ALLEGHENY UNIVERSITY

SCHOOL OF HEALTH PROFESSIONS

Thesis Approval

This is to certify that the thesis presented to us by Virginia MacCallum

on the 10th day of November, 1997, in partial fulfillment of the requirements for the degree of Creative Arts in Therapy/DMT. Thx has been examined and is acceptable in both scholarship and literary quality.

Committee Members Signatures

Sharon L. Snodi CR, Chairperson

Paul Nolan

Karen B. Hansen

ON THE ORGANIZATION OF NEUROPHYSIOLOGIC PROCESSES AND THE INTEGRATION OF CONSCIOUS AND UNCONSCIOUS PERCEPTIONS IN DANCE/ MOVEMENT THERAPY

Thesis

Presented to

the Faculty of the Graduate School

of Allegheny University of the Health Sciences

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Virginia Elaine MacCallum

Creative Arts in Therapy / Dance-Movement Therapy

December 1997

ABSTRACT

This study explores the relationship between the organization of neurophysiologic processes and the integration of conscious and unconscious perceptions in dance/movement therapy. The view is proposed that processes of organization and perception form a single gestalt: change in one produces a shared change in the other. The implications of this view are discussed in terms of the capacity of dance/movement therapy to access the reciprocal nature of this relationship and effectively promote an individual's psychic and organic health.

The literature examines the interrelationship of perceptual and organizational processes in terms of psychic, organic and motoric expression. Perspectives from the fields of psychology, hypnotherapy, neuroscience, and quantum physics are considered in relationship to dance/movement therapy theory.

A theoretical integration of the literature emphasizes the view that the basis of all cognitive, emotional, and physical expression is the neurologic processing of patterns of energy. The essential role of movement in every perceptual-organizational event is underscored. From these understandings, this thesis submits that dance/movement therapy accesses states of healing and adaptation within the nervous system by engaging the movement potential of the individual on multiple levels and promoting the conscious realization of the interrelationship between perceptual and organizational processes.

DEDICATION

Every movement is complete. Every movement is named to be whole.
Every movement is universal. Every movement reveals all.
Every movement is shared. Every sharing is life.
We are the sharers seeking consciousness.

I dedicate this work to the following individuals, whose distinct languages and visions are wholly enfolded within my own.

James Vincent Goure

Anne Elizabeth Robinson

John Patrick MacCallum

and Susan Marion MacCallum

ACKNOWLEDGEMENTS

I offer deep appreciation for the patience, support, and suspension of disbelief, of Sherry Goodill. For his enthusiasm, directness, and evolving sense of humor, I wish to thank Paul Nolan. And, much gratitude is given to Karl Pribram for his willingness to be involved and the reality of possibility his involvement created.

I would also like to thank my classmates, each of whose imagination perpetuated the unfolding of my own; particularly, Sabina Koch, for her clarity and capacity to travel far and to return; Karen Belevetz, for her heart-felt understanding of symbolic processes; and, especially, Carlos Andrade, who silently reflected all that occurred.

Finally, I extend my arms in thanks to Matthew, Lara, and Rebekah MacCallum for transversing emotions and conversations of nearly every nature, and to my parents for unconditionally sharing themselves and continuing to reveal their wisdom. For Alan Joseph Mehlbrech, his bright paintings, complete presence and generosity, and knowledge of how perceptions can coexist, I am particularly grateful.

TABLE OF CONTENTS

I. INTRODUCTION

1-1: Objective and Proposed Thesis

This study will explore the relationship between the organization of neurophysiologic processes and the integration of conscious and unconscious perceptions in dance/movement therapy.

A case will be made to support the thesis that by facilitating the interplay of imaginal and muscular patterns of response toward the integration of conscious and unconscious perceptions, dance/movement therapy is promoting states of congruency between psychological and physiologic processes that organize the potential of a person's nervous system to heal and to adapt.

1-2: Context and Definition of Terms

Dance/Movement therapy is "defined as the psychotherapeutic use of movement as a process which furthers the physical and psychic integration of an individual (American Dance Therapy Association, 1975). Four basic tenets of dance/movement therapy theory are immediately presumed by this study. The first is the belief that mind and body are dynamically integrated expressions of the wholeness of self (Lewis, 1979). This understanding is distinguished from the view of mind and body as separate yet intimately

related systems. The second is that "mind, body, organic functioning, and behavior are interwoven with the environment" (Lewis, 1979). The third asserts that by promoting the capacity to integratively experience one's self within the present moment, a person's potential to embody and effectively respond to experiences within their environment is increased (Lewis, 1979). And, the fourth presumption identifies movement as essential to all aspects of development, transformation, relationship, expression and function of the self (Lewis, 1979).

To avoid reifying the perspective of mind-body dualism within this paper, the identifiers "mind" and "body" will be replaced as often as possible by terms that emphasize the *dynamic* and *unified* nature of these processes. As this study examines the work of theoreticians from distinct areas of research, their unique and respective use of language will be adhered to in the chapters that review established theory (see Chapters two and three). The words in question, then, are used primarily within the sections of this work concerned with the integration of the presented literature (see Chapters four and five). The following glossary is offered as a point of orientation to these terms.

Imaginal movement: The psychic expression of the innerworkings of the brain and nervous system.

Muscular movement: The muscular expression of the innerworkings of the brain and nervous system.

Congruency: A state in which the experience of the whole transcends the experience of the parts.

Informing: The process of reducing uncertainty within the receptive systems through the minimum range in which energy patterns of the spectral domain may concurrently be measured relative to the space-time constraints of the nervous system (Pribram,1991).

Perception: The organization of sensory input into a momentary pattern of response mediated by the movement of reciprocal interactions between energy, matter, and mind in relationship to memory.

Subtlety: The potential to penetrate and finely differentiate; a quality of inwardness, that which is not overtly displayed (Webster's, 1966).

1-3: Motivation and Implications

The motivation for the work lies in: (a) The evident potential of this study to further substantiate the mind-body unity described by dance/movement therapy theory; and, (b) The apparent need for a more coherent theory of the relationship between psychological and neurophysiological organizations in the dance/movement therapy field (Berrol, 1992).

The contributions of dance/movement therapist Cynthia Berrol (1992) toward a neurophysiologic understanding of dance/movement therapy support the field's theoretical premise of "mind and body as a gestalt in which change in one of these domains produces corollary change in the other" (Berrol, 1992). She asserts that the interdependent

nature of neurophysiologic processes exemplifies the interrelationship between "physical, cognitive [and] psycho-social" aspects of behavior (Berrol, 1992, p. 20). Importantly, Berrol emphasizes the capacity of *movement* to mediate and organize these systems on a neurologic level.

Berrol states:

> Viewing the human body as the vessel or container, and rhythmic movement as the medium, the receptor systems - kinesthetic, proprioceptive, vestibular, auditory, visual - can be systematically manipulated for therapeutic ends. Movement can serve as a mediator, intervening to organize and/or reorganize the neurologic underpinnings of cognitive, physical and emotional function to facilitate behavioral change and enhance well being (Berrol, 1992, p.28)

This study seeks to supplement Berrol's work by introducing perspectives which describe the basis of cognitive, physical and emotional function by the neurologic processing of patterns of energy. It will be suggested that this level of processing within the nervous system indicates that the interrelationship of mental and material processes may be understood in terms of a continuum of subtlety. On this continuum, the most subtle direction is displayed by dynamic patterns of energy within which mind and matter are implicately contained. The least subtle direction is displayed by those material processes of the body that appear fixed in space and time and relatively unchanging. While muscular movement is identified as an effective "mediator and organizer of the neurologic underpinnings" of psychic and organic processes (Berrol, 1992), imaginal movement will be examined in terms of its capacity to mediate more subtle degrees of interrelationship

within the nervous system.

Furthermore, it will be proposed that dance/movement therapy accesses the more subtle relationships of psychic and organic processes by facilitating the interplay of imaginal and muscular movement toward the conscious integration of unconscious patterns of response. In other words, by consciously interrelating psychic and physical processes with the intention of embodying expressions of the self that were previously unrelated, immobile, or blocked, more subtle potentials of the self for wholeness and adaptation become available to the individual nervous system. The precept of dance/movement therapy that "human reception, processing and response inextricably link the mind and body into a functional whole" (Berrol, 1992, p. 20) will be reexamined from this context.

1-4: Format

Selected literature from the fields of psychology, neuroscience and quantum physics will be introduced in the second chapter of this study. These perspectives will examine: (a) Conscious and unconscious processes of the psyche; (b) Psycho-biological states; (c) Perceptual events in terms of the neurologic processing of the spectral domain; and, (d) Responses ordered by memory relative to unconditioned acts of perception. Chapter three will address the conscious integration of unconscious perceptions in terms of dance/movement therapy theory. A theoretical integration of the literature will be presented in chapter four. In this chapter, a discussion of the relationship between perceptual and

organizational processes will be followed by a case for the proposed thesis. The case will assert that dance/movement therapy expands the potential of an individual's nervous system to heal and adapt by promoting the embodiment of more subtle states of psychic and organic interrelationship. Chapter five will summarize the work and indicate directions for further study.

1-5: An Overview of Perception

Although the word *perception* is commonly used and familiar to most, it is surprisingly difficult to pin down an exact definition. Frequently, its meaning is interchanged with concepts of consciousness, awareness, and sensation. Perception is attributed to the five senses of the body *and* to the capacities of the mind to understand and infuse value within those sensations. On some occasions it is used to indicate solely the activities of consciousness, while in other contexts, it is prescribed to the dynamics of the unconscious.

Sigmund Freud (1911) emphasizes the intimate connection between conscious perceptions and the sensations of the body by noting the significance of the infant's capacity to sensorially distinguish between "feeling and being felt" in the development of the ego (Brenner, 1973). Gregory Bateson similarly extracts the "responsiveness to difference" as the essence of perceptual experience (Bateson, 1987). Depth psychologist, Carl Jung, discusses perception in terms of both conscious and unconscious processes.

He distinguishes *sensory* perceptions as those *physical* sensations which indicate that "something *is*," and *apperceptions* as those *mental* processes which "tell us *what* it is in relation to *us*" (i.e., through associations of affect, memory, judgement, will, thought, imagination, feeling, intuition, dreams, etc.) (Jung, 1927). Jung hypothesizes that the unconscious "may possibly have everything that consciousness has...all in subliminal form" (Jung, 1927).

