and tempo increased. (The *jor* features an increase in tempo to a medium speed and the introduction of the percussion instruments, the *tablas).* At this point the pulse became fuller and gave the physician the empathic experience of bliss. The S's head was bobbing;*Vata subdosha* imbalance lessened in intensity; *Kapha subdosha* imbalance remained unchanged.

Seventeen minutes into the music the *raga* entered its third movement, the *gat.* (The *gat* features increasing tempo with increased intensity of the *tablas*). Imbalances in the pulse were detected as being sharp and clear.

Vata subdosha imbalance increased to +2 intensity level; *Kapha subdosha* imbalance remained unchanged. As the music concluded all imbalances in the pulse disappeared briefly. Heart rate slowed down to 78 beats per minute (see Figure 5-4).

At the point where pulse imbalances disappeared, a 2 second duration of 9 Hz alpha occurred in the brain wave activity along with some theta. Alpha continued to be found in all regions of the brain throughout this time.

Following the end of the music a 3 second low voltage 8 Hz alpha burst occurred and continued to alternate with theta bursts throughout the next few minutes. 3 minutes later the S opened his eyes at which time more activity was found in the pulse with faint perception of imbalances. 8 Hz alpha bursts continued periodically. Please see Table 5-4 for a summary of the doctor's comments on pulse diagnosis for session one.

Conclusion Session One

At the beginning of the session the subject was restless and unsettled as indicated by muscle and eye movement artifacts in the EEG and imbalances in the *subdoshas* of the pulse. At the onset of the music the subject immediately settled down: eye and muscle

artifacts disappeared, imbalances in the *subdoshas* became fainter. Throughout the twenty minute music session, a pattern of alpha arousal followed by theta occurred regularly while the pulse continued to improve in balance and smoothness. At the end of the music all imbalances in the pulse disappeared briefly and alpha bursts followed by theta continued for several minutes until the subject opened his eyes at which time more artifacts appeared in the EEG and faint imbalances in the pulse returned.

Heart rate did not appear to change systematically during the session. It varied between 84 beats per minute and 78 beats per minute, resulting in an overall change of 6 beats. This pattern continued throughout the music.

The subject found the music to be "very relaxing" with a "general feeling of wholeness" being created. He commented that "Overall (it was) very sweet and healing". These comments compare favorably with the subjective report of "bliss" given by the single subject in Pilot Study Two—Immediate Effects of a Live *Maharishi Gandharva Veda* Concert—reported later.

Comments will be given regarding the significance of the bursts of alpha, theta, and the 7-9 Hz alpha/theta frequencies following the description of the second session. Note that no evidence of unusual beta activity appeared during the session, in contrast to what will be reported in Pilot Study Two.

Figure 5.1. Session One. EEG eyes closed pre music condition. Eye movements appeared predominately in the frontal leads along with mixed EEG frequencies in the other leads. Notice the heart rate artifacts in all the leads of the EEG. This was due to the placement of the linked mandibles electrodes which picked up the heart rate signal. Also, due to recording difficulties, the P3 signal was lost throughout the session. Heart Rate was 84 beats per minute. Pulse diagnosis indicated the subject had dosha and subdosha imbalances.

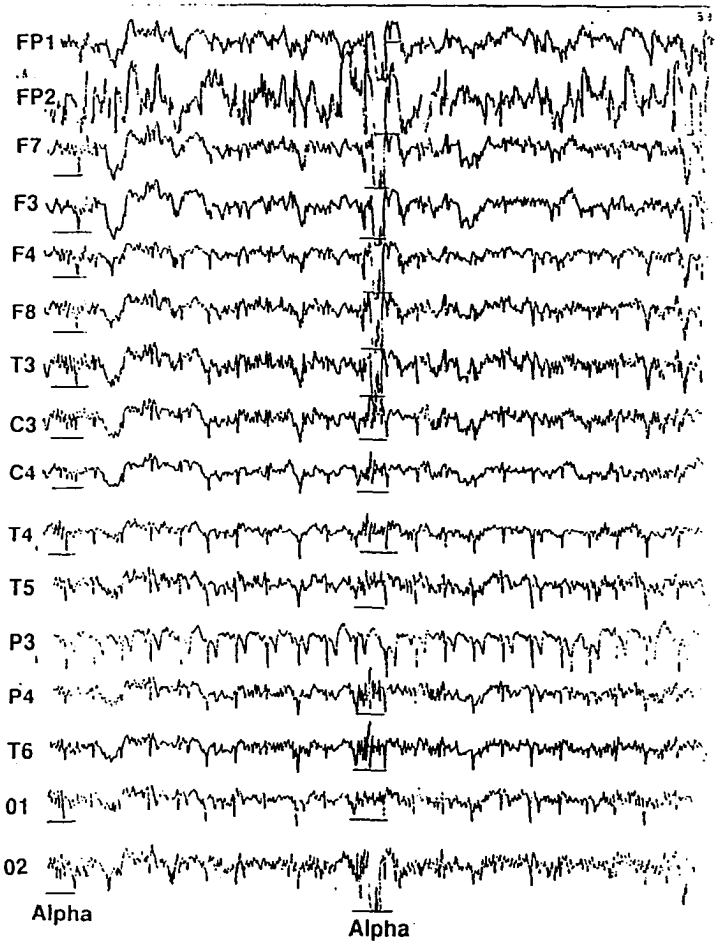

Figure 5.2. Session One. Eyes closed at onset of music (5:33 min from the beginnning of the session). Two 1-sec 9 Hz global alpha bursts occurred, both at the beginning and at the middle of this record. The second burst occurred just after the music began. In this second brief burst the anterior alpha registered along with eye movments, indicating a relaxed state along with movement. HR slowed to 78 beats/minute. Pulse diagnosis indicated that the pulse became "smoother, more coherent".

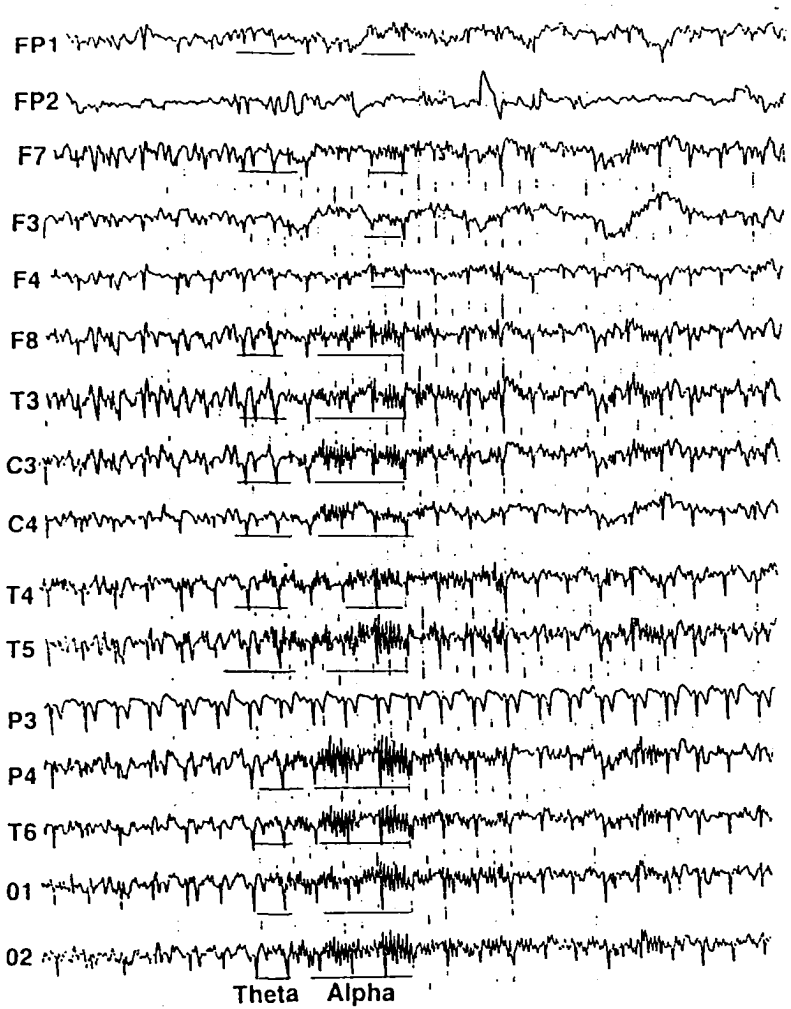

Figure 5.3. Session One. EEG eyes closed, 2:66 min into the music and 11 min from the beginning of the session. 6 Hz theta followed by 8 Hz alpha occurred in all leads except FP2. This pattern of theta alternating with alpha continued throughout the music. HR increased to 84 beats/minute. Pulse diagnosis indicated that "background activity disappeared" allowing for subdosha imbalances to be more clearly perceived.

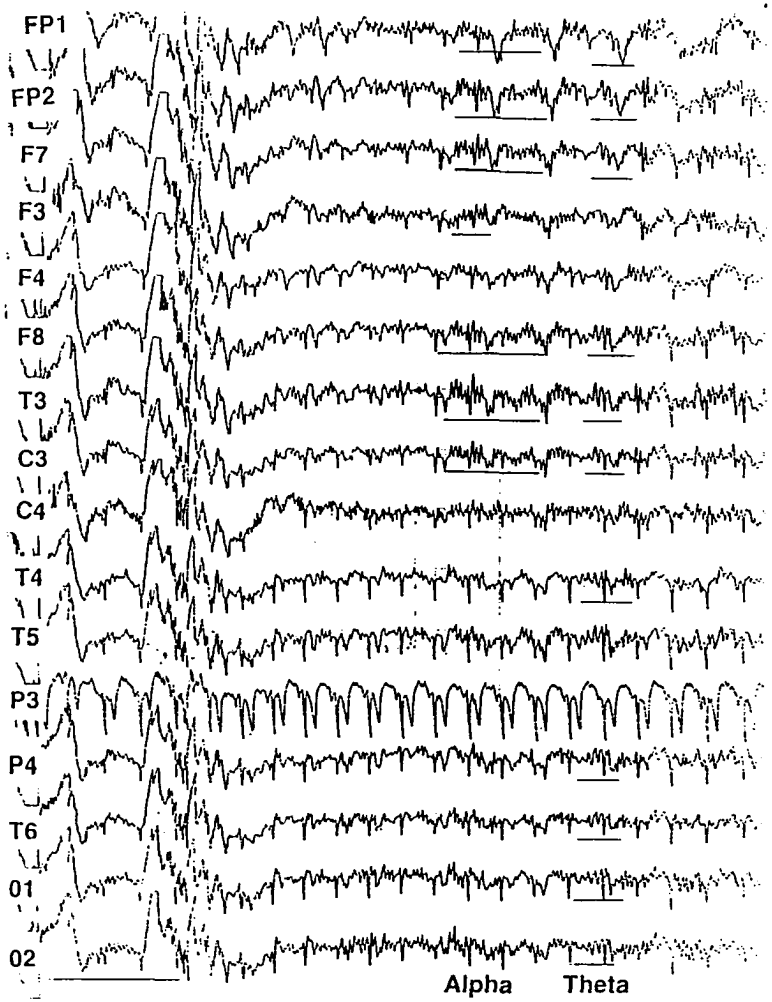

Figure 5.4. Session One. EEG eyes closed at end of music (28 minutes from the beginning of the session). Muscle artifacts appeared in all leads at left of record. 9 Hz alpha occurred anteriorally in both hemispheres with a higher amplitude dominating in the left hemisphere. This was followed by theta in all leads except F3, F4, C4 and T5. HR returned to 78 beats/minute. Pulse diagnosis indicated a brief disappearance of subdosha imbalances during this time.

TABLE 5-4
Session 1: Pulse Diagnosis and Doctor's Remarks

Time[a] (minutes)	Activity[b]	Pulse Vata	Pulse Pitta	Pulse Kapha	Comments[c]
2:00	EC	$V_2{}^{1,4}$	$P_2{}^{1,5}$	$K^1{}_2$	Imbalances in 5 sub-doshas: udana, prana, ranjaka, sadhaka & avalambaka; Prakriti is Pitta/Kapha; dhatus well-formed.
6:00	MGV on	V	P	K	MGV on 3 min; pulse smoother, more coherent. Gives physician experience of unboundedness.
10:66	MGV	$V_{2,4}$	$P_{2,3}$	K_2	Imbalances more clearly perceived as background activity disappears.
12:66	MGV	V	P	K	Pulse fuller; more rasa, coherence; imbalances clearly perceived; dhatus normal
17:00	MGV	$V_1{}^{2+,4}$	P^0	$K_2{}^{2+}$	Vata subdosha imbalance shifts to prana. Pitta imbalance disappears
19:33	MGV	V_1		$K_2{}^{2+}$	Music in lower register. Pulse fuller, clear, gives experience of bliss. Head bobbing.
20:33	MGV	$V_1{}^{2+}$		$K_4{}^{2+}$	Transition in music. Imbalances sharp and clear.
27:66	Music ends	V	P	K	No spikes in pulse. Imbalances disappear briefly.
28:00	EC	$V_1{}^{1,4}$	$P_2{}^{1/2}$	$K_2{}^1$	
30:00	EO	V_1		K_2	More activity in pulse; imbalances faint; dhatus normal

Note: Data is for one subject.
[a] Time is in a running sequence by minutes.
[b] MGV represents *Maharishi Gandharva Veda*; EC represents eyes closed and EO represents eyes open.
[c] Remarks were written by the physician at the beginning of each time period.

Results Session Two

The second session's analysis indicated that the results of the first session were not anomalous. Although the subject experienced more drowsiness than in session one, the overall trend in the second session remained in the direction of lessening of *dosha*

imbalance and improved sense of subjective well-being. The occurrence of 7-9 Hz alpha/theta bursts reappeared in the second session along with bursts of alpha and theta.

At the beginning of the second session, with eyes open, the subject was unsettled as indicated by pulse and EEG recordings. Pulse analysis indicated well-formed *dhatus*, *Pitta-Kapha* body type, and 2+ imbalances in *Vata* and *Kapha subdoshas*; while EEG registered mixed frequencies in all areas of the brain, along with eye movements and muscle artifacts. Thirty seconds into the session, imbalances appeared in *Pitta subdosha.*

When the S closed his eyes an immediate settling occurred. Pulse analysis showed diminishing of all *subdosha* imbalance. Heart rate was 69 beats per minute. EEG showed prominent 12 Hz alpha waves, even anteriorally (see Figure 5-5).

At the onset of music the pulse became even more settled with background activity in the *subdosha*s diminishing even more. This settled pulse indicated an experience of unbounded awareness according to the physician. Heart rate increased to 72 beats per minute. EEG registered a global alpha burst at music onset with continuing alpha thereafter. This alpha burst could be seen as an arousal pattern indicating increased alertness with the onset of music. The burst was not as dramatic as in session one indicating the subject was generally fairly alert in session two (see Figure 5-6).

Two minutes into the music (*alap* section) the pulse became smoother indicating "deeper experiences". Perception of imbalances became clearer. EEG showed 10 Hz alpha activity which then slowed down. Some 6 Hz theta also was seen.

Three minutes into the music the EEG showed theta and delta activity, indicating the subject may have become sleepy. Note that traditional EEG findings show that initial delta activity in sleep does not occur as rapidly as observed here. Thus, the current demonstration of delta is unusual in that the subject came in and out of it very rapidly, as will be discussed below.

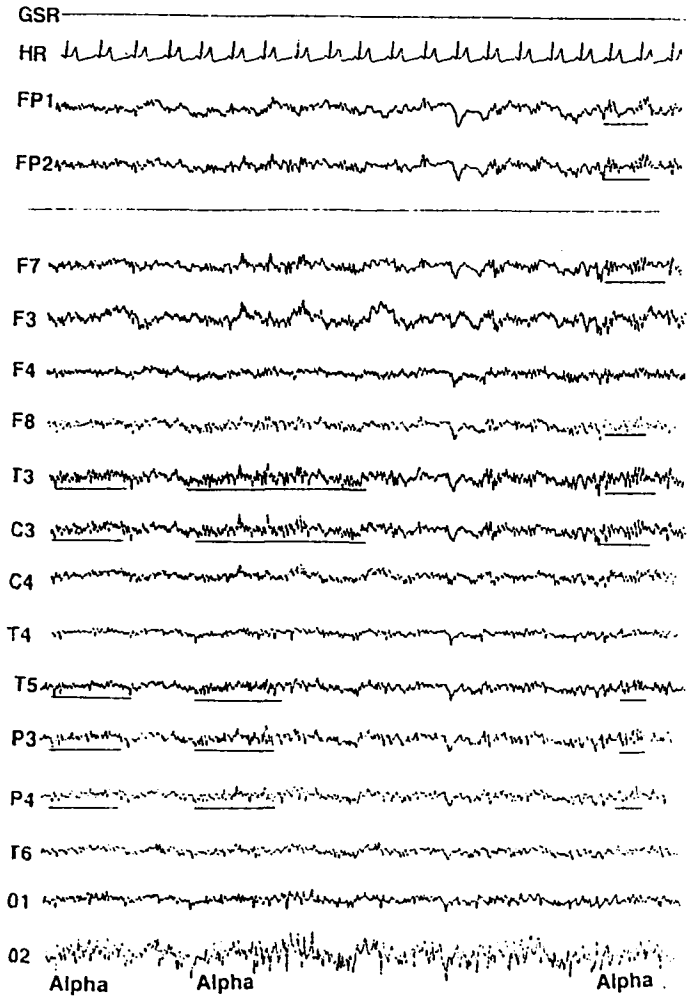

Figure 5.5. Session Two. EEG eyes closed pre music condition. Fewer artifacts were found in this record than in the pre music period for Session One. A strong 12 Hz alpha appeared predominately in the left hemisphere at T3, C3, T5, and P3. HR was 69 beats/minute. Pulse diagnosis indicated imbalances diminished in intensity during eyes closed condition.

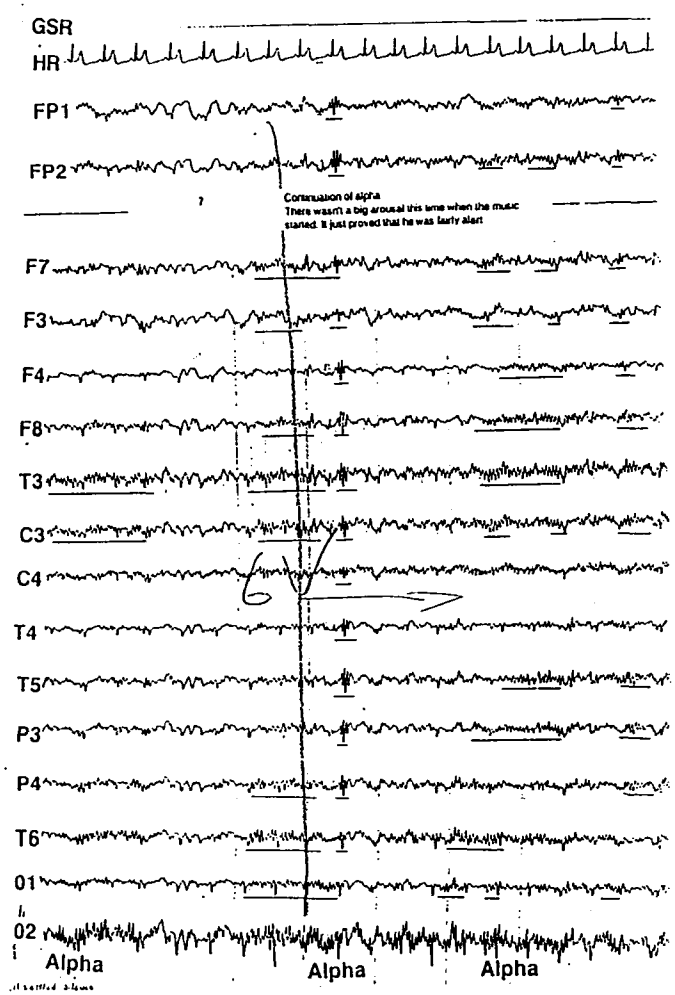

Figure 5.6. Session Two. EEG eyes closed at onset of music (8:66 minutes from the beginning of the session). When the music began, a brief global alpha burst occurred, reflecting an arousal pattern. Note that the highest amplitude alpha appeared at O2 with a 1-sec alpha burst of equal value amplitude occurring at all other points on the scalp. Dominant alpha patterns continued at T3 and C3. A 2-sec high amplitude alpha occurred at T3, C3, P4, T6 and O2 just prior to the alpha arousal pattern. HR increased to 72 beats/minute. Pulse diagnosis indicated that subdosha imbalances were distinctly perceived in the pulse.

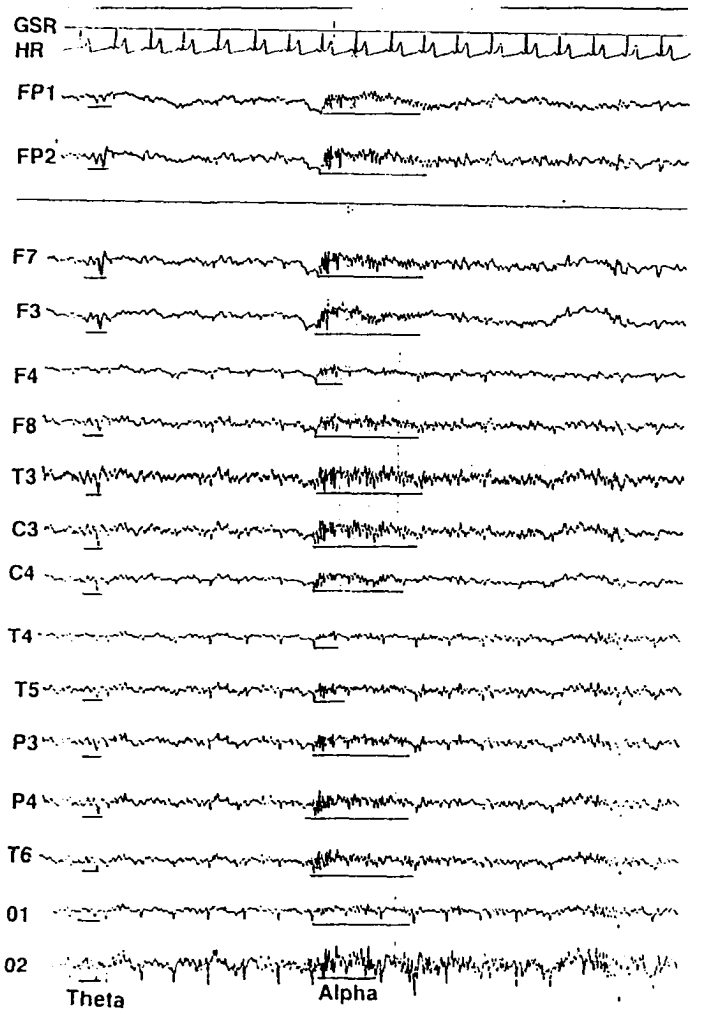

Figure 5.7. Session Two. EEG eyes closed 3 min into the music and 13:33 min from the beginning of the session. A 5-6 Hz theta burst in FP2, F7, F8, T3, C3,C4, P3, P4, T6, O1 and O2 occurred at the beginning of the paper record followed 15 sec later by an 8 Hz high amplitude global alpha wave pattern lasting 2+ sec towards the end of the record. Heart Rate returned to 69 beats/minute. Pulse diagnosis became more"coherent" during this period.

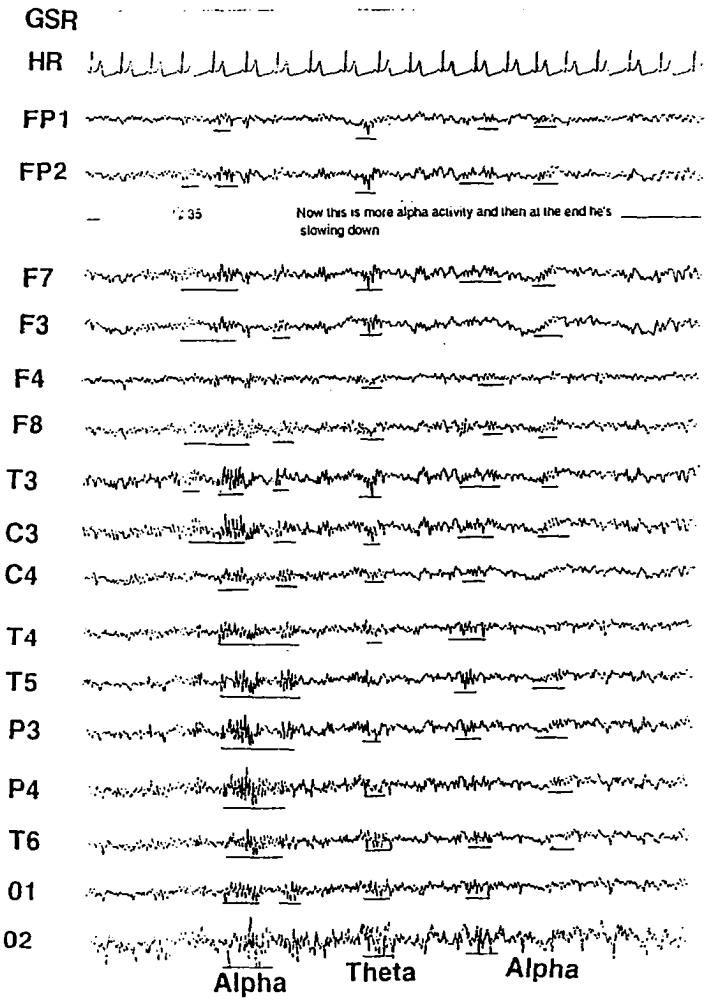

Figure 5.8. Session Two. EEG eyes closed 2 min after music ends and 32:33 min from the beginning of the session. 8 Hz high amplitude globa alpha occurred, lasting 1 - 2 sec in all points on the scalp. The most dominant alpha appeared in the O2 lead. This was followed by a global theta burst which in turn was followed by more alpha, especially in F7, F3, T3, C3, T4, T5, P3, T6, O1 and O2. HR increased to 72 beats/minute. Pulse diagnosis indicated that background activity in the pulse increased during this time.

The subject mentioned in his comments afterwards that he did experience some sleepiness. Subsequently, a 5 - 6 Hz theta burst followed by a 8 Hz high amplitude global alpha wave pattern lasting 2+ seconds occurred. This rhythmicity of theta followed by alpha was found in the first session as well and could possibly be associated with listening to this music. Heart rate returned to 69 beats per minute (see Figure 5-7).

Four minutes into the music the *rasa* in the pulse became fuller, covering over the imbalances thus suggesting increased *dosha* coherence to the physician. A 1 second, 10 Hz alpha burst then was seen in the EEG along with theta in the temporal area. Theta and alpha kept alternating throughout this time period, as seen in session one.

Six minutes into the music the melody shifted from the *alap* section to the *jor* and the pulse became fuller. When the *tablas* or drums commenced playing in the *jor* there was an immediate increase in *Pitta subdosha* imbalance with *subdosha imbalances* in *Vata* and *Kapha* disappearing. EEG showed a 3 second alpha burst which could be interpreted as an arousal pattern. 10 Hz alpha continued throughout this time period. Note the close correspondence between the EEG changes, pulse changes, and musical development.

Ten minutes into the music the *gat* or 3rd movement of the *raga* began and the tempo of the melody increased. The pulse became very smooth with *Pitta subdosha* imbalance still palpable and *Kapha subdosha* faintly appearing. EEG showed sustained alpha in the frontal lobes. 3 second of 10 Hz alpha was seen followed by theta. The pattern of alpha followed by theta continued throughout the time period along with 7-9 Hz alpha/theta bursts.

Thirteen minutes into the music HR decreased, pulse became smoother, *subdosha* imbalances became faint, indicating a more settled system. EEG indicated stage one sleep. Eye movements were not a variable under observation; therefore, the stage one condition must be inferred from the EEG alone.

Fourteen minutes into the music a new rhythm (12 - 16 Hz activity in the somatosensory area known as a vertex wave) appeared in the EEG indicating the subject may have fallen asleep sitting up. Fast theta was followed by 1 second of global 10 Hz alpha leading into the vertex wave. The global alpha pattern extended into the frontal lobes as well. This appearance of alpha in the frontal area as been noted as a characteristic of Maharishi's Transcendental Meditation experience. The pattern of theta followed by alpha followed by vertex showed up several times during the next five minutes.

Nineteen minutes into the music the climax of the *raga* took place. Pulse diagnosis indicated reduced imbalances in all *subdoshas* and great coherence in all areas of the pulse. EEG indicated more of a drowsy activity as indicated by muscle activity, mixed frequencies, and theta activity. Also theta and alpha continued to alternate throughout. There was more low voltage activity and some beta activity during the climax.

The music ended at 21 minutes. An alpha spindle of 10 Hz was seen followed by theta. Alpha and theta alternated continuously. The pulse continued to be very smooth with *Vata* and *Pitta subdosha* imbalances occurring at the 2+ intensity.

Two minutes after the music ended background activity in the pulse returned; *Vata* and *Pitta subdosha* imbalance dropped in intensity while *Kapha* imbalance remained the same. Heart rate increased to 72 beats per minute. EEG showed mixed frequencies of theta and alpha (see Figure 5-8). Please see Table 5-5 for a summary of the doctor's comments in regard to pulse diagnosis for session two.

TABLE 5-5
Session 2: Pulse Diagnosis and Doctor's Remarks

Time[a] (minutes)	**Activity**[b]	**Pulse** Vata	**Pulse** Pitta	**Pulse** Kapha	**Comments**[c]
2:04	EO	V_1 2+		K_4 2+	Imbalances in prana & tarpaka; Prakriti is Pitta-Kapha; dhatus well-formed.
2:06	EO	V_1 2+	P_3 2+	K_4 2+	Imbalance in sadhaka detected too.
2:07	EC	V_1 1+	P_3 1+	K_4 1+	Immediate settling. Imbalances all diminish in intensity. Dhatus normal. Prakriti same.
2:09	EC	V_1 1 1/2	P_3 1 1/2	K_4 1 1/2	Silence in room. Pulse more settled (gives experience of expanded, unbounded awareness. Imbalances perceived more distinctly as background activity diminishes.
2:10 - 2:11	MGV starts	V_1 1+	P_3 1+	K_4 1+	Pulse is smoother, experience "deeper"; perception of imbalances is clearer.
2:13	MGV	V_1	P_3	K_4	Pulse becomes fuller (greater rasa) covering over imbalances; indicates greater coherence.
2:17	MGV		P_3 2+		Tabla starts. Immediate increase in sadhaka impulse. Pulse fuller. Dhatus balanced. Prakriti unchanged.
2:20	MGV		P_3 2+	K_2 1/2	Tempo of music increases. Pulse now very smooth and sadhaka still readily palpable. Dhatus normal.
2:23	MGV		P_2 1+	K_2 1/2	Heart rate decreases. Pulse fainter (weaker) but still clear. Imbalance less striking. System is even more settled.
2:29	MGV climax	V_1 1/2	P_3 1 1/2	K_2 1/2	Imbalances reduced. Great coherence in all areas of pulse.
2:30	Music ends	V_1 2+	P_3 2+	K_2 1/2	Silence.
2:33	EC	V_1 1+	P_3 1+	K_2 1/2	Background activity in pulse increasing.
2:36	EO	V_1 1 1/2	P_3 2+	K_2 1/2	Pulse still very clear (coherent). Sadhaka stronger. Prakriti very clear.

Note: Data is for one subject. MGV represents *Maharishi Gandharva Veda.* EC represents eyes closed and EO represents eyes open.

[a] Time is in a running sequence by minutes.

[b] Remarks were written by the physician at the beginning of each time period.

Conclusion Session Two

In the beginning eyes open condition, the subject appeared unsettled as indicated by muscle and eye artifacts in the EEG and by imbalances in various *subdoshas* in the pulse. An immediate settling down was noticed in both pulse and EEG when the subject closed his eyes prior to the music condition as is usually the case upon closing the eyes. Pulse analysis indicated that *subdoshas* diminished in intensity and EEG indicated alpha and theta wave dominating brain wave activity. With the onset of music the pulse became smoother with less background activity while the EEG showed increases in alpha followed by theta activity, along with 7-9 Hz alpha/theta bursts. During the music condition, the subject became very relaxed and appeared drowsy as indicated by stage one sleep indices of vertex wave, delta activity, decreased HR, and smoother pulse. However, the subject remained alert to music shifts as indicated by alpha bursts in EEG at those times. When the music condition ended, alpha and theta continued for a few minutes and then artifacts in EEG and background activity in pulse increased.

As in session one, heart rate did not systematically change with the music. It varied between 69 beats per minute and 72 beats per minute, resulting in an overall drop of 3 beats. This pattern continued throughout the music.

The subject reported feeling deep relaxation, some sleepiness, subtle mental (emotional) activity. Overall he felt it was very enjoyable, balancing, and healing. No explicit mention of "bliss" or its synonyms was made. However, such would not exclude the possibility of the experience. (See discussion in Pilot Study Two.)

Discussion

In this initial pilot study, the question was raised as to what effects *Maharishi Gandharva Veda* music has on the physiology. Given that *Maharishi Gandharva Veda*

music and Maharishi's Transcendental Meditation technique are two of twenty approaches of *Maharishi Ayur-Veda*, they should have similar effects since ultimately all approaches contribute to expanding and stabilizing the experience of pure consciousness. As indicated in the review earlier, research on Maharishi's Transcendental Meditation indicates that changes in EEG occur when an individual experiences the effects of restful alertness during transcending to pure consciousness. Thus similar changes should be found with *Maharishi Gandharva Veda* music if it also facilitates transcending and stabilization of restful alertness.

As reviewed earlier, research indicates that during Maharishi's Transcendental Meditation there is an increase in high amplitude alpha activity in the frontal areas of the brain, particularly for the slow alpha frequencies, accompanied at times by synchronous theta trains (Banquet, 1972, 1973; Krahne and Taneli, 1975; Wallace et al., 1971). During the *Maharishi Gandharva Veda* condition, an alternating pattern of theta followed by slow alpha developed in both sessions. Also, 7-9 Hz theta/alpha bursts occurred. This pattern continued for the duration of the music. At one point in session two, the subject felt drowsy and stage one sleep tracings appeared on the record. Delta frequencies also appeared. These drowsy, or sleep tracings differed from the theta and alpha pattern, indicating something different from normal sleep yet very restful in its own nature that may have been occurring throughout most of the music session.

One interpretation of these results is according to Maharishi's Junction Point Model (Maharishi, 1972; Travis, 1994). In this view, Transcendental Consciousness is the junction point between waking, dreaming and sleep states. From the junction point, we can slip into any of the other states. From this perspective, *Maharishi Gandharva Veda* music, like Maharishi's Transcendental Meditation technique, kept the individual hovering around the junction point, with the physiology slipping back and forth between

states, as the normalization process required. Thus, the subject alternately showed brief periods of sleep, drowsiness and Transcendental Consciousness (restful alterness).

It is interesting to note that the subjective report was of being awake or aware during almost the entire session, even though there were considerable periods of drowsiness. This suggests a "witnessing" effect of maintaining awareness during all states, as also reported by subjects in Chapter Four.

The Junction Point interpretation is consistent with other observations as well. At several times during the music, pulse and EEG recorded similar findings: in session one, alpha synchrony increased and artifacts lessened at the same time that 'white noise' in the pulse diminished and *subdosha* imbalances faded away. Again, in session two, pulse diagnosis indicated a deep state of rest at the time when the EEG recorded stage one sleep. The settling of the pulse at the time of drowsiness in both sessions suggests the subject was transcending, but could not sustain conscious awareness due to fatigue in the system, and therefore slipped in and out of the sleep mode, while apparently witnessing the transition.

It was hypothesized that the physiological mechanisms responsible for the effects of *Maharishi Gandharva Veda* music would be the same as those for Maharishi's Transcendental Meditation (Maharishi, personal communication, January, 1990). The Junction Point interpretation links the current EEG findings with the experience that characterizes both the practice of TM and the waking/sleeping transition, such as the waking and sleep transitions observed during session two. Travis (1990) compared the EEG of 10 subjects practicing Maharishi's Transcendental Meditation technique with the EEG of 10 non-meditating subjects during the waking/sleeping transition (prior to Stage 1 sleep). The subjects were matched in age, gender, and handedness. Travis reported that the two groups exhibited essentially identical power and coherence spectra. The major difference was that the sleeping subjects exhibited the characteristic EEG only 3-5

minutes, while, during TM, subjects exhibited the EEG the whole experimental session. Travis (1994) points out that other researchers have reported similar findings (Wallace, 1970; Fenwick et al., 1977; Wachsmuth and Dolce, 1980; Stigsby et al., 1981). Some have suggested that TM freezes the hypnagogic (junction point) state (Schuman, 1980, Pagano and Warrenburg, 1983).

As Travis points out, Wallace (1970) identified three categories to characterize the TM pattern of EEG: increase of frontal alpha, slowing of the peak EEG 1-2 Hz, and periodic global theta bursts. Mason et al. (1990) studied EEG in eight subjects during sleep who were experienced in the TM practice. This study found theta/alpha bursts (7-9 Hz) simultaneous with delta of deep sleep during periods when these subjects reported witnessing sleep. Banquet and Sailhan (1974) reported theta/alpha activity, seen during the practice of TM, simultaneously with delta activity during deep sleep in advanced meditators . In later research, Travis (1994) demonstrated significantly greater occurrence of theta/alpha (7-9 Hz) activity during three "junction points" compared with other sleep stages such as REM periods ($p = .003$) and non-REM periods of sleep ($p = .007$). The three junction points were at the waking/NREM-sleep transition, the transition from delta of deep sleep to REM-dreaming, and between REM-dreaming and delta sleep.

Travis (1994) comments that theta/alpha activity is usually ignored during sleep research because it does not fit into standard sleep categories and has only been reported in the waking/sleeping transition such as when subjects fall asleep (Santamaria and Chiappa, 1987), called hypnagogic sleep . Travis suggests that this transition may be the same as the "junction point" model identified by Maharishi and also reflected in various EEG findings among TM practitioners.

> This model portrays waking, NREM-sleep, and REM-dreaming as "waves" of the underlying "ocean": they are different only on the surface, sharing the same source from which their characteristic activities arise and fall....[T]he spaces between waves represent the junction points between states of consciousness. The experience of the underlying field is theorized

> to be available at these junction points, and to be more directly assessed experientially and physiologically during meditation....In light of the junction point model, these theta/alpha bursts could signal the junction point between sleeping and dreaming. (Travis, 1994, p. 92 and 96)

The particular application of the junction point model to the current research lies in the putative mechanics by which *Maharishi Gandharva Veda* music brings about balance of the *doshas*. The two sessions reported here found a correlation between balancing of the *doshas* and exposure to *Maharishi Gandharva Veda* music. EEG recorded during the experiences in both sessions indicated bursts of alpha alternating with theta and occurrences of 7-9 Hz theta/alpha activity as well. These are also EEG "signatures" of the TM experience, which, as indicated above, can be associated with the junction point model.

Travis (1994) suggests how the junction point model relates to the TM practice (and presumably to the *Maharishi Gandharva Veda* music experience):

> According to [the junction point] model, EEG patterns would be similar during the waking/sleeping transition and during TM practice because both states involve a gradual minimizing of mental activity followed by short Transcendental Consciousness periods between states in the first case, and between thoughts in the second. Also, this model would predict a longer duration of this pattern during TM practice because one continues to give an inward direction to awareness during TM, thereby cycling through Transcendental Consciousness many times in each session, in contrast to the transition through that state in the shift from waking to sleeping (Travis, 1994, p. 98).

Suggestions for Future Research

There is a great need for further research on *Maharishi Gandharva Veda* music. Recall that most EEG research on music has focused on four major areas: 1) structural locations in the hemispheres, 2) music recognition tasks, 3) aural evoked potentials, and 4) other psychophysiological variables which may affect EEG.

Regarding structural locations, this pilot research indicated that dynamic changes occur throughout the brain when a subject is listening to *Maharishi Gandharva Veda* music. Further research is necessary to determine if specific areas of the brain respond more to *Maharishi Gandharva Veda* music than to other forms of music. If, as Boyle and Radocy (1987) have indicated, unfamiliar music may initially be unsettling to a listener, it may be that initial sessions with this music may influence areas of the brain that differ from areas influenced by later sessions with the music. For example, non musicians respond with right hemispheric activation upon hearing melodies; perhaps first time listeners to *Maharishi Gandharva Veda* music will respond similarly.

Questions arise as to what would be effects on the cortex over time? Would a child who grew up listening to this music have a thicker corpus callosum, a more pronounced planum temporale, or would there be some other developmental effects? What would be the effects of someone who "passively" listened to the music in the background twenty-four hours a day versus someone who actually played one of the instruments used in *Maharishi Gandharva Veda* music? The theory of *Maharishi Gandharva Veda* music suggests that listening to *Maharishi Gandharva Veda* music is a powerful developmental technology that conditions the neurophysiology to function in accord with the total potential of natural law. In the context of the twenty approaches of *Maharishi Ayur-Veda*, *Maharishi Gandharva Veda* music contributes to the growth of enlightenment, the state of perfect psychophysiological balance (Maharishi, 1991). This would suggest that an enlightened individual with such a developed nervous system would be at home with all knowledge and all situations, spontaneously thinking and behaving in accord with natural law.

In regard to *Maharishi Ayur-Vedic dosha* balance, it was noticed that *Pitta* aggravations reduced during the music session. This reduction in *Pitta* apparently occurred during the epochs of increased alpha production. If so, could there be a

connection between balanced *Pitta* and increased alpha? Is this a phenomenon produced by the music for all individuals, for a particular subgroup of personality types, or just for this one individual? The results of experiment one in Chapter Four suggest that *Maharishi Gandharva Veda* balances all *doshas* for all types of people. Does each section of the *raga* (the *alap*, *jor*, and *gat*) produce a different effect on *doshas* and EEG or is it more important to look at the overall effect? This also should be researched further.

In regard to hemispheric laterality, research on *Maharishi Gandharva Veda* music and trained vs. non trained musicians should be done. Will musicians trained in Western music styles respond with the same laterality patterns when presented with this *Vedic* music style? Will non musicians respond similarly or differently to hearing a different type of music? Which hemisphere will respond more to this unique music style? Will musical sub-processing systems become more apparent with a non familiar musical style?

This first study gives a glimpse into the possibilities that arise with research into power spectra. Further studies should aim to reveal homolateral power and coherence increases associated with listening to *Maharishi Gandharva Veda* music.

When looking at other variables, further studies should investigate into gender, age and ethnic differences as variables which may affect the EEG of an individual listening to this music style.

And, in regard to aural evoked potentials, does the brain have stored within its own structure templates of this music which is reportedly in alliance with natural law? In other words, if, as Maharishi (1990) suggests[5], this music is indeed reflecting the mechanics of the unified field of natural law, it would stand to reason, that the brain would recognize

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[5] Please see Chapter One for a detailed explanation of the mechanics of the unified field of natural law as it is reflected in *Maharishi Gandharva Veda* music.

this natural pattern and respond to it with a unique signature. This signature should appear in the AEP. Further research is needed to determine this.

This first pilot study looked at overall effects of *Maharishi Gandharva Veda* music on the power spectra of the brain, with findings associated with alpha and theta powers. The experiment used a single subject who listened to a cassette recording of *Maharishi Gandharva Veda* music in an isolated room optimized for EEG recording. The next pilot study explores the effects of this music on the EEG spectra during a live concert.

Immediate Effects of a Live *Maharishi Gandharva Veda* Concert on the EEG and Subjective Experiences: Pilot Study Two

This experiment was conducted as part of a trial run of a new EEG recording system, the Interactive Brainwave Visual Analyzer (IBVA). The purpose of the study was to observe the effects of a live *Maharishi Gandharva Veda* concert on the EEG. The IBVA is only designed to record frontal EEG (FP1 and FP2). Among its benefits for use in concert settings is its light weight and portability.

Hypothesis

This second pilot study investigated the possible relationship between changes in EEG and changes in subjective experiences in a subject listening to a live concert of *Maharishi Gandharva Veda* music.

The independent variable was music; the dependent variables were frontal EEG and reported subjective experiences.

Method

Subject

A right-handed 53 year-old Caucasian male volunteered for the study. He had practiced Maharishi's TM program continuously for 24 years. The subject was a non musician who had attended previous concerts on *Maharishi Gandharva Veda* music at MIU.

Apparatus

An Interactive Brainwave Visual Analyzer (IBVA) was used for the study in the concert hall. The IBVA records EEG from two points on the scalp — FP1 and FP2 over the eyebrows. The electrodes are embedded in a headband which in turn is fitted to the subject's head and held in place with a velcro fastening. The system uses telemetry to amplify and transmit the EEG signal from the two electrodes to radio receivers connected to the computer a short distance away. The effective range of the telemetry is about 20 feet. The data is picked up by the computer and processed in real time by the IBVA software which displays the raw EEG signals and displays an FFT for both electrodes. Both raw data and FFT's can be stored for future analysis. The computer used for this study was a portable Macintosh Powerbook 160C.

Concert

The *Raga* performed at this concert was *Jhinjhoti*. The *Jhinjhoti thata* consists of all natural *swaras* or notes without *Ni komal*. Its *arohi* is *Sa, Re, Ma, Pa, Dha, Sa*; its *abrohi* consists of all *swaras*. Instruments used during this performance were *sitar*, *tablas* and *tanpuras*. The main performer on *sitar* for this concert was Debu Chaudhuri, world renowned *sitarist* and head of the Department of Music at Delhi University. He was accompanied by a performer on *tablas*, and by two performers on *tanpura* —Mrs. Chaudhuri, the renowned sitarist's wife, and Mrs. Graciella Elmkar, an instructor of music at MIU. The performance of the *raga* lasted one hour.

Procedure

To test the feasibility of using the IBVA in a live concert setting, the subject tested himself, specifically to correlate subjective experience to the EEG record. The subject

came into the concert hall and sat down in the front row where the IBVA and Powerbook had been set up for the study. Data was taken continuously from a few minutes prior to the start of the concert until the end of the performance for the first *raga*. The subject sat comfortably, with eyes closed and listened to the music. During periods of significant change in experience he open his eyes slightly and wrote down the time mark on the FFT from the real time computer display and jotted down the subjective experience at that time.

Results

IBVA automatically stores the FFT results and generates a compressed spectral array (CSA) for FP1 and FP2 from 0 - 45 Hz. In visually inspecting the CSAs, it was found that the most salient change in the EEG was increased amplitude of rhythmical beta in the left and right frontal areas that was correlated to self-reports of subjective experiences of bliss. This beta amplitude was approximately 10 microvolts, compared with virtually no power in the theta and alpha bands at FP1 and FP2. Details of this finding follow.

Figure 5.9 presents the CSA during the first two minutes of the concert. There was no frontal beta in the EEG record, except that associated with occasional movement artifacts, such as at minute 1: 43. The subject reported feeling somewhat unsettled, as he was adjusting to wearing the headband while listening to the commencement of the performance.

Figure 5.10 presents the CSA for 14-15 minutes into the concert. It can be seen that frontal 20 -30 Hz beta increased compared to the previous figure. The subject reported that at that time he felt quite relaxed and had experiences of happiness, bliss, and "feelings of being profoundly grounded in nature" associated with the music. Note in

Figure 5.10 that there are several periods when there is no low voltage activity, which is associated with eye movement artifacts, yet the increased beta power persisted (e.g.. at minutes 14:35, 15:27). Also see Figure 5.13 which shows samples of the raw data during these periods. Later in the concert the experience of bliss disappeared as the subject became restless and uncomfortable (see Figure 5:11, minutes 28:30 to 32:30).

Figure 5.12 presents the CSA 37-40 minutes into the concert. Frontal beta again increased to the level seen previously. This corresponded to the subject's report of increased bliss, wholeness, and balanced.

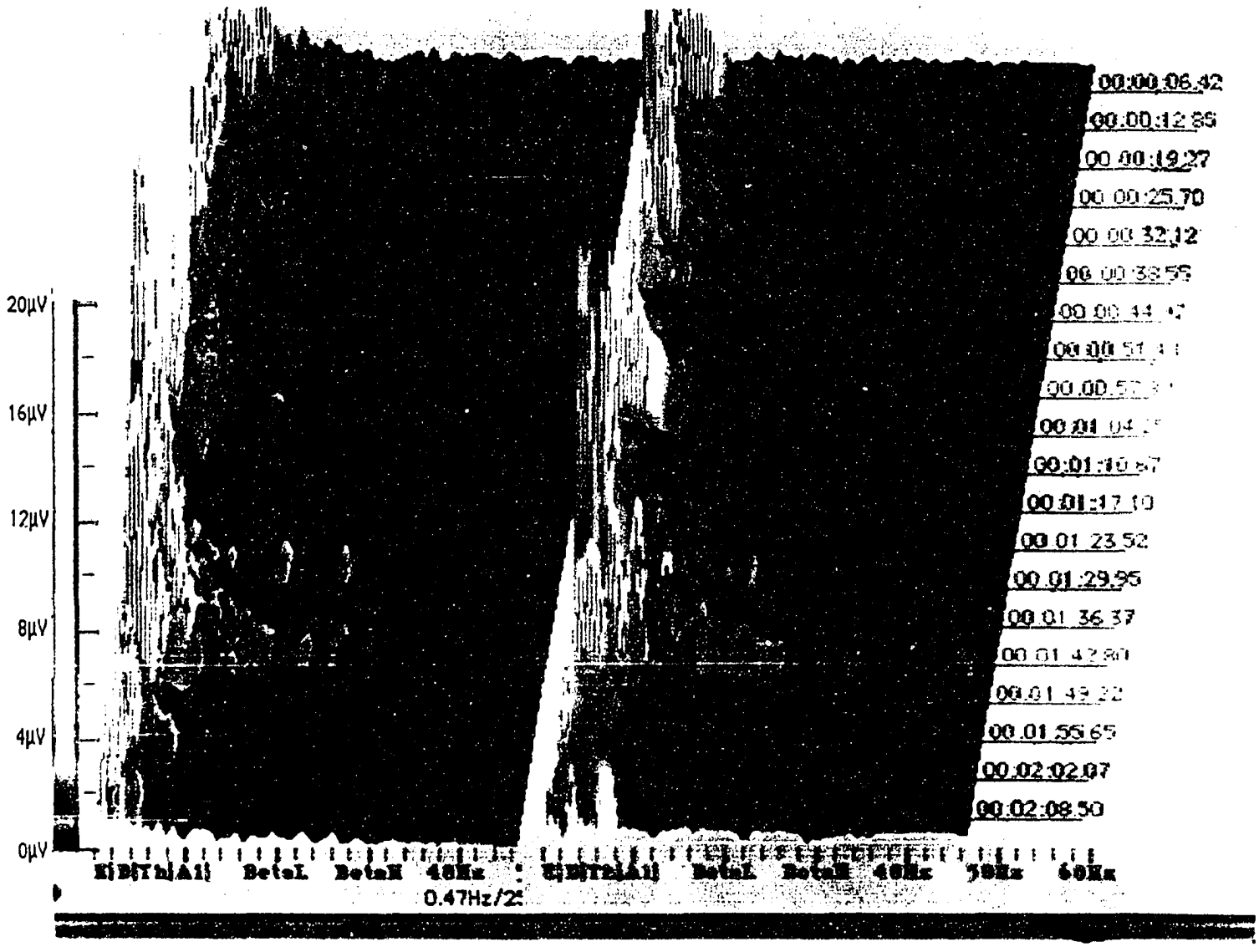

Figure 5.9. 2 minutes into *Maharishi Gandharva Veda* Concert. No sustained Beta is found on EEG record of subject.

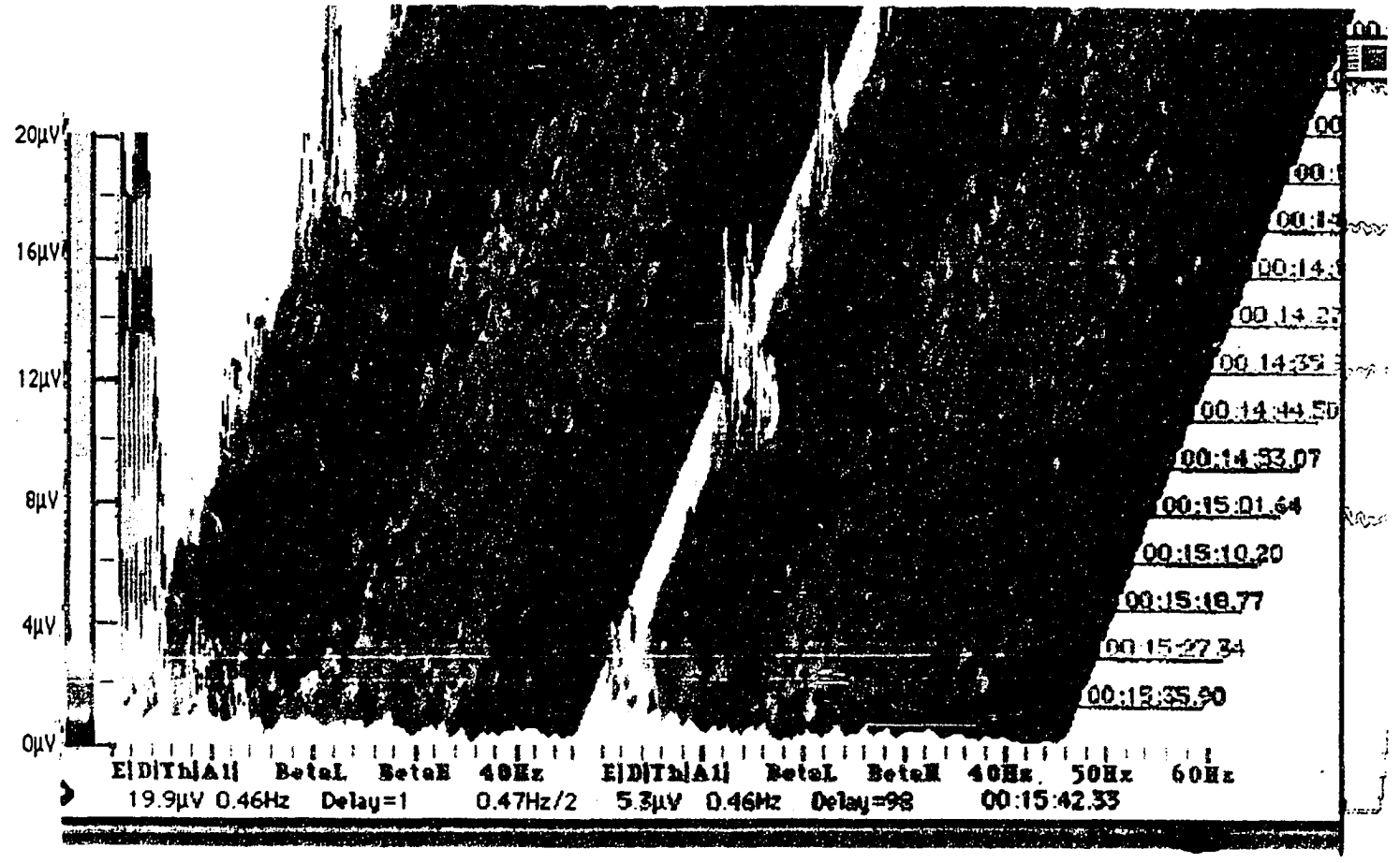

Figure 5.10. Fifteen minutes into *Maharishi Gandharva Veda* Concert. Increased Beta associated with increased bliss. Also present is increased alpha.

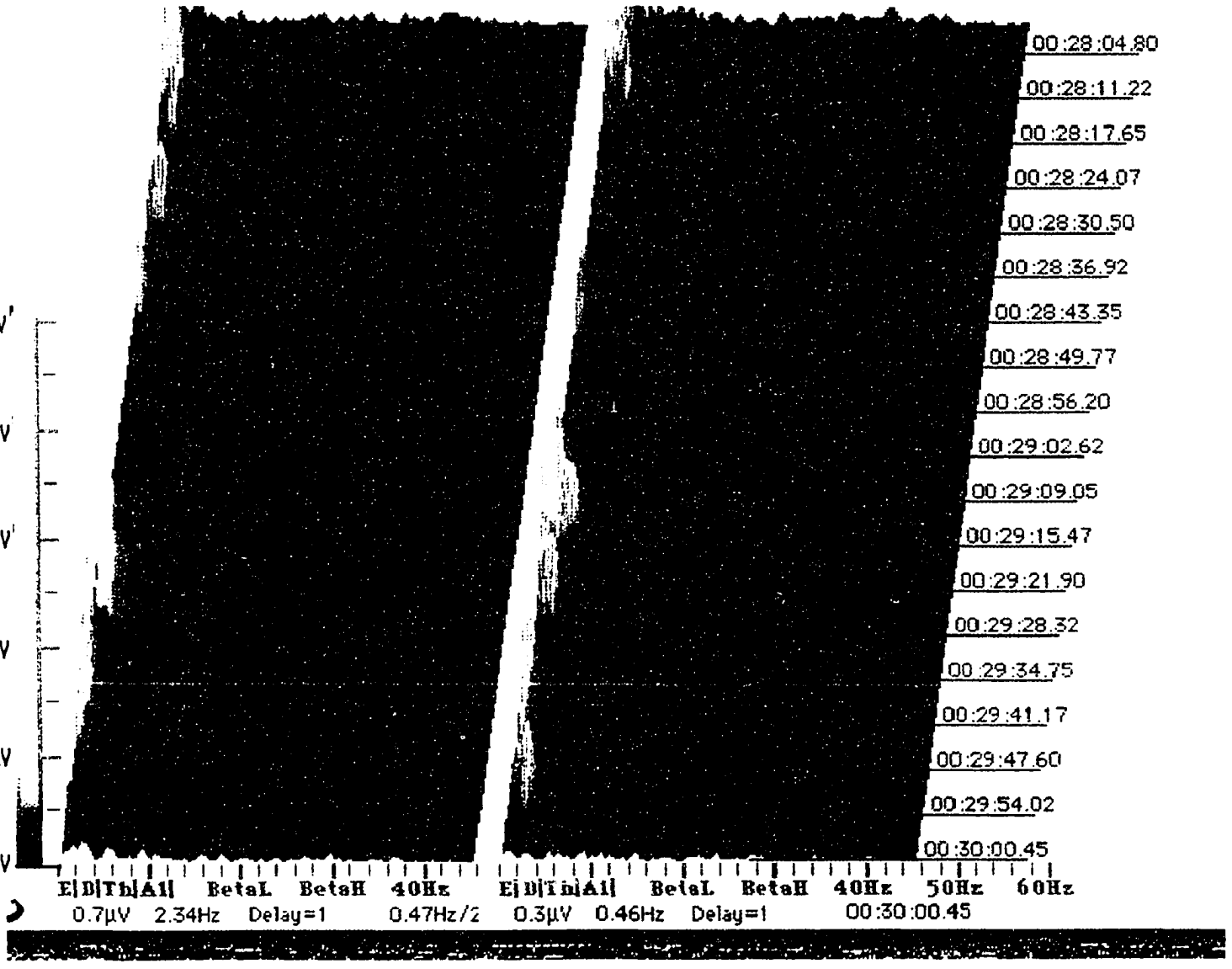

Figure 5.11. 28-30 minutes into the Maharishi Gandharva-Veda concert beta disappeared, associated with the experience of lack of bliss and physical discomfort in the subject.