While it is generally agreed that perceptions encompass both the mental and physical spheres of an individual's experience with their environment, the extent to which perceptions *are organized by* the reality of one's experience and the extent to which perceptions *organize* the reality of one's experience is evidently more ambiguous. Much evidence has accumulated that indicates perceptual processes do not primarily reflect the differences of an external reality but rather *interpret* and *construct* subjective realities in a differentiated way. This interpretation and construction is based upon the interplay of environmental information, individual experience, and genetic disposition (Dossey, 1982).

Neuroscientist Karl Pribram (1991) proposes an inherently constructive theory of brain processes and perception in which perceptual events involve the continuous transformation of neurologic potentials as "sensory input is organized into previous patterns of experience" (Pribram, 1991). Pribram identifies how the nervous system becomes *informed* by the neural processing of interference patterns of frequency waves

(Pribram, 1991). Information, as used by Pribram, references Dennis Gabor's definition of a *quantum of information* which recognizes the minimum range that frequency potentials (wave forms) may concurrently be measured relative to neurologic constraints (Pribram, 1991). Essentially, this range forms a channel of communication/processing that reduces the degree of uncertainty within the receptive systems (Pribram, 1991). Every act of perception is a transformative event. These understandings suggest that by becoming more conscious of how perceptual events transform the self one may begin to utilize their perceptual capabilities differently: in a manner that actively supports their mental and physical well being. Evidence from the field of quantum physics that "instead of discovering particles, physicists may actually be creating them" (Talbot, 1992) poses further implications that "our perceptions of the world may not be based solely on the information we receive through the five senses" (Talbot, 1992).

In quantum physics, a *state* is an outcome of possible relationships between all processes relevant to a particular event. Theoretically, prior to the impact of *perception*, all potential outcomes synchronously exist (Wolf, 1994). A particular state of *experience*, therefore, may be described as an outcome of all processes related to the self at a given moment. These processes include internal and external stimuli, conscious and unconscious configurations, past and future oriented material, psychological and physical sensations and expressions. Evidently, perception *orders* all of these processes, which initially reflect a variety of possible states, into a particular, momentary pattern of

of self expression.

Clinical psychologist, Ernest Rossi (1993), reflects this view as he defines perceptual organizations by an infinite number of *states* formed by the binding of physical levels of arousal with symbolic interpretations of the mind. Rossi asserts that "there are as many layers of self awareness as there are levels of arousal and corresponding symbolic interpretations in an individual's interpretive repertoire (Rossi, 1993). Everyday conscious awareness is generated by the moment to moment response of state-dependent processes of learning, memory, and behavior elicited by environmental or internal patterns of input (Rossi, 1993).

Like Rossi, physicist David Bohm identifies normal states of conscious perception, primarily, as habitual thought patterns based upon memory, formed by the "conjunction of meaning with a physical reaction" (Bohm, 1980). He defines *thought* as "that active response of memory in every phase of life...including, the intellectual, emotional, sensuous, muscular and physical responses to memory," while an *unconditioned act of perception* is a response of intelligence (Bohm, 1980). Here, *intelligence* denotes the *inward potential of life energy*: the implicate order that ultimately contains both mind and matter and the infinite possibilities for experience these expressions permit (Bohm, 1977, 1980). Bohm asserts that unconditioned acts of perception, also called insights, "directly transform thought by rearranging the structural matter of the brain"

(Bohm, 1980). The position is offered that all structural organizations of the self reciprocally develop through the implicate movements of energy, matter and mind (Bohm, 1980).

Piaget's description of adaptation as "two complementary movements, accommodation and assimilation," is used by Bohm to identify all intelligent perception (Bohm, 1980). Accommodation is "the establishment of a common measure" (Bohm, 1980) and speaks to "the outgoing, adjusting process of reaching out to the environment" (Pulaski,1971); whereas, assimilation means "to make into a comprehensive and inseparable whole (which includes oneself)...to understand"(Bohm, 1980) and recognizes the "taking-in process...by which one incorporates" input from the environment into their own experience (Pulaski, 1971). Bohm further states:

> It is clear that in intelligent perception, primary emphasis has in general to be given to assimilation, while accommodation tends to play a relatively secondary role in the sense that its main significance is as an aid to assimilation...To work in this way is evidently to give primary emphasis to something similar to *artistic perception*. Such perception begins by observing the whole fact in its full individuality, and then by degree articulates the order that is proper to the assimilation of this fact (Bohm, 1980, p. 141).

Significantly, each of the perspectives introduced emphasizes perception as a process mediated by the movement potential of the entire system. Collectively, these views indicate that perceptual processes organize the entire system from one moment to the next. Relative to this initial framework, chapter two will present a more comprehensive

examination of perceptual and organizational processes of the self.

1-6: Limitations of the Study

The limitations of this work are: a) The scope of the material. The theorists emphasized are four of *many* potentially important sources. This thesis does not begin to address the entire body of research that is currently available on this subject. b) Perhaps even more significant, is the limited capacity of this work to reveal the true extent of the material introduced. The individual contributions of each theorist included in this paper invites and requires an *ongoing* process of study. The intention of the author is that this thesis will provide a preliminary ground from which to formulate hypotheses and indicate directions for further consideration and research within the dance/movement therapy field.

II. REVIEW OF THE LITERATURE

Often it is just as well that we do not know the danger we escape when we rush in where angels fear to tread (Jung, 1958/1969, p.247).

A fact never exists only as it is in itself, but also as we see it (Jung, 1921, p.510).

The objective of this chapter is to introduce four theoretical perspectives which characterize perceptions in terms of their capacity to organize particular functions of the self. The first section defines *conscious and unconscious perceptions* and describes how the *integration* of these perceptions increases an individual's psychological potential for adaptation and development. The capacity of perceptual organizations to become *state-bound* and impact psycho-biologic function will be identified in the second section of this chapter. Section three will examine how perceptual events involve the neural processing of interference patterns of frequency which become constructively organized in relationship to previous patterns of experience. And, the fourth section of this chapter will discuss how unconditioned acts of perception neurologically *transform* thought patterns directed by memory. These perspectives will be followed, in chapter three, by a discourse on the integration of conscious and unconscious perceptions in terms of dance/movement therapy theory.

A. CONSCIOUS AND UNCONSCIOUS PERCEPTIONS

> *Everyone makes for himself his own segment of world and constructs his own private system, often with air tight compartments, so that after a time it seems to him that he has grasped the meaning and structure of the whole. But the finite will never be able to grasp the infinite. Although the world of psychic phenomena is only a part of the world as a whole, it may seem easier to grasp precisely for that reason. But one would be forgetting that the psyche is the only phenomenon that is given to us immediately and, therefore, is the sine qua non of all experience (Jung,1927).*

The psyche orders and defines the life experience of an individual; its contents are the mental representations of one's subjective world (Jung, 1927). The development of the psyche depends upon, and permits, relationships with the objects of ourselves, the environment, and others. Housed within the physiological structures of the nervous system, the psyche relies upon the function of the brain (Jung, 1927). Physical "perceptions tell us that something is" (Jung, 1927). "Psychic processes of apperception tell what it is" in relation to us (Jung, 1927). The *relationship* is determined by associating these contents of experience with a relative value of psychic energy. This value reflects the psychological significance of the information in relationship to the existing values of all other psychic contents (Jung, 1927). As perceptual processes shape the subjective life around particular values and information, they influence the immediate and future experiences of the individual.

Perceptions are defined by conscious and unconscious processes. Consciousness is that function of the psyche concerned with each present moment of adapting and orienting the individual in relationship to the environment and its changes (Jung,1927). Jung compares its function to the act of orienting to space (Jung, 1927). And, he emphasizes seven perceptual categories of consciousness (Jung, 1927). *Physical sensations* that enter our awareness from the environment are distinguished from the apperceptive processes of *recognition* (thought), *evaluation* (feeling, emotion), and *intuition* (perception of the possibilities inherent within a situation). *Volitional* impulses are defined as directed impulses based upon apperception, *and instinctual* impulses are observed as originating directly from the body or the unconscious. Jung discusses apperceptive processes in terms of their *directed or undirected* nature, the former characterized by rational attention while the latter involves irrational and fantasy relationships. And, the seventh category noted are those psychic processes of *dreams*, which, he states, "are the most significant and most obvious result of the unconscious influence upon consciousness" (Jung, 1927)

Jung hypothesizes that the unconscious "may possibly have everything that consciousness has, including perception, apperception, memory, imagination, will, affectivity, feeling, reflection, judgement, dreams, etc., all in subliminal form" (Jung, 1927). He distinguishes between two levels of unconscious: the *personal* and the *collective* (Jung, 1927). The personal unconscious contains those contents of individual experience which have not been *directly* related to the self with enough value, or intensity, to emerge

within consciousness, *and* those contents which have been consciously separated from one's awareness through means of repression. The collective unconscious is " the source of the instinctual forces of the psyche and of the forms or categories that regulate them, namely the archetypes" (Jung, 1927). These contents are transpersonal, not limited to the individual's experience, but representations of all possibilities for human experience. Jung identifies these archetypal contents as the "true basis of the psyche" (Jung, 1927).

The boundaries between the conscious and unconscious are characterized as dynamic and overlapping, "much like a sliding scale" (Jung, 1927). These psychic processes are continuously influencing one another and inextricably mixed. The function of consciousness to order and relate that information which is evidently significant to the adaptation of the self reflects the *directed* nature of the mind. The function of the unconscious to represent those contents which are evidently not compatible or significant enough to be related to consciousness reflects the *indirect* nature of the mind. These conscious and unconscious tendencies exist in a *compensatory* relationship which Jung identifies as the self-regulating potential of the psyche (Jung, 1916).

As experience is consciously and unconsciously valued, a person's options for perceiving information in particular relationships are formed. The conscious and the unconscious regulate the ways in which experience is perceived by associating new input to previous patterns of input. The subjective filter which these associations create

functionally supports the sustenance of a personal identity. This is exemplified by the function of the unconscious to order information that is yet *"too strange, or unfamiliar,"* to be adequately related to consciousness (Jung, 1916). The unconscious and the conscious exist as a "living system of reactions and aptitudes" (Jung, 1927), of representations of meaning, that records and constructs subjective experience.