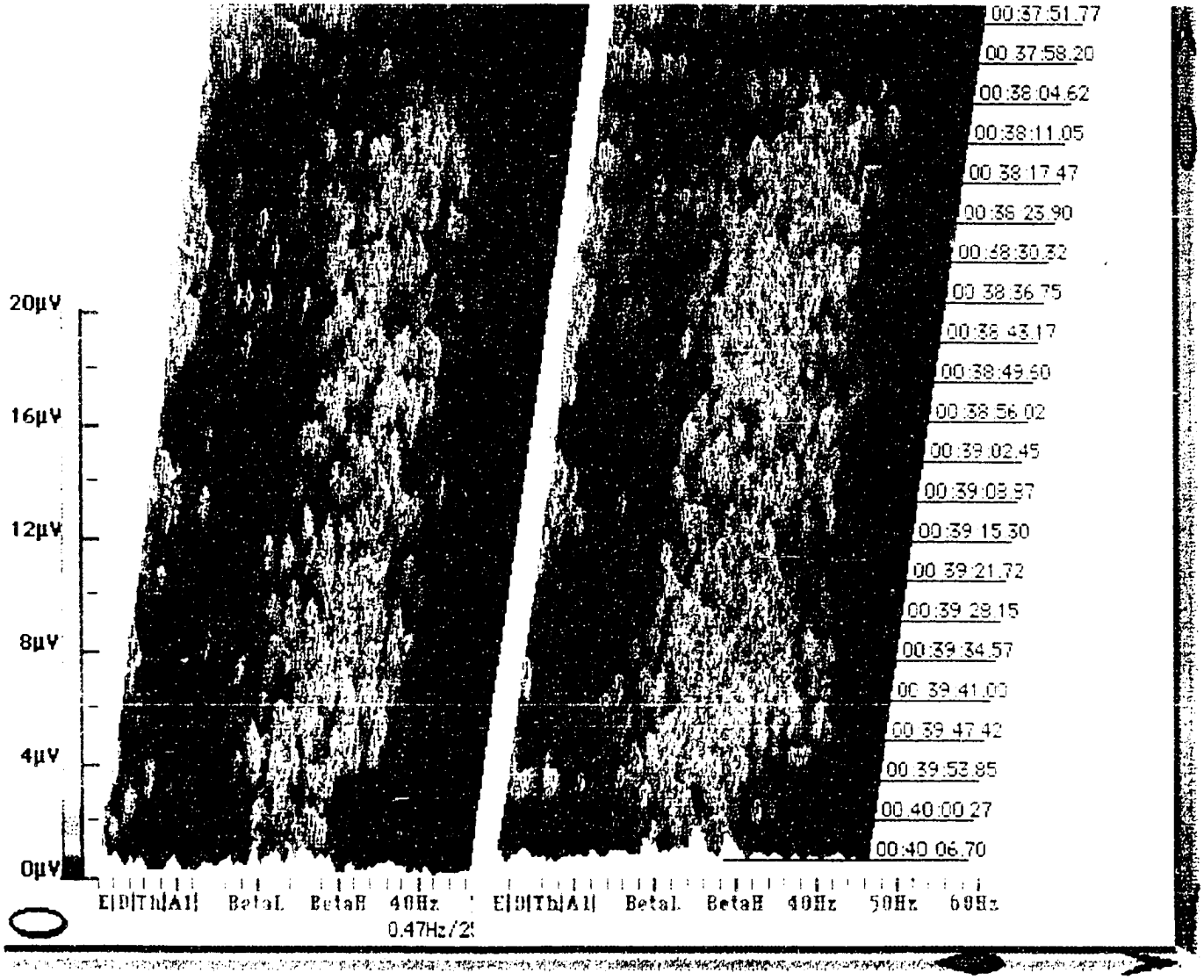

Figure 5.12. This figure shows the return of beta towards the end of the concert (minutes 37:51 - 40:06) associated with increased subjective experience of bliss. Note that there is very little low voltage activity, indicating few eye or movement artifacts, corresponding to the subjective feeling of being very settled and balanced.

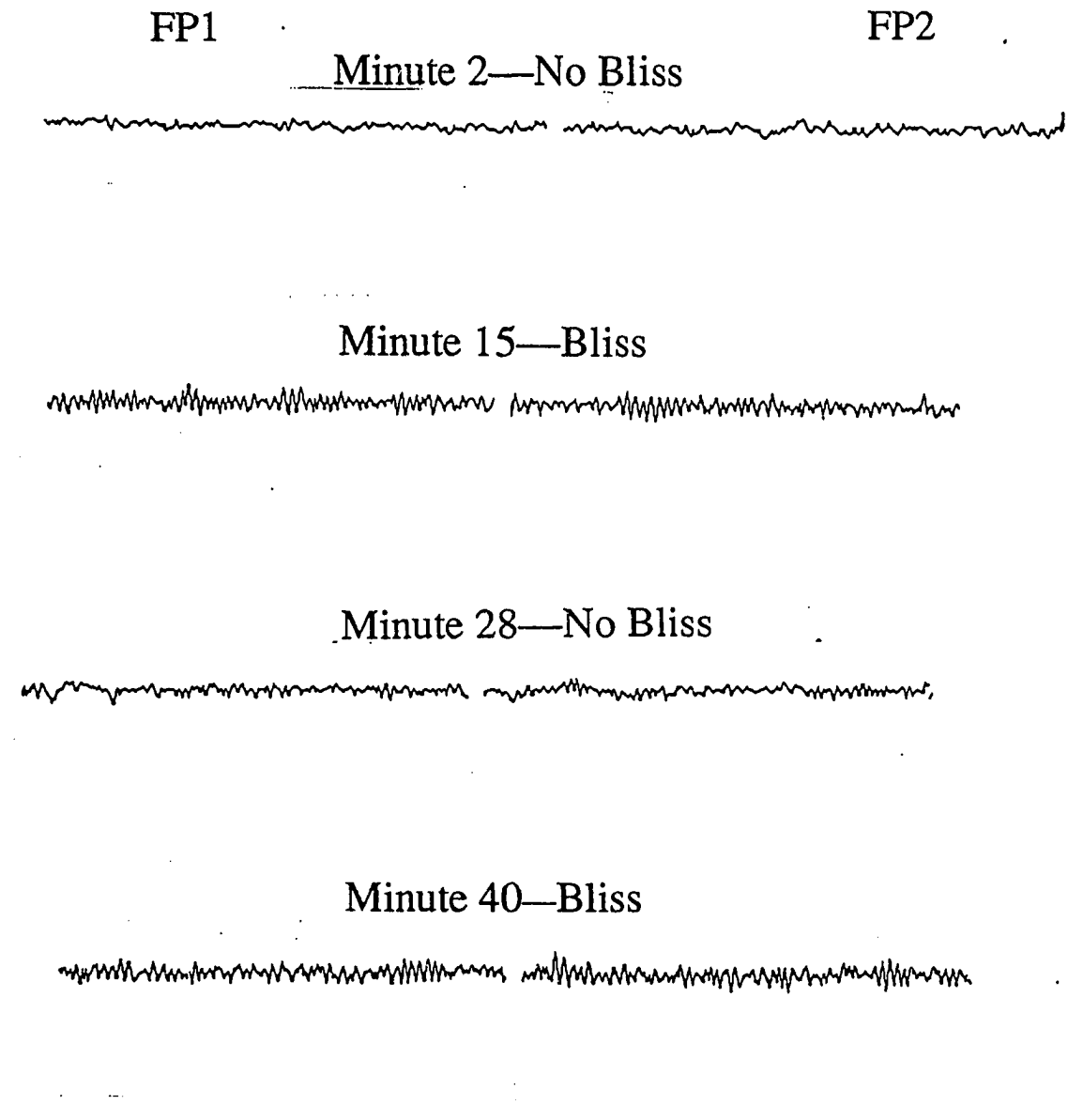

Figure 5.13. Raw data from during the Maharishi Gandharva Veda concert, from 2 min., 15 min., 28 min., and 40 min. into the concert. The raw data shows well formed 10 micro volt beta spindles associated with experiences of bliss (mins. 15 and 40) and relatively flat EEG associated with no bliss (mins. 2 and 28).

Discussion

In the first pilot study, the subject exhibited alternating alpha and theta, without obvious beta activity in any derivations. In the second pilot study, the subject exhibited frontal beta with minimal theta and alpha activity. This may be due to differences between subjects or instrument differences. The IBVA, used in the second pilot study, records electrode potentials at Fp1 and Fp2, which are over the left and right frontalis muscles (Cacciopo and Tassinary, 1990, p.332). Therefore the signal may contain EMG as well as EEG components.

However, inspection of the raw data suggests that this beta activity may be primarily cortical rather than muscular in origin. Figure 5.13 shows the raw EEG traces from FP1 on the left and FP2 on the right for the different periods of the experiment. It can be seen that during periods of No Bliss at the beginning of the concert (minute 2), and at the middle of the concert (minute 28), the frontal beta was very low amplitude (approximately 5 microvolts). Presumably no muscular activity occurred during this sample of time, a "control sample".

In contrast, the samples of beta activity taken during subjective experiences of bliss indicate well-formed (approximately 25 hertz) beta spindles of about 10 microvolts. These beta spindles are similar to the ones reported by Banquet (1973).

Dr. N. V. Lyubimov, Professor of Neurophysiology and Experimental Neurology at the University of Moscow, and President of Maharishi Vedic University, Moscow, using the same equipment, found highly similar findings during the practice of Maharishi's Transcendental Meditation technique. He observed a marked increase in frontal beta during TM compared to the pre-eyes closed period during a session rated as particularly deep by the subject. Amidst the traditional definition of TM as "restful alertness", Dr. Lyubimov's interpretation of the frontal beta was that it may reflect a dynamical

restructuring of the brain during TM. In the current instance, a similar restructuring is conjectured as an outcome of listening to *Maharishi Gandharva Veda.*

Similarly, based on published (Banquet 1972, 1973; Farrow and Hebert, 1982; Badawi, Wallace, Orme-Johnson and Rouzere, 1984) and unpublished findings involving subjects practicing TM, Orme-Johnson (1995, personal communication) suggests that the frontal beta may reflect what Maharishi (1995) refers to as "wholeness of dynamism" and "infinity of dynamism"; whereas alpha-theta may correspond to Maharishi's "wholeness of silence", an infinity of silence[6].

The above interpretations are consistent with the traditional interpretation of beta activity as being associated with activation and increased problem solving in normal daily activity (Bruya and Severtsen, 1984). Note that the neurophysiological conditions supporting a positive influence of *Maharishi Gandharva Veda* music have been suggested to be identical to the conditions created by the practice of Maharishi's Transcendental Meditation (Maharishi, personal communication, 1990). Therefore, it is reasonable to investigate findings of frontal beta as well as theta/alpha that have occurred in the TM literature.

Banquet (1972) found that during TM sessions, a relatively high voltage rhythmic beta of approximately 20 Hz appeared which was usually mixed with alpha and theta. He noted that low mixed theta and beta became prominent during TM which differed from those usually associated with drowsiness. He also found that frontal beta diffused towards posterior regions during the practice. In another paper on TM-related EEG changes, Banquet (1973) reported that in some subjects rhythmic amplitude-modulated beta waves predominating in anterior channels, and sometimes present over the whole scalp, were

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6 According to Maharishi, the sequential emergence of the *Rk Veda*, and hence of natural law, in *Maharishi Gandharva Veda* music, and ultimately of all music, is the move of one wholeness (silence) to the other wholeness (dynamism).

associated with "deep meditation or even transcendence". The beta spindles tended to become continuous in a persistent background of slower activity

Banquet and Sailhan (1974) noted that beta spindles in the F3 derivation were produced during Maharishi's TM technique which they suggested corresponded to a state of mental activation. Note that this beta activity may not have been reported during the experience of Transcendental Consciousness (TC) itself but may have followed it, with the mind experiencing activation. Other researchers timed the occurrence of TC relative to respiratory and EEG markers.

Farrow and Hebert (1982) found bursts of beta power *at the end* of respiratory suspensions (RS)— RS being a reported characteristic of Transcendental Consciousness. Badawi, Wallace, Orme-Johnson and Rouzere (1984) reported a similar finding: *during* periods of respiratory suspension, delta and beta *decreased*, but during the post control period, a time when the nervous system is returning to dynamic activity, beta and theta power *increased.*

Travis and Wallace (1993) also did not find beta activity during the experience of TC. Travis (1995, personal communication) interprets beta as the mental process of attending to an outward stimulus and not necessarily as a characteristic associated with experiences of Transcendental Consciousness. As suggested by Orme-Johnson earlier, these periods of respiratory suspension during the TM technique could be associated with a time of "infinite silence" within the awareness of the individual reflected in the physiological EEG pattern of alpha alternating with theta, whereas beta bursts could be associated with periods of "dynamic silence," a time when the nervous system still maintains silence and yet is more outwardly oriented, as in listening to *Maharishi Gandharva Veda* music in the present study.

In conclusion, it appears that increased frontal beta reflects a dynamic state, which would be expected when one is listening to music or is coming out of a period of

Transcendental Consciousness. The fact that it was associated with experiences of bliss (in this subject) may indicate that it represents an integration of silent, expanded consciousness brought out into dynamic activity. This frontal beta could be a valuable marker that may yield important insights into higher levels of human potential that would result from exposure to *Maharishi Gandharva Veda* music.

CHAPTER SIX
IMMEDIATE THERAPEUTIC EFFECTS OF *MAHARISHI GANDHARVA VEDA* MUSIC ON THE ELDERLY

Introduction

For the ancient Greeks, perfect health meant a mind and body that functioned harmoniously. To maintain normal health required maintaining concordance or harmony in the body. One way to restore harmony in the body was to listen to music (Pratt, 1989). Since the early Nineteenth Century researchers have been investigating the claim that music can restore harmony to the body and thereby restore health to the individual (Alvin, 1966).

As reviewed earlier in chapter one and five, research indicates that music used in conjunction with other forms of medical treatment can aid in restoring health. In particular, music therapy is useful in the treatment of anxiety (Bonny, 1985; Gross & Swartz, 1982); depression (Bailey, 1983); hostility, fatigue and confusion (Bailey, 1983); in the reduction of blood pressure, heart rate and EDR (Hodges, 1980); and in improving mood (Goloff, 1981).

There have been several studies with music therapy with the elderly. Watts (1980) found music to be a powerful instrument in working with the elderly. Olson (1984) found that music therapy enhanced a state of well-being and youth, enabled retrieval of specific long-term memories, and provided action-oriented cognitive themes and stimulation. Social behavior improved (Riegler, 1980), as did life satisfaction, music attitude, and self-concept for elderly nursing home residents (Vanderark, Newman and Bell (1983).

Utilizing music as a form of therapy is appealing because it is relatively innocuous. Clients usually consider music enjoyable to listen to, and music therapy can be conducted by hospital staff with a minimum of training.

One of the most ancient forms of music therapy is *Gandharva Veda* music (Danielou, 1968). As detailed in Chapter One, it is the classical music of the ancient Vedic civilization. As we have seen, *Gandharva* means intelligible sound and *Veda* translates as knowledge. Thus *Gandharva Veda* means the knowledge or science of intelligible sound. Individual selections of *Maharishi Gandharva Veda* music are termed *ragas*. There are specific *ragas* for different times of the day. His Holiness Maharishi Mahesh Yogi, founder of Maharishi's Transcendental Meditation and TM-Sidhi program, has recently re-introduced the principles of *Gandharva Veda* music to Western researchers. Maharishi states that "*Maharishi Gandharva Veda* music, by using sound, melody, and rhythm, restores balance and harmony in the mind, body, behavior, and environment. It upholds the natural rhythms that prevail at different times throughout the day and night (Maharishi, 1991).

Because the re-introduction of *Maharishi Gandharva Veda* music in the West is so recent, there exists little research on the therapeutic effects of this music. Current pilot research indicates that *Maharishi Gandharva Veda* music does increase calmness, alertness, and mind-body coordination in listeners (Olson, Boyer, Canon, and Sorflaten 1990). Recall from Chapters Four and Five that it also develops balance in the psychophysiology of normal listeners, as indicated by increased positive responses to the MAARQ completed by attendees at live concerts, and by reports of changes in EEG brain-wave activity and pulse diagnosis that occur while listening to the music. Compared to western classical music, *Maharishi Gandharva Veda* music decreases anxiety significantly more, while showing a statistical trend towards increasing happiness in listeners compared to western classical music (Olson, Boyer, Canon, and Sorflaten, 1990).

Because *Maharishi Gandharva Veda* music is reported to be uniquely attuned to the rhythms or frequencies of natural law that prevail at different time periods (Maharishi,

1991, p. 12), I suggest that it may offer an alternative approach to therapy as therapy is presently used today. By re-tuning the psychophysiology of the individual to resonate with what Maharishi considers to be those frequencies of nature responsible for creating order and harmony throughout creation (Maharishi, p. 12 - 13), it is suggested that one can regain order and harmony in the functioning of the human nervous system; i.e. normal health. Thus, *Maharishi Gandharva Veda* music could be considered to be a more natural and holistic therapy for restoring harmony and balance to individual life. It may be the fulfillment of the age-old quest for using music as medicine.

The purpose of this research study was to test the therapeutic value of *Maharishi Gandharva Veda* music by comparing it with a form of Western music that has been demonstrated to be useful in clinical settings. One of the most therapeutic forms of Western music is sedative music characterized by regular rhythm, predictable dynamics, consonance of harmony, and recognizable instrumental and vocal timbre (Gaston, 1951). Sedative music is generally music that is calming to the listener; stimulative music generally excites the listener. Classical, Light Classical, Baroque, and at times Big Band music all satisfy the criteria for sedative music.

Fisher and Greenberg (1972) studied effects of music on women and found that calm music reduced anxiety, whereas exciting music increased anxiety. Stoudenmire (1975) found that sedative music was more effective than stimulative music in reducing anxiety in general. As indicated in Chapter One, *Maharishi Gandharva Veda* music, on the other hand, is neither stimulative nor sedative, but rather balancing. That is, if the individual is in need of stimulation, the music appears to provide that impetus; if the client needs to relax, the music seems to be experienced as soothing.

As discussed in Chapter Four, it is reasonable to hypothesize that *Maharishi Gandharva Veda* music will result in therapeutic improvements at least as much as that provided by western classical music, a proven therapeutic modality. This hypothesis

balances conflicting expectations. On the one hand, *Maharishi Gandharva Veda* music should provide positive benefits regardless of the cultural background of the listener. On the other hand, research has shown considerable bias against favoring music for therapeutic purposes that is unfamiliar or not a part of the subject's early adulthood (Radocy and Boyle, 1988; Radocy, 1982; Walker, 1980). The fact of not being familiar with the music, by itself, may inhibit the salutatory benefits of the music. Given these opposing expectations, it is suggested the *Maharishi Gandharva Veda* music will be at least as beneficial as Western Baroque music.

Therapeutic Effects of Gandharva Veda on an Elderly Population

Hypothesis

Geriatric subjects listening to *Maharishi Gandharva Veda* music will demonstrate improvement in their mental and social behavior. The change will be at least as much as geriatric subjects who hear only Western Baroque music.

Method

Subjects

Twenty seven geriatric patients, ranging in age from 52[1] to 88 years, participated in the study. All subjects were institutionalized geriatric patients at a mental health facility located in a small midwestern town.

Subjects were matched for age and gender and then randomly assigned to two groups. Group A consisted of 14 subjects, nine males and five females, whose age ranged from 52 - 88 years. Group B had thirteen subjects, eight males and five females, ranging

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[1] According to Peters (1987), the term "geriatric" generally refers to individuals aged 65 or older. Those in their 50's are considered to be middle-aged. However, at this particular facility, individuals aged 50 and above were admitted to the locked geriatric ward and hence in this study were called geriatric.

in age from 52 - 83. Subjects' diagnoses ranged from senile dementia to schizophrenia, mental retardation, alcoholism and Alzheimer's disease. It was not possible to match diagnosis for subjects in both groups. However, the presiding psychiatrist felt that the groups were reasonably balanced in the spectrum of ailments.

Each subject's hearing was tested prior to treatment so that technicians could adjust the volume of the music according to subjects' needs. A general volume level of 80dB was chosen, with subjects exhibiting greater hearing loss sitting closer to the stereo cassette recorder speakers while subjects with better or normal hearing sat further away.

Two of the subjects involved in the study matriculated out of the Institute before the study was completed and therefore data that was already collected for those two was not used in the final analysis.

Apparatus

Music was heard over two Sony CFS-W360 stereo cassette recorders, one for each room in which music was played. The cassette recorders were placed at one end of the room on a table which was positioned three feet from the closest chair. Two HF 90-min Sony cassette tapes with type 1 normal bias were used for the study.

Music Stimulus

Although previous research in Music Therapy techniques (Radocy and Boyle, 1988, pp. 243 - 264; Spintge, 1989, p. 83) has shown that when subjects choose their own musical selections during music therapy sessions they receive greater benefits from the sessions, it was decided not to use musical preference for this particular study. The supervising psychiatrist considered it important that, for this particular group of institutionalized individuals, the music selected should be well known and researched for

its healing effects rather than left to individual preference. He also recommended that only instrumental music be selected. Therefore, the following instrumental selections were chosen for the study.

One set of tapes (Set B) was a complete 20-minute presentation of *Maharishi Gandharva Veda* instrumental music selected for time of day the treatment was administered[2]. Instruments used included *sitar, tanpura*, and *tablas*. In this particular set of tapes, the names and identifying characteristics of the *ragas* as well as the names of the performers were not given. The only information given was that these particular *ragas* were suitable to be heard between 1 p.m. and 4 p.m.

The second set of tapes (Set A) was entitled, Largos and Adagios from the Baroque Era, produced by the Lind Institute[3]. It contains a large number of Baroque instrumental selections which are known for their healing effects and is used by the Superlearning Institute as an aid in memory and learning ability. Research on this music indicates other major benefits accrue from listening to this music in connection with the Superlearning techniques, including: physiological benefits of relaxation and stress release along with increased alpha, decreased beta, decreased heart rate, lower blood pressure; psychological benefits of greater happiness, decreased anxiety, increased learning ability, and emotional benefits such as improved attitude, improved self-esteem and happiness, and improved interactions with peers (Ostrander and Schroeder, 1989, p. 65). Selections on the tape were: Vivaldi's *Largo* from *Violin Concerto in D Major, Op. 11 no. 1* ; Albinoni's *Andante* from *Sinfonia in G Major*, Caudioso's *Largo* from *Concerto for Mandolin and*

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[2] The updated, complete set of eight tapes or CD's on *Maharishi Gandharva Veda* music suitable for the right time of day can be ordered in the United States of America from Maharishi Ayur-Ved Products International Inc., P.O. Box 49667, Colorado Springs, Colorado 80949 - 9667. Telephone: 1-800-255-8332

[3] This tape is available in Iowa, U.S.A. from the Society for Accelerated Learning and Teaching (S.A.L.T.), P.O. BOX 1216, Welch Station, Ames, Iowa 50010. Telephone: (515) 294 - 1488.

Strings; Albinoni's *Andante* from *Violin Concerto Opus X, no. 2*; Vivaldi's *Largo* from *Concerto for Recorder and Orchestra in A Minor*; Zipoli's *Arla* from *Suite in F*; Scarlatti's *Adagio* from *Concerto no. 8*; Handel's *See The Conquering Hero Comes* from *Judas Maccabaeus*; Albinoni's *Andante* from *Violin Concerto Opus X, no.4(1)*; Vivaldi's *Largo* from *Violin Concerto in B Flat, RV 363(1)*; Scarlatti's *Amoroso* from *Concert no.8(2)*; Vivaldi's *Largo* from *Concerto in D Major, RV 564(1)*; Molter's *Andante* from *Concerto in D for Strings* ; Vivaldi's *Andante* from *Concerto for Two Mandolins in C, RV 558*; and Delalande's *Second Fantasie of Caprice Which the King Requested Often (2).* Twenty minutes were played from this tape for each session.

To assess changes in personality and competency, the Fairview Self-Help Scale, and the Brief Psychiatric Rating Scale (BPRS) were used. All measures were designed to be completed by care-givers. The Fairview Self-Help Scale (FSHS) is comprised of four pages of evaluative questions assessing competency of the patient in caring for oneself. The Brief Psychiatric Rating Scale (BPRS) includes 16 items assessing the level of general psychological functioning of the subject. The BPRS, and FSHS were completed by the night nurse and took no more than ten minutes to complete altogether for each subject.

To assess effects of the music, structured monitoring of subject behaviors was carried out by experiment administrators attending each music session. This entailed briefly noting behavior patterns for each subject in the room at least once during the first 10 minutes and once during the last 10 minutes of each music therapy session. See the Appendix for copies of the pen and paper measures and observation sheets.

Design

A pretest-posttest control group design was used. The study was conducted over a three-month period. Subjects served as their own controls. The first month was treated as baseline; the other two months served as the music therapy section of the study. During the music therapy section, two different forms of music were administered to two different groups. Data was collected at the end of the fourth week of baseline and at the end of the second, fifth, and eighth weeks of the music therapy section. See Table 6-1 for a description of the timeline of the study.

TABLE 6-1
Timeline for Music Therapy Study

Week	Group A (Western Baroque)	Group B (*Maharishi Gandharva Veda* Music)
Baseline Period		
1	No music	No music
2	No music	No music
3	No music	No music
4	No music - Test A	No music - Test A
Music Treatment		
1	Music	Music
2	Music - Test B	Music - Test B
3	Music	Music
4	Music	Music
5	Music - Test C	Music - Test C
6	Music	Music
7	Music	Music
8	Music - Test D	Music - Test D

The independent variable was music condition at two levels: *Maharishi Gandharva Veda* music and Western Baroque music. Each of the two groups heard 20-minute selections of either *Maharishi Gandharva Veda* music (Group B) or Western Baroque music (Group A) once a day at the same time of day for eight weeks.

The dependent variables were the following: Fairview Self-Help Scale, Brief Psychiatric Rating Scale, and structured monitoring of observations by experiment administrators.

Procedure

During the week prior to the study, subjects were informed of the study and of the intent to maintain confidentiality of the data collected. Subjects were then asked to give written consent to participate in the study. Subjects were informed that they were free to discontinue participation in the project at any time. Written consent forms were collected. Also, a brief biographical data sheet was completed on each subject. Information included age, gender, diagnosis, hearing level, ethnic background, education level, and preferred music type. For those subjects who were incapable of giving informed consent, the subject's legal guardians gave written consent.

During the first month, all subjects met in the general dining room for 30-minutes after lunch with the two experiment administrators and at least one hospital staff member. No music was played; instead, other quiet activities such as reading newspapers, talking informally, and other forms of gentle interaction took place. This enabled the patients to become familiar with the two experimenters[4], thus decreasing possible experimenter effects. Also, during this month hearing tests were conducted on all the subjects by an outside university hearing center in order to confirm that subjects could indeed hear the music. As a result of the hearing test, no subject was eliminated; indeed, for some their hearing actually improved due to clearing out of built up ear wax by the staff.

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[4] For the study, the two administrators were myself and Mr. Patrick Barrett Ph.D. At the time Mr. Barrett was on academic leave from the Union Institute in Ohio where he was involved with his doctoral studies and residing at Maharishi International University as an academic researcher in residence. This enabled him to participate in the study.

At the end of the fourth week, the FHSH, and BPRS were completed during the evening by the night nurse six hours after the therapy session. This was to ensure blind testing. The night nurse had no contact with the subjects during the music therapy sessions. This first set of data served as the baseline data for the study.

During the first week of the second part of the study, subjects were matched according to age and gender, and then randomly assigned to one of two groups which met in different rooms. The extra subject was not matched but was randomly assigned to a group. Room One was the television room; Room Two was the dining room. These two rooms were used as they were the largest rooms available in the geriatric wing of the Institute. Both had a substantial number of chairs, with space to walk around and windows overlooking the outside. The size of the rooms was relatively similar. The two rooms were across the hall from one another.

The stereo cassette recorder was placed on a table three feet high at one end of each room. In Room One, the stereo cassette recorder was placed at the end of the room opposite to the television set. In Room Two, a table was placed at the end of the room and the stereo cassette recorder was placed on top. The closest chairs were positioned three feet away from the speakers and then spread out in a half circle. For Room One, the chairs were large, overstuffed chairs that were difficult to move; hence, subjects with poor hearing were placed in chairs closest to the stereo cassette recorder while subjects with better hearing ability were placed in chairs further away. All subjects were asked if they could hear the music comfortably before the actual music session began.

Subjects listened to one twenty-minute selection of music each day. During the session, subjects were instructed to, "Sit comfortably and just listen to the music. If you feel to close your eyes, that's fine. If you wish to get up and walk around, or move to the music, that too is fine. Just be comfortable, but do not leave the room without permission to do so." Administrators sat near the door to enable subjects to check with them first

before leaving. At least one staff member was in attendance during the sessions to help in the event of a subject experiencing some behavioral difficulty during the session.

Subjects were informed that they should not be concerned if the music sounded unfamiliar, and that they should not attempt to analyze it in any manner. If they had any questions about the study, they were told to approach the music session administrator or the psychiatrist in charge. Subjects were asked not to discuss the music among themselves during their daily activity. The supervising psychiatrist met with the subjects the first day of the music session to address any concerns. For the rest of the study, however, the psychiatrist remained away so as to not affect the outcome of the study.

Structured monitoring by experimenters of subjects' behavior during the music session occurred daily. At the end of weeks two, five, and eight, the night nurse staff member completed the FSHS, and BPRS for all subjects.

Results

Statistical Analysis

Owing to administrative error on the part of the nursing staff, data was omitted on the FSHS for the second testing period (B). Therefore, these scores were omitted from the analysis.

Pretest and posttest scores for each dependent measure collected during the treatment period were analyzed using the general linear modeling program of Systat 5.1 (Wilkensen, 1992). To test the null hypothesis that *Maharishi Gandharva Veda* music will have a weaker effect than Western Baroque music, a two (Groups) x three (Tests) x three (trials) repeated measures MANOVA was performed. Trials factors consisted of the three testing periods A, C, and D. Alpha levels for overall Type 1 error were set at $p <$ .05. See Appendix 6 - D for tests of the full model. Note that the scores for BPRS have

been inverted for this test, so that a higher score indicates a better rating for the patient. This makes the scoring consistent with the FSHS.

Multivariate test results indicated no interaction between trials and groups, $p = .8593$, $F(2, 42) = .1334$. This indicated that for the two variables, FSHS and BPRS, the differences between the groups were more or less constant for all the 3 trials, including the pre-test. The result was supported with the multivariate Wilks' Lambda = .9773, $F(2, 20) = .2326$, $p = .7946$. Also, there were no interactions of trials with either the psychiatric measures or with the measures and group together.

Given no interaction across trials, the main effect for differences between groups was examined. There was no significant difference, indicating that the groups scored relatively the same across the 3 trials $F(1, 21) = .0791$, $p = .7813$, univariate test. The null hypothesis can be rejected. Evidence indicates that *Maharishi Gandharva Veda* music demonstrated therapeutic effects at least as good as that found for Western Baroque.

The question arises whether *any* improvement is indicated even when combining the two groups. Interestingly, the polynomial test of linear trend across trials proved insignificant, $p = .1533$, $F(1, 21) = 1.0982$, one-tailed test. No improvement trend across trials for the two measures was evident. Since the main effect for trials was not significant, this indicates that neither group had a significant effect on these measures. Therefore, it is not that both types of music were equally effective with no difference between them, but rather that music in general did not have an effect in these severely disturbed patients as measured by these tests. See Table 6-2 for means and standard deviations for the variables. Follow-up analysis was accomplished to investigate the details of these findings.

TABLE 6-2
Means and Adjusted SE for Psychiatric Measures in Multivariate Test

	Trial A (after 4 weeks of no-music baseline)	Trial C* (after 5 weeks of music)	Trial D (after 8 weeks of music)
FSHS			
Western Baroque N=10			
Mean	61.5000	60.0000	64.1000
SE	10.7646	11.3497	11.5119
Gandharva Veda N=13			
Mean	64.1538	61.4615	65.3846
SE	9.4412	9.9543	10.0966
Combined N=23			
Mean	63.0000	60.8261	64.8261
SE	Not computed		
BPRS			
Western Baroque			
Mean	61.7000	58.6000	60.1000
SE	3.8848	3.2154	3.0916
Gandharva Veda			
Mean	53.4615	52.3077	56.7692
SE	3.4072	2.8201	2.7115
Combined			
Mean	57.0435	55.0435	58.2174
SE	Not computed		

*Data from Trail B was not available for the FSHS, therefore, it is omitted from both variables.
**Scores for BPRS normally are lower for better ratings of the patient. However, to make the scoring consistent with FSHS, they have been inverted.
***No SE was given for the overall scores by the computer program.

For each variable, FSHS and BPRS, scores for the available trials were tested using repeated measures ANOVA with 2 factors: 4 (trials) x 2 (groups). (Note that FSHS had only three trials). In all three cases, the main effect for music group showed no significant differences between groups.

Additional follow-up tests were conducted to determine if the individual rating measures revealed any improvement across trials. BPRS and FHSH demonstrated no significant linear trend, although the FSHS did exhibit a modest non-significant trend

towards improvement, $p = .1335$, one-tailed. See Table 6-3 for means and standard errors associated with each trial. See Appendix 6 - E and F for the tests of the full models.

TABLE 6-3
Means and Adjusted SEs for Psychiatric Measures Tested Separately

	Trial A (after 4 weeks of no-music baseline)	Trial B (after 2 weeks of music)	Trial C (after 5 weeks of music)	Trial D (after 8 weeks of music)
FSHS				
Western Baroque N=11				
Mean	64.6364		63.4545	67.1918
SE	10.2482		10.8262	10.9232
Gandharva Veda N=13				
Mean	64.1538		61.4615	65.3846
SE	9.4270		9.9586	10.0479
Combined N=24**				
Mean	64.3750		62.3750	66.2083
SE*	6.6134		7.2934	7.3144
BPRS***				
Western Baroque N=12				
Mean	34.5455	34.7273	37.2727	36.2727
SE	3.5901	3.0700	3.0326	2.9447
Gandharva Veda N=11				
Mean	43.6667	38.9167	44.2500	39.5833
SE	3.4373	2.9393	2.9035	2.8194
Combined N=23				
Mean	39.3043	36.9130	40.9130	38.0000
SE	2.3059	2.0354	2.0079	1.9387

*Standard Error is not given for the least squares estimate of the mean for the combined groups. The SE presented here is derived from the descriptive statistics which may use a different N due to missing subjects changing the subject pool for the test. See Appendix 6-G for the N and means associated with it.
**Modest non-significant polynomial linear trend across trials, $p = .1335$, one-tailed.
***Actual BPRS scores are used. Lower scores indicate a better rating for a patient.

Structured Observations

(a) *Maharishi Gandharva Veda* Music Group. Experiment administrators noted effects of the music during the music therapy sessions. One of the administrators (Barrett, 1992, personal communication) commented specifically on changes in behavior patterns

noticed while *Maharishi Gandharva Veda* music was being played. Although such other factors as medication levels, physical therapy session and personal meetings with doctors may have contributed to behavioral pattern changes in general, the behaviors commented on here specifically occurred during the music therapy sessions and not at other times, indicating that the music may have contributed towards positive changes in certain behavior patterns.

For example, at the beginning of the study, during the hearing tests, one woman diagnosed as schizophrenic with extrapyramidal syndrome[5] and suffering from tardive dyskinesia[6], exhibited what the experiment administrator termed "annoying stereotypic negativity". "I don't like anything" summed up her attitude towards life. Whatever one said to her elicited the same response. At the end of the hearing test, when asked if she would like to hear a bit of the music that she would be listening to in her group session, she responded, "No, I don't want to hear it. I don't like music. I don't like anything". The music was played anyway.

When the music began, she stopped all movements and stared at the cassette recorder with extreme concentration. Music was played for 30 sec. When the music was turned off and she was asked if she liked it, rather than following her usual pattern of negativity, she did not say anything. Although it was not a positive response, it was not a negative response either and could be seen as a positive change in a typical behavior pattern that may have been attributed to the playing of the music. The music heard was *Maharishi Gandharva Veda* music. Further research would have to confirm if the

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[5] Extrapryamidal syndrome refers to involuntary movements associated with Parkinson's disease.

[6] Tardive dyskinesia refers to involuntary movements of the limbs which occur as a permanent side effect from taking certain anti-psychotic drugs.

subject's response was due solely to the playing of *Maharishi Gandharva Veda* music or if it would occur with the introduction of any type of music.

Several of the subjects had symptoms of extrapyramidal syndrome and tardive dyskinesia. Although tardive dyskinesia is a permanent side effect which occurs with some rehabilitative drugs, its symptoms often subside during sleep. During the playing of *Maharishi Gandharva Veda* music, these movements would often stop for 5 - 10 sec or longer. At times, the subject's eyes would be wide open; at other times, the subject would close the eyes for a few minutes yet remain alert as indicated by the subject's straight posture in the chair. It was especially noted that during these brief eyes closed periods that the movements stopped.

It may be *Maharishi Gandharva Veda* music produced a state of restful alertness, similar to that experienced during Maharishi's Transcendental Meditation program (Wallace, 1970, 1993). This is consistent with subjective reports given by normal subjects in experiment 1 and also with findings from the previous study on EEG reported in Chapter Five which found that *Maharishi Gandharva Veda* music may produce brain wave patterns similar to those found during Maharishi's Transcendental Meditation program (7 - 9 Hz Theta/alpha, alpha and theta bursts, including frontal derivations). It is also consistent with the Junction Point Model as discussed by Travis (1994). This conjecture is speculative, given that the subjects heard the music generally with eyes open while the EEG subjects had eyes closed throughout the entire period.

Subjects in the *Maharishi Gandharva Veda* music group frequently settled down and slept during the music, which suggests that the music was relaxing and induced normalization.

Personal interactions among subjects in the *Maharishi Gandharva Veda* music group also changed. Often in a mental institution where subjects are involuntarily committed for care, the patients rarely interact with each other, and when they do, their

behavior is usually characterized by peevishness and/or aggression. These behaviors may be the result of many years of institutional living in which one learns to keep to oneself and not trust anyone (Barret, 1990, personal communication).

During the *Maharishi Gandharva Veda* music group sessions, it was noted on seven different occasions that subjects' interactions were unusually positive. Three of these interactions were noticed with the aforementioned subject who "did not like anything." During these occasions she was observed being helpful in consoling other subjects who seemed agitated. She was particularly friendly to one who looked depressed after being removed from involuntary seclusion. She also regularly performed clean up chores after snacks even though she received little reinforcement from the staff to do so.

Another subject was an 83 year old severely mentally retarded, autistic woman who had been institutionalized in her teens. She was unresponsive and uncooperative during the hearing test although institution staff confirmed that she could indeed hear well enough to respond to her name when they called to her from down the hall. During the *Maharishi Gandharva Veda* music sessions, administrators noticed that she appeared to respond to the music, tapping her fingers on the floor in time to the rhythm of the *talas*, and swaying and dancing to the melody of the *raga* in general. Once, she was observed looking lovingly into the eyes of another who responded similarly. During week eight of the music therapy section of the study, she was observed moving to the music, finger tapping at times, at other times swaying to the music as she moved around the room. The administrator was busily engaged in writing down observations when all of a sudden this subject came up to the administrator, tapped her on the shoulder, looked her square in the eye and proceeded to make unintelligible sounds, as if conversing without word structure to the administrator. This was a radical departure from her many years of autistic silence. The administrator responded to the subject in a positive manner, gently encouraging more interaction. After a minute or two the subject moved on and the music came to an end. A

few days after the music therapy sessions ended, the subject reverted to her previous unresponsive behavior patterns.

Another time, during the *Maharishi Gandharva Veda* music session, a male patient, diagnosed as undifferentiated schizophrenia with tendencies towards paranoia and dependency, invited another male patient who was exhibiting agitated and panicked behavior to sit by him. The agitated patient had just learned that he would not be allowed to visit his family and was quite upset. When the agitated patient sat, the first subject proceeded to hold his hand, smiling and consoling him. The agitated patient responded by settling down and becoming more soothed.

A similar incident occurred with another subject toward the end of the study. This time the consoler was a severely demented individual who rarely responded to even such simple questions as "how are you". During the *Maharishi Gandharva Veda* music, this severely demented individual reached out a hand in a friendly and caring way to a person who had a history of violent behavior. Most patients on a ward have learned to avoid any contact with those who have a previous history of violent behavior as they may become harmed inadvertently (Barrett, personal communication). And yet, in this instance, the subject opted to reach out to this person in need, resulting in a warm interaction that yielded therapeutic benefits for both.

Another female subject was not expected to live through the study as she would not eat voluntarily. Consequently, she was fed through nose tubes and had gentle restraints on her hands to prevent her from disconnecting the nose tube. During the first month of *Maharishi Gandharva Veda* music she improved to the point that nose tubes for nourishment were removed as were the restraints. For several days she was capable of self-sufficient behavior, but then she relapsed and nose tubes and restraints to prevent removal of the tubes were reinstated. It is not known how long she lived after the study was complete.

(b) Western Baroque Group Such behaviors were not noticed in the Western Baroque music sessions. In fact, the opposite appeared to happen. For instance, subjects with tardive dyskenisia did not experience a cessation of symptoms during Western Baroque music. Although a few subjects did rest with eyes closed, the majority kept their eyes open, drumming on the tables, asking when the music would be over. One subject exhibited an aggressive reaction to attending the western music therapy session. Whenever the music began he would shout that he hated the music and wanted country music. Music preference was not a variable in this study as the psychiatrist in charge considered it more important to use music already known for its healing properties with this particular population. The subject became so aggressive that half-way through the music section of the study, the institute's staff dismissed him from the study and put him in involuntary temporary seclusion during the therapy session time- period so that the subject could take a nap.

Another subject, female, diagnosed with schizophrenia, became more negative as the music session continued. She constantly complained and grumbled during the music sessions. Another male subject loved classical music. Throughout the music section he would sit quietly in the back with eyes closed, smiling. He did not interact with the other subjects.

A 71 year old female was relatively stable at the beginning of the music section. Two weeks into the music, she began to deteriorate, exhibiting more bizarre behavior with each session. Bizarre behavior included walking around talking to herself, walking up to mirrors and conversing with her image, holding on to her doll, and responding with hostility to any suggestion to sit down. The other subjects in the room ignored her as much as possible, even turning their backs whenever she appeared to need help or wished to talk with the others.

One male subject remained quiet but hostile throughout the entire music session. He was angry at the beginning of the music section, angry during the session, and angry at the end. He did not respond to other subjects at any time even though he was aware of their needs.

In general, subjects attending the Western Baroque music sessions were hostile towards one another throughout the entire study. They either responded violently or ignored others who were exhibiting abnormal behavior. At no time did any of the subjects reach out to interact with, console, or even speak with the others. It was as if they did not trust one another and had learned to keep to themselves for fear of getting involved.

Discussion

The lack of long-term effects may be partly due to the fact that the subjects were severely disturbed and elderly. Other research on severely afflicted psychiatric patients reported by Michel (1985) also failed to measure changes. As in the current study, Michel had attempted to use qualitative measures such as comparing pre- and posttest amounts of sedative drugs. The current study had attempted to monitor drug usage. However, as in the case of Michel,

> ...inadequate controls and the exigencies of the clinical setting limited more accurate observation of the need for and use of sedative drugs by the subjects, but positive effects noted by the observer did support the theory that music could influence the general mood of patients (Michel, 1985, p. 74).

Regarding geriatric settings, Hanser (1987) indicates that "the most withdrawn and confused patients of convalescent hospitals have been observed participating actively in music therapy sessions" (p. 11).

Given these positive reports in the literature, and considering the extreme difficulties encountered by psychotic and/or geriatric subjects, the reports given in the

structured monitoring sections merit our attention. Note that the behavioral changes reported here are definitely departures from the 'normal' stereotyped repertories typically exhibited by the patients. One interpretation may be that the musical experience was a "critical incident" that created a neuropsychological "window" during which new behaviors could be exhibited, or, at least, practiced momentarily.

Another reason that could account for the lack of statistically significant improvements in trends across trials for both *Maharishi Gandharva Veda* music and Western Baroque music groups is that perhaps the effects of music are immediate and wear off quickly. Therefore, future research must use measures which test for immediate effects. Research has shown that music can affect the psycho-physiology of the individual within 15 seconds (Eagle, 1972). Rauscher, Shaw, and Ky (1993) found that listening to 10 minutes of Mozart significantly improved spatial IQ scores but the effect only lasted for the 10-15 minutes needed to perform the task. It takes very little to disrupt the effect of music; even simple stretching or moving around can dissolve any benefit. The fact that measurements were taken six to eight hours after the music therapy sessions meant that the effects from the music therapy session were not well reflected in the measurements. Also, other treatments given by the staff could influence the subjects' measures. However, note that the minimal nature of improvements over time also suggests that the hospital was unable *by any other means* to improve the subjects' lives as well.

Yet another source of compromise could be that the music (Western Baroque or *Maharishi Gandharva Veda*) was not played long enough to produce a long lasting effect. For example, according to Maharishi (1991, private conversation) in order to receive maximum healing benefit from *Maharishi Gandharva Veda* music, it is necessary for the music to be played twenty-four hours a day, rather than just for twenty minutes. Maharishi explained that as the planet rotates through the various time periods of day and night, the transition periods between these time periods may have an affect on human

behavior patterns. If an individual is already out of balance, these transition periods may be a bit rough, leading to unstable behavior. Thus, to compensate, it is necessary for *Maharishi Gandharva Veda* music to be heard during those transitions in order to restore balance to the psychophysiology. Only then will the full benefit of the music be experienced by the individual. In this case, the music was heard only a short while during one of the eight periods and this may have contributed to the balancing effects wearing off more quickly.

Further Considerations

Note that the Institute staff experienced some discomfort with the presence of the experiment's administrators on the premises. The staff was overworked and understaffed and consequently felt that the addition of an experimental study to the normal routine was taxing and an intrusion for which they were not prepared. The somewhat negative attitude of the staff towards the study was observed by the subjects and comments by staff during the rest of the day were reported to the experimental administrators by the subjects. The negative comments apparently influenced some of the subjects' attitudes towards the study and this in turn may have affected behavior patterns which would be reflected in the type of measurement that was taken.

Also, it could be that medication levels interfered with the therapeutic effects of the music and thus no improvement could be reported for either *Maharishi Gandharva Veda* music or Western Baroque music.

However, there were positive outcomes to report as well. First, researchers such as Boyle and Radocy (1987) have reported that subjects hearing unfamiliar music initially may experience some discomfort, but with repeated exposure to the unfamiliar music, it becomes more healing. *Maharishi Gandharva Veda* music was definitely not a familiar

music to these midwestern patients. But, from the very beginning of the music sessions, rather than producing a negative effect which would thus produce significant results for the Western Baroque music, the *Maharishi Gandharva Veda* music produced even more beneficial behavioral effects during the music.

Limitations of the Study

One of the limitations of the study was the bias against the study by the Institute staff. If the daily staff that administers to the needs of the subjects expresses a negative opinion regarding the study, the subjects themselves may reflect that negativity in their attitude, possibly in order to please the staff so that the subject may leave sooner. Further research studies should take place in a facility where the daily staff welcome the music therapy sessions and express positive attitudes toward projects which may promote faster healing among patients.

Another limitation was the lack of a no treatment control group. A more robust study would include a third group which had received no music. This would enable the researcher to determine the effects of music compared to no music rather than compared to another type of music, although change scores did not show an increase and thus the no treatment control would have to show a deterioration for there to be a significant difference from the treatment groups.

A third limitation was the lack of counterbalancing of music types. The resident psychiatrist suggested that switching music types half-way through the study might be upsetting for the subjects and therefore did not recommend it. Further research should consider adding this measure to the design.

As mentioned previously, further research should arrange for *Maharishi Gandharva Veda* music to be played twenty-four hours a day. In Fairfield, Iowa this is now a

possibility as a local radio station, KHOE, plays only *Maharishi Gandharva Veda* music. Future research could have radios left on day and night in the subjects' room and measures taken every few weeks to measure psychophysiological changes. This would be in accord with Maharishi's suggestions for optimum effectiveness.

Summary and Conclusion

The purpose of this pilot study was to determine the therapeutic benefits of *Maharishi Gandharva Veda* music for the elderly compared to an already well known form of therapeutic music. Twenty-seven subjects participated in the study at a small midwestern mental health facility. Two types of music were selected: *Maharishi Gandharva Veda* music and Western Baroque music. Assessment of changes brought about by the music were measured by scores on the Fairview Self-Help Scale, and the Brief Psychiatric Rating Scale. The first month of the study subjects met informally with experiment administrators after lunch. During the next two months of the study subjects were divided into two music groups. No significant differences were found between music groups for any of the measures, nor was there any significant change from the pre to post test for music in general. Given the lack of improvement over time, it was noted that other research on music therapy had found a rapid diminution of effects within minutes after a therapy session concludes. In the current study, nurses evaluation were not conducted until 6 - 8 hours after patients heard the music, thus possibly contributing to the conflicting reports of quantitative improvements across both groups.

Daily structured observations revealed immediate reactions to the two types of music. Subjects in the *Maharishi Gandharva Veda* music group portrayed more positive interactive behavior compared to subjects in the Western Baroque music group. In addition, subjects with tardive dyskinesia were found to be without movements for short

periods of time during the *Maharishi Gandharva Veda* music while no change occurred for subjects similarly affected in the Western Baroque group. Based on the structured observations, it seems that *Maharishi Gandharva Veda* music had a more balancing, nourishing effect on the subjects than did Western Baroque music during the music. Further research is needed to confirm these initial findings.

CHAPTER SEVEN
OVERVIEW AND DISCUSSION

Overview

The purpose of this dissertation has been to present a theoretical understanding of the Vedic principles involved with *Maharishi Gandharva Veda* music and present exploratory research on its effects for the listening individual. Chapter One presented a brief theoretical overview of Maharishi's Vedic Science and its relationship to *Maharishi Gandharva Veda* music.

Maharishi's Vedic Science includes the Vedic theory of sound and a new psychology of music based on Maharishi's Vedic Science. The Vedic theory of sound traces the development of sound from its value as frequency in the unified field of pure consciousness to its more complex expressions as melody and rhythm in manifest creation. The Vedic theory of sound involves five major theoretical constructs:

(1) The Vedic theory of sound which describes the fundamental Vedic properties associated with sound as it is produced by the self-interacting dynamics of the unified field of pure consciousness, the home of all the laws of nature, explained in Maharishi's Vedic Science;

(2) The theory of *Maharishi Gandharva Veda* music which explains the principles by which this frequency or sound evolves into melody and rhythm, ultimately becoming heard as music in manifest creation.

(3) Maharishi's Vedic Psychology which explains the relationship of human awareness to the unified field of pure consciousness;

(4) A new psychology of music based on Maharishi's Vedic Science which expresses the *samhita* value of music in terms of the knower (the musical psyche), the

process of knowing (the theory of *Maharishi Gandharva Veda* music) and the known (Music Therapy);

(5) The *Richo Akshare* chart of A new psychology of music based on Maharishi's Vedic Science which illustrates the practical application of Maharishi's Vedic Science in the field of music research.

The Affective Response Questionnaire

Given an understanding of the Vedic theories from Chapter One, questions then arise as to which methodologies are appropriate for measuring the effects of *Maharishi Gandharva Veda* music on the individual. These questions are addressed in Chapters Two and Three.

Crucial aspects to these questions include the type of effects this music may have and how modern science measures such changes in the psychophysiology of the individual. The choice of measures was narrowed to (1) a subjective self-report form to obtain affective responses, (2) heart rate, pulse diagnosis, and EEG to obtain physiological responses, and (3) therapeutic rating scales along with structured observations to obtain behavioral responses.

Chapter Two briefly reviewed previously existing methodologies that western science has developed for measuring immediate affective responses to music. The chapter presented a definition of affect and arousal and then discussed the various approaches used for measuring affective responses. In addition, it also reviewed the development of various questionnaires which have been used in previous research.

This chapter also pointed out that with all the questionnaires, the researchers first presented subjects with different types of music and then had the subjects list adjectives which may have reflected the feelings subjects experienced while listening to the music.

This empirical form of investigation yielded conclusions regarding the effect of music on a general population. It used standard research methodologies developed in western science for uncovering fundamental laws inherent in the structure of musical melodies which may be responsible for creating a particular effect in the individual.

In Chapter Three, a different approach was taken that led to the development of a new, state-of-the-art affective questionnaire. Rather than inquire into what the general population thought about particular types of music, I looked into the various predictions which the *Vedic* Literature made about this music, including its effects and then, with the help of experts in the field of *Maharishi Ayur-Veda*, evolved a system of measurement appropriate for those predictions. This led to the development of an affective response questionnaire based on *Maharishi Ayur-Vedic* body types or *doshas*. It was assumed that different adjectives on a questionnaire, which represented affects or feelings associated with particular *doshas*, would reflect the different *dosha* responses to music. If, as Maharishi suggests, *Maharishi Gandharva Veda* music is balancing to all *dosha* types, then regardless of body type individuals would experience some degree of balancing effect from listening to that music.

To measure this, a list of bipolar adjectives using a Likert rating scale was created, in which the listed adjectives reflected the most balanced and imbalanced feelings associated with each of the three *doshas*: *vata*, *pitta* and *kapha*. It was predicted that the questionnaire, known as the Maharishi Ayur-Veda Affective Response Questionnaire (MAARQ), would reflect the affective response of the individual to the music in terms of balance in the three *doshas*. Increased positive scores would indicate increased balance. Unlike previous questionnaires, this was not based on empirical selection of appropriate adjectives, but rather on prediction based on ancient Vedic texts. The Maharishi Ayur-Veda Affective Response Questionnaire (MAARQ) was then tested successfully for

content validity and construct validity by comparing it to a previously used and well known questionnaire.

Measuring the Immediate Effects of *Maharishi Gandharva Veda* Music at Live Concerts

In Chapter Four the MAARQ was used to determine the effects of a live performance of *Maharishi Gandharva Veda* music on an audience (pre-post comparison). Two experiments were carried out: the first looked at individuals who attended live *Maharishi Gandharva Veda* concerts in general; the second looked at possible confounds in Experiment One. All subjects attending the concerts practiced Maharishi's Transcendental Meditation program.

Experiment One had three hypotheses: (a) *Maharishi Gandharva Veda* music was expected to increase balance in the three *doshas* as indicated by more positive post-scores compared to pre-scores on the MAARQ; (b) *Maharishi Gandharva Veda* music was expected to produce significantly greater pre-post differences for females compared to males; and (c) *Maharishi Gandharva Veda* music heard in the afternoon was expected to produce a more balancing effect on *Vata dosha* while *Maharishi Gandharva Veda* music heard in the evening was expected to produce a more balancing effect on *Kapha dosha.*

For Experiment One, the dependent variables were MAARQ improvement scores for each of the three *dosha* types: *Vata, Pitta*, and *Kapha.* The independent variables were: music, time of performance, and gender. Results of statistical analysis confirmed the first two hypotheses. Results showed that (a) live *Maharishi Gandharva Veda* concerts significantly balanced all the *doshas* ; and (b) females showed a significantly greater range of improvement in *Pitta* and *Vata* scores (but not in *Kapha* scores) than did males.

The hypothesis for (c) that specific *doshas* associated with certain times of day would exhibit a greater balancing effect with the music appropriate for that time of day, was not supported. Instead, follow-up analysis revealed that greater balance of all the *doshas* occurred with evening performances compared to afternoon performances. This finding is suspected to be an outcome of the lower pre-music scores on the MAARQ for the evening; that is, subjects were more fatigued and otherwise out of balance at the beginning of the evening concerts than at the beginning of the afternoon concert. The post-music scores, however, were roughly equivalent for the afternoon and evening, indicating that the rejuvenating power of *Maharishi Gandharva Veda* music could overcome the work-day fatigue.

Experiment Two investigated two possible confounds that could influence the interpretation of tests for the first three hypotheses in Experiment One. Recall that Experiment One was conducted on all-TM audiences. The first part of Experiment Two examined the effects which the practice of Maharishi's Transcendental Meditation program vs. non-TM practice may have had on the self-reports given in the MAARQ. It was possible that TM practice could be associated with a 'social compliance' effect, inducing subjects to give positive responses on the post-music MAARQ. The purpose of this experiment was to determine if a 'social compliance' effect had influenced the responses to the MAARQ. The second part of Experiment Two examined the effects which a culturally unfamiliar type of music (*Maharishi Gandharva Veda*) may have had on a western audience compared to a more familiar type of music (Western Baroque).

Experiment Two utilized Western Baroque music in order to obtain a context that included non-TM participants since insufficient non-TM practitioners had attended *Maharishi Gandharva Veda* concerts to permit statistical analysis. Hypothesis 2a predicted that for Western Baroque concerts, TM practitioners would experience a similar effect, as indicated by similar or significantly greater positive pre-post improvement

scores on the MAARQ, compared to non-TM practitioners. If similar effects were found on any of the three *doshas*, then the 'social compliance' effect could be discounted. If all three *doshas* indicated greater effects, then it could not be discounted. The independent variables were music type and TM practice. Dependent variables were the *dosha* scores for *vata*, *pitta*, and *kapha* on the MAARQ.

Results indicated that for Western Baroque musical performances, composed roughly of 50% TM and 50% non-TM audiences, TM subjects did not demonstrate any response bias in *Vata* and *Pitta* MAARQ scores. However, TM subjects demonstrated significantly greater improvement in *Kapha dosha* compared to non-TM subjects and hence some response bias could be indicated, or the greater improvement in *kapha* could be due to greater flexibility in the subjects. In general, the results suggested that effects demonstrated in Experiment 1 could be generalized to a non-TM population.

Hypothesis 2 b predicted that the balancing effect of *Maharishi Gandharva Veda* music would overcome any bias which western audiences may have had due to unfamiliarity with the music type, as indicated by post-scores on the MAARQ for *Maharishi Gandharva Veda* being at least equal to post-scores produced by the more familiar Western Baroque music. For the second hypothesis, self-reports from TM practitioners who had attended both types of music concerts were used for analysis. Independent variables were type of music and TM practice. Dependent variables were *Vata*, *Pitta* and *Kapha dosha* scores on the MAARQ questionnaire.

For hypothesis 2b results showed significantly greater *Vata* balancing at posttest for the *Maharishi Gandharva Veda* music when compared to Western Baroque music. *Pitta* and *Kapha* balance at posttest were marginally greater for *Maharishi Gandharva Veda* music compared with Western Baroque.

These results indicated that the lack of familiarity with *Maharishi Gandharva Veda* music did not counteract its beneficial effects, specifically when compared with Western

Baroque music, a musical style that other research indicates has therapeutic value (Ostrander and Schhroeder, 1989). The findings also indicated that *Maharishi Gandharva Veda* music exceeded western music in balancing *Vata dosha.* Maharishi has postulated that the processes of balance arising from *Maharishi Gandharva Veda* music begin with *Vata dosha,* move to *Pitta* and finally to *Kapha dosha* (Maharishi, telephone communication, MIU, 1989). When the effects were ranked the same order of efficacy was found.

Measuring the Immediate Effects of *Maharishi Gandharva Veda* Music on the Physiology

Recorded Music

In Chapter Five the immediate effects of *Maharishi Gandharva Veda* music were tested using psychophysiological measurements. Two studies were reported: Experiment Three used a recording of *Maharishi Gandharva Veda* music; Experiment Four took place at a live *Maharishi Gandharva Veda* concert. The hypothesis for the Experiment Three predicted that an individual listening to *Maharishi Gandharva Veda* music played in a style appropriate for the time of day would experience increased physiological balance as indicated by changes in EEG, specifically global alpha and global theta activity, during the subject's deepest experience. Positive changes in the pulse be indicated by specific reports of increased balance, unbounded awareness, and increased well-being as diagnosed by a physician trained in *Maharishi Ayur-Veda.* The hypothesis for the Experiment Four will presented a little further on in the chapter.

The independent variable for Experiment Three was recorded music at one condition. The music was a cassette recording of *Maharishi Gandharva Veda* music performed by Amar Nath, an Indian flutist of international renown who has performed with the National Orchestra of India. The recording was of the *raga* suitable for 1 p.m - 4

p.m. The name of the *raga* was not available. Dependent variables were EEG paper recordings, *Maharishi Ayur-Vedic* pulse diagnosis, and heart rate. The experiment was a case study of a single individual who listened to *Maharishi Gandharva Veda* music in an isolated room optimized for EEG recording. Two separate sessions were reported in the study.

Results showed that for Session One, the subject was at first restless and unsettled as indicated by muscle and eye movement artifacts in the EEG and imbalances in the *subdoshas* of the pulse. At the onset of the music the subject immediately settled down: eye and muscle artifacts disappeared; imbalances in the *subdoshas* became fainter. Throughout the twenty minute music session, a pattern of alpha arousal followed by theta occurred regularly while the pulse continued to improve in balance and smoothness. At the end of the music all imbalances in the pulse disappeared briefly and alpha bursts followed by theta and 7-9 Hz theta/alpha bursts continued for several minutes until the subject opened his eyes, at which time more artifacts appeared in the EEG and faint imbalances in the pulse returned.

The subject found the music to be "very relaxing" with a "general feeling of wholeness" being created. He commented that "Overall (it was) very sweet and healing". This settled feeling reported by the subject correlates to the objective reports of decreasing *pitta subdosha* imbalances in the pulse, fewer muscle artifacts, less drowsiness and a pattern of increased alpha activity followed by theta in the power spectrum of the brain.

The second session was not anomalous with the first. Although the subject experienced more drowsiness than in Session One, the overall trend in the second session remained in the direction of lessening of *dosha* imbalance and improved sense of subjective well-being. The occurrence of 7-9 Hz theta/alpha bursts reappeared in the second session along with bursts of alpha and theta.