The viability of one's personality relies upon the functional relationship between the conscious and unconscious. On the one hand, the directedness of consciousness is necessary for individual experience to be formed and related (Jung, 1916). Life necessitates a continuous exchange of new information in relationship to previous information. Consciousness serves to give these dynamics order. On the other hand, "the further we are able to remove ourselves from the unconscious through directed functioning, the more powerful a counterposition can build up in the unconscious" (Jung, 1916).

The relationship of the conscious and unconscious is expressed by an individual's attitude toward their present circumstance in the environment. Attitudes are perceptual associations that emerge from and shape one's personality. As new attitudes are formed from previous ones, perceptual patterns are fed forward. Often, they become habituated until a symptom arises that generates unrest or discomfort (Jung, 1916). Even then, it is frequently difficult for an individual to consider that perceptions are *potentials* of relating to their experience rather than establishments of identity. Once the counterposition of the

unconscious limits the adaptive potential of the mind, it manifests itself as an individual conflict which requires the transition from one attitude to another (Jung, 1916).

The conflict is a functional expression of the psyche indicating the need for a perceptual reorganization in order to adapt within the immediate situation of one's life. The psychic conflict represents the presence of information from a person's own experience that is important for their growth and development. Jung asserts that these conflicts signify that the compensatory tension between the conscious and the unconscious have organized the individual's psychic energy around a particular content of experience, a *complex*, that reduces the energy normally available for adaptation (Jung, 1916). Complexes (Jung, 1916) are selected contents of experience that are causally related to the environment and organized by the psyche into a particular feeling tone. The feeling tone generates constellations of associations within the mind that are conditioned and related by the quality of the affect and psychological value they represent (Jung, 1916). Jung emphasizes that it is "in the intensity of the emotional disturbance itself that the value, or energy, lies which the individual should have at his disposal in order to remedy the state of reduced adaptation" (Jung, 1916).

Humans are distinguished from other forms of life by the capacity to consciously *realize* experience. As consciousness defines our immediate experience, it is *that potential* through which, and of which, we are most aware within ourselves. Jung describes the

attention upon the affective quality of their attitude, the contents of the unconscious may become realized objectively. The conscious mind necessarily must loosen its directed nature, of analysis and judgment, and *observe* the unconscious perception. As the person's attention grows less directed, the unconscious material can more fully emerge. "The unconscious contents want first of all to be seen clearly, which can only be done by giving them shape, and to be judged only when everything they have to say is tangibly present" (Jung, 1916).

Unconscious perceptions may be given shape by creative expression. Jung indicates that these formulations often reflect the individual's natural preferences of expression (i.e., visually oriented people may paint or verbalize inner images, kinesthetic orientations may result in symbolic gestures or postures). "By shaping it, one goes on dreaming the dream in greater detail in the waking state, and the initially incomprehensible, isolated event is integrated into the sphere of the total personality, even though it remains at first unconscious to the subject" (Jung, 1916). Giving the unconscious a symbolic form creates a space in which opposing tendencies can meet and potentially interact.

Once the unconscious material has been formulated, the therapeutic focus moves to the discovery of *meaning and purpose* of those contents (Jung, 1916). This encourages a further enrichment of the affect and information that has emerged. Ideally, there would occur a natural cycling between the expression of the unconscious and the consideration of

meaning and relationship. In this manner, the conscious and the unconscious may appear to take turns taking the lead (Jung, 1916). A reciprocal relationship between shaping experience and giving it meaning essentially describes the goal of the therapeutic process: for the individual to integrate this potential so that they may more easily adapt and grow within multiple situations and environments. From this standpoint, the immediate conflict is not the primary focus, but rather how to promote the increased adaptation of the person through future experiences and conflict : how to lessen the separation between conscious and unconscious perceptions (Jung, 1916).

B. PERCEPTION AS A STATE-DEPENDENT PSYCHO-BIOLOGICAL PROCESS

From the recent efforts to examine life as a process of informational exchange, a view has arisen that all components of nature are *systems of information* (Stonier, 1990). Clinical psychologist, Ernest Rossi, (1993) asserts that information theory offers a new understanding of mind-body communication that effectively bridges the Cartesian dichotomy of mind and matter. He describes "mind and body as two ways of conceptualizing a *single* information system" (Rossi, 1993). A person *experiences* life immediately through their mind *and* body. Although mental and physical phenomena may be recognized independently, *perceptions* emerge from the interaction of the *whole* self - conscious with unconscious (psychological with physiological) - with the input of the environment. Rossi proposes that the information a person "learns and remembers is dependent upon (their) psycho-physiological state at the time of the experience" (Rossi, 1993). Every moment of subjective experience contains mental and physical responses that create unique perceptual organizations of the self. These organizations represent *states* of experience. *State-dependent learning, memory, and behavior* (SDLMB) identifies the interaction of psychological and physiological processes that enable an individual to differentiatedly respond to experience (Rossi, 1993).

New experience, particularly patterns of input generating "heightened states of awareness, emotion, and motivation," often associated with " shock, trauma, and stress," is

organized within the body through the limbic-hypothalamic, and closely related, systems, by messenger molecules (Rossi, 1993). The primary function of these molecules is to mediate the communication between most, and perhaps all, physiologic functions. "They serve as the ultimate keys for the state-dependent encoding of personal emotional experience and behavior that have always been of relevance for psychotherapy and mind-body healing" (Rossi, 1993). The following is a *general* description of functions of particular messenger molecules which exemplify the psychobiological basis of mind-body communication that Rossi proposes:

> *i) The **autonomic nervous system** uses **neurotransmitters** as molecular messengers between one nerve and the next for facilitating states of optimal performance and activity (the sympathetic nervous system) as well as relaxation, creativity, and healing (the parasympathetic nervous system).*
> *ii) The **endocrine system** uses **hormones** (primary messengers) to regulate the basic processes of metabolism, such as growth, maturations, digestion, energy, sexuality, etc, with emotions, memory, learning, and behavior.*
> *iii) The **immune** system uses **cytokines** as messenger molecules to signal white blood cells (leukocytes) that are involved in the defense against disease, viruses, and cancer, as well as psychological mood and motivation.*
> *iv) The **neuropeptide system** uses **neuropeptides** as messenger molecules to modulate the central nervous system of the brain and the peripheral nervous system of the body as well as our sense organs. The neuropeptides are literally the "neuromodulators" they modulate neural communication in mental and behavioral states of emotions, pleasure, pain, stress, trauma, memory, learning, and behavior.*
> (Rossi, 1993, p. 158-159)

The particular ways in which an individual's physiologic systems (i.e. autonomic, endocrine, immune, and neuropeptide systems) respond is inherently linked to the psychological associations of the experience (Rossi, 1993). In this manner, perceptual organizations may become *state-bound.*

> *"Inasmuch as meaningful experience arises from the binding or coupling of i) a particular state or level of* ***arousal*** *with ii) a particular symbolic* ***interpretation*** *of that arousal, experience is* ***state-bound*** *and can thus be evoked either by inducing - "naturally," hypnotically, or with the aid of drugs - the particular level of arousal, or by presenting some symbol of its interpretation such as an image, melody, or taste"* (Fischer & Landon, 1972; Rossi, 1993, p. 52) [Emphasis added].

The binding of a particular level of arousal and interpretation may result in an unconscious organization of that experience that is unavailable to the conscious mind. The psychological meaning and the intensity of the associated physiological state reflect two potential entrances to that unconscious material within the therapeutic process. "While remembering from one state to another is usually called *state-dependent learning*," Rossi emphasizes that perceptual organizations may become state-bound by a single experience (Rossi, 1993).

As the new patterns are able to be integrated, the individual's habitual repertoire, their normal capacity to respond in multiple ways to their experience, is increased. If the organizations of input remain state-bound and inaccessible to one's consciousness, depending upon the level of arousal and significance of the experience, the individual's adaptive potential may be reduced. Rossi asserts that by therapeutically accessing these state-bound organizations, unconscious patterns of response can be consciously integrated toward more effective adaptation and increased potential for health within the entire system (Rossi, 1993).

As we subjectively move from one state to another retrieving and associating information, we are functionally accessing our own state-dependent processes of learning. There are "as many layers of self-awareness as there are levels of arousal and corresponding symbolic interpretations in an individual's interpretive repertoire" (Rossi, 1993). The potential of consciousness to organize experience is emphasized by its evident task of relating an infinite number of discrete states toward a general continuity of awareness. The nature of our every day awareness is characterized by previous patterns of response arising in relationship to the mental and physical associations evoked by the constant flow of of input from the environment. In this manner, every day consciousness is largely composed of "habitual patterns of memories, associations, and behaviors" (Rossi, 1993).

Dramatic reorganization of these perceptual patterns appear to occur primarily in situations of extreme *stress*, or trauma, and during experiences of *creativity*. Rossi proposes that creative moments are "the basic unit of original thought and insight as well as personality change" (Rossi, 1993). Creative experiences occur when habitual patterns of consciousness are by-passed, broken through, to allow potentials from the unconscious to flow through in the form of insights and symbolic expression. On a psychobiological level, connections have been proposed (Kimble, 1965; Hebb, 1963) between creative experiences and the constructive alteration of proteins and cellular processes in the brain (Rossi, 1993). Stressful and traumatic experiences also generate heightened states of awareness and function. They are usually associated with a rush of hormonal activity and

an immediate increase in performance and energy. Both creative and stressful experiences represent *altered states* of consciousness that are sharply distinguished from the state-dependent *patterns* that constitute an individual's normal every day consciousness.

An individual's response to trauma may be defined as an effort to maintain their psychological and biological homeostatic balance. Hans Seyle's formulation of a General Adaptation Syndrome (1974) arose from his findings that "whatever the source of biological stress intruding upon (an) organism, it would react with the same pattern of response to restore its internal homeostasis." The response pattern involved an initial *alarm reaction*, followed first by a stage of *resistance* and eventually, one of *exhaustion* (Seyle, 1974). Rossi reformulates Seyle's syndrome into two stages:

> *i) An initial complex adaptive response* (that acknowledges the differences in perceptual meanings of information within each individual) *of alarm and arousal; and ii) the eventual maladaptive consequences of the prolonged stress response when arousal becomes chronic* (Rossi, 1993, p. 71).