At the beginning of the second session, during the eyes open condition, the subject appeared unsettled as indicated by muscle and eye artifacts in the EEG and by imbalances in various *subdoshas* in the pulse. An immediate settling down was noticed in both pulse and EEG when the subject closed his eyes prior to the music, as is usually the case upon closing the eyes. Pulse analysis indicated that *subdoshas* diminished in intensity and EEG indicated alpha and theta waves were dominating brain wave activity. With the onset of music the pulse became smoother with less background activity while the EEG showed increases in alpha followed by theta activity, along with 7-9 Hz theta/alpha bursts. During the music condition, the subject became very relaxed and appeared drowsy as indicated by stage one sleep indices of vertex wave, delta activity, decreased HR, and smoother pulse. However, the subject remained alert to music shifts as indicated by alpha bursts in EEG at those times. When the music condition ended, alpha and theta continued for a few minutes and then artifacts in EEG and background activity in pulse increased.

The subject reported feeling deep relaxation, some sleepiness, some subtle mental (emotional) activity. Overall he felt it was very enjoyable, balancing, and healing.

In this pilot study, the question was raised as to what effects *Maharishi Gandharva Veda* music may have had on the physiology. Since Maharishi has explained that *Maharishi Gandharva Veda* music and Maharishi's Transcendental Meditation technique are two of twenty approaches of *Maharishi Ayur-Veda*, it was suggested that they should have similar effects (Maharishi, personal communication, 1990).

As pointed out in the literature review, previous research has indicated that during Maharishi's Transcendental Meditation technique there is an increase in high amplitude alpha activity in the frontal areas of the brain, particularly for the slow alpha frequencies, accompanied at times by synchronous theta trains. During the *Maharishi Gandharva Veda* music condition, an alternating pattern of theta followed by slow alpha developed in both sessions. Also, 7 - 9 Hz theta/alpha bursts occurred. This pattern continued for the

duration of the music. At one point in session two, the subject felt drowsy and stage one sleep tracings appeared on the record. Delta frequencies also appeared. These drowsy, or sleep tracings differed from the theta and alpha pattern yet were mixed with the above mentioned phenomenon, indicating something different from sleep, yet very restful in its own nature, may have been occurring throughout most of the music session.

At several times during the music, pulse and EEG recorded similar findings: in session one, alpha synchrony increased and artifacts lessened at the same time that 'white noise' in the pulse diminished and *subdosha* imbalances faded away. Again, in session two, pulse diagnosis indicated a deep state of rest at the time when the EEG recorded stage one sleep. The settling of the pulse at the time of drowsiness in both sessions suggested that the subject was transcending but could not sustain conscious awareness due to fatigue in the system, and therefore slipped in and out of the sleep mode, consistent with a junction point hypothesis.

Maharishi Gandharva Veda Music and The Junction Point Model of Consciousness

As has been noted, it was hypothesized that the physiological mechanisms responsible for the effects of *Maharishi Gandharva Veda* music would be the same as those for Maharishi's Transcendental Meditation (Maharishi, personal communication, January 1990). This chapter pointed out that a line of evidence has accrued which links the current EEG findings on *Maharishi Gandharva Veda* music with the experience that characterizes both the practice of TM and the waking/sleeping transition, such as the waking and sleep transitions observed during session two. In regard to the TM and waking/sleeping transition phenomena, Travis (1990) compared the EEG of 10 subjects practicing Maharishi's Transcendental Meditation technique with the EEG of 10 non-meditating subjects during the waking/sleeping transition (prior to Stage 1 sleep). The

subjects were matched in age, gender, and handedness. Travis reported that the two groups exhibited essentially identical power and coherence spectra. The major difference was that the sleeping subjects exhibited the characteristic EEG only 3-5 minutes, while, during TM, subjects exhibited the characteristic EEG throughout the whole experimental session (p. 45). In later research Travis (1994) demonstrated significantly greater occurrence of theta/alpha (7-9 Hz) activity during three "junction points" compared with other sleep stages such as REM periods (p =.003) and non-REM periods of sleep (p = .007). The three junction points were at the waking/NREM-sleep transition, the transition from delta of deep sleep to REM-dreaming, and between REM-dreaming and delta sleep. Travis suggested that these transitions reflect the characteristics of Maharishi's "junction point" model of consciousness.

It was suggested that this junction point model could be applied to the findings produced by *Maharishi Gandharva Veda* music due to the putative mechanics by which the music brings about balance to the *doshas*. The two music sessions reported a correlation between balancing of the *doshas* and exposure to *Maharishi Gandharva Veda* music. EEG recorded during the experiences in both sessions indicated bursts of alpha alternating with theta and occurrences of 7-9 Hz theta/alpha activity. These are also EEG "signatures" of the TM experience and have been associated with the junction point model. Further research is needed to confirm this model with *Maharishi Gandharva Veda* music.

Live Concert

A fourth experiment looked at the immediate effects of a live *Maharishi Gandharva Veda* concert on the EEG and subjective experiences.

The study was an exploratory study of many possible correlations between subjective experiences during the concert and EEG changes. An Interactive Brainwave Visual Analyzer (IBVA) was used to measure EEG activity in the subject at the concert hall.

Through visual inspection of the FFTs, it was found that the most salient change in the EEG was increased amplitude of rhythmical beta in the left or right frontal areas that was correlated to self-reports of subjective experiences of bliss. The study concluded that *Maharishi Gandharva Veda* music increased beta in the frontal lobes and that this increase in frontal beta activity may possibly be associated with subjective reports of increased bliss perhaps indicating a restructuring of the physiology (Lyubimov, 1995) and/or periods of what Maharishi calls "wholeness of dynamism" in contrast to periods of "wholeness of silence", which may be associated with alpha-theta.

Immediate Effects of *Maharishi Gandharva Veda* Music on Behavior

Chapter Six looked into the immediate effects of *Maharishi Gandharva Veda* music on behavior. The purpose of this fifth experiment was to determine the therapeutic benefits of *Maharishi Gandharva Veda* music for the elderly compared to an already well known form of therapeutic music. The hypothesis stated that geriatric subjects listening to *Maharishi Gandharva Veda* music will show less anxiety and demonstrate improvement in their mental and social behavior at least as much as geriatric subjects who hear only Western Baroque music. Twenty-seven subjects participated in the study at a small midwestern mental health facility. The independent variable was music condition at two levels: *Maharishi Gandharva Veda* music and Western Baroque music.

The dependent variables were the following: Fairview Self-Help Scale (FSHS), Brief Psychiatric Rating Scale (BPRS) and structured monitoring of observations by experiment administrators.

The first month of the study subjects met informally with experiment administrators after lunch. During the next two months of the study subjects were divided into two music groups. Each of the two groups heard 20-minute selections of either *Maharishi Gandharva Veda* music or Western Baroque music once a day at the same time of day for eight weeks.

No significant long-term differences were found between music groups for the two rating measures, and there were no long-term effects of music on these measures in this elderly, psychiatric population. However, daily structured observations did reveal immediate reactions to the two types of music. Subjects in the *Maharishi Gandharva Veda* music group portrayed more positive interactive behavior compared to subjects in the Western Baroque music group. In addition, subjects with tardive dyskinesia were found to be without movements for short periods of time during the *Maharishi Gandharva Veda* music while no change occurred for subjects similarly affected in the Western Baroque group. Based on the structured observations, it seemed that *Maharishi Gandharva Veda* music had a more balancing, nourishing effect on the subjects than Western Baroque music during the music. Further research is needed to confirm these initial findings.

Discussion: The Parts In Context of the Whole.

> Music is the restorer of equilibrium, of order and harmony with the world in which we live and with the people with whom we share it.
>
> —Feder and Feder, 1981

The concept of music as a means for bringing the psychophysiology into a state of harmonious integrated functioning which is spontaneously attuned with the functioning of Natural Law is not new. The above quotation illustrates the Apollonian perspective of the purpose of music (Feder and Feder, (1981). It is similar to that expressed by Maharishi for *Maharishi Gandharva Veda* music (see quote a little further on in the Chapter). In recent years this perspective has become popular once more, and with the introduction of a new psychology of music based on Maharishi's Vedic Science, this theoretical perspective now has practical application for the individual and hence society.

The research presented in this dissertation has been exploratory in nature. That is, its purpose was to uncover the directions which future research on *Maharishi Gandharva Veda* music might take. For instance, we now know that *Maharishi Gandharva Veda* music has a significant effect on affect associated with *Maharishi Ayur-Vedic doshas* . We also know that EEG and pulse are influenced as well. We have seen that during the music sessions, behavioral changes occur, but these positive changes rapidly fade with time in the institutionalized geriatric subjects studied. From these initial findings, the following research questions arise.

As we know from Chapter Three, Western Baroque music influenced the *doshas* differently compared to *Maharishi Gandharva Veda* music. Western Baroque influenced *vata* and *kapha* but not *pitta* whereas *Maharishi Gandharva Veda* music significantly influenced all three *doshas*. It could be that each type of music has its own *dosha* signature. Future research could ascertain *dosha* signatures for different types of music; i.e. what *doshas* and to what degree, are influenced by what type of music— this would give a blueprint for music therapists in determining what music type would balance what *dosha* for what age group.

Another question: could a certain *dosha* type learn to play a musical instrument better than another type? Research could investigate into musical aptitude and *dosha* type.

How would interactive music sessions affect the *doshas* ? In these present studies measurements were taken on subjects who sat passively and listened to the music. What happens to the *doshas* of the performers? How do the *doshas* of the students learning to play a musical instrument respond? This research would enable music educators to select appropriate instruments for their students which in turn would maximally optimize the growth of consciousness in the student. If one's *doshas* come into balance through the practice sessions on an instrument suitable for that particular psychophysiology, less stress and strain should be experienced and learning should become more comfortable, leading to greater balance and fulfillment in life.

We know that affect changes with *Maharishi Gandharva Veda* music, leading to what Sharma (1993) has called increased balance or bliss. What other parts of the mind could also be affected? Future research should investigate into these possibilities.

For example, during the past year, western researchers have discovered that IQ temporarily rises in children who listen to Mozart (Rauscher, Shaw & Ky, 1993). What would happen to IQ in children who listen to *Maharishi Gandharva Veda* music? I suggest that IQ would rise as well.

How does listening to *Maharishi Gandharva Veda* music affect learning ability? Memory? Mind-body coordination as indicated by reaction time scores? These types of studies could be accomplished at the Maharishi School for the Age of Enlightenment (MSAE) in Fairfield, Iowa, U.S.A. as the students there learn *Maharishi Gandharva Veda* music as part of their curriculum.

Further, does listening to *Maharishi Gandharva Veda* music settle down rowdy school-children? Several of the teachers of the MSAE school have commented in

personal communications that they found playing *Maharishi Gandharva Veda* for a few minutes before starting class did help settle the classroom for learning.

And, if *Maharishi Gandharva Veda* music can settle the school-children, what can it do for the family, community, city, state or nation? Can the playing of this music decrease negative tendencies in society? The type of negativity and its qualitative as well as quantitative decrease should be measurable.

Effects of Maharishi Gandharva Veda music on Body, Mind, Behavior and Environment: Research Questions

At the very beginning of this dissertation, a quotation from Maharishi appeared which explained the overall value of *Maharishi Gandharva Veda* music. He said that *Maharishi Gandharva Veda* music:

> makes a precious contribution to the creation of world peace—the use of sound, melody and rhythm to restore balance and harmony in the mind, body, behavior and environment.

In order to understand the ramifications of this statement, research needs to be conducted on the eight topics which Maharishi mentions in this quote. Following are some ideas for each area:

Sound

This generally refers to the drone or *tanpura* used in the performance. Previous research by Deva (1980) and others indicates a relaxing effect is produced by the drone alone. Maharishi has indicated that the never changing sound of the drone during each *raga* is the basis upon which the ever changing melody of the *raga* is based. If this is so, how does the drone affect the psychophysiology? Perhaps it inhibits distracting thoughts that otherwise would create tension. Research could investigate not only effects on the

doshas but also effects on heart rate, breath rate and amplitude, EEG, muscle tension and anxiety.

According to Chaudhuri[1] the *pakar* is the identifying musical phrase of the *raga.* Research could look into the *pakars* of the r*agas* to determine what effects these *swaras* played by themselves would have on an individual.

Does pitch discrimination improve with *Maharishi Gandharva Veda* music? Given that performers of *Maharishi Gandharva Veda* music are sensitive to the *sruti* value of the *swara*, could it be that sensitivity carries over to pitch discrimination of all sounds? Is there a difference between musicians and non musicians in this ability?

Melody

Plato recognized that "the soul of the world is a musical scale"(in Berendt, 1987). The soul of melody is the scale. In *Maharishi Gandharva Veda* this refers to the parts that comprise the *Raga.* Research needs to be done on the melody of each *raga* in order to determine their relative merits and benefits for the *doshas*. For instance, by focusing on the melody during the *gat* or fastest part of the *Raga* may train the mind to focus more skillfully. Also, it could be that certain *ragas* may be more conducive to improving learning ability etc. Research could determine this.

It would be interesting to look into the relationship of the *rasas*, the *doshas* and the *alamkaras*. If, as this research has indicated, the *doshas* can be reflected in affective descriptors, then perhaps the feelings or *rasas* portrayed in the *ragas* via the ornamentation or *alamkaras* can be measured as well. Recall from Chapter Three that the last four items on the MAARQ listed feelings indicative of the *rasas*. A research study

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[1] See Lesson Ten of the General Theory and Instruction Booklet on Maharishi Gandharva Veda .

could be done quite easily using this data to determine which *rasa* dominated which *raga* and how that *rasa* impacted the *doshas*.

Rhythm

Gaston, the father of music therapy, identifies rhythm as "the most significant element of music.

> It is an energizer as essential to music as the heartbeat is to human life; without rhythm there could be no music. Rhythm is also an organizing instrument that serves to coordinate sound, to influence activity, to communicate, to structure reality, and—on a social level— to bring people together to dance, play and listen. Rhythm serves to control behavior; it provides a non-verbal persuasion not only to act but to act in concert with others." Gaston (1968) *Music in Therapy*. pp. 17 - 27.

In *Maharishi Gandharva Veda* music rhythm is produced by the *tablas*. The *talas* or types of beats and *bols* (phrases of beats) are a self-sufficient part of the *Raga*. As such, each *tala* could be researched for its effects on the psychophysiology. For instance, *teen tal* is supposedly syncopated to the human heart beat. This should be measurable.

Danielou (1977, p. 212) points out that in western theory,

> the connection between musical rhythm and the rhythms of the body is substantiated by evidence from musicologists, experimental psychologists, and neurologists. The average normal musical tempo is about the same speed as the average normal HR of 72 - 80 beats per minute. This tempo corresponds to the reaction time value of .75 seconds, which seems 'to be a psychic constant corresponding to the duration of the complete process of perception' (McLaughlin citing Oleron, 1970, p. 34). Thus, it would appear that the relationship between the important body rhythms or "rate-controlling constants of the brains's mechanism" (McLaughlin, p. 34) and musical rhythm would be quite close, and HR research has tried to describe and clarify this connection.

An area associated with musical rhythm is the field of circadian rhythms. According to Dr. Tony Nader, President of Maharishi Ayur-Veda University, International, music has an intimate connection to the circulatory and circadian rhythms in the physiology. If so, then research should confirm this connection. Previous research by Rider, Floyd and

Kirkpatrick (1985) pointed to the significant effects of music on such circadian variables as body temperature, corticosteroids and circadian amplitude. Clark, Watson, and Leeka (1989) investigated diurnal variations in affect, finding that clearly defined morning and evening types showed significant variation in diurnal mood patterning. Mulcahy, Keegan, Fingret, Wright, Park, Sparrow, Curcher and Fox (1990) studied the circadian variation of heart rate in members of a symphony orchestra, including staff. They found that heart rate peaked not only in the morning hours but also peaked on concert days, with a primary peak occurring in the evening hours on the day of the concert and a lesser peak occurring in the morning both for musicians and staff. Interesting to note is that mean heart rate was higher for staff than for performers.

If, as Maharishi has pointed out, *Maharishi Gandharva Veda* music restores balance and harmony to the psychophysiology, and if *Maharishi Gandharva Veda* music upholds the natural rhythms that prevail at different times throughout the day and night, then it seems reasonable that listening to *Maharishi Gandharva Veda* music should affect the circadian rhythms of the individual. This would be of interest for those trying to overcome jet lag as well as for those with insomnia etc. Future research should investigate the effects of *Maharishi Gandharva Veda* music on circadian rhythms.

Another area associated with circadian rhythms is a phenomenon which affects older people and known as Sundowner's Syndrome. It seems that as the sun either goes down or rises, some elderly people tend to become disoriented and confused. If listening to *Maharishi Gandharva Veda* music can smooth the behavioral transitions between time periods (Maharishi, 1990, personal communication), perhaps it would be an effective therapeutic tool for restoring equilibrium to this particular population.

Mind

Mind here refers to the levels of mind in Maharishi's Vedic Psychology. In addition to other possible studies mentioned earlier on learning ability and discrimination skills, research also should look into effects of this music on self-esteem, motivation, and perception.

Body

Although the studies performed for this dissertation looked at EEG, HR and pulse, other physiological variables should be studied as well. For instance, EMG or muscle tension has been found to respond to different music selections in previous research (see Dainow, 1977). Fried (1990) found that breathing deepens and relaxation occurs more quickly with certain types of music—breathing amplitude and rate would be excellent markers for *Maharishi Gandharva Veda* music. It could be that certain areas of the brain respond more to *Maharishi Gandharva Veda* music. Given that most of us do not understand the lyrics, does one hemisphere react more than the other? Also, are there laterality differences between musicians and non musicians with this music? Coherence studies should also be undertaken to determine significance of brainwave spectra.

Does listening to *Maharishi Gandharva Veda* music improve both physical and mental health? What are its effects on substance abusers? How can it be implemented in hospitals and would it be effective in resting homes?

Behavior

Interpersonal relations and interactive situations fall into this category. Although the research reported in this document found behavioral changes only during the music

sessions, perhaps, over time the behavioral changes become long-lasting. Research needs to confirm this.

According to Maharishi (1991, p. iii) *Maharishi Gandharva Veda* music

> "is a precious discipline of Vedic Science, the complete science of life. It sends forth those powerful melodies and rhythms of nature to purify the atmosphere, thereby neutralizing negative trends and tendencies in the environment and promoting the orderly evolution of life". If individuals are functioning from within an integrated, harmonious mode, it stands to reason that their interactions with one another will also be more harmonious.

Given the tremendous amount of anger and hostility prevalent in relationships around the world, *Maharishi Gandharva Veda* music could become invaluable in reestablishing order and harmony through a somewhat innocuous manner. If *Maharishi Gandharva Veda* music could be played twenty-four hours a day in each city in the nation, whether heard audibly or not, would anger become less? Research is needed on the social implications of this music for producing a better quality of life in the family, community, city, state, nation, and the world.

Environment

Recall from Chapter One that many of the *ragas* are seasonal. In private conversations with Debu Chaudhuri, it was learned that when he performed one *raga* intended to bring the rain, in areas of drought rain appeared within twenty-four hours. Research is needed to confirm if there is a direct cause/effect relationship.

Conclusion

My research showed that live concerts of *Maharishi Gandharva Veda* music had a holistic balancing effect on all three doshas, *vata, pitta*, and *kapha*. Subjective experiences ranged from normalization to higher states of consciousness, indicating that

Maharishi Gandharva Veda music facilitates evolution for all psychophysiological states.

Pilot psychophysiological studies showed that the balancing effects and bliss reported by subjective experiences are reflected in the EEG and in the pulse. Moreover, *Maharishi Gandharva Veda* music was observed to have beneficial effects during the music on severely disturbed psychiatric elderly patients, although no long-term effects were measured.

The implications of the value which *Maharishi Gandharva Veda* music has for the world is tremendous. Maharishi has said,

> *Gandharva* music is a must today in this generation, when people are fighting and creating trouble for others. With all the problems in the international and national world, *Gandharva* music is a must for everyone.

How will *Maharishi Gandharva Veda* music contribute towards creating a peaceful world? Maharishi (p.13) explains that "whether someone listens to this music or not, if those reverberations are created in the atmosphere, a harmonizing influence will prevail and imbalances will become balanced." According to a newspaper interview given in Orange County, California in 1988[2]: "Chaudhuri believes the music has the power to change the world. 'I always say that if one atom can create hell on earth, like Hiroshima or Nagasaki, why can't an atom of sound create something good through this music?'" According to the Introduction (p.3) of the book, *Maharishi Gandharva-Veda: Creating Balance in Nature and Harmony in World Consciousness—Global Achievements*,

> It was during Maharishi's festivals (of Music for World Peace) that mankind witnessed the dawn of world peace. The dangerous rivalry between the superpowers subsided, conflicts between nations ended, and peace and freedom began to be enjoyed by the people of many countries for the first time in many decades.

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2 The interview can be found on page 139 of the book, *Maharishi Gandharva-Ved: Creating Balance in Nature and Harmony in World Consciousness—Global Achievements.*

If, as Maharishi has suggested, world peace can be attained simply by listening to this beautiful music, how easy and attainable world peace has suddenly become. And how crucial it becomes to begin these research studies in order to help more people understand the value of this precious contribution of one branch of Maharishi's Vedic Science. Truly this is the beginning of the descent of Heaven on earth. As Plotinius once said, "All music, based upon melody and rhythm, is the earthly representative of heavenly music". All we need do is add *Maharishi Gandharva Veda* music to our daily routine and start living the reality of Heaven on earth.

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APPENDIX 1-A
Historical Perspective of *Gandharva Veda* Music

Gautam (1989) clearly describes the evolution of *Gandharva Veda* music theory. Following is a brief outline of the theory presented by the earlier authors which are quoted in Chapter One. Note: the author's names are left in normal type print, the title of treatises are italicized as is Indian terminology. All references and quotes come from Gautam.

1. Naradiya Siksa. written c.150 B.C.

Considered the earliest work on *Gandharva* music theory. Its main subject matter is Vedic music followed by *Grama ragas*. Deals with origin of the *Sama* scale. The word *raga* first used in a technical sense. However: No mention of *Jati*. No presentation of structure, form, nor arrangement of *svaras* in *ragas*.

2. Bharata. Natya Sastra. written c. 50 B.C.

Focuses on *Marga* music. Presents a comprehensive description of the *Grama-Murcchana-Jati* system. Develops the 22 *srutis*. *Grama raga* present only as "a mood augmenting mode in particular scenes just before their commencement". *Jati* considered *Gandharva Sangita*, a music that pleased not only men of learning but also the *Gandharvas* and the Gods. *Marga* refers to spiritual, celestial music. A total of five *talas* presented: *cacatputa, cancatputa, satpitaputraka, udghatta and sampakvestaka. Prabhandas* for composition presented.

However: *Raga* used in literal sense of pleasing, not in a technical sense. *Desi* music (music composed by the musicians for entertainment purposes only) not developed. Time theory not mentioned.

Gautum indicates that *grama* and *jati* apparently developed separately but at the same time. He suggested that some authors may have preferred the system of *grama*; while other contemporary theoriests preferred *jati*. *Gautum* suggests that one or the other was in vogue at different times, hence their alternating presentations in varying treatises. It is not known which came first.

3. Matanga. Brhaddesi. Available only in parts. c. 800 A.D.

Main contributions: the 12 tone *Murcchana* system, elaboration of *Jatis* with notation, *Grama ragas, Bhasas, Vibhasas* and *Antarabhasas*, description and examples of *Desi* ragas, and introduction of the *Kinnari vina*. *Grama Raga* as *Margi Sanghita* gains prominence. *Marga* refers more to classical music as opposed to folk music rather than to spiritual music. Introduces a *sruti-svara* reltionship based on *asraya-asrayi bhava* with two kinds of *sruti* namely *atahsruti* and *svasruti* which is more convincing according to Gautum's than is Sarngadeva's theory.

4. Sarngadeva. Sangita Ratnakara. written c. 1230 A.D.

The treatise has seven chapters: 1) *Svara*, 2) *Raga*, 3) *Prakirnaka*, 4) *Prabandha*, 5) *Tala*, 6) *Vadya* and 7) *Nritya*. Clearly specifies time-theory governing *Grama ragas*. Number of *Talas* totals 108. The original five *talas* of *Bharata* are considered *margi talas*; the others as *desi talas*. Regarding composition, *rupakalapti* replaces *prabandhas*. The present day style of *Khayal* is based on *rupakalapti*.

Note: Sarngadeva's chapter on *svara* contains theories which are contradictory to the principles on which they are supposedly based. For example, take Sarngadeva's concept regarding *srutis*. Supposedly based on Bharata's 22 *srutis* in a *saptaka*, Sarngadeva instead introduces fourteen notes within a *saptaka* rather than seven. He states that there are ten notes--five under *Ni*, five under *Ga* in addition to the other four

svaras. Each *svara* is one *sruti* interval apart, whereas Bharata clearly states that there should be two *sruti* intervals between *svaras* for them to be musically viable. As Gautum points out, even though Sarngadeva's *sruti* concept is musically unviable, subsequent scholars have attempted to locate fourteen *svaras* within 22 *srutis* rather than increasing the *srutis* to twenty-eight which would conform to Bharata's theoretical construct. Gautum recommends using Matanga's *sruti* concept instead.

> Regarding time theory: Gautum states that the origin of time theory is not known. But the significant point is that the musical structure and aesthetics forms began to be associated with the diurnal and nocturnal cycles, and some inscrutable relationship established between the intrinsic expressive quality of the *svaras* and the particular time of day and night. This indicates the realization of the integration of sound and light in nature and how it is correlated in music. This in itself may open out a new field of research. In this age of highly technological specialization, it may not be difficult to scientifically investigate the exact correlation between the *svara* and varying degrees of light and shade (Gautam, 1989).

5. Parsvadeva. Sangita Samayasara . contemporary of Sarngadeva.

The first chapter and half of the second chapter are not available.This manuscript presents a clearer discussion of *gamakas* than Sangita Ratnakara.

6. Commentaries on Sarngadeva's Sangit Ratnakara.

A. Simhabhupala (published)

B. Kesava (not published and not available)

C. Kallinatha (published)

D. Vittala (not published written in Telegu)

APPENDIX 3-A
Tests of Reliability - Cronbach's Alpha

RELIABILITY ANALYSIS - SCALE (ALPHA)

1. VPRESET
2. VPRECALM
3. VPRECMPD
4. VPRETRAN
5. VPREHARM
6. VPRESMTH

Correlation Matrix

	VPRESET	VPRECALM	VPRECMPD	VPRETRAN	VPREHARM
VPRESET	1.0000				
VPRECALM	.7952	1.0000			
VPRECMPD	.7466	.8313	1.0000		
VPRETRAN	.7231	.7751	.8013	1.0000	
VPREHARM	.5970	.6477	.7095	.7722	1.0000
VPRESMTH	.6105	.6417	.6831	.7278	.8020

N of Cases = 870.0

Item Var	Mean	Minimum	Maximum	Range	Max/Min	Variance
1.3557	1.2402	1.5092	.2690	1.2169	.0098	
1.5753	1.3296	1.7500	.4204	1.3162	0268	

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.7243	.5970	.8313	.2343	1.3924	.0054

Reliability Coefficients 6 items

Alpha = .9394 Standardized item alpha = .9403

1. PPRECOLD
2. PPREPCFL
3. PPRESERN
4. PPRESOOT ppresooth
5. PPREHPY

Correlation Matrix

	PPRECOLD	PPREPCFL	PPRESERN	PPRESOOT	PPREHPY
PPRECOLD	1.0000				
PPREPCFL	.0906	1.0000			
PPRESERN	-.0250	.2356	1.0000		
PPRESOOT	.1267	.7565	.2139	1.0000	
PPREHPY	.0832	.6426	.1778	.6649	1.0000

N of Cases = 869.0

Item Var	Mean	Minimum	Maximum	Range	Max/Min	Variance
1.0226	-.1761	1.4971	1.6732	-8.5033	.4677	

Reliability Coefficients 5 items

Alpha = .5170 Standardized item alpha = .6784

1. PPREPCFL
2. PPRESERN
3. PPRESOOT ppresooth
4. PPREHPY

Correlation Matrix

	PPREPCFL	PPRESERN	PPRESOOT	PPREHPY
PPREPCFL	1.0000			
PPRESERN	.2358	1.0000		
PPRESOOT	.7566	.2143	1.0000	
PPREHPY	.6416	.1780	.6643	1.0000

N of Cases = 871.0

Item Var	Mean	Minimum	Maximum	Range	Max/Min	Variance
1.3238	1.1137	1.5006	.3869	1.3474	.0253	

Reliability Coefficients 4 items

Alpha = .5573 Standardized item alpha = .7648

1. KPREALRT
2. KPREEXHI kpreexhil
3. KPREPLYF kpreplyfl
4. KPREENLV kpreenlvnd
5. KPREENER kpreenerg

Correlation Matrix

	KPREALRT	KPREEXHI	KPREPLYF	KPREENLV	KPREENER
KPREALRT	1.0000				
KPREEXHI	.6566	1.0000			
KPREPLYF	.5865	.6703	1.0000		
KPREENLV	.5498	.6349	.6647	1.0000	
KPREENER	.6242	.6846	.6886	.7025	1.0000

N of Cases = 877.0

Item Var	Mean	Minimum	Maximum	Range	Max/Min	Variance
.7893	.4504	1.2725	.8221	2.8253	.1044	
1.7002	1.4019	1.8092	.4073	1.2906	.0286	

Reliability Coefficients 5 items
Alpha = .9008 Standardized item alpha = .9013

APPENDIX 4-A
Musical Experience Questionnaire

Dear Friend,

A scientific survey study is being conducted on experiences produced by various melodies. On the following pages you will find a questionnaire that we would like you to complete during the session. There is one page for each selection that will be performed. Please complete this page and the page entitled "pre-test" *now* and then each following page directly after hearing the appropriate selection.

Filling out this form constitutes approval to use this information for research. The information that you provide will be kept confidential and will be used for research purposes only. Thank you very much for taking the few minutes to complete this form and thereby contribute to a valuable research project.

Date_____ Time of Performance: afternoon___ night___

Name_____ Code Number_____

Age____ Gender:___m ___f Telephone number_____

Are you a student? ___yes ___no

Present year of study_____
Major_____

Degree(s)
completed_____

Occupation_____
or
Profession_____

Rate your music preference from 1 to 5 for each of the following. (1 is least preferred; 5 is highly preferred). Use a different number for each category.

rock___ folk___ classical___ big band___ other____
If other, please write down name of music_____

Do you practice Transcendental Meditation? yes___ no___
If yes, for how long? years___ months___

Please turn to the page marked PRE-TEST

PRE-TEST

Directions: Please circle the number which most accurately describes how you feel at present. For example, if you feel enlivened, circle +2 on item #15; if you feel its opposite, a little depressed, circle -1. Please be sure that you **circle one number for each** of the words listed below.

How do you feel right now?

1. settled	3	2	1	0	-1	-2	-3	restless
2. calm	3	2	1	0	-1	-2	-3	nervous
3. composed	3	2	1	0	-1	-2	-3	agitated
4. tranquil	3	2	1	0	-1	-2	-3	strained
5. harmonious	3	2	1	0	-1	-2	-3	frazzled
6. smooth	3	2	1	0	-1	-2	-3	rough
7. cold	3	2	1	0	-1	-2	-3	hot
8. peaceful	3	2	1	0	-1	-2	-3	annoyed
9. serene	3	2	1	0	-1	-2	-3	irritated
10. soothed	3	2	1	0	-1	-2	-3	upset
11. happy	3	2	1	0	-1	-2	-3	angry
12. alert	3	2	1	0	-1	-2	-3	dull
13. exhilarated	3	2	1	0	-1	-2	-3	drowsy
14. playful	3	2	1	0	-1	-2	-3	lethargic
15. enlivened	3	2	1	0	-1	-2	-3	depressed
16. energetic	3	2	1	0	-1	-2	-3	heavy
17. romantic	3	2	1	0	-1	-2	-3	intellectual
18. heroic	3	2	1	0	-1	-2	-3	cowardly
19. compassionate	3	2	1	0	-1	-2	-3	uncaring
20. marvelous	3	2	1	0	-1	-2	-3	bland

When you are finished, please turn to the next page.

Code Number _____

SELECTION ONE

Directions: Please circle the number which most accurately describes how you feel at present. For example, if you feel enlivened, circle +2 on item #15; if you feel its opposite, a little depressed, circle -1. Please be sure that you **circle one number for each** of the words listed below.

How do you feel right now?

1. settled	3	2	1	0	-1	-2	-3	restless
2. calm	3	2	1	0	-1	-2	-3	nervous
3. composed	3	2	1	0	-1	-2	-3	agitated
4. tranquil	3	2	1	0	-1	-2	-3	strained
5. harmonious	3	2	1	0	-1	-2	-3	frazzled
6. smooth	3	2	1	0	-1	-2	-3	rough
7. cold	3	2	1	0	-1	-2	-3	hot
8. peaceful	3	2	1	0	-1	-2	-3	annoyed
9. serene	3	2	1	0	-1	-2	-3	irritated
10. soothed	3	2	1	0	-1	-2	-3	upset
11. happy	3	2	1	0	-1	-2	-3	angry
12. alert	3	2	1	0	-1	-2	-3	dull
13. exhilarated	3	2	1	0	-1	-2	-3	drowsy
14. playful	3	2	1	0	-1	-2	-3	lethargic
15. enlivened	3	2	1	0	-1	-2	-3	depressed
16. energetic	3	2	1	0	-1	-2	-3	heavy
17. romantic	3	2	1	0	-1	-2	-3	intellectual
18. heroic	3	2	1	0	-1	-2	-3	cowardly
19. compassionate	3	2	1	0	-1	-2	-3	uncaring
20. marvelous	3	2	1	0	-1	-2	-3	bland

In the space provided, please describe any specific experiences that you may have had during Selection One. When you are finished, please turn to the next page.

Code Number _____

SELECTION TWO

Directions: Please circle the number which most accurately describes how you feel at present. For example, if you feel calm, circle +3 on item #2; if you feel its opposite, very nervous, circle -3. Please be sure that you **circle one number for each** of the words listed below.

How do you feel right now?

1. settled	3	2	1	0	-1	-2	-3	restless
2. calm	3	2	1	0	-1	-2	-3	nervous
3. composed	3	2	1	0	-1	-2	-3	agitated
4. tranquil	3	2	1	0	-1	-2	-3	strained
5. harmonious	3	2	1	0	-1	-2	-3	frazzled
6. smooth	3	2	1	0	-1	-2	-3	rough
7. cold	3	2	1	0	-1	-2	-3	hot
8. peaceful	3	2	1	0	-1	-2	-3	annoyed
9. serene	3	2	1	0	-1	-2	-3	irritated
10. soothed	3	2	1	0	-1	-2	-3	upset
11. happy	3	2	1	0	-1	-2	-3	angry
12. alert	3	2	1	0	-1	-2	-3	dull
13. exhilarated	3	2	1	0	-1	-2	-3	drowsy
14. playful	3	2	1	0	-1	-2	-3	lethargic
15. enlivened	3	2	1	0	-1	-2	-3	depressed
16. energetic	3	2	1	0	-1	-2	-3	heavy
17. romantic	3	2	1	0	-1	-2	-3	intellectual
18. heroic	3	2	1	0	-1	-2	-3	cowardly
19. compassionate	3	2	1	0	-1	-2	-3	uncaring
20. marvelous	3	2	1	0	-1	-2	-3	bland

In the space provided, please describe any specific experiences that you may have had during Selection Two. When you are finished, please turn to the next page.

Code Number _____

SELECTION THREE

Directions: Please circle the number which most accurately describes how you feel at present. For example, if you feel peaceful, circle +2 on item #8; if you feel its opposite, a little annoyed, circle -1. Please be sure that you **circle one number for each** of the words listed below.

How do you feel right now?

1. settled	3	2	1	0	-1	-2	-3	restless
2. calm	3	2	1	0	-1	-2	-3	nervous
3. composed	3	2	1	0	-1	-2	-3	agitated
4. tranquil	3	2	1	0	-1	-2	-3	strained
5. harmonious	3	2	1	0	-1	-2	-3	frazzled
6. smooth	3	2	1	0	-1	-2	-3	rough
7. cold	3	2	1	0	-1	-2	-3	hot
8. peaceful	3	2	1	0	-1	-2	-3	annoyed
9. serene	3	2	1	0	-1	-2	-3	irritated
10. soothed	3	2	1	0	-1	-2	-3	upset
11. happy	3	2	1	0	-1	-2	-3	angry
12. alert	3	2	1	0	-1	-2	-3	dull
13. exhilarated	3	2	1	0	-1	-2	-3	drowsy
14. playful	3	2	1	0	-1	-2	-3	lethargic
15. enlivened	3	2	1	0	-1	-2	-3	depressed
16. energetic	3	2	1	0	-1	-2	-3	heavy
17. romantic	3	2	1	0	-1	-2	-3	intellectual
18. heroic	3	2	1	0	-1	-2	-3	cowardly
19. compassionate	3	2	1	0	-1	-2	-3	uncaring
20. marvelous	3	2	1	0	-1	-2	-3	bland

In the space provided, please describe any specific experiences that you may have had during Selection One. When you are finished, please drop it off in the box at the exit.

APPENDIX 4-B
Multivariate and Univariate Tests of Effects for *Maharishi Gandharva Veda* Music: All *Doshas* X Improvement X Gender X Time of Performance

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
TIME
  1.0000   2.0000
GENDER
  1.0000   2.0000

NUMBER OF CASES PROCESSED:  609

DEPENDENT VARIABLE MEANS (Improvement Scores)

       DVAVG          DPAVG          DKAVG
       0.6554         0.6928          0.7040

         -1
ESTIMATES OF EFFECTS B = (X'X) X'Y

                 DVAVG            DPAVG            DKAVG
CONSTANT          0.7155          0.7398           0.7499

TIME             1.0000           -0.1934          -0.1565          -0.1211
GENDER           1.0000            0.1391           0.1349           0.0148

TIME             1.0000
GENDER           1.0000           -0.0390          -0.0557           0.0876

SQUARED MULTIPLE CORRELATIONS

      DVAVG   DPAVG   DKAVG
       0.0405  0.0357  0.0133
```

LEAST SQUARES MEANS.

TIME = 1.0000 N OF CASES = 398.0000

	DVAVG	DPAVG	DKAVG
LS. MEAN	0.5221	0.5834	0.6287
SE	0.0581	0.0540	0.0648

TIME = 2.0000 N OF CASES = 211.0000

	DVAVG	DPAVG	DKAVG
LS. MEAN	0.9089	0.8963	0.8710
SE	0.0798	0.0742	0.0890

GENDER = 1.0000 N OF CASES = 295.0000

	DVAVG	DPAVG	DKAVG
LS. MEAN	0.8546	0.8747	0.7647
SE	0.0689	0.0641	0.0768

GENDER = 2.0000 N OF CASES = 314.0000

	DVAVG	DPAVG	DKAVG
LS. MEAN	0.5765	0.6050	0.7351
SE	0.0707	0.0657	0.0788

TIME = 1.0000

GENDER = 1.0000 N OF CASES = 180.0000

	DVAVG	DPAVG	DKAVG
LS. MEAN	0.6222	0.6625	0.7311
SE	0.0860	0.0800	0.0960

TIME = 1.0000

GENDER = 2.0000 N OF CASES = 218.0000

	DVAVG	DPAVG	DKAVG
LS. MEAN	0.4220	0.5042	0.5264
SE	0.0781	0.0727	0.0872

TIME = 2.0000

GENDER = 1.0000 N OF CASES = 115.0000

	DVAVG	DPAVG	DKAVG
LS. MEAN	1.0870	1.0870	0.7983
SE	0.1076	0.1001	0.1200

TIME = 2.0000

GENDER = 2.0000 N OF CASES = 96.0000

	DVAVG	DPAVG	DKAVG
LS. MEAN	0.7309	0.7057	0.9438
SE	0.1178	0.1095	0.1314

```
TEST FOR EFFECT CALLED:  CONSTANT

UNIVARIATE F TESTS

 VARIABLE  SS  DF  MS    F    P

 DVAVG   64.5465  1  64.5465  56.0823   0.0000
  ERROR  211.7698 184  1.1509
 DPAVG   63.2991  1  63.2991  59.8162   0.0000
  ERROR  194.7137 184  1.0582
 DKAVG   10.7592  1  10.7592   9.4941   0.0024
  ERROR  208.5179 184  1.1332

MULTIVARIATE TEST STATISTICS

   WILKS' LAMBDA =  0.7349
    F-STATISTIC =  21.8839 DF = 3, 182  PROB =  0.0000

   PILLAI TRACE =  0.2651
    F-STATISTIC =  21.8839 DF = 3, 182  PROB =  0.0000

 HOTELLING-LAWLEY TRACE =  0.3607
    F-STATISTIC =  21.8839 DF = 3, 182  PROB =  0.0000

TEST OF RESIDUAL ROOTS

 ROOTS 1 THROUGH 1
 CHI-SQUARE STATISTIC =  -1.0781  DF =  3  PROB =  1.0000

CANONICAL CORRELATIONS

      0.5149

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

  DVAVG    0.4737
  DPAVG    0.5965
  DKAVG   -0.0046


CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

  DVAVG    0.9192
  DPAVG    0.9493
  DKAVG    0.3782
```

TEST FOR EFFECT CALLED: TIME

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	20.4572	1	20.4572	15.3657	0.0001
ERROR	805.4698	605	1.3314		
DPAVG	13.3943	1	13.3943	11.6259	0.0007
ERROR	697.0256	605	1.1521		
DKAVG	8.0247	1	8.0247	4.8424	0.0281
ERROR	1002.5825	605	1.6572		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9727
F-STATISTIC = 5.6416 DF = 3, 603 PROB = 0.0008

PILLAI TRACE = 0.0273
F-STATISTIC = 5.6416 DF = 3, 603 PROB = 0.0008

HOTELLING-LAWLEY TRACE = 0.0281
F-STATISTIC = 5.6416 DF = 3, 603 PROB = 0.0008

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0969 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.1652

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	0.8455
DPAVG	0.0368
DKAVG	0.3096

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	0.9512
DPAVG	0.8274
DKAVG	0.5340

TEST FOR EFFECT CALLED: GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	10.5770	1	10.5770	7.9445	0.0050
ERROR	805.4698	605	1.3314		
DPAVG	9.9499	1	9.9499	8.6362	0.0034
ERROR	697.0256	605	1.1521		
DKAVG	0.1200	1	0.1200	0.0724	0.7880
ERROR	1002.5825	605	1.6572		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9836
F-STATISTIC = 3.3595 DF = 3, 603 PROB = 0.0185

PILLAI TRACE = 0.0164
F-STATISTIC = 3.3595 DF = 3, 603 PROB = 0.0185

HOTELLING-LAWLEY TRACE = 0.0167
F-STATISTIC = 3.3595 DF = 3, 603 PROB = 0.0185

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0580 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.1282

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	0.3610
DPAVG	0.7644
DKAVG	-0.3113

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	0.8864
DPAVG	0.9242
DKAVG	0.0846

TEST FOR EFFECT CALLED: TIME*GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	0.8303	1	0.8303	0.6237	0.4300
ERROR	805.4698	605	1.3314		
DPAVG	1.6988	1	1.6988	1.4745	0.2251
ERROR	697.0256	605	1.1521		
DKAVG	4.1927	1	4.1927	2.5300	0.1122
ERROR	1002.5825	605	1.6572		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9887
F-STATISTIC = 2.2986 DF = 3, 603 PROB = 0.0764

PILLAI TRACE = 0.0113
F-STATISTIC = 2.2986 DF = 3, 603 PROB = 0.0764

HOTELLING-LAWLEY TRACE = 0.0114
F-STATISTIC = 2.2986 DF = 3, 603 PROB = 0.0764

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0398 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.1063

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	0.3424
DPAVG	-1.1199
DKAVG	0.9687

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	-0.3002
DPAVG	-0.4616
DKAVG	0.6047

APPENDIX 4-C
Multivariate and Univariate Tests of Effects for Maharishi Gandharva Veda Music: All Doshas X Pre-music scores X Gender X Time of Performance

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
TIME
  1.0000   2.0000
GENDER
  1.0000   2.0000

NUMBER OF CASES PROCESSED:  609

DEPENDENT VARIABLE MEANS

     VPAVG   PPRAVG   KPRAVG (Pre-music scores)

      1.4119   1.3366   0.7565

        -1
ESTIMATES OF EFFECTS B = (X'X) X'Y


        VPAVG   PPRAVG   KPRAVG

 CONSTANT       1.3316   1.2755   0.7321

  TIME    1.0000   0.2536   0.1941   0.0676

 GENDER    1.0000   -0.0439   -0.0288   0.0024

  TIME    1.0000
 GENDER    1.0000   -0.0108   -0.0061   -0.0391


SQUARED MULTIPLE CORRELATIONS

     VPAVG   PPRAVG   KPRAVG
      0.0548   0.0329   0.0048


LEAST SQUARES MEANS.
  TIME =   1.0000 N OF CASES =   398.0000

     VPAVG   PPRAVG   KPRAVG
 LS. MEAN     1.5852   1.4697   0.7998
 SE      0.0524   0.0520   0.0544

  TIME =   2.0000 N OF CASES =   211.0000

     VPAVG   PPRAVG   KPRAVG
 LS. MEAN     1.0780   1.0814   0.6645
 SE      0.0720   0.0714   0.0747
```

```
GENDER =  1.0000 N OF CASES =  295.0000

     VPAVG  PPRAVG  KPRAVG
 LS. MEAN    1.2877  1.2467  0.7346
 SE     0.0622  0.0617  0.0645

 GENDER =  2.0000 N OF CASES =  314.0000

     VPAVG  PPRAVG  KPRAVG
 LS. MEAN    1.3755  1.3044  0.7297
 SE     0.0638  0.0633  0.0662

  TIME =  1.0000
 GENDER =  1.0000 N OF CASES =  180.0000

     VPAVG  PPRAVG  KPRAVG
 LS. MEAN    1.5306  1.4347  0.7631
 SE     0.0776  0.0770  0.0806

  TIME =  1.0000
 GENDER =  2.0000 N OF CASES =  218.0000

     VPAVG  PPRAVG  KPRAVG
 LS. MEAN    1.6399  1.5046  0.8365
 SE     0.0705  0.0700  0.0732

  TIME =  2.0000
 GENDER =  1.0000 N OF CASES =  115.0000

     VPAVG  PPRAVG  KPRAVG
 LS. MEAN    1.0449  1.0587  0.7061
 SE     0.0971  0.0964  0.1008

  TIME =  2.0000
 GENDER =  2.0000 N OF CASES =  96.0000

     VPAVG  PPRAVG  KPRAVG
 LS. MEAN    1.1111  1.1042  0.6229
 SE     0.1063  0.1055  0.1104
```

TEST FOR EFFECT CALLED: CONSTANT

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	969.8034	1	969.8034	893.9412	0.0000
ERROR	656.3419	605	1.0849		
PPRAVG	889.8352	1	889.8352	832.9850	0.0000
ERROR	646.2905	605	1.0682		
KPRAVG	293.1554	1	293.1554	250.7534	0.0000
ERROR	707.3047	605	1.1691		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.3887
F-STATISTIC = 316.0953 DF = 3, 603 PROB = 0.0000

PILLAI TRACE = 0.6113
F-STATISTIC = 316.0953 DF = 3, 603 PROB = 0.0000

HOTELLING-LAWLEY TRACE = 1.5726
F-STATISTIC = 316.0953 DF = 3, 603 PROB = 0.0000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -3.3072 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.7819

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	0.6234
PPRAVG	0.3915
KPRAVG	0.0572

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	0.9693
PPRAVG	0.9357
KPRAVG	0.5134

TEST FOR EFFECT CALLED: TIME

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	35.1754	1	35.1754	32.4239	0.0000
ERROR	656.3419	605	1.0849		
PPRAVG	20.6074	1	20.6074	19.2908	0.0000
ERROR	646.2905	605	1.0682		
KPRAVG	2.5015	1	2.5015	2.1397	0.1441
ERROR	707.3047	605	1.1691		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9478
F-STATISTIC = 11.0592 DF = 3, 603 PROB = 0.0000

PILLAI TRACE = 0.0522
F-STATISTIC = 11.0592 DF = 3, 603 PROB = 0.0000

HOTELLING-LAWLEY TRACE = 0.0550
F-STATISTIC = 11.0592 DF = 3, 603 PROB = 0.0000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.1875 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.2284

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	-1.1081
PPRAVG	0.0715
KPRAVG	0.1547

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	-0.9869
PPRAVG	-0.7613
KPRAVG	-0.2535

TEST FOR EFFECT CALLED: GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	1.0533	1	1.0533	0.9709	0.3249
ERROR	656.3419	605	1.0849		
PPRAVG	0.4547	1	0.4547	0.4257	0.5144
ERROR	646.2905	605	1.0682		
KPRAVG	0.0033	1	0.0033	0.0028	0.9579
ERROR	707.3047	605	1.1691		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9980
F-STATISTIC = 0.4064 DF = 3, 603 PROB = 0.7485

PILLAI TRACE = 0.0020
F-STATISTIC = 0.4064 DF = 3, 603 PROB = 0.7485

HOTELLING-LAWLEY TRACE = 0.0020
F-STATISTIC = 0.4064 DF = 3, 603 PROB = 0.7485

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0071 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.0449

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	-1.2224
PPRAVG	0.1866
KPRAVG	0.4415

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	-0.8909
PPRAVG	-0.5899
KPRAVG	0.0477

TEST FOR EFFECT CALLED: TIME*GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	0.0637	1	0.0637	0.0587	0.8086
ERROR	656.3419	605	1.0849		
PPRAVG	0.0203	1	0.0203	0.0190	0.8903
ERROR	646.2905	605	1.0682		
KPRAVG	0.8381	1	0.8381	0.7169	0.3975
ERROR	707.3047	605	1.1691		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9985
F-STATISTIC = 0.3082 DF = 3, 603 PROB = 0.8195

PILLAI TRACE = 0.0015
F-STATISTIC = 0.3082 DF = 3, 603 PROB = 0.8195

HOTELLING-LAWLEY TRACE = 0.0015
F-STATISTIC = 0.3082 DF = 3, 603 PROB = 0.8195

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0054 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS
0.0391

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	0.5248
PPRAVG	-0.8830
KPRAVG	1.1312

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	0.2516
PPRAVG	0.1433
KPRAVG	0.8791

APPENDIX 4-D
Multivariate and Univariate Tests of Effects for Western Baroque Music: All Doshas X Pre-music Scores X Gender X Time of Day

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
TIME
    1.0000     2.0000
GENDER
    1.0000     2.0000

NUMBER OF CASES PROCESSED:   188

DEPENDENT VARIABLE MEANS

           VPAVG    PPRAVG    KPRAVG  (Pre-music scores)

             1.2172    1.2420    0.9553

 -1
ESTIMATES OF EFFECTS B = (X'X) X'Y


VPAVG    PPRAVG    KPRAVG

 CONSTANT            1.0983    1.1900    0.9872

   TIME      1.0000    -0.2311    -0.1011    0.0574

  GENDER      1.0000    0.0456    -0.0084    -0.0251

   TIME      1.0000
  GENDER      1.0000    0.0943    0.0064    0.0152


SQUARED MULTIPLE CORRELATIONS

           VPAVG    PPRAVG    KPRAVG

             0.0315    0.0058    0.0030
```

```
LEAST SQUARES MEANS.
   TIME  =    1.0000 N OF CASES =    45.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        0.8673    1.0889    1.0447
 SE           0.1761    0.1721    0.1679

   TIME  =    2.0000 N OF CASES =    143.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.3294    1.2911    0.9298
 SE           0.0990    0.0967    0.0943


GENDER  =    1.0000 N OF CASES =    99.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.1440    1.1816    0.9621
 SE           0.1405    0.1373    0.1340

  GENDER  =    2.0000 N OF CASES =    89.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.0527    1.1984    1.0123
 SE           0.1451    0.1418    0.1383

   TIME  =    1.0000
  GENDER  =    1.0000 N OF CASES =    23.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.0072    1.0870    1.0348
 SE           0.2463    0.2406    0.2348

   TIME  =    1.0000
  GENDER  =    2.0000 N OF CASES =    22.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        0.7273    1.0909    1.0545
 SE           0.2518    0.2461    0.2400

   TIME  =    2.0000
  GENDER  =    1.0000 N OF CASES =    76.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.2807    1.2763    0.8895
 SE           0.1355    0.1324    0.1291

   TIME  =    2.0000
  GENDER  =    2.0000 N OF CASES =    67.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.3781    1.3060    0.9701
 SE           0.1443    0.1410    0.1375
```

TEST FOR EFFECT CALLED: CONSTANT

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	164.9462	1	164.9462	118.2518	0.0000
ERROR	256.6565	184	1.3949		
PPRAVG	193.6404	1	193.6404	145.3868	0.0000
ERROR	245.0692	184	1.3319		
KPRAVG	133.2656	1	133.2656	105.1321	0.0000
ERROR	233.2386	184	1.2676		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.5178
F-STATISTIC = 56.5010 DF = 3, 182 PROB = 0.0000

PILLAI TRACE = 0.4822
F-STATISTIC = 56.5010 DF = 3, 182 PROB = 0.0000

HOTELLING-LAWLEY TRACE = 0.9313
F-STATISTIC = 56.5010 DF = 3, 182 PROB = 0.0000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = 121.4401 DF = 3 PROB = 0.0000

CANONICAL CORRELATIONS

0.6944

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	0.2982
PPRAVG	0.4650
KPRAVG	0.4136

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	0.8307
PPRAVG	0.9211
KPRAVG	0.7833

TEST FOR EFFECT CALLED: TIME

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	7.3008	1	7.3008	5.2341	0.0233
ERROR	256.6565	184	1.3949		
PPRAVG	1.3977	1	1.3977	1.0494	0.3070
ERROR	245.0692	184	1.3319		
KPRAVG	0.4509	1	0.4509	0.3557	0.5516
ERROR	233.2386	184	1.2676		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9562
F-STATISTIC = 2.7798 DF = 3, 182 PROB = 0.0425

PILLAI TRACE = 0.0438
F-STATISTIC = 2.7798 DF = 3, 182 PROB = 0.0425

HOTELLING-LAWLEY TRACE = 0.0458
F-STATISTIC = 2.7798 DF = 3, 182 PROB = 0.0425

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = 8.2659 DF = 3 PROB = 0.0408

CANONICAL CORRELATIONS

0.2093

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	-1.3116
PPRAVG	0.3984
KPRAVG	0.5215

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	-0.7879
PPRAVG	-0.3528
KPRAVG	0.2054

TEST FOR EFFECT CALLED: GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	0.2848	1	0.2848	0.2042	0.6519
ERROR	256.6565	184	1.3949		
PPRAVG	0.0097	1	0.0097	0.0072	0.9323
ERROR	245.0692	184	1.3319		
KPRAVG	0.0862	1	0.0862	0.0680	0.7945
ERROR	233.2386	184	1.2676		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9959
F-STATISTIC = 0.2514 DF = 3, 182 PROB = 0.8602

PILLAI TRACE = 0.0041
F-STATISTIC = 0.2514 DF = 3, 182 PROB = 0.8602

HOTELLING-LAWLEY TRACE = 0.0041
F-STATISTIC = 0.2514 DF = 3, 182 PROB = 0.8602

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = 0.7631 DF = 3 PROB = 0.8583

CANONICAL CORRELATIONS

0.0642

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	-1.5395
PPRAVG	1.1422
KPRAVG	0.3081

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	-0.5175
PPRAVG	0.0975
KPRAVG	0.2986

TEST FOR EFFECT CALLED: TIME*GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	1.2171	1	1.2171	0.8725	0.3515
ERROR	256.6565	184	1.3949		
PPRAVG	0.0056	1	0.0056	0.0042	0.9482
ERROR	245.0692	184	1.3319		
KPRAVG	0.0317	1	0.0317	0.0250	0.8745
ERROR	233.2386	184	1.2676		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9888
F-STATISTIC = 0.6859 DF = 3, 182 PROB = 0.5617

PILLAI TRACE = 0.0112
F-STATISTIC = 0.6859 DF = 3, 182 PROB = 0.5617

HOTELLING-LAWLEY TRACE = 0.0113
F-STATISTIC = 0.6859 DF = 3, 182 PROB = 0.5617

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = 2.0743 DF = 3 PROB = 0.5571

CANONICAL CORRELATIONS

0.1057

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	1.6080
PPRAVG	-1.3039
KPRAVG	0.1592

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	0.6476
PPRAVG	0.0451
KPRAVG	0.1097

APPENDIX 4-E
Multivariate and Univariate Tests of Effects for Western Baroque Music: All Doshas X Pre-music Scores X Gender X TM Group

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
GENDER
    1.0000     2.0000
TM
    1.0000     2.0000

NUMBER OF CASES PROCESSED:   188

DEPENDENT VARIABLE MEANS

           VPAVG    PPRAVG    KPRAVG (Pre-music scores)

             1.2172    1.2420    0.9553

 -1
ESTIMATES OF EFFECTS B = (X'X) X'Y


VPAVG    PPRAVG    KPRAVG

 CONSTANT            1.2202    1.2445    0.9571

  GENDER      1.0000    0.0022    -0.0085    -0.0339

    TM      1.0000    0.1235    0.0687    0.0008

  GENDER      1.0000
    TM      1.0000    0.0499    0.0546    0.0009


SQUARED MULTIPLE CORRELATIONS

           VPAVG    PPRAVG    KPRAVG

             0.0130    0.0063    0.0009
```

```
LEAST SQUARES MEANS.
  GENDER  =    1.0000 N OF CASES =    99.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.2224    1.2361    0.9233
 SE           0.1199    0.1160    0.1133

  GENDER  =    2.0000 N OF CASES =    89.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.2181    1.2530    0.9910
 SE           0.1264    0.1223    0.1195

    TM  =    1.0000 N OF CASES =    92.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.3438    1.3132    0.9580
 SE           0.1244    0.1204    0.1176

    TM  =    2.0000 N OF CASES =    96.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.0967    1.1758    0.9563
 SE           0.1219    0.1180    0.1153

  GENDER  =    1.0000
    TM  =    1.0000 N OF CASES =    48.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.3958    1.3594    0.9250
 SE           0.1721    0.1665    0.1627

  GENDER  =    1.0000
    TM  =    2.0000 N OF CASES =    51.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.0490    1.1127    0.9216
 SE           0.1669    0.1616    0.1578

  GENDER  =    2.0000
    TM  =    1.0000 N OF CASES =    44.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.2917    1.2670    0.9909
 SE           0.1797    0.1739    0.1699

  GENDER  =    2.0000
    TM  =    2.0000 N OF CASES =    45.0000

          VPAVG    PPRAVG    KPRAVG
 LS. MEAN        1.1444    1.2389    0.9911
 SE           0.1777    0.1720    0.1680
```

TEST FOR EFFECT CALLED: CONSTANT

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	278.9978	1	278.9978	196.2852	0.0000
ERROR	261.5358	184	1.4214		
PPRAVG	290.2076	1	290.2076	217.9993	0.0000
ERROR	244.9467	184	1.3312		
KPRAVG	171.6592	1	171.6592	135.1363	0.0000
ERROR	233.7291	184	1.2703		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.4192
F-STATISTIC = 84.0683 DF = 3, 182 PROB = 0.0000

PILLAI TRACE = 0.5808
F-STATISTIC = 84.0683 DF = 3, 182 PROB = 0.0000

HOTELLING-LAWLEY TRACE = 1.3857
F-STATISTIC = 84.0683 DF = 3, 182 PROB = 0.0000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -3.0433 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.7621

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	0.4176
PPRAVG	0.4153
KPRAVG	0.3429

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	0.8774
PPRAVG	0.9247
KPRAVG	0.7280

TEST FOR EFFECT CALLED: GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	0.0009	1	0.0009	0.0006	0.9800
ERROR	261.5358	184	1.4214		
PPRAVG	0.0134	1	0.0134	0.0101	0.9202
ERROR	244.9467	184	1.3312		
KPRAVG	0.2149	1	0.2149	0.1691	0.6814
ERROR	233.7291	184	1.2703		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9989
F-STATISTIC = 0.0694 DF = 3, 182 PROB = 0.9762

PILLAI TRACE = 0.0011
F-STATISTIC = 0.0694 DF = 3, 182 PROB = 0.9762

HOTELLING-LAWLEY TRACE = 0.0011
F-STATISTIC = 0.0694 DF = 3, 182 PROB = 0.9762

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0040 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.0338

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	-0.5176
PPRAVG	0.0536
KPRAVG	1.0711

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	-0.0547
PPRAVG	0.2186
KPRAVG	0.8962