Biological resources engaged by the alarm reaction are mobilized within seconds after the input is perceived. The limbic-hypothalamic system is a primary mediator of these adaptive responses. Essentially, the hypothalamus signals the mind-body systems to turn *up* specific capacities (e.g., cardiovascular and cardiopulmonary tone, cognition, speed and strength of motor response) and turn *down* others (e.g., digestive, sexual, and immune systems; also evident in stress-induced analgesia, the numbness associated with shock) (Rossi, 1993). Many of the hormones released during the alarm response are

involved in the storage and construction of memory, further emphasizing the state-dependent relationship of the psychological and physiological processes activated by these experiences (Rossi, 1993).

> *Certain cells within the hypothalamus transduce the neurally encoded information (perceived on the mind-brain level) into the emergency messenger molecule corticotropin-releasing hormone (CRH). CRH signals the neighboring pituitary gland to release the "master brain-body messenger molecule" adrenocorticotropin (ACTH) into the blood stream within about fifteen seconds where it travels throughout the body evoking many adaptive responses in the heart, liver, brain, and muscles in twenty to thirty seconds. Within a few minutes after receiving the ACTH messenger, cells within the cortex of the adrenal glands release cortisol in the blood stream. Cortisol is recognized as the major activating messenger that signal a multitude of adaptive responses in the various organs, tissues, and cells throughout the body* (Rossi, 1993, p. 73).

This abrupt mobilization requires a great expenditure of energy often in a very short amount of time. It is an emergency response in that is functionally organized to support an *immediate* rather than a prolonged reaction to one's circumstance. The habituation of this response essentially wears down the resources and systems of the mind and body. Rossi proposes that the perpetuation of the initially adaptive alarm response ultimately leads to mental and physical organizations of reduced function and disease (Rossi, 1993).

Evidently, once those cell receptors become overstimulated from the perceptual information that signals the emergency response, they preserve themselves through a process called down regulation: "the individual cells of the brain and body can pull in many thousands of receptors they normally have on their surface and destroy them before the

excessive signal destroys the cell itself" (Rossi, 1993) This process of down regulation therefore inhibits the reception of the excess messenger molecules (i.e., adrenaline, cortisol) resulting in a decrease of hormonal activity below the normal levels. The individual then experiences a state of withdrawal and, frequently, will make efforts to regain the, now habituated, heightened state of energy, alertness, affective intensity, etc. (Rossi, 1993). Interestingly, "these dynamics of the messenger molecule and cell receptor system are the mind-body basis of a similar process that takes place in all addictions" (Rossi, 1993).

Research indicates that psychological perceptions play a primary role in the physiological manifestation of the stress response (Rossi, 1993). Perceptual organizations (thoughts, feelings, beliefs, fears) have been shown to regulate the intensity of the alarm response; and, even "trigger a stress response in the *absence* of a homeostatic disruption" (Rossi, 1993). A person's unique psychological patterns of response to a common stressor have been linked to the unique physiological responses expressed within the parameters of Seyle's general pattern of response (Rossi, 1993).

Milton Erickson (1943, 1980) describes these unique psychological patterns of stress response as "manifestations of the creative unconscious" of each person. Rossi (1993) proposes that these creative patterns represent a "state-dependent filter" which becomes the basis for particular physiological organizations of symptoms and disease. "It is precisely this type of psychological double bind wherein shock and stress strongly encode

traumatic events and simultaneously impair coping behavior that leads to the genesis of many types of mind-body dysfunctions" (Rossi, 1993) In this light, creative experiences emerge as a constructive and therapeutic means of accessing processes of state-dependent learning, memory and behavior so to reorganize the mind and body in ways that increase mental and physical states of health. *"The major hypothesis* [presented by Rossi] *is that psychotherapeutic processes can access the state-dependent encoding of these stressors of the complex adaptation response and mediate healing by the same or similar patterns of mind-body messengers"* (Rossi, 1993)

C. THE SPECTRAL DOMAIN OF PERCEPTUAL PROCESSING

A great amount of evidence exists in support of the view that perceptions arise from the interaction of the brain and body with the environment. In this light, mental phenomena appear as "emergent properties" of these interactions. However, evidence is accumulating which indicates the reciprocity of this relationship: that perceptions shape the reality of our experience and our environment to a far greater extent than has been traditionally realized. Furthermore, such evidence suggests that physical phenomena, the brain/body and the environment, may be "emergent properties" of the interactions represented by perceptual processes (Pribram, 1978; Bohm, 1980). Neuroscientist, Karl Pribram proposes: *Perhaps the very fundamental properties of the universe are, therefore, mental and not material* (Pribram, 1978).

Perceptual processes engage the material components of sensory receptors and neural systems at one end, and the mental capacities of cognition at the other. The *where,* or *how,* mind meets body is illuminated by the processes of transformation that occur through the *interaction* of these physical and mental events. Perception is described by Pribram in terms of a *holonomic brain theory* which extends from Dennis Gabor's mathematical formulations of *holography*, initially developed to enhance the resolution of electron microscopy (Pribram, 1978).

Holography is a process of transforming an object into a three dimensional image by a) *translating* the information of the object into patterns of *frequency* waves; b) *recording* these patterns onto a piece of film; and, c) *reconstructing* these patterns to form an image of the object, a *hologram*. A hologram is created by the interference of light waves, produced by splitting a laser beam in two and reflecting one of the beams first off of an object before allowing it to intersect back into the reference beam which is projected onto a piece of film. In this manner, the interference patterns of light waves (frequency patterns) are recorded. Once another laser is shown through the film, a three dimensional image of the object appears projected into space (Talbot, 1992).

Gabor's holographic equations are based upon the formulations of Jean B. J. Fourier who "developed a mathematical way of converting any pattern, no matter how complex, into a language of simple waves" (Talbot, 1992). These "equations showed that the identical mathematical transfer function transformed *object into wave storage and wave storage into image*. The storage of wave patterns is thus *reciprocally related* to the imaging of objects" (Pribram, 1978).

Gabor named the wave pattern store a hologram because one of its most interesting characteristics is that ***information from the object becomes distributed*** *over the surface of the photographic film. The spread is not haphazard...rather, ripples of waves move out from the point of light much as ripples of waves are formed when a pebble strikes a smooth surface of a pond of water. The ripples produced by each pebble or grain will crisscross with those produced by other pebbles, setting up patterns of interfering wave fronts. The smooth mirror like surface has become blurred, but the blur has hidden within it an unsuspectedly orderly pattern. If the pond could suddenly become frozen at this moment,*

its surface would be a hologram. The photographic hologram is such a frozen record of ***interference patterns*** (Pribram, 1978, p. 31-32) [emphases added].

The manner in which these interference patterns are globally distributed onto the film permits the entire image to be reconstructed out of any individual section cut from the film. If one were to splice off the bottom left corner and illuminate it with a laser source, the three dimensional image would remain intact. The resolution is subject to decrease rather than the content of the image. These holographic processes serve to supplement current understanding of *how* memory is stored in the brain. It is now known that specific memories are not localized within specific neurons. The concept of the "grandfather cell," the *engram*, is contradicted by the findings of zoologist, Karl Lashley, that memory is resistant to the surgical removal of multiple parts of the brain (Pribram, 1978). There is no evidence in any case of brain damage or surgical excision, that select memories vanish while other remain in tact (Pribram, 1978). Rather, it is the case that the ability to *retrieve* memory becomes impaired (Pribram, 1991).

Pribram considered that if it was possible for every portion of a piece of holographic film to contain all the information necessary to create a whole image, then it seemed equally possible for every part of the brain to contain all of the information necessary to recall a whole memory...He deduced that memories were not localized, but rather distributed throughout the brain as a whole (Talbot, 1992, p.17).

Pribram further applies the concepts of holography to processes of sensory perception. The mathematical principles generating the "whole-in-part" distribution of

the hologram provide explanation for Pribram's findings that "even after removing 90 percent of a rat's visual cortex...it could still perform tasks requiring complex visual skills" (Talbot, 1992). The "lack of evidence for any one-to-one correspondence between the external world and the brain's electrical activity" is not so mysterious when considered in terms of the apparent random patterns of interference that generate an orderly representation of the object through processes of holography. (Talbot, 1992).

The *holonomic brain theory* proposes that processes of memory and perception involve the *transformation* of experience into *frequency* patterns which are globally *distributed* throughout the nervous system, *encoded* in relationship to previous patterns of experience, and reciprocally *transformed* into the mental *representations* of the mind (Pribram, 1978). "[The] theory rests on four fundamental concepts and the relations between them" (Pribram, 1991).

[i] ***Space and time are intimately related through movement..."*** (Pribram, 1991, p. 28).

Perceptual processes reflect the dynamic relationship between local operations and temporal cycles which serve to define experience in a way that it can be effectively embodied by the nervous system.

[ii] ***"Processing of all exteroceptive sensations... can be understood as amplitude modulations of*** **[frequency]** ***oscillations..."*** (Pribram, 1991, p. 28). *Frequency* is the measure of closeness in distribution (density) of a repeated, periodically generated signal (oscillation) (Pribram, 1991). This order is described by patterns of interference produced by the change and momentum of waves of energy. Pribram identifies this order as the *spectral* domain. The holonomic theory indicates that the spectral domain encompasses the range of perceptual configurations available to the nervous system, including the perceptions of space and time. The boundaries of time and space are suspended, or *enfolded* within the frequency potential (Pribram, 1978). In this enfolded order, the distinction between the information and the perceiver is not displayed.

> *A solid body of evidence has accumulated that the auditory, somatosensory, motor, and visual systems of the brain do in fact process, at one or several stages, input from the senses in the frequency domain. This distributed input must then, in some form, perhaps as changes in the conformation of proteins at membrane surfaces, become encoded into distributed memory traces. The* ***protein molecules*** *would serve the* ***neural photographic hologram*** (Pribram, 1978, p. 32-33) [emphasis added].

The *transformations* of patterns of input into frequency signals are manifested by electrochemical interactions which constitute the interaction *between* neurons. *Neurons* are the cellular structures which make up the nervous system. They are generally described "by a cell body (perikaryon) and dendritic branches" (Pribram, 1991). Ordinarily, nerve impulses are spontaneously generated within a long nerve branch of the cell, the *axon*, which permits the electrical impulse of response to be communicated throughout the neural

system (Pribram, 1991). Notably, it requires a minimum of four neurons to communicate one bit of information (Pribram, 1991). The electrical impulse is received, at the end point of the axon, by shorter fibers of dendritic branches, which constitute the *wave*, or *frequency potential*, of the neuron (Pribram, 1991). If the connecting cell is another neuron, the space of neural connection is called an axonal-dendritic *synapse* (Pribram, 1991). "Importantly, the space between neurons is on the order of 200 to 300 A, a magnitude so minute it is in the range considered by quantum physics" (Pelletier, 1978). The microprocesses of the dendritic branches generate the receptive fields of the neuron. *Receptive fields* constitute the excited networks of dendritic activity generated in the brain by input from the environment (Pribram, 1991).