TEST FOR EFFECT CALLED: TM

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	2.8583	1	2.8583	2.0109	0.1579
ERROR	261.5358	184	1.4214		
PPRAVG	0.8843	1	0.8843	0.6642	0.4161
ERROR	244.9467	184	1.3312		
KPRAVG	0.0001	1	0.0001	0.0001	0.9922
ERROR	233.7291	184	1.2703		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9869
F-STATISTIC = 0.8024 DF = 3, 182 PROB = 0.4940

PILLAI TRACE = 0.0131
F-STATISTIC = 0.8024 DF = 3, 182 PROB = 0.4940

HOTELLING-LAWLEY TRACE = 0.0132
F-STATISTIC = 0.8024 DF = 3, 182 PROB = 0.4940

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0460 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.1143

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	-1.2706
PPRAVG	0.2926
KPRAVG	0.3373

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	-0.9090
PPRAVG	-0.5224
KPRAVG	-0.0063

TEST FOR EFFECT CALLED: GENDER*TM

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
VPAVG	0.4665	1	0.4665	0.3282	0.5674
ERROR	261.5358	184	1.4214		
PPRAVG	0.5590	1	0.5590	0.4199	0.5178
ERROR	244.9467	184	1.3312		
KPRAVG	0.0002	1	0.0002	0.0001	0.9912
ERROR	233.7291	184	1.2703		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9968
F-STATISTIC = 0.1923 DF = 3, 182 PROB = 0.9016

PILLAI TRACE = 0.0032
F-STATISTIC = 0.1923 DF = 3, 182 PROB = 0.9016

HOTELLING-LAWLEY TRACE = 0.0032
F-STATISTIC = 0.1923 DF = 3, 182 PROB = 0.9016

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0111 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.0562

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

VPAVG	0.1853
PPRAVG	1.0249
KPRAVG	-0.6039

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

VPAVG	0.7502
PPRAVG	0.8486
KPRAVG	0.0144

APPENDIX 4-F
Multivariate and Univariate Tests of Effects for Western Baroque Music: All Doshas X Improvement X Gender X TM Group

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
GENDER
    1.0000     2.0000
TM
    1.0000     2.0000

NUMBER OF CASES PROCESSED:    188

DEPENDENT VARIABLE MEANS (Improvement Scores)

          DVAVG     DPAVG     DKAVG

            0.6215    0.6862    0.4362

                                                    -1
ESTIMATES OF EFFECTS B = (X'X) X'Y


                                                DVAVG     DPAVG     DKAVG

 CONSTANT              0.6162    0.6804    0.4381

  GENDER      1.0000    0.0717    0.1071    0.0408

    TM        1.0000   -0.0606    0.0087    0.1831

  GENDER      1.0000
    TM        1.0000   -0.0162   -0.0202    0.0213


SQUARED MULTIPLE CORRELATIONS

          DVAVG     DPAVG     DKAVG

            0.0081    0.0113    0.0304
```

```
LEAST SQUARES MEANS.
  GENDER  =    1.0000 N OF CASES =    99.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.6879    0.7875    0.4789
 SE           0.1083    0.1040    0.1088

  GENDER  =    2.0000 N OF CASES =    89.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.5444    0.5734    0.3973
 SE           0.1142    0.1096    0.1147

    TM  =    1.0000 N OF CASES =    92.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.5556    0.6892    0.6212
 SE           0.1124    0.1079    0.1129

    TM  =    2.0000 N OF CASES =    96.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.6768    0.6717    0.2550
 SE           0.1101    0.1058    0.1106

  GENDER  =    1.0000
    TM  =    1.0000 N OF CASES =    48.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.6111    0.7760    0.6833
 SE           0.1555    0.1493    0.1561

  GENDER  =    1.0000
    TM  =    2.0000 N OF CASES =    51.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.7647    0.7990    0.2745
 SE           0.1508    0.1448    0.1515

  GENDER  =    2.0000
    TM  =    1.0000 N OF CASES =    44.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.5000    0.6023    0.5591
 SE           0.1624    0.1559    0.1631

  GENDER  =    2.0000
    TM  =    2.0000 N OF CASES =    45.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.5889    0.5444    0.2356
 SE           0.1606    0.1542    0.1612
```

TEST FOR EFFECT CALLED: CONSTANT

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	71.1410	1	71.1410	61.3254	0.0000
ERROR	213.4505	184	1.1601		
DPAVG	86.7551	1	86.7551	81.0885	0.0000
ERROR	196.8583	184	1.0699		
DKAVG	35.9667	1	35.9667	30.7446	0.0000
ERROR	215.2530	184	1.1699		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.6755
F-STATISTIC = 29.1430 DF = 3, 182 PROB = 0.0000

PILLAI TRACE = 0.3245
F-STATISTIC = 29.1430 DF = 3, 182 PROB = 0.0000

HOTELLING-LAWLEY TRACE = 0.4804
F-STATISTIC = 29.1430 DF = 3, 182 PROB = 0.0000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -1.3730 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.5696

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	0.3081
DPAVG	0.6239
DKAVG	0.2472

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	0.8330
DPAVG	0.9578
DKAVG	0.5898

TEST FOR EFFECT CALLED: GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	0.9641	1	0.9641	0.8311	0.3631
ERROR	213.4505	184	1.1601		
DPAVG	2.1487	1	2.1487	2.0083	0.1581
ERROR	196.8583	184	1.0699		
DKAVG	0.3119	1	0.3119	0.2666	0.6062
ERROR	215.2530	184	1.1699		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9889
F-STATISTIC = 0.6813 DF = 3, 182 PROB = 0.5645

PILLAI TRACE = 0.0111
F-STATISTIC = 0.6813 DF = 3, 182 PROB = 0.5645

HOTELLING-LAWLEY TRACE = 0.0112
F-STATISTIC = 0.6813 DF = 3, 182 PROB = 0.5645

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.0391 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.1054

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	0.2308
DPAVG	-1.1965
DKAVG	0.0924

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	-0.6342
DPAVG	-0.9859
DKAVG	-0.3592

TEST FOR EFFECT CALLED: TM

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	0.6886	1	0.6886	0.5936	0.4420
ERROR	213.4505	184	1.1601		
DPAVG	0.0142	1	0.0142	0.0133	0.9083
ERROR	196.8583	184	1.0699		
DKAVG	6.2811	1	6.2811	5.3692	0.0216
ERROR	215.2530	184	1.1699		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9618
F-STATISTIC = 2.4125 DF = 3, 182 PROB = 0.0683

PILLAI TRACE = 0.0382
F-STATISTIC = 2.4125 DF = 3, 182 PROB = 0.0683

HOTELLING-LAWLEY TRACE = 0.0398
F-STATISTIC = 2.4125 DF = 3, 182 PROB = 0.0683

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = -0.1365 DF = 3 PROB = 1.0000

CANONICAL CORRELATIONS

0.1956

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	-0.5608
DPAVG	0.0422
DKAVG	0.9788

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	-0.2848
DPAVG	0.0426
DKAVG	0.8566

```
TEST FOR EFFECT CALLED:   GENDER*TM

UNIVARIATE F TESTS

  VARIABLE     SS     DF     MS        F        P

  DVAVG       0.0490   1    0.0490     0.0423     0.8373
    ERROR   213.4505  184    1.1601
  DPAVG       0.0765   1    0.0765     0.0715     0.7895
    ERROR   196.8583  184    1.0699
  DKAVG       0.0852   1    0.0852     0.0728     0.7876
    ERROR   215.2530  184    1.1699

MULTIVARIATE TEST STATISTICS

      WILKS' LAMBDA =   0.9986
       F-STATISTIC =   0.0833  DF =  3, 182   PROB =   0.9691

      PILLAI TRACE =   0.0014
       F-STATISTIC =   0.0833  DF =  3, 182   PROB =   0.9691

 HOTELLING-LAWLEY TRACE =   0.0014
       F-STATISTIC =   0.0833  DF =  3, 182   PROB =   0.9691

TEST OF RESIDUAL ROOTS

 ROOTS 1 THROUGH 1
  CHI-SQUARE STATISTIC =   -0.0048   DF =    3    PROB =   1.0000


CANONICAL CORRELATIONS

            0.0370


DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

   DVAVG       0.1066
   DPAVG      -1.0117
   DKAVG       0.9410


CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

   DVAVG      -0.4091
   DPAVG      -0.5320
   DKAVG       0.5370
```

APPENDIX 4-G
Multivariate and Univariate Tests of Effects for Western Baroque Music: All Doshas X Improvement XTime of Day X Gender

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
TIME
    1.0000    2.0000
GENDER
    1.0000    2.0000

NUMBER OF CASES PROCESSED:   188

DEPENDENT VARIABLE MEANS

          DVAVG    DPAVG    DKAVG

            0.6215   0.6862   0.4362

                                                    -1
ESTIMATES OF EFFECTS B = (X'X) X'Y


                                                DVAVG    DPAVG    DKAVG

 CONSTANT            0.6871   0.6804   0.2805

   TIME     1.0000   0.1334   -0.0038   -0.2979

  GENDER     1.0000   0.0758   0.1739   0.0850

   TIME     1.0000
  GENDER     1.0000   0.0023   0.1278   0.0976


SQUARED MULTIPLE CORRELATIONS

          DVAVG    DPAVG    DKAVG

            0.0159   0.0221   0.0607
```

```
LEAST SQUARES MEANS.
   TIME  =    1.0000 N OF CASES =    45.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.8205    0.6766    -0.0174
 SE              0.1600    0.1534    0.1587

   TIME  =    2.0000 N OF CASES =    143.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.5536    0.6842    0.5784
 SE              0.0899    0.0862    0.0892

  GENDER  =    1.0000 N OF CASES =    99.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.7629    0.8543    0.3655
 SE              0.1277    0.1224    0.1267

  GENDER  =    2.0000 N OF CASES =    89.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.6113    0.5065    0.1955
 SE              0.1318    0.1264    0.1308

   TIME  =    1.0000
  GENDER  =    1.0000 N OF CASES =    23.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.8986    0.9783    0.1652
 SE              0.2237    0.2145    0.2220

   TIME  =    1.0000
  GENDER  =    2.0000 N OF CASES =    22.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.7424    0.3750    -0.2000
 SE              0.2287    0.2193    0.2270

   TIME  =    2.0000
  GENDER  =    1.0000 N OF CASES =    76.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.6272    0.7303    0.5658
 SE              0.1231    0.1180    0.1221

   TIME  =    2.0000
  GENDER  =    2.0000 N OF CASES =    67.0000

          DVAVG     DPAVG     DKAVG
 LS. MEAN        0.4801    0.6381    0.5910
 SE              0.1311    0.1257    0.1301
```

TEST FOR EFFECT CALLED: CONSTANT

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	64.5465	1	64.5465	56.0823	0.0000
ERROR	211.7698	184	1.1509		
DPAVG	63.2991	1	63.2991	59.8162	0.0000
ERROR	194.7137	184	1.0582		
DKAVG	10.7592	1	10.7592	9.4941	0.0024
ERROR	208.5179	184	1.1332		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.7349
F-STATISTIC = 21.8839 DF = 3, 182 PROB = 0.0000

PILLAI TRACE = 0.2651
F-STATISTIC = 21.8839 DF = 3, 182 PROB = 0.0000

HOTELLING-LAWLEY TRACE = 0.3607
F-STATISTIC = 21.8839 DF = 3, 182 PROB = 0.0000

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = 56.8290 DF = 3 PROB = 0.0000

CANONICAL CORRELATIONS

0.5149

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	0.4737
DPAVG	0.5965
DKAVG	-0.0046

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	0.9192
DPAVG	0.9493
DKAVG	0.3782

TEST FOR EFFECT CALLED: TIME

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	2.4340	1	2.4340	2.1148	0.1476
ERROR	211.7698	184	1.1509		
DPAVG	0.0019	1	0.0019	0.0018	0.9659
ERROR	194.7137	184	1.0582		
DKAVG	12.1347	1	12.1347	10.7079	0.0013
ERROR	208.5179	184	1.1332		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9165
F-STATISTIC = 5.5242 DF = 3, 182 PROB = 0.0012

PILLAI TRACE = 0.0835
F-STATISTIC = 5.5242 DF = 3, 182 PROB = 0.0012

HOTELLING-LAWLEY TRACE = 0.0911
F-STATISTIC = 5.5242 DF = 3, 182 PROB = 0.0012

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = 16.0789 DF = 3 PROB = 0.0011

CANONICAL CORRELATIONS

0.2889

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	-0.7210
DPAVG	0.1536
DKAVG	0.9284

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	-0.3553
DPAVG	0.0105
DKAVG	0.7994

TEST FOR EFFECT CALLED: GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	0.7857	1	0.7857	0.6827	0.4097
ERROR	211.7698	184	1.1509		
DPAVG	4.1334	1	4.1334	3.9059	0.0496
ERROR	194.7137	184	1.0582		
DKAVG	0.9877	1	0.9877	0.8715	0.3518
ERROR	208.5179	184	1.1332		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9742
F-STATISTIC = 1.6089 DF = 3, 182 PROB = 0.1889

PILLAI TRACE = 0.0258
F-STATISTIC = 1.6089 DF = 3, 182 PROB = 0.1889

HOTELLING-LAWLEY TRACE = 0.0265
F-STATISTIC = 1.6089 DF = 3, 182 PROB = 0.1889

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = 4.8292 DF = 3 PROB = 0.1847

CANONICAL CORRELATIONS

0.1607

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	-0.6731
DPAVG	1.3953
DKAVG	0.0080

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	0.3740
DPAVG	0.8947
DKAVG	0.4226

TEST FOR EFFECT CALLED: TIME*GENDER

UNIVARIATE F TESTS

VARIABLE	SS	DF	MS	F	P
DVAVG	0.0007	1	0.0007	0.0006	0.9804
ERROR	211.7698	184	1.1509		
DPAVG	2.2320	1	2.2320	2.1092	0.1481
ERROR	194.7137	184	1.0582		
DKAVG	1.3030	1	1.3030	1.1498	0.2850
ERROR	208.5179	184	1.1332		

MULTIVARIATE TEST STATISTICS

WILKS' LAMBDA = 0.9745
F-STATISTIC = 1.5882 DF = 3, 182 PROB = 0.1938

PILLAI TRACE = 0.0255
F-STATISTIC = 1.5882 DF = 3, 182 PROB = 0.1938

HOTELLING-LAWLEY TRACE = 0.0262
F-STATISTIC = 1.5882 DF = 3, 182 PROB = 0.1938

TEST OF RESIDUAL ROOTS

ROOTS 1 THROUGH 1
CHI-SQUARE STATISTIC = 4.7679 DF = 3 PROB = 0.1896

CANONICAL CORRELATIONS

0.1597

DEPENDENT VARIABLE CANONICAL COEFFICIENTS
STANDARDIZED BY CONDITIONAL (WITHIN GROUPS) STANDARD DEVIATIONS

DVAVG	-1.0818
DPAVG	1.3926
DKAVG	0.1855

CANONICAL LOADINGS (CORRELATIONS BETWEEN CONDITIONAL
DEPENDENT VARIABLES AND DEPENDENT CANONICAL FACTORS)

DVAVG	0.0112
DPAVG	0.6617
DKAVG	0.4886

APPENDIX 4-H
Tests of Normality and Descriptive Statistics

Experiment 1, Hypotheses 1a, 1b, 1c.

KOLMOGOROV-SMIRNOV ONE SAMPLE TEST USING STANDARD NORMAL DISTRIBUTION

For Maharishi Gandharva Veda Music Concerts

VARIABLE	N-OF-CASES	MAXDIF	LILLIEFORS PROBABILITY (2-TAIL)
Pre-music MAARQ scores			
Vata	609.0000	0.1293	0.0000
Pitta	609.0000	0.1147	0.0000
Kapha	609.0000	0.0669	0.0000
Post-music			
Vata	609.0000	0.1980	0.0000
Pitta	609.0000	0.1885	0.0000
Kapha	609.0000	0.1173	0.0000
Improvement (post minus pre)			
Vata	609.0000	0.1095	0.0000
Pitta	609.0000	0.0919	0.0000
Kapha	609.0000	0.0470	0.0027

Descriptive Statistics

Key: V=Vata, P=Pitta, K=Kapha, PR=Pre-music mean, 1=Post-music mean, D=Difference (improvement score: 1 minus PR). AVG=Average. E.g., VPAVG = Vata, Pre-music score, Average.

	VPAVG	PPRAVG	KPRAVG	V1AVG	P1AVG
N OF CASES	609	609	609	609	609
MINIMUM	-3.0000	-3.0000	-2.4000	-3.0000	-2.7500
MAXIMUM	3.0000	3.0000	3.0000	3.0000	3.0000
MEAN	1.4119	1.3366	0.7565	2.0651	2.0291
VARIANCE	1.1421	1.0991	1.1689	0.8723	0.8500
STANDARD DEV	1.0687	1.0484	1.0812	0.9340	0.9220
SKEWNESS(G1)	-0.7260	-0.8107	-0.1733	-1.5498	-1.3715
KURTOSIS(G2)	0.3573	0.8198	-0.3506	3.3151	2.4783
MEDIAN	1.6667	1.5000	0.8000	2.1667	2.0000

	K1AVG	DVAVG	DPAVG	DKAVG
N OF CASES	609	609	609	609
MINIMUM	-2.4000	-6.0000	-4.0000	-5.0000
MAXIMUM	3.0000	5.5000	6.0000	5.0000
MEAN	1.4595	0.6554	0.6928	0.7040
VARIANCE	1.3870	1.3808	1.1889	1.6713
STANDARD DEV	1.1777	1.1751	1.0903	1.2928
SKEWNESS(G1)	-0.7946	-0.2266	0.1755	-0.3237
KURTOSIS(G2)	0.2256	2.8160	2.1285	0.6314
MEDIAN	1.6000	0.6667	0.7500	0.8000

Experiment 2, Hypothesis 2a. (All Western Baroque music)

KOLMOGOROV-SMIRNOV ONE SAMPLE TEST USING STANDARD NORMAL DISTRIBUTION

VARIABLE	N-OF-CASES	MAXDIF	LILLIEFORS PROBABILITY (2-TAIL)
Pre-music MAARQ scores			
Vata	188.0000	0.1346	0.0000
Pitta	188.0000	0.1177	0.0000
Kapha	188.0000	0.0937	0.0004
Post-music			
Vata	188.0000	0.1607	0.0000
Pitta	188.0000	0.1335	0.0000
Kapha	188.0000	0.0997	0.0001
Improvement (post minus pre)			
Vata	188.0000	0.1323	0.0000
Pitta	188.0000	0.1305	0.0000
Kapha	188.0000	0.0945	0.0003

Descriptive Statistics

Key: V=Vata, P=Pitta, K=Kapha, PR=Pre-music mean, 1=Post-music mean, D=Difference (improvement score: 1 minus PR). AVG=Average. E.g., VPAVG = Vata, Pre-music score, Average.

	VPAVG	PPRAVG	KPRAVG	V1AVG	P1AVG
N OF CASES	188	188	188	188	188
MINIMUM	-3.0000	-3.0000	-2.4000	-3.0000	-3.0000
MAXIMUM	3.0000	3.0000	3.0000	3.0000	3.0000
RANGE	6.0000	6.0000	5.4000	6.0000	6.0000
MEAN	1.2172	1.2420	0.9553	1.8387	1.9282
VARIANCE	1.4171	1.3181	1.2510	0.8294	0.7789
STANDARD DEV	1.1904	1.1481	1.1185	0.9107	0.8826
SKEWNESS(G1)	-0.7597	-0.8753	-0.5180	-1.3672	-1.4139
KURTOSIS(G2)	0.2306	1.2243	-0.0595	3.7298	4.3740
MEDIAN	1.5000	1.5000	1.0000	2.0000	2.0000

	K1AVG	DVAVG	DPAVG	DKAVG
N OF CASES	188	188	188	188
MINIMUM	-3.0000	-6.0000	-6.0000	-3.8000
MAXIMUM	3.0000	3.8333	4.7500	4.2000
RANGE	6.0000	9.8333	10.7500	8.0000
MEAN	1.3915	0.6215	0.6862	0.4362
VARIANCE	0.9711	1.1508	1.0648	1.1871
STANDARD DEV	0.9854	1.0728	1.0319	1.0896
SKEWNESS(G1)	-0.8240	-1.0160	-0.9991	-0.2313
KURTOSIS(G2)	1.4441	8.2535	10.3899	2.1182
MEDIAN	1.6000	0.5000	0.7500	0.4000

Experiment 2, Hypothesis 2b. (Gandharva Veda music and Western Baroque)

KOLMOGOROV-SMIRNOV ONE SAMPLE TEST USING STANDARD NORMAL DISTRIBUTION

VARIABLE	N-OF-CASES	MAXDIF	LILLIEFORS PROBABILITY (2-TAIL)
Gandharva Veda music			
Pre-music MAARQ scores			
Vata	21.0000	0.1366	0.3889
Pitta	21.0000	0.1137	0.7233
Kapha	21.0000	0.1635	0.1496
Post-music			
Vata	21.0000	0.2092	0.0170*
Pitta	21.0000	0.2812	0.0001*
Kapha	21.0000	0.2398	0.0027*
Improvement (post minus pre)			
Pitta	21.0000	0.1137	0.7233
Vata	21.0000	0.1366	0.3889
Kapha	21.0000	0.1635	0.1496
Western Baroque music			
Pre-music			
Vata	21.0000	0.1178	0.6550
Pitta	21.0000	0.1529	0.2247
Kapha	21.0000	0.3412	0.0110*
Post-music			
Vata	21.0000	0.1282	0.4986
Pitta	21.0000	0.1952	0.0358*
Kapha	21.0000	0.1500	0.2490
Improvement (post minus pre)			
Vata	21.0000	0.1178	0.6550
Pitta	21.0000	0.1529	0.2247
Kapha	21.0000	0.1101	0.7841

Descriptive Statistics

Key: G=Gandharva Veda music, W=Western Baroque music,
V=Vata, P=Pitta, K=Kapha, PR=Pre-music mean, 1=Post-music mean,
D=Difference (improvement score: 1 minus PR). AVG=Average.
E.g., VPAVG = Vata, Pre-music score, Average.

	GVPRAVG	GPPRAVG	GKPRAVG	GV1AVG	GP1AVG
N	21	21	21	21	21
MINIMUM	-1.3333	-1.7500	-0.8000	-0.3333	-0.7500
MAXIMUM	3.0000	2.7500	2.2000	3.0000	3.0000
RANGE	4.3333	4.5000	3.0000	3.3333	3.7500
MEAN	1.1508	1.0833	0.7048	2.1190	2.2024
VARIANCE	1.2386	1.1521	0.7265	0.8087	0.9664
STD	1.1129	1.0734	0.8523	0.8993	0.9830
SKEWNESS(G1)	-0.5047	-0.7629	-0.1541	-1.1892	-1.9274
KURTOSIS(G2)	-0.3473	0.3955	-0.8944	0.7813	2.8054
MEDIAN	1.3333	1.2500	0.8000	2.3333	2.7500

	GK1AVG	GDVAVG	GDPAVG	GDKAVG	WVPRAVG
N	21	21	21	21	21
MINIMUM	-0.6000	-1.3333	-1.7500	-0.8000	-1.0000
MAXIMUM	3.0000	3.0000	2.7500	2.2000	2.8330
RANGE	3.6000	4.3333	4.5000	3.0000	3.8330
MEAN	1.9333	1.1508	1.0833	0.7048	0.8968
VARIANCE	1.0893	1.2386	1.1521	0.7265	1.2900
STD	1.0437	1.1129	1.0734	0.8523	1.1358
SKEWNESS(G1)	-0.9523	-0.5047	-0.7629	-0.1541	-0.2739
KURTOSIS(G2)	-0.1902	-0.3473	0.3955	-0.8944	-1.0367
MEDIAN	2.2000	1.3333	1.2500	0.8000	1.1670

	WPPRAVG	WKPRAVG	WV1AVG	WP1AVG	WK1AVG
N	21	21	21	21	21
MINIMUM	-1.2500	-1.2000	-0.3330	-0.7500	-0.6000
MAXIMUM	3.0000	3.0000	3.0000	3.0000	3.0000
RANGE	4.2500	4.2000	3.3330	3.7500	3.6000
MEAN	1.1190	0.6667	1.5397	1.7857	1.5714
VARIANCE	1.3976	1.0413	1.3885	1.2455	0.9051
STD	1.1822	1.0205	1.1784	1.1160	0.9514
SKEWNESS(G1)	-0.2622	0.1950	-0.3837	-0.7878	-0.5859
KURTOSIS(G2)	-0.9694	-0.0751	-1.1639	-0.4075	-0.3750
MEDIAN	1.2500	0.8000	1.8330	2.0000	1.8000

	WDVAVG	WDPAVG	WDKAVG
N	21	21	21
MINIMUM	-1.0000	-1.2500	-1.2000
MAXIMUM	2.8330	3.0000	3.0000
RANGE	3.8330	4.2500	4.2000
MEAN	0.8968	1.1190	0.6667
VARIANCE	1.2900	1.3976	1.0413
STD	1.1358	1.1822	1.0205
SKEWNESS(G1)	-0.2739	-0.2622	0.1950
KURTOSIS(G2)	-1.0367	-0.9694	-0.0751
MEDIAN	1.1670	1.2500	0.8000

APPENDIX 5-A
Subject Participation Letter

Dear Friend,

Welcome to the EEG laboratory! We are honored to have you participate as a subject in this research project. The technicians who will be working with you today are

_____.

The experiment will proceed in the following way: first, we will ask you to read this and complete the following page. Then we will attach electrode leads to your head and various places on your wrist etc. Then, we will ask you to sit in a comfortable room. You and a trained specialist in Ayur-Vedic pulse diagnosis will be there together. He will be taking your pulse during the experiment. Once you are seated comfortably, we will test the equipment to make sure it is running properly and then we will begin the experiment. All you will be required to do is sit back and enjoy the music, preferably with eyes closed.

Once the experiment is over we'll ask you to complete a few forms and then confirm next week's appointment. That's it!

We do ask that you do not mention this experiment to anyone. That way, in case your friend also is asked to participate, he/she will be innocent as to the procedure.

Thank you very much.

APPENDIX 5.B
Background Information Sheet

Background Information Sheet

Note: Filling out this form constitutes approval to use this information for research. The information that you provide will be kept confidential and will be used for research purposes only.

Date:_____ Session Time: _____

Name:_____

Telephone number:_____

Age:_____ Gender:_____

Are you right or left handed?_____

Do you have normal hearing?_____

Occupation:_____

From the following categories, please rate which music you prefer (5 is most preferred, 1 is least preferred)

rock___ folk___ classical___ big band___ religious___ other_____

Please describe any musical training you may have had and for how long:

_____

_____

Do you practice Transcendental Meditation? yes___ no___

If yes, for how long? years____ months____
If you know it, please list your Ayur-Vedic body type:_____
Who diagnosed it?_____

When you are finished, please give this to the technician.

Appendix 5.C
EXPERIENCE SHEET

Experience Sheet

Thank you very much for participating in this experiment. In order to help us design even better experiments in the future, we would like to have you answer the following questions:

1. Briefly describe your experiences while listening to the music.

2. Did having the doctor in the room interfere with your ability to enjoy the music?

3. What would you change in the experiment?

Please give this to the technician before leaving. Thank you very much.

APPENDIX 6-A
Pen and Paper Tests

Following are copies of the pen and paper inventories administered during the study and also the structured monitoring sheets and instructions used by experiment administrators and staff during the music sessions. The inventories include the Fairview Self Help Scale and the Brief Psychiatric Rating Scale.

PATIENT _____ NO. _____ RATER _____ DATE _____

BRIEF PSYCHIATRIC RATING SCALE

OVERALL AND GORHAM

DIRECTIONS. DRAW A CIRCLE AROUND THE TERM UNDER EACH SYMPTOM WHICH BEST DESCRIBES THE PATIENT'S PRESENT CONDITION.

1. SOMATIC CONCERN - DEGREE OF CONCERN OVER PRESENT BODILY HEALTH. RATE THE DEGREE TO WHICH PHYSICAL HEALTH IS PERCEIVED AS A PROBLEM BY THE PATIENT, WHETHER COMPLAINTS HAVE REALISTIC BASIS OR NOT.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

2. ANXIETY - WORRY, FEAR, OR OVER-CONCERN FOR PRESENT OR FUTURE. RATE SOLELY ON THE BASIS OF VERBAL REPORT OF PATIENT'S OWN SUBJECTIVE EXPERIENCES. DO NOT INFER ANXIETY FROM PHYSICAL SIGNS OR FROM NEUROTIC DEFENSE MECHANISMS.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

3. EMOTIONAL WITHDRAWAL - DIFFICULTY IN RELATING TO THE INTERVIEWER AND THE INTERVIEW SITUATION. RATE ONLY DEGREE TO WHICH THE PATIENT GIVES THE IMPRESSION OF FAILING TO BE IN EMOTIONAL CONTACT WITH OTHER PEOPLE IN THE INTERVIEW SITUATION.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

4. CONCEPTUAL DISORGANIZATION - DEGREE TO WHICH THE THOUGHT PROCESSES ARE CONFUSED, DISCONNECTED OR DISORGANIZED. RATE ON THE BASIS OF INTEGRATION OF THE VERBAL PRODUCTS OF THE PATIENT; DO NOT RATE ON THE BASIS OF THE PATIENT'S SUBJECTIVE IMPRESSION OF HIS OWN LEVEL OF FUNCTIONING.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

5. GUILT FEELINGS - OVER-CONCERN OR REMORSE FOR PAST BEHAVIOR. RATE ON THE BASIS OF THE PATIENT'S SUBJECTIVE EXPERIENCES OF GUILT AS EVIDENCED BY VERBAL REPORT WITH APPROPRIATE AFFECT; DO NOT INFER GUILT FEELINGS FROM DEPRESSION, ANXIETY, OR NEUROTIC DEFENSES.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

6. TENSION - PHYSICAL AND MOTOR MANIFESTATIONS OF TENSION, "NERVOUSNESS", AND HEIGHTENED ACTIVATION LEVEL. TENSION SHOULD BE RATED SOLELY ON THE BASIS OF PHYSICAL SIGNS AND MOTOR BEHAVIOR AND NOT ON THE BASIS OF SUBJECTIVE EXPERIENCES OF TENSION REPORTED BY THE PATIENT.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

7. MANNERISMS AND POSTURING - UNUSUAL AND UNNATURAL MOTOR BEHAVIOR, THE TYPE OF MOTOR BEHAVIOR WHICH CAUSES CERTAIN MENTAL PATIENTS TO STAND OUT IN A CROWD OF NORMAL PEOPLE. RATE ONLY ABNORMALITY OF MOVEMENTS; DO NOT RATE SIMPLE HEIGHTENED MOTOR ACTIVITY HERE.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

8. GRANDIOSITY - EXAGGERATED SELF-OPINION, CONVICTION OF UNUSUAL ABILITY OR POWERS. RATE ONLY ON THE BASIS OF PATIENTS STATEMENTS ABOUT HIMSELF OR SELF-IN-RELATION-TO-OTHERS, NOT ON THE BASIS OF HIS DEMEANOR IN THE INTERVIEW SITUATION.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

9. DEPRESSIVE MOOD - DESPONDENCY IN MOOD, SADNESS. RATE ONLY DEGREE OF DESPONDENCY; DO NOT RATE ON THE BASIS OF INFERENCES CONCERNING DEPRESSION BASED UPON GENERAL RETARDATION AND SOMATIC COMPLAINTS.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

10. HOSTILITY - ANIMOSITY, CONTEMPT, BELLIGERENCE, DISDAIN FOR OTHER PEOPLE OUTSIDE THE INTERVIEW SITUATION. RATE SOLELY ON THE BASIS OF THE VERBAL REPORT OF FEELINGS AND ACTIONS OF THE PATIENT TOWARD OTHERS; DO NOT INFER HOSTILITY FROM NEUROTIC DEFENSES, ANXIETY OR SOMATIC COMPLAINTS. RATE ATTITUDE TOWARD INTERVIEWER UNDER "UNCOOPERATIVENESS".)