> *In current understanding, the transmission of nerve impulses across the synaptic cleft is initiated by a nerve impulse arriving at the end foot and causing a release of packets of chemical neurotransmitters from synaptic vesicles or sacs located in the presynapse...these processes are...only now beginning to be studied in terms of quantum physics. Graded slow potential changes wax and wane continuously at the junctions between neurons. These potentials can be influenced by infinitesimal amounts of energy on the order of quantum events* (Pelletier, 1978, p. 119-120).

As an electrical signal moves through the dendritic fibers it "radiates outward like ripples in a pond" (Talbott, 1992). The expanding motion of the electrical waves (neural potentials) create dynamic patterns of interference within the neural tissue. Because the multitude of neurons exists in such close order, there is a rich potential for an endless variety of intersecting patterns and configurations of response (Talbot, 1992).

"Some neurons...have no long fibers and display no nerve impulses. [These, mostly dendro-dendritic, neurons] function in the graded wave mode primarily and are especially responsible for... connections in which holographic-like interference patterns can be constructed" (Pribram, 1978, 32). The nature in which these particular neurons process information tends to be *inhibitory* (Pribram, 1991).

Nerve impulses *characterize*, or frame, the microprocessing potentials of dendrites. The microproceses use *Fourier transforms*, exemplified by the processes of holography. The signal (nerve impulse) is transformed into a pattern of waves, distributed throughout the wave potential of the neural system and processed relative to memory patterns, then reciprocally transformed into a sensory-perceptual image (Pribram, 1991).

Neurons are thresholding devices that spatially and temporally segment the results of the dendritic microprocesses into discrete packets for communication and control of other levels of processing. These packets are more resistant to degradation and interference than the graded microprocesses. They constitute the channels of communication not the processing element (Pribram, 1991, p. 7).

As neural potentials are excited, they generate a foreground of electrical patterns against the background of those potentials which remain inhibited. The interference patterns manifest as local (spatial and temporal) channels of electrical activity in the brain. The *spectral* ground, the *potential transformations* of the dendritic microprocesses, encompasses the whole spectrum of the neural system, the foreground and background of every pattern imaginable. The selective nature of the neural impulse generated by particular

patterns, essentially, *directs* the spatial and temporal "emphases" (channels) yielded by the frequency transformation. Therefore, the constraints of space-time perceptions shape the experience and representation of these wave potentials.

Pribram explains further by identifying a third fundamental concept of the holonomic brain theory:

> **[iii]** ***There is a limit with which both frequency and space-time can be concurrently determined in any measurement.*** *This* ***uncertainty*** *describes a fundamental* ***minimum*** *defined by Gabor (1946) as a quantum of information...It is this limit, defined by residual bandwidth of frequencies and the probability of an occurrence within the range of space-time that proscribes the efficiency with which the system can operate. In effect, therefore, the Gabor relation describes the composition of a communication/processing channel, and the residual uncertainty defines the limits of channel processing span* (Pribram, 1991, p. 28).

Thus, the *minimum* recognizes a templative path through which spectral patterns of movement can *infuse* space-time. It is a channel of communication *transformed* by the spectral processes of frequency but *defined* by the parameters of space-time and *memory*.

The fourth concept fundamental to this theory follows that: **[iv]** ***Dendritic microprocessing is conceived to take advantage of the uncertainty relation to achieve optimal information processing...*** *efficiency based on spectral resolution obtained by the tuning of receptive field properties* (Pribram, 1991. p. 28). This statement concerns the *Least Action Principle* which asserts that "any physicochemical process tends to run in the direction of the least expenditure of energy...before reaching equilibrium" (Pribram, 1991). The means by which information is perceived and transformed most efficiently involves the

tendency of frequency and space-time interaction to infuse those channels already available, thus expanding the established range rather than creating an entire new one. Patterns of experience form a "holoscape" of frequency activity in the nervous system which is "*embodied* in the microprocess of polarizations occurring in dendritic networks, thus constituting a sub- and transneuronal manifold" (Pribram, 1991) [italics added].

Previously distributed memory traces serve as *attractors* for these frequency potentials; they dimensionally organize the neural potentials around particular resonant capacities of the receptive fields. This entails a *matching process* between the sensory input and previously distributed memory traces - which, in fact, *enfold the physical and mental* configurations of all prior experience. The reciprocal transformations of the spectral domain into space-time representations are evidently triggered by *imaginal and muscular movement.*

Pribram likens the processes of perception to the metaphor of a piano, in which the keys of the instrument represent the *sensory receptors* and the individual strings stand for the receptive fields of the *cortical cells* (Pribram, 1991). *"Each string resonates at a limited bandwidth of frequency"* (Pribram, 1991). The significant role of memory emerges in this description, perhaps, as the entire *representational range* of the neural systems at a given *moment* within the unfolding of a composition.

Thus far, perception has been described in terms of what Pribram (1991) calls a "bottom-up" viewpoint: "a movement initiated sensory input which drives the perception of object forms." However, in the holonomic brain theory, Pribram identifies a second source of perceptions: "a set of top down categorizing and evaluating procedures that are triggered by and preprocess the perception of these object-forms" (Pribram, 1991).

> *Ordinarily, input from sensory or internal receptors preempts allocation by creating a "temporary dominant focus" of activation within one or another brain system. However, when input competition, incompleteness, or ambiguity place extra demands on the routine operations of allocation, envisioning proprieties and priorities, and practical inference become necessary* (Pribram, 1991, p. 239).

"Top-down preprocessing procedures, organized by prior experience, are those that constitute the cognitive aspects of perception" (Pribram, 1991). The dynamics of evaluation, ordering, and assessment entail a matching process between previous input and representations distributed in memory. These perceptual orders, like sensory input, serve as "structured constraints on the [dendritic] networks" (Pribram, 1991). They pre-resonate, "at the midbrain and thalamic level, the input to the primary sensory cortex"(Pribram, 1991) As in the case of engaging one's *imagination*, the input engages the frequency transforms and serves to shape immediate and future experiences of perception. Often, the perceiver is unaware that these processes are occurring - thus such terms as "unconscious inference" have been used to describe them (Pribram, 1991).

No matter the source of the initiation, perceptual processes engage the interaction of

mind and brain/body within each moment of perception by spectral transformations and processes. Each retrieval or storage of experience thus constitutes a reconstruction of the information in relationship to the whole of the individual experience. In this manner, processes of memory and perception may be characterized as constructive and transformative rather than passive and reflective.

Space-time and spectrum provide the dimensions within which information occurs. Whenever these dimensions become in-formed, rather than displaying their pre-formed potential (their entropy) - optimization, whether material or mental...becomes possible... Information repeatedly actualizes potential into space-time configurations thus accounting for their evolution One sort of evolving configuration is experienced by us as perceptual experience (Pribram, 1991, p. 271-272).

It is significant to emphasize that the reciprocal relationship between the object/image domain and the spectral domain exemplifies a reciprocal relationship between a perceptual experience bound by space and time and a perceptual experience described by the spectral domain in which space and time are collapsed. The latter domain evidently may be associated with moments described by creative insight, spiritual unity, even perhaps by psychosis and other dissociative states of mental disorder: when the individual is essentially *fused* with their immediate experience and not localized in a point of reference (Pribram, 1991)

Pribram asserts:

Perceptual experiences may on occasion...reflect the spectral energy/momentum potential more than they reflect space-time configurations. One such occasion results when

excitation is the frontolimbic formations greatly exceeds that in the posterior cerebral convexity. [This] *excitation can be induced by internal neurochemical stimulation or by external methods such as concentrating on ambiguous stimuli... provided by a mantra, for example. When the spectral dimension dominates the production of a perception, space and time become enfolded in the experienced episode...Therefore, the episode is often referred to as spiritual in the sense that, as a consequence of practiced inference, an effective union is envisioned between perceiver and perceived.* (Pribram, 1991, p. 272-273).

As those transforms of information involved in perceptual processes reflect the computational processes of quantum phenomena, the holonomic brain theory offers further insight toward the points of contact between mind and matter. Although the question of *which* bore *which* first may not be clear, it is apparent that perceptual experience dynamically involves the interaction of physical and mental phenomena in a manner that is transformative, integrative, and constructive: in a manner that infuses the self anew with potential to shape, attract, and embody experience.

D. THE RELATIONSHIP BETWEEN THOUGHT AND UNCONDITIONED ACTS OF PERCEPTION

> *Relativity and, even more important, quantum mechanics have strongly suggested (though not proved) that the world cannot be analyzed into separate and independently existing parts. Moreover, each part somehow involves all the others: contains them or enfolds them..I look at the process of evolution as the unfoldment of the potential of matter, which at bottom becomes indistinguishable from the potential of the mind (Bohm, 1977).*

Quantum physicist, David Bohm, (1977) proposes that the relationship of mind and matter may be understood in terms of a continuous movement and flux that he calls *holomovement*, the movement of the whole. His position asserts the presence of an inherent relationship between that which arises in form and meaning (the *foreground* of physical objects, body, mind, thought, sensation, feeling, etc.) and that from which all form and meaning arise (the *background* of continuous movement and change). This relationship is described by an implicate and explicate order of expression (Bohm, 1977). The *explicate order* is the means in which the *implicate order* of the *holomovement* is *displayed* (Bohm, 1977).

Bohm emphasizes that we cannot perceptibly grasp the total nature of the implicate order (Bohm, 1977). The *idea* of implicate order cannot tangibly encompass that which it implies. Any idea serves as a *bridge,* a point of connection, to the flux and streams of consciousness from which it arises (Bohm, 1977). Therefore, the idea *itself* does not contain the whole of consciousness; it contains the implicate order *of* itself which is an

abstraction, a display, of the whole at that moment. In these terms, *perception* may be defined as those processes with which we have *direct* contact (i.e., our senses, cognitions, behaviors, etc., which include those instruments which permit a heightening of these faculties; i.e. microscopes, mathematical tools, etc.) with the implicate order (Bohm, 1980). By *indirectly* emphasizing the continuous movement *between* the foregrounds of evidently independent processes and the backgrounds against which they become evident, Bohm suggests that the potential of the holomovement may further infuse our perceptual organizations (Bohm, 1977).

Bohm's perspectives extend from the field of quantum study and draw upon the mathematical principles of holography, introduced in the previous section (part three) of this chapter. Pribram's work localizes the interaction between the spectral domain (the implicate order) and the space-time domain (the explicate order) in the microprocesses of the dendritic networks. Bohm's theories describe that universe in which such interactions may occur. And, it is from this theoretical context that Bohm discusses the relationship between thought and *unconditioned acts of perception.*

> *There is a great deal of evidence indicating that* ***thought is basically a material process****...it has been observed...that thought is inseparable from electrical and chemical activity in the brain and nervous system, and from concomitant tensions and movements of muscles...Thought is in essence,* ***the active response of memory*** *in every phase of life. We include in thought the intellectual, emotional, sensuous, muscular and physical responses of memory. These are all aspects of one indissoluble process. To treat them separately makes for fragmentation and confusion. All these are one process of response of memory to each actual*

situation, which response in turn leads to a further contribution to memory, thus conditioning the next thought (Bohm, 1980, p. 50,52). [Emphases added]

Memory essentially allows us to *perceive* the multitude of ways we express ourselves and express that which we come in contact with. A sensation *from* the environment is formed by the extent to which our physical and mental capacities can embody that sensation. A thought about *another* represents our expression of that information within ourselves. Thought arises from the ground of previous mental and physical expressions we have configured in relationship to ourself and the environment in the face of immediate experience (Bohm, 1980). The particularities of the experience shape the flow of these configurations. And, insofar as we return to those thoughts, the display of that information will appear fixed and unchanging (Bohm, 1977). "The flowing movement [of awareness into memory] regenerates the same thing over and over, causing us to lose sight of the movement itself..." (Bohm, 1977). This capacity to return, or regenerate, does not mean that those thoughts which arise accurately reflect the immediate circumstance (Bohm, 1980). The display of memory primarily serves to infuse the present situation with a potential of the self to respond.

In order to determine the extent to which a particular thought (memory response) is relevant requires a new understanding that encompasses both thought and the momentary experience. An implicit order of awareness is necessary to evaluate and express the potential of the situation (Bohm, 1980). An example of this lies in any ordinary

conversation that a particular statement is made with a certain value (Bohm, 1977). The value is inseparable from the experiential ground of the individual making that statement. Implicit information must be shared in order to communicate more fully what is explicitly intended (Bohm, 1977). This implicit information is expressed verbally and nonverbally, arising from the immeasurable interactions of the individual and the environmental configurations which compose the situation. "If we think of the particular thoughts as the basic reality, we miss this" (Bohm, 1977).

Bohm suggests that *an unconditioned act of perception* essentially bypasses thought, permitting experience to be assimilated in terms of an implicit order of relationship that is not dominated by previous patterns of experience (Bohm, 1977).

> [Insight does not arise from the] *combination of arrangement and organization of these memories into further structures of ideas and concepts, categories, etc...*[these] *may possess a certain kind of novelty resulting from ...the interplay of elements of memory... such novelty* [however] *is still essentially mechanical (like the new combinations appearing in a kaleidoscope)* (Bohm, 1980, p. 50-51).

As thought is described as a relatively *material* process, Bohm proposes that these acts of perception do not arise from the material interactions associated with a response of memory (Bohm, 1980). "What is subtle is basic and the manifest is the result (Bohm, 1977). An unconditioned act of perception, which Bohm also identifies as *insight*, is more subtle and more basic than the energies of thought (Bohm, 1977). Therefore, insight is said not to arise within "structures such as cells, molecules, atoms, elementary particles,

etc." (Bohm, 1980). All that these structures encompass, the laws, dynamics of interaction, etc, is within "the field of what can be known, i.e. stored up in memory" (Bohm, 1980). Rather, he asserts, perceptions of insight are responses of the brain and nervous system to *an inward intelligence* of a life energy that infuses all of nature in varying degrees (Bohm, 1977).

Inanimate matter expresses a mostly mechanical order of "relatively fixed, recurring, and stable patterns of movement" (Bohm, 1977). Forms of life express an essential quality of creation: the generation of new potential. Bohm suggests that "a living organism has a more direct contact with what is thus enfolded in the holomovement than does inanimate matter. When such an organism dies, this relatively direct contact ceases to operate, so that the body of the organism reverts back to the more mechanical order of inanimate matter" (Bohm, 1977). Life energy is evidently *formed* by matter. And, yet its source of origination is a *movement of energy and flux* in which matter and mind are ultimately contained (Bohm, 1980).

> *Mind, which is deeply creative and new in its essential mode of operation, cannot then be explained in terms of any mechanical abstraction of the properties of inanimate matter. Rather, it is being proposed here that its operation originates in implicate depths of the holomovement beyond those needed for understanding the ordinary mechanical qualities of matter...For this reason, one can appropriately call the holomovement the life energy, which is the ground that ultimately creates and sustains all matter and all mind, as two relatively autonomous and independent streams that may move in parallel* (Bohm, 1977).

The *intelligence* that Bohm describes points toward an energy potential of the whole motion, that which interaction of the entirety generates. But, in responding to the answer of "what" it *is,* Bohm continually emphasizes the movement of *becoming*, the *interactions of processes* which fundamentally cannot be defined in space and time, which appear in terms of intersections of motion and degrees of intensity of the energy organized by those intersections (Bohm, 1980). Ultimately, intelligence appears as the potential to move, to change, to relate, and connect: to create expression in multiple ways. Bohm proposes that intelligent perception bypasses thought (the physical and mental responses of memory) by altering the structural organizations of the brain to which thought/memory/movement are so intimately tied (Bohm, 1977).

> *One might suggest that in* [an unconditioned act of perception], *the brain and the nervous system respond directly to an order in the universal and unknown flux that cannot be reduced to anything that could be defined in terms of knowable structures...it is thought responding to intelligent perception which is capable of bringing about an overall harmony or "fitting" between mind and matter* (Bohm, 1980, p. 53).

Bohm asserts that "our most immediate experience of the implicate order is movement itself" (Bohm, 1977). Any mental or physical display of information, sensation, wish, intention, etc., immediately generates the experience of movement. It is not actually clear to us *how* it is that we move - through thoughts, through gestures and postures, through dreams, through space and through time (Bohm, 1977). But, the experience of movement immediately reflects the presence of an implicate potential for change and

expression. Bohm identifies movement as an expression of the intelligent life energy that is continuously formed and valued by the explicate orders displayed by consciousness (Bohm, 1977). He asserts that "when activity is displayed, we can bring some order to it, but without display we can do nothing about it" (Bohm, 1977). In this light, it is evident that the implicate and explicate orders of information are cooperative expressions of an informational whole. "The basic movement [the folding and unfolding of the holomovement] is one in which the content of each of these continually passes into the other" (Bohm, 1977).

> *We have reached the stage at which the implicate order is also being displayed, or at least some symbolization of it. So the implicate order is getting to know itself better; it is reaching another level of consciousness, which is to say, another point in the evolution of consciousness. As consciousness gets to know itself more deeply, so it knows more of what it is doing. At present, such knowledge is mostly confined to the outward domain, because it is here that most of the display is seen...It is a continuum...[Quantum physics bears this out] insofar as it says that there is an implicate order and there is an infinite sea of energy, and that this unfolds to form time, space, and matter* (Bohm, 1977).

III. THE INTEGRATION OF CONSCIOUS AND UNCONSCIOUS PERCEPTIONS IN DANCE MOVEMENT THERAPY

Dance/Movement therapy is a practice which believes that conscious and unconscious perceptions are reciprocally related to the movement expression of the body (Siegel, 1984; Chodorow, 1995). This chapter will briefly review perspectives of dance/movement therapy theory that support this belief. The perspectives will be discussed in terms of elements of dance/movement therapy which facilitate the integration of conscious and unconscious perceptions.

The theoretical base of dance/movement therapy may generally be described by a *holistic frame of reference* (Lewis, 1979). The individual is viewed as an integrated unity; mind and body reflect and effect each other. [Furthermore], "mind, body, organic functioning, and behavior are [perceived as being] interwoven with the environment" (Lewis, 1979).

Within this framework, dance/movement therapy draws heavily upon developmental theory. Development is understood as the movement from a relatively undifferentiated state through various stages of further differentiation and complexity (Lewis, 1979). This progression is identified as a *dynamic spiral* of growth (Lewis, 1979). "Each phase of development has its somatic and physiological elements as well as its psycho-social aspects, all of which interrelate and are necessary for healthy development" (Lewis, 1979).

As an individual embodies the potentials of a particular developmental stage, potentials of earlier stages are re-embodied in relationship to new patterns of experience.

Stages of development are essentially "passages...[which, initially,] create the foundation for a clear separation of conscious and unconscious," and ultimately provide opportunity for the integration of these perceptions in relationship to each new moment of experience (Chodorow, 1995). Continuous reorganization serves to further integrate the self as he/she becomes more complex. The *inner* dynamics of self and the interaction *between* self and environment, mutually define these passages. As differentiation and integration occurs within the self, the capacity for differentiated and integrative relationships with others increases, and vice-versa. Significantly, it is through the experience of *action* that the processes of differentiation are initiated (Piaget, 1960).

In dance/movement therapy, the body is perceived as the initial source of consciousness (Siegel, 1984) . The movement of the body is recognized as symbolic expressions of perceptual organizations (Lewis, 1979). Postural shifts, the emergence and dissolution of gestures, the display of the body's qualitative and configural potentials all are seen, by the dance/movement therapist, as physical manifestations of psychological expression. These recognitions are based upon "formulations from different disciplines which state that our modes of locomoting and carrying our bodies have specific meaning and are formed by acceptance or rejection of both inner and outer stimuli as well as by

conscious and unconscious perceptions" (Siegel, 1984).

Freud's assertion that the "ego is first and foremost a body ego" (Brenner, 1955) points toward the undifferentiated state of the infant who "values the entire content of consciousness on a single plane in which ostensible realities and the unconscious of the self are inextricably mixed" (Piaget, 1960). This stage of development is characterized by a primary *somatization* of experience (Siegel, 1984). Psychological perceptions are essentially *nonlocalized physical sensations* fused with a basic affective discernment. The "primary unintegration." as termed by Winnicott (1958) is distinguished from experiences of "resomatization, or...physiologic regression" by the necessity of the former stage to healthy development and the nonadaptive nature of the latter (Siegel, 1984).