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

11. SUSPICIOUSNESS - BELIEF (DELUSIONAL OR OTHERWISE) THAT OTHERS HAVE NOW, OR HAVE HAD IN THE PAST, MALICIOUS OR DISCRIMINATORY INTENT TOWARD THE PATIENT. ON THE BASIS OF VERBAL REPORT, RATE ONLY THOSE SUSPICIONS WHICH ARE CURRENTLY HELD WHETHER THEY CONCERN PAST OR PRESENT CIRCUMSTANCES.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

12. HALLUCINATORY BEHAVIOR - PERCEPTIONS WITHOUT NORMAL EXTERNAL STIMULUS CORRESPONDENCE. RATE ONLY THOSE EXPERIENCES WHICH ARE REPORTED TO HAVE OCCURRED WITHIN THE LAST WEEK AND WHICH ARE DESCRIBED AS DISTINCTLY DIFFERENT FROM THE THOUGHT AND IMAGERY PROCESSES OF NORMAL PEOPLE.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

13. MOTOR RETARDATION - REDUCTION IN ENERGY LEVEL EVIDENCED IN SLOWED MOVEMENTS AND SPEECH, REDUCED BODY TONE, DECREASED NUMBER OF MOVEMENTS. RATE ON THE BASIS OF OBSERVED BEHAVIOR OF THE PATIENT ONLY; DO NOT RATE ON BASIS OF PATIENT'S SUBJECTIVE IMPRESSION OF OWN ENERGY LEVEL.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

14. UNCOOPERATIVENESS - EVIDENCES OF RESISTANCE, UNFRIENDLINESS, RESENTMENT, AND LACK OF READINESS TO COOPERATE WITH THE INTERVIEWER. RATE ONLY ON THE BASIS OF THE PATIENT'S ATTITUDE AND RESPONSES TO THE INTERVIEWER AND THE INTERVIEW SITUATION; DO NOT RATE ON BASIS OF REPORTED RESENTMENT OR UNCOOPERATIVENESS OUTSIDE THE INTERVIEW SITUATION.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

15. UNUSUAL THOUGHT CONTENT - UNUSUAL, ODD, STRANGE, OR BIZARRE THOUGHT CONTENT. RATE HERE THE DEGREE OF UNUSUALNESS, NOT THE DEGREE OF DISORGANIZATION OF THOUGHT PROCESSES.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

16. BLUNTED AFFECT - REDUCED EMOTIONAL TONE, APPARENT LACK OF NORMAL FEELING OR INVOLVEMENT.

NOT PRESENT VERY MILD MILD MODERATE MOD. SEVERE SEVERE EXTREMELY SEVERE

FAIRVIEW SELF-HELP SCALE

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Fairview (California) State Hospital

Name_____ Sex: M F Birth date_____ No_____
(LAST) (FIRST) (CIRCLE ONE)

Observer_____ Place_____ Today's date_____ Subject's age In months_____

A. GENERAL DESCRIPTION OF SUBJECT

1. MEDICAL STATUS. Please record "0" for none, 1 for "mild," 2 for "moderate" and 3 for "severe."

_____Deafness	_____Cerebral palsy	_____Other (please specify)
_____Blindness	_____Psychosis	_____ _____
_____Epilepsy	_____Paralysis	_____ _____

2. MECHANICAL AIDS. Please check any aids necessary:

_____none _____brace _____cane _____crutches _____wheelchair _____bed patient

3. BEHAVIOR PROBLEMS. Check any of the following behaviors which, in your opinion, is severe enough to interfere with outside placement:

_____Temper tantrums	_____Bangs head, bites self, etc.	_____Hostile
_____Undresses publicly	_____Destroys property, clothes, etc.	_____Runs away
_____Bites others	_____Unresponsive and lethargic	_____Screams
_____Hyperactive	_____Smears faeces	_____Unmanageable

B. SCORE SUMMARY (sum of items circled)

I. MOTOR DEXTERITY	☐	IV. SOCIAL INTERACTION	☐
1. Ambulation	☐	V. SELF-DIRECTION	☐
II. SELF-HELP SKILLS	☐	TOTAL	☐
1. Toilet Training	☐	BEHAVIORAL AGE (in mos.)	☐
2. Dressing	☐	BEHAVIORAL QUOTIENT	☐
3. Eating	☐	BEHAVIORAL LEVEL	☐
4. Grooming	☐		
III. COMMUNICATION SKILLS	☐		

Circle the number of the one description of each item. There must be one, and only one, answer for each question.

I. MOTOR DEXTERITY

1. AMBULATION

a. *Standing*
- 0—does not stand at all—relatively immobile
- 1—does not stand, but crawls
- 2—stands when held by others
- 3—stands alone with support
- 4—stands unsteadily unsupported—falls frequently
- 5—stands well alone

b. *Walking*
- 0—does not walk
- 1—walks with help
- 2—walks unsteadily alone
- 3—walks well alone
- 4—runs without falling

2. ARM-HAND USE
- 0—does not use arms or hands
- 1—uses one or both arms, but not hands or fingers
- 2—uses one hand and arm, does not use other
- 3—uses both arms and hands for gross movements
- 4—uses both arms and hands for fine movements

3. MUSCULAR COORDINATION
- 0—no significant coordination
- 1—gross incoordination, falls, spills, etc.
- 2—minor incoordination, occasional accidents
- 3—usable coordination, gross tasks
- 4—usable coordination, fine tasks

II. SELF-HELP SKILLS

1. TOILET TRAINING

a. *Degree of Training*
- 0—not toilet trained
- 1—uses toilet when placed on it
- 2—indicates need to go to toilet
- 3—goes to toilet when told
- 4—goes to toilet by self—occasional accidents
- 5—goes to toilet by self—no accidents during day

b. *Enuresis*
- 0—wets self day and night
- 1—wets bed at night—dry in daytime
- 2—dry day and night

c. *Toileting*
- 0—does not wipe self
- 1—occasionally wipes self
- 2—frequently wipes self
- 3—nearly always wipes self

d. *Flushing Toilet*
- 0—never flushes toilet
- 1—sometimes flushes toilet
- 2—usually flushes toilet

e. *Washing Hands*
- 0—never washes hands
- 1—sometimes washes hands
- 2—usually washes hands

2. DRESSING

a. *Getting Dressed*
- 0—does not put on any clothing
- 1—puts on one or two items (pants or shirt) only
- 2—puts on most clothing, cannot zip or button
- 3—puts on most clothing, can zip or button
- 4—completely dresses self, except for shoe tying
- 5—completely dresses, including shoe tying

b. *Tying Shoe Laces*
- 0—does not pull laces tight
- 1—pulls laces tight
- 2—makes first part of the knot
- 3—ties bow—soon comes untied
- 4—ties bow—remains tied

c. *Initiates Dressing*
- 0—never tries to dress self
- 1—must be told to dress
- 2—sometimes starts dressing without being told
- 3—usually starts dressing by self
- 4—dresses by self at appropriate time

d. *Undressing*
- 0—does not remove any clothing
- 1—takes off some clothing, (shirt, pants or sox only)
- 2—takes off most clothing, can unzip or unbutton
- 3—completely undresses self

0—cannot drink from glass or cup
1—drinks from glass or cup with help and sloppily
2—drinks by self, much spilling
3—drinks by self, uses both hands neatly
4—drinks by self—holds glass in one hand

b. *Eating Skills*
0—does not feed self
1—feeds self with fingers and hands
2—uses spoon only—very messy
3—uses spoon only—reasonably neat
4—uses spoon and fork—considerable spilling
5—uses spoon and fork neatly
6—uses knife, fork and spoon correctly

4. GROOMING

a. *Washing Hands and Face*
0—does not wash hands or face
1—partially washes hands and face; needs help finishing
2—washes hands and face but needs to be checked
3—washes hands and face—does not have to be checked

b. *Brushing Teeth*
0—does not brush teeth
1—makes brushing motions, but does not brush adequately
2—brushes teeth adequately, but cannot apply paste
3—applies paste and brushes teeth adequately

c. *Keeping Nose Clean*
0—does not keep nose clean
1—usually cleans nose
2—always cleans nose

d. *Drooling*
0—drools nearly constantly
1—drools occasionally
2—does not drool

e. *Bathing*
0—does not bathe self
1—helps with bath, but must be assisted
2—bathes self but must be checked
3—bathes self satisfactorily

0—mute—makes no sounds
1—cries or laughs only
2—says single syllables—"da, goo," etc.
3—combines syllables, but says no meaningful words
4—says simple words only
5—speaks two word sentences—"I go, give me," etc.
6—speaks sentences of three or more words
7—can carry on a simple conversation
8—can tell a story

2. CLARITY OF SPEECH
0—no speech (words)
1—speech seriously indistinct—only immediate caretaker understands
2—speech indistinct—understood with some difficulty
3—understood by most people

3. COMPREHENSION OF SPEECH
0—does not recognize his own name
1—recognizes his name when called
2—knows the meaning of simple commands—"come here," "stop that"
3—understands more complex commands—"throw the dolly on the floor"
4—understands stories when read by others

IV. SOCIAL INTERACTION

1. IDENTIFICATION
0—does not state first name
1—tells others his first name only
2—tells others full name
3—tells others full name and address

2. REPEATING WORDS
0—does not repeat sounds or words made by others
1—repeats some sounds on request
2—repeats words said by others on request
3—repeats complete sentences said by others on request

3. ANSWERING QUESTIONS
0—does not respond
1—responds by nodding, pointing or other gestures
2—responds with words—"yes," "No," "don't know," etc.

4. HELPING OTHERS
0—never offers to help others
1—helps others rarely
2—sometimes helps others spontaneously
3—usually stops what he is doing to help others

0—rejects contact with others (a loner)
1—contact limited to one person
2—will join a small group
3—seeks out groups to join

V. SELF-DIRECTION

1. INDEPENDENCE

0—cannot find his way around—to bed, bathroom, etc.
1—knows way around—but many times gets confused
2—knows way around—bed, bathroom, dining room, etc.
3—can get to school and back by self
4—goes about the hospital alone

2. PLAY ACTIVITY

0—cannot occupy self with own activity
1—plays with rattle, doll or ball
2—marks with crayon or pencil
3—builds with blocks, dresses doll, colors pictures
4—plays on wagon or swing
5—plays group games

3. HOUSEHOLD TASKS

0—performs no household tasks
1—fetches and carries objects on request
2—helps at little household tasks
3—does routine tasks on request
4—performs responsible routine chores

4. TIME SENSE

0—no sense of time
1—recognizes difference of night and day
2—knows meaning of "morning," "noon," and "night"
3—tells time for morning, noon and evening meal (8, 12, etc.)
4—tells time plus or minus one hour
5—tells time to nearest hour
6—tells time to nearest quarter hour
7—tells hours and minutes

5. NUMBER SENSE

0—no indication of understanding of number
1—can bring one thing from many of same
2—knows names for "one" and "two"
3—can count to "three"
4—can count to "ten"
5—can add one-digit numbers

0—no recognition of objects in pictures
1—points to objects in pictures spontaneously
2—points to objects in pictures on request
3—names objects in pictures
4—recognizes his written name
5—reads very simple words
6—reads first-grade books
7—reads children's books
8—reads newspaper

BEHAVIORAL AGE FROM Self-Help Total Score

Score	Age in Months	Score	Age in Months	Score	Age in Months
132	120	88	35.6	44	16.5
131	116	87	34.9	43	16.1
130	113	86	34.2	42	15.7
129	109	85	33.5	41	15.4
128	106	84	32.8	40	15.0
127	102	83	32.1	39	14.6
126	98	82	31.4	38	14.2
125	95	81	30.7	37	13.9
124	91	80	30.0	36	13.5
123	88	79	29.6	35	13.1
122	84	78	29.2	34	12.7
121	81	77	28.8	33	12.4
120	77	76	28.4	32	12.0
119	75	75	28.0	31	11.6
118	73	74	27.6	30	11.2
117	71	73	27.2	29	10.9
116	69	72	26.8	28	10.5
115	67	71	26.4	27	10.1
114	66	70	26.0	26	9.7
113	64	69	25.7	25	9.4
112	62	68	25.3	24	9.0
111	60	67	24.9	23	8.6
110	58	66	24.6	22	8.2
109	57	65	24.2	21	7.9
108	55	64	23.9	20	7.5
107	54	63	23.5	19	7.1
106	53	62	23.2	18	6.7
105	51	61	22.8	17	6.4
104	50	60	22.5	16	6.0
103	49	59	22.1	15	5.6
102	48	58	21.8	14	5.2
101	46	57	21.4	13	4.9
100	45	56	21.0	12	4.5
99	44.2	55	20.6	11	4.1
98	43.4	54	20.2	10	3.7
97	42.6	53	19.9	9	3.4
96	41.8	52	19.5	8	3.0
95	41.0	51	19.1	7	2.6
94	40.2	50	18.7	6	2.2
93	39.4	49	18.4	5	1.9
92	38.6	48	18.0	4	1.5
91	37.8	47	17.6	3	1.1
90	37.0	46	17.2	2	0.7
89	36.3	45	16.9	1	0.4
				0	0

APPENDIX 6-B
Instructions to Administrators

Instructions to Administrators: Music Therapy Procedure

Before Starting the Session

A) Collect tape players, cassette tapes and folders from the Doctor's office.

B) In the appropriate room, place the tape player on a table with the correct number of chairs, making a half circle in front of the table. Closest chair should be three feet from speakers; furthest chair should be ten feet from speakers. Insert the tape into the tape player and check that it is cued to the proper beginning for the session.

C) Have the proper group come into the room.

---

1. Confirm that the **correct** people are present in the room. Make necessary changes. Note anyone not present on observation sheet.
2. Confirm that the patients are seated (as much as possible) according to the seating chart. (This will ensure that the patients with less hearing ability are closer to the speakers).
3. Tell the patients "We are going to hear some music. It's all right to close your eyes if you wish. Please do not leave the room until the music is finished."

---

4. Start the music. Volume should be set at 6th loudness level as indicated on volume control button. Press the play button and let the music play for 20 minutes. When twenty minutes is up, stop the music

5. Sit unobtrusively away from the table where the cassette-corder is located. It would be good to sit near the door to encourage with your presence that subjects stay in the room. Write down any positive or negative reaction made by members of the group during the session on the observation sheets.
6. At the end of the session, open the doors, collect the tape recorder, tape, and folders and return to the Doctor's office. The Institute staff member can give his equipment to the experiment administrators who will return equipment for him.

APPENDIX 6-C
Music Therapy Daily Session Report

MUSIC THERAPY DAILY SESSION REPORT

Please fill in the following information, noting any positive or negative reactions which the subject might make during the treatment session. Be sure to be specific in your observation. Note if the subject is not present or leaves the room. Also, try to make two observations: one ten minutes into the session, another eighteen minutes into the session.

Please turn in the complete sheets at the end of the two month session. Sheets should be kept in the appropriate folder until then.

Thank you!

Day/Date	Subject's Name	Observation
1.		
2.		
3.		
4.		
5.		

6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		

APPENDIX 6-D
Multivariate and Polynomial Tests of Effects for Music: Psychiatric Tests X Trials X Music Group

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
MUSICGP
    1.0000    2.0000

  4 CASES DELETED DUE TO MISSING DATA.
NUMBER OF CASES PROCESSED:   23

DEPENDENT VARIABLE MEANS (Note: for this test only, the BPRS scores
have been inverted so that a higher score indicates
 a better rating. This is consistent with the FSHS.)

         BPRSA16   BPRSC16   BPRSD16    FSHSA    FSHSC

           57.0435   55.0435   58.2174   63.0000   60.8261

          FSHSD

           64.8261

REPEATED MEASURES FACTORS AND LEVELS

         DEPENDENT VARIABLES
WITHIN FACTOR  1 2 3 4 5 6
Variable      1 1 1 2 2 2
Trials       1 2 3 1 2 3


LEAST SQUARES MEANS.
  MUSICGP  =   1.0000 N OF CASES =   10.0000

         BPRSA16   BPRSC16   BPRSD16    FSHSA    FSHSC
 LS. MEAN      61.7000   58.6000   60.1000   61.5000   60.0000
 SE          3.8848    3.2154    3.0916   10.7646   11.3497

          FSHSD
 LS. MEAN      64.1000
 SE          11.5119

  MUSICGP  =   2.0000 N OF CASES =   13.0000

         BPRSA16   BPRSC16   BPRSD16    FSHSA    FSHSC
 LS. MEAN      53.4615   52.3077   56.7692   64.1538   61.4615
 SE          3.4072    2.8201    2.7115    9.4412    9.9543

          FSHSD
 LS. MEAN      65.3846
 SE          10.0966
```

UNIVARIATE AND MULTIVARIATE REPEATED MEASURES ANALYSIS

BETWEEN SUBJECTS

SOURCE	SS	DF	MS	F	P
MUSICGP	146.2876	1	146.2876	0.0791	0.7813
ERROR	38846.8718	21	1849.8510		

WITHIN SUBJECTS

SOURCE	SS	DF	MS	F	P	G-G	H-F
Variable	1067.4123	1	1067.4123	0.5386	0.4711	.	.
Variable *MUSICGP	509.7311	1	509.7311	0.2572	0.6173	.	.
ERROR	41618.4718	21	1981.8320				

GREENHOUSE-GEISSER EPSILON: .
HUYNH-FELDT EPSILON : .

Trials	280.3304	2	140.1652	1.9049	0.1615	0.1702	0.1653
Trials *MUSICGP	19.6348	2	9.8174	0.1334	0.8755	0.8349	0.8593
ERROR	3090.4667	42	73.5825				

GREENHOUSE-GEISSER EPSILON: 0.8181
HUYNH-FELDT EPSILON : 0.9201

Variable *Trials	8.2533	2	4.1266	0.0576	0.9441	0.9219	0.9400
Variable *Trials *MUSICGP	55.6736	2	27.8368	0.3888	0.6803	0.6487	0.6740
ERROR	3007.2974	42	71.6023				

GREENHOUSE-GEISSER EPSILON: 0.8563
HUYNH-FELDT EPSILON : 0.9693

SINGLE DEGREE OF FREEDOM POLYNOMIAL CONTRASTS

POLYNOMIAL TEST OF ORDER 1 (LINEAR)

SOURCE	SS	DF	MS	F	P
Trials	43.3445	1	43.3445	1.0982	0.3066
Trials *MUSICGP	17.6923	1	17.6923	0.4483	0.5104
ERROR	828.8077	21	39.4670		
Variable *Trials	6.3692	1	6.3692	0.1504	0.7020
Variable *Trials *MUSICGP	55.6736	1	55.6736	1.3149	0.2644
ERROR	889.1308	21	42.3396		

POLYNOMIAL TEST OF ORDER 2 (QUADRATIC)

SOURCE	SS	DF	MS	F	P
Trials	236.9860	1	236.9860	2.2005	0.1528
Trials *MUSICGP	1.9425	1	1.9425	0.0180	0.8944
ERROR	2261.6590	21	107.6980		
Variable *Trials	1.8841	1	1.8841	0.0187	0.8926
Variable *Trials *MUSICGP	0.0000	1	0.0000	0.0000	1.0000
ERROR	2118.1667	21	100.8651		

MULTIVARIATE REPEATED MEASURES ANALYSIS

TEST OF: Trials		HYPOTH. DF	ERROR DF	F	P
WILKS' LAMBDA=	0.8525	2	20	1.7308	0.2026
PILLAI TRACE =	0.1475	2	20	1.7308	0.2026
H-L TRACE =	0.1731	2	20	1.7308	0.2026

TEST OF: Trials *MUSICGP		HYPOTH. DF	ERROR DF	F	P
WILKS' LAMBDA=	0.9773	2	20	0.2326	0.7946
PILLAI TRACE =	0.0227	2	20	0.2326	0.7946
H-L TRACE =	0.0233	2	20	0.2326	0.7946

TEST OF: Variable *Trials		HYPOTH. DF	ERROR DF	F	P
WILKS' LAMBDA=	0.9919	2	20	0.0822	0.9214
PILLAI TRACE =	0.0081	2	20	0.0822	0.9214
H-L TRACE =	0.0082	2	20	0.0822	0.9214

TEST OF: Variable *Trials *MUSICGP		HYPOTH. DF	ERROR DF	F	P
WILKS' LAMBDA=	0.9410	2	20	0.6267	0.5445
PILLAI TRACE =	0.0590	2	20	0.6267	0.5445
H-L TRACE =	0.0627	2	20	0.6267	0.5445

APPENDIX 6-E
Multivariate and Polynomial Tests of Effects for Music: BPRS (Brief Psychiatric Rating Scale) X Trials X Music Group

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
MUSICGP
    1.0000     2.0000

  4 CASES DELETED DUE TO MISSING DATA.
NUMBER OF CASES PROCESSED:   23

DEPENDENT VARIABLE MEANS (Note: a lower number = better rating)

         BPRSA16    BPRSB16    BPRSC16    BPRSD16

           39.3043    36.9130    40.9130    38.0000

LEAST SQUARES MEANS. (Classical = group1, Gandharva = group 2)
  MUSICGP  =    1.0000 N OF CASES =    11.0000

         BPRSA16    BPRSB16    BPRSC16    BPRSD16
 LS. MEAN       34.5455    34.7273    37.2727    36.2727
 SE           3.5901    3.0700    3.0326    2.9447

  MUSICGP  =    2.0000 N OF CASES =    12.0000

         BPRSA16    BPRSB16    BPRSC16    BPRSD16
 LS. MEAN       43.6667    38.9167    44.2500    39.5833
 SE           3.4373    2.9393    2.9035    2.8194

UNIVARIATE AND MULTIVARIATE REPEATED MEASURES ANALYSIS
BETWEEN SUBJECTS
----------------

SOURCE        SS     DF     MS         F         P

MUSICGP       799.0139    1    799.0139     2.5382     0.1261
ERROR        6610.6383   21    314.7923

WITHIN SUBJECTS
---------------
SOURCE         SS     DF      MS      F     P    G-G    H-F

Trials       195.7894    3    65.2631   1.5391 0.2131 0.2197 0.2131
Trials
*MUSICGP      121.4851    3    40.4950   0.9550 0.4196 0.4090 0.4196
ERROR        2671.3845   63    42.4029

GREENHOUSE-GEISSER EPSILON:     0.8455
HUYNH-FELDT EPSILON    :     1.0000
```

SINGLE DEGREE OF FREEDOM POLYNOMIAL CONTRASTS

POLYNOMIAL TEST OF ORDER 1 (LINEAR)

SOURCE	SS	DF	MS	F	P
Trials	0.1886	1	0.1886	0.0038	0.9516
Trials *MUSICGP	61.5364	1	61.5364	1.2307	0.2798
ERROR	1050.0549	21	50.0026		

POLYNOMIAL TEST OF ORDER 2 (QUADRATIC)

SOURCE	SS	DF	MS	F	P
Trials	1.7313	1	1.7313	0.0357	0.8520
Trials *MUSICGP	2.2965	1	2.2965	0.0473	0.8299
ERROR	1019.1383	21	48.5304		

POLYNOMIAL TEST OF ORDER 3 (CUBIC)

SOURCE	SS	DF	MS	F	P
Trials	193.8696	1	193.8696	6.7607	0.0167
Trials *MUSICGP	57.6522	1	57.6522	2.0105	0.1709
ERROR	602.1913	21	28.6758		

MULTIVARIATE REPEATED MEASURES ANALYSIS

TEST OF: Trials	HYPOTH. DF	ERROR DF	F	P
WILKS' LAMBDA= 0.7243	3	19	2.4109	0.0987
PILLAI TRACE = 0.2757	3	19	2.4109	0.0987
H-L TRACE = 0.3807	3	19	2.4109	0.0987

TEST OF: Trials *MUSICGP	HYPOTH. DF	ERROR DF	F	P
WILKS' LAMBDA= 0.8369	3	19	1.2340	0.3249
PILLAI TRACE = 0.1631	3	19	1.2340	0.3249
H-L TRACE = 0.1948	3	19	1.2340	0.3249

APPENDIX 6-F
Multivariate and Polynomial Tests of Effects for Music: FSHS (Fairvew Self-Help Scale) X Trials X Music Group

```
LEVELS ENCOUNTERED DURING PROCESSING ARE:
MUSICGP
    1.0000    2.0000

  3 CASES DELETED DUE TO MISSING DATA.
NUMBER OF CASES PROCESSED:   24

DEPENDENT VARIABLE MEANS (Note: a higher number = better rating)

          FSHSA    FSHSC    FSHSD

           64.3750   62.3750   66.2083

LEAST SQUARES MEANS. (Classical = group1, Ganhdarva = group 2)
  MUSICGP  =   1.0000 N OF CASES =   11.0000

          FSHSA    FSHSC    FSHSD
 LS. MEAN      64.6364   63.4545   67.1818
 SE         10.2482   10.8262   10.9232

  MUSICGP  =   2.0000 N OF CASES =   13.0000

          FSHSA    FSHSC    FSHSD
 LS. MEAN      64.1538   61.4615   65.3846
 SE          9.4270   9.9586   10.0479

UNIVARIATE AND MULTIVARIATE REPEATED MEASURES ANALYSIS
BETWEEN SUBJECTS
----------------

SOURCE       SS    DF    MS       F       P

MUSICGP      36.2588   1   36.2588    0.0102    0.9205
ERROR     78352.0606   22  3561.4573

WITHIN SUBJECTS
---------------

SOURCE        SS    DF     MS     F    P   G-G   H-F

Trials      174.3737   2   87.1869  0.8916 0.4173 0.3846 0.3925
Trials
*MUSICGP      8.0404   2    4.0202  0.0411 0.9598 0.9064 0.9215
ERROR      4302.8485   44   97.7920


GREENHOUSE-GEISSER EPSILON:    0.6862
HUYNH-FELDT EPSILON    :    0.7499
```

SINGLE DEGREE OF FREEDOM POLYNOMIAL CONTRASTS

POLYNOMIAL TEST OF ORDER 1 (LINEAR)

SOURCE	SS	DF	MS	F	P	
Trials	42.4825	1	42.4825	1.2971	0.2670	(One-tailed p=.1335)
Trials *MUSICGP	5.1492	1	5.1492	0.1572	0.6955	
ERROR	720.5175	22	32.7508			

POLYNOMIAL TEST OF ORDER 2 (QUADRATIC)

SOURCE	SS	DF	MS	F	P
Trials	131.8912	1	131.8912	0.8100	0.3779
Trials *MUSICGP	2.8912	1	2.8912	0.0178	0.8952
ERROR	3582.3310	22	162.8332		

MULTIVARIATE REPEATED MEASURES ANALYSIS

TEST OF:		HYPOTH.	DF	ERROR DF	F	P
Trials	WILKS' L	0.9236	2	21	0.8688	0.4340
	PILLAI TR	0.0764	2	21	0.8688	0.4340
	H-L TRACE	0.0827	2	21	0.8688	0.4340
Trials *MUSICGP	WILKS' L	0.9911	2	21	0.0943	0.9104
	PILLAI TR	0.0089	2	21	0.0943	0.9104
	H-L TRACE	0.0090	2	21	0.0943	0.9104

APPENDIX 6-G
Descriptive Statistics

TOTAL OBSERVATIONS: 28

	FSHSA	FSHSB	FSHSC	FSHSD	BPRSA16
N OF CASES	26	0	25	25	28
MINIMUM	9.0000	0	3.0000	4.0000	23.0000
MAXIMUM	116.0000	0	123.0000	125.0000	75.0000
MEAN	61.2692	0.	64.8000	1337.5100	143.5670
STDEV	33.7219	0	36.4669	36.5720	11.9819
STD. ERROR	6.6134	0.	0.0911	0.1480	-0.7917
KURTOSIS(G2)	-1.2773	0.	-1.3891	-1.3236	0.6700
C.V.	0.5504	0.	0.5628	0.5337	0.2084
MEDIAN	52.5000	0.	59.0000	57.0000	57.0000

	BPRSB16	BPRSC16	BPRSD16
N OF CASES	24	25	24
MINIMUM	29.0000	21.0000	34.0000
MAXIMUM	77.0000	70.0000	79.0000
MEAN	58.9583	55.2800	58.1250
VARIANCE	99.4330	100.7933	90.2011
STANDARD DEV	9.9716	10.0396	9.4974
STD. ERROR	2.0354	2.0079	1.9387
SKEWNESS(G1)	-0.8191	-1.6878	-0.4968
KURTOSIS(G2)	1.7019	3.7203	0.6821
C.V.	0.1691	0.1816	0.1634
MEDIAN	58.0000	58.0000	61.0000

VARIABLE	N-OF-CASES	MAXDIF	LILLIEFORS PROBABILITY (2-TAIL)
BPRSA16	28.0000	0.1318	0.2603
BPRSB16	24.0000	0.1428	0.2298
BPRSC16	25.0000	0.2093	0.0062
BPRSD16	24.0000	0.1616	0.1053
FSHSA	27.0000	0.1530	0.1185
FSHSC	25.0000	0.1387	0.2423
FSHSD	25.0000	0.1499	0.1540