> *Schur maintains that a physiologic regression is a preverbal, pre-ego state which is said to play a major role in psychosomatic disorders such as ulcerative colitis, asthma, some forms of hypertension and so on. These disorders have also been called "anxiety equivalents" (Fenichel). Or to phrase it differently, even when there is no awareness of anxiety, somatization takes place but energy is discharged inwardly, similarly to the way a neonate discharges energies silently inward until that point in development when skin surfaces become known entities through the ministrations of the mother(Jacobsen, 1964).* (Siegel, 1984).

Dance/Movement therapy is primarily concerned with *desomatization*: the differentiation and modulation of experience (Siegel, 1984). These processes may be supported by creating opportunities to explore new organizations of the body in relationship to the active presence of the therapist (Lewis, 1979). Through movement,

experience can be constructively expressed and localized within the self relative to the environment. Conscious and unconscious perceptions can become further defined. By engaging action in relationship to perception, the potential of the individual to engage their whole self within experience becomes conceivable (Lewis, 1979). In other words, this potentiality becomes conscious.

Consciousness is theoretically defined by Lewis simply as " that which the individual is aware" while the unconscious comprises "that which the individual is unaware" (Lewis, 1979). The integration of conscious and unconscious perceptions in dance/movement therapy is *initiated* by both the therapist's and client's *active recognition of the body as an expression of experience.*

> *Developmentally related, intermeshed somatic experiences, unconscious material and conscious behavior are stored in the body and are reflected in the breathing, posturing, and movement of an individual. Present experience may be influenced by and trigger past stored experience bringing past behavior to present...Body movement due to its ontogenic neurologic origins can provide a direct avenue into the unconscious. Through breath, posturing, and movement, unedited material from the unconscious can be observed, engaged, and re-experienced* (Lewis, 1979).

As the unconscious material becomes shaped by movement, an opportunity arises for the previously unrelated experience to be consciously related to the self. The body provides a channel of communication through which unconscious information can begin to be recognized. However, this information must, in a sense, be consciously *received* in order to be integrated. Receiving involves identifying the unconscious perceptions with

meaning and purpose; in this manner, they may be consciously related (Siegel, 1984).

Dance/Movement therapist's facilitate the interpretation of the unconscious contents verbally and nonverbally. Nonverbal means involve "mirroring, completing a movement phrase, or offering a second chance around" (Siegel, 1984). Verbal interpretation extends from the client's own associations and primarily is defined by guiding the momentum and general parameters of the client's discovery process (Siegel, 1984). "Permanent changes rarely happen without such talking...[although] sometimes the changes occur before the insight can be verbalized" (Siegel, 1984).

With the support of the therapist, these images, sensations, or lack of images and sensations, can be expressed and shaped by the use of metaphor or symbol, or directly related to a particular event (in one's imagination or real life; past, present, or future; verbally and nonverbally) (Lewis, 1979). Fundamentally, the process of interpretation is about exploration and understanding in a way that encourages the flexibility of volitional behavior and dissolves limitations unconsciously bound by the past (Siegel, 1984).

> *...this aim is accomplished by paying equal attention to speech and motility. Not only emotional states and events but bodily behavior in relationship to these states is investigated. Thus, not only the inter- and intrasystemic workings of clients' psyches is interpreted but also as many aspects of their motility as they feel free to use (Siegel, 1984).*

"Motor responses are the infant's first *meanings*, and throughout human life all thoughts and feelings are experienced in muscle action, i.e., impulses to respond"

(Silberman-Deihl and Komisaruk, 1985). "...every sequence of tensions and relaxations provokes a specific attitude. When there is a specific motor sequence, it changes the inner situations and attitudes and even provokes a fantasy situation which fits the muscular sequence" (Schilder, 1950). Furthermore, "...action potentials arise in muscles simultaneously with the meaning processes with which the activity of the muscle, if overtly carried out, would correspond" (Jacobsen, 1955).

> *Emotions [are] at once somatic and psychic. By somatic...the bodily innervations and expressive physical action. By psychic...the associated images and ideas. In the depths of the unconscious, it is the emotions that mediate between the realms of body and psyche, instinct and spirit* (Chodorow, 1992).

In dance/movement therapy, muscular changes and shifts in inner attitudes are thus perceived in reciprocal relationship, each causally affecting the organization of the other from one moment to the next (Schilder, 1950).

By supporting the client's observation of the feelings and meanings generated by these changes; and encouraging their amplification and definition, the dance/movement therapist facilitates the emergence of insight (Siegel, 1984). It is through insight that unconscious material can be effectively integrated toward a more adaptive perceptual and motoric organization.

As unconscious perceptions become objectified and meaningfully related to consciousness, the individual is moved within a new point of reference (Siegel, 1984). These processes of expression and interpretation frequently manifest themselves in cyclic

unfoldings of material and meaning making. Much as the "healthy desomatization of a child...learns to substitute thought for action..." the client incrementally learns to substitute insight for the separation between conscious and unconscious processes, thus replacing habituated patterns with "present" oriented expression and response (Siegel, 1984).

The opportunity to reorganize perceptual relationships generates a new potential for experience and increased flexibility within the whole individual. It is primarily the client's embodiment of this process, rather than the resolution of a particular conflict, that generates a healthier, more integrative, organization (Lewis, 1979). The creative orientation of the therapeutic process and the empathic, reality-based nature of the therapeutic relationship provide an adaptive range of freedom and stability (Lewis, 1979). The goal is to facilitate an organic passage from one perceptual organization to another (Jung, 1916): a passage that integrates conscious and unconscious potentials of the whole self.

> *In dance therapy, this passage occurs when the mover discovers that he or she can move freely without censoring; while at the same time maintaining a self-reflective, symbolic, psychological attitude. This is the essence of Jung's method of active imagination; opening to the unconscious and giving free rein to fantasy, yet at the same time observing objectively how it develops* (Chodorow, 1995).

IV. INTEGRATION OF THEORY

> *.....We must not speak of any mind or intelligence in nature ---- because it is taboo. Might it not make things less complicated if we were now to infringe the taboo and concede that what we call unconscious, or unself-conscious, mind is in fact the inwardness of nature as well as ourselves? (Barfield, 1977)*

This chapter will present an integration of the theory. The objective is to explore the relationship between the organization of neurophysiologic processes and the perceptual integration of conscious and unconscious patterns of response in dance/movement therapy. In addition, a case will be made for the proposed thesis. Chapter four will summarize the conclusions of the thesis and submit directions for further study.

4-1: Integration and Discussion of the Literature

The following outline offers an overview of perceptual and organizational processes as described by the literature introduced. Elements of the neurophysiologic basis of perception are identified and related to the main points of this study.

(A) *Movement to Impulse:*

Movement within the self and the environment stimulates the relative sensory receptive systems. Nerve impulses are spontaneously generated; they permit patterns to be communicated electrically throughout the neural system (Pribram, 1991).

(B) ***Impulse to Frequency:***

Electrical impulses are received at the end points of the axons by dendritic networks of fibers which constitute the frequency processing potential of the neuron (Pribram, 1991). The electrochemical potentials of these networks are expressed by neural receptive fields (Pribram, 1991). Receptive fields reflect the range or degree of excitation of the dendritic networks generated by movement patterns of input from the environment (Pribram, 1991). The electromagnetic signals of these microprocesses ripple outward and create interference patterns of frequency waves within the spectral domain of processing (Pribram, 1991). The transfer functions of sensory input into the spectral domain are reciprocally related to the transfers of spectral potentials to psycho-biological representations of experience.

(C) ***Frequency - The Basis of Cognitive, Emotional, and Physical Function:***

Each individual may be characterized by an inwardness of dynamic energy patterns that become outwardly expressed through cognitive, emotional, and physical function. The inwardness is an order that contains all potentials of the self for expression (conscious and unconscious; psychic, organic, and motoric). Bohm (1977) describes this order as the "implicate order" of the self. Pribram (1991) identifies these patterns as the "spectral domain." The literature has shown that the basic level of human reception and response is the neurologic processing of spectral patterns (Pribram, 1978; Bohm, 1980).

In this domain, there is no distinction between the perceiver and the perceived; space-time, matter and mind are enfolded by dynamic patterns of frequency potentials (Pribram, 1991; Bohm, 1980). These potentials are reciprocally organized by memory traces and patterns of sensory input (Pribram, 1991). The matching processes engaged by the reciprocal transformations between the spectral domain and space-time representations allow experience to be globally distributed and differentiatedly expressed throughout the nervous system. Processing of input in the spectral domain optimizes the receptive, expressive, and organizing capacities of the self. The optimization occurs through further differentiation of those neurologic channels which permit the most efficient and concurrent measure of frequency patterns relative to the space-time constraints of the brain and nervous system (Pribram, 1991). Every perceptual event is a transformation of immediate experience and memory that orders all functional expressions of the self within a momentary pattern of response.

All levels of function are presentations of the moment to moment range of processing within the spectral domain. Function is defined as that which "acts in a required and expected manner" as well as that which is "used" (Webster's, 1966). To *use* neurophysiologic processes in a manner required by the constraints of the relative systems is the event of drawing neurologic potentials into particular patterns of expression. These patterns are differentiated displays of the spectral domain. Cognitive, emotional and physical processes are a means of integrating implicate potentials for relationship, response,

and expression in ways that are specific to the explicate constraints of the relative systems. With this understanding, every response may be viewed as a symbolic presentation of the neurologic patterns generated by the processing of input from one moment to the next. Perception appears literally as the act of forming experience within: in forming.

(D) *Synaptic Interaction to Messenger Molecule:*

Messenger molecules are released through the synaptic interactions of neural processing. These molecules transduce and encode patterns of input throughout the neurophysiological systems of the self (Rossi, 1993). "Every nerve in the brain and body is modulated by messenger molecules...many of these molecules ultimately tell our genes to express themselves by using their blueprints to promote growth and healing [the potential of the whole] within every cell of brain and body" (Rossi, 1993). Certain molecules orient the capacities of the limbic-hypothalamic and other closely related systems (Rossi, 1993). These systems, essentially, regulate and integrate (i.e. sensory-perceptual-motor) the interpretive functions of cognition in relationship to the major biological systems of the mind and body (Rossi, 1993). Messenger molecules are the transmitters of the informing patterns of input within the autonomic, immune, endocrine, and neuropeptide systems (Rossi, 1993).

(E) *The Relationship Between Organization and Perceptual Integration:*

The presented literature establishes: (a) the capacity of perceptual processes

to consciously and unconsciously organize and transform psychic (Jung, 1927; Rossi, 1993; Pribram, 1991; Bohm, 1980; Lewis, 1979), organic (Jung, 1927; Rossi, 1993; Pribram, 1991; Bohm, 1980; Lewis, 1979), and motoric (Jung, 1916; Bohm, 1980; Lewis, 1979) responses of the self; and, (b) the reciprocal and interrelated nature of these interactions (Jung, 1916; Rossi, 1993; Pribram, 1991; Bohm, 1980; Lewis, 1979).

As particular patterns are transmitted locally throughout the brain and nervous system, a foreground of electrical activity is displayed against a background of inhibited neural networks (Pribram, 1991). The juxtapositions of these patterns become expressed by particular psycho-biological responses that constitute normal states of awareness (Rossi, 1993). Images that arise within the psyche are bound to corresponding levels of physical arousal. These state-dependent processes emphasize the psycho-somatic basis of all cognitive, emotional, and physical expression (Rossi, 1993). Imaginal movement, like muscular movement, mediates neurologic processing and is reciprocally related to all levels of neurophysiologic function.

Cognitive events of evaluation, assessment, and ordering preprocess "at the midbrain and thalamic level, the input to the primary sensory cortex" (Pribram, 1991) As in the case of imagining the possibilities inherent within a particular situation, patterns of memory are engaged in relationship to a previous organization of experience. These perceptual events indicate that further processing is required. The associated

interpretations serve as the patterns of input analyzed and distributed within the spectral domain in relationship to memory organizations (Pribram, 1991). The capacity of the self to organically embody cognitive initiated input points to the significant potential of chronically habituated perceptions to perpetuate maladaptive states of health.

These understandings support the precept of dance/movement therapy that "human reception, processing and response inextricably link the mind and body into a functional whole" (Berrol, 1992). The perceptual events of reception, processing, and response incite a global response of the self in order to consciously relate a series of momentary states of experience (i.e. within space and time, and relative to memory) while inhibiting degrees of input that lessen the continuity of the experience. The continuity that is experienced arises from a collaborative effort of all levels of function. Perceptual processes not only exemplify the interrelationship of perceptual and organizational processes but also emphasize the human potential to organize the self within an infinite number of states of functional wholeness and perceive them in an integrative way.

(F) *A Continuum of Interrelationship and Subtlety*

Each moment of seeing, of "perceiving," differently represents a different state of being. A single moment of consciously orienting to one's environment involves a transformation of state. Bringing conscious awareness to the fact that one does transform/ reorganize with the momentary act of orienting to a new space increases the complexity of

the experienced state. With this increase in complexity, the options for response increase. In this case, not only is input from the environment perceived, but the relationship between environmental input and internal responses of the self become embodied. The complexity of human potential reflects a relatively high degree of material differentiation from the start, displayed by genetic parameters and adaptivity of structure. But, as emphasized above, it is the reciprocal relationship between perceptual and organizational processes that continuously optimizes human potential into a function movement of the whole. Every event of processing input generates a new opportunity for the self to embody and consciously order experience (Pribram, 1991; Bohm, 1980).

This study submits, based upon the literature introduced, that the interrelationship of psychic and organic processes may be understood in terms of a continuum of *subtlety*. The condition of being subtle signifies states of lesser density. Subtlety describes the potential to penetrate and finely differentiate; in indicates a quality of inwardness, that which is not overtly displayed (Webster's, 1966). Matter is less subtle than mind; mind is less subtle than energy (Bohm, 1980).

On this continuum, the most subtle direction is displayed by the dynamic patterns of energy to which the nervous system continuously responds. Mind and matter are implicately contained within these spectral patterns (Pribram, 1991; Bohm, 1980). As the nervous system processes/responds to these patterns, psychic and organic expressions

unfold the spatial and temporal constraints of the individual nervous system. The unfolding of these expressions represents a less subtle range on the continuum. Significantly, this range permits the emergence of the observing ego. The ability to consciously relate and differentiate in an effective way relies upon the differentiation of mental and material processes (Lewis, 1979). These processes, like two arms that belong to a single body offer more possibility of experiencing the self in the world. But, ultimately the movement of these processes is bound up by the basic wholeness of the self; with each gesture, relationship, and moment of internally or externally motivated change transforming the state of interaction and degree of differentiation. The least subtle direction of the continuum is displayed by those material processes of the self that appear relatively fixed and unchanging. Evidently, these expressions of the self are chronically perpetuated by memory, genetic factors, and environmental constraints (Bohm, 1980); they appear devoid of conscious momentum and flow like support walls upon which the entire structure leans.

Both directions of the continuum evidently reflect states beyond consciousness: the spectral domain signifies a lack of all boundaries between the perceiver and the perceived while the material domain reflects the predominantly undifferentiated expression of unconscious perpetuation. These polarities functionally serve as the boundaries through which consciousness may gradually evolve: moving to assimilate events dominated by the spectral domain of least constraints, moving to accommodate these experiences within the

conscious reality of the self, moving to assimilate the definitive constraints of material processes, and moving again to accommodate these experiences within the conscious reality of the self. The differentiation of the self takes place by the more subtle orders moving the less subtle ones (Bohm, 1980). The interrelationship of psychic and organic processes may, therefore, be understood as a series of movements from one state of relationship to another: differentiated primarily be degrees of *subtlety* and *integration of consciousness*.

4-2: The Proposed Thesis.

By facilitating the interplay of imaginal and muscular patterns of response toward the integration of conscious and unconscious perceptions, dance/movement therapy is promoting states of congruency between psychological and physiologic processes that organize the potential of a person's nervous system to heal and to adapt.

Imaginal movement is defined by this study as the symbolic display of psychic response to the innerworkings of the brain and nervous system. It may be loosely compared to the classification of particular movement rituals called "image dances" "The essence of these dances is based upon what is experienced through experiential perceptions...thus, the pervading belief systems are contingent upon the capacity to cause the metaphorical to become real through its embodiment" (Lewis, 1979).

This speaks to the potential of the imagination to evoke a multiplicity of realities based upon a collage of input from previous, present, and desired experience. Consciousness permits the opportunity to observe, to distinguish, and, thus, to imitate as a means incorporation and growth (Jung, 1927). And, it also provides the ease with which we may embody and reembody our own projections of reality that may be exceedingly limited.

"Imageless dances" offer a parallel to *muscular* movement, defined as the motoric display of muscular response to the innerworkings of the brain and nervous system. "The primary goal of the imageless dance is one of attainment of a transcendental ecstasy - a focus inward toward the eventual release of the ego - the outer world is replaced by exhilaration" (Lewis, 1979). These dances extract the potential of the physical body, like the psychic, to transform experience.

Interestingly, the relationships formed by these parallels assert that the dominance of the physical expression is employed to lessen the voice of the ego, while the dominance of the imagined expression is used to embody and imitate. Both engage the potential of the self for movement. Movement is identified in this study as being essential to events of perception (Pribram, 1991; Bohm, 1980; Lewis, 1979). Movement: (a) *Generates* information (Pribram, 1991); (b) *Relates* experience within space and time (Pribram, 1991); (c) *Mediates* and organizes the neurologic underpinnings of psychic, organic, and motoric processes (Berrol, 1992); and, (d) *Expresses* the closest experience of implicate order within the self (Bohm, 1980).

Dance/Movement therapy actively engages both *imaginal* and *muscular* movement within the therapeutic process (Siegel, 1984). By orienting the expression of these potentials for transformation toward the conscious integration of previously unconscious patterns of response, dance/movement therapy is promoting states of congruency between psychic and organic processes.

Congruency is defined by this study as states in which the experience of the whole transcends the experience of parts. As the individual brings awareness to a new relationship between their psychic and physical expressions, a more complex perspective of self may be incorporated (Lewis, 1979; Bohm, 1980): one that realizes more options of response. The experience of moving through gestures and metaphors, or emotional and intellectual extremes, emphasizes the primarily unconscious occurrence of moving from one state-dependent organization to another as a means of receiving, processing, and responding. These experiences offer the opportunity to consciously and more adaptively embody an inherent capacity for transformation and expression.

The interplay of imaginal and muscular movement provides a momentum from which the unconscious material may unfold (Chodorow, 1995). Furthermore, the movement provides an immediate medium for symbolic and metaphoric expression that offers a structure as well as a wide range of exploration (Lewis, 1979). The event of assimilating unconscious patterns in a state of mobility allows defenses to come down and new responses to be more easily explored (Lewis, 1979). By accessing the dynamics of

expression and response within the therapeutic relationship, experiences of fragmentation and immobility may be replaced with those of integration and adaptation. As more of the individual is organized to attend and experience the present, fragmentation of experience and unnecessary effort is reduced. As these experiences of increased expression, mobility, conscious experience and potential for response within the present occur by the binding of a psychic interpretation with a physical response (Rossi, 1993; Bohm, 1980), each event represents new patterns available to the nervous system and memory.

However, it is exceedingly clear that while a client may discover a more adaptive way to respond in one circumstance, the realization that they can discover new options of response in other circumstances does not necessarily occur. Behavioral modification, for example, appears an effective means of adapting state-dependent responses relative to certain behaviors and contexts. But, as Jung (1916) emphasizes, the underlying therapeutic goal is the incorporation of a dynamic interplay of adaptation and structure that supports the individual through a variety of circumstances, states, and stages of development. Dance/Movement therapy's attention to the interrelated and dynamic nature of development directly addresses this goal. While particular responses support individual growth more than others, dance/movement therapy accesses the individual's ability to respond in multiple ways as well as in effective ones. The opportunity is provided to relate self-expression to adaptation through the creative therapeutic process. Not only do the patterns of response available to the individual nervous system increase, but the capacity to embody more subtle,

integrated organizations of the nervous system expands.

These events reference Bohm's (1980) description of unconditioned acts of perception: events in which the memory response is bypassed by transcending into a new perceptual organization and then related to new responses consciously. Dance/movement therapy promotes these experiences toward the goal of psychotherapeutic change. The proposed thesis asserts that the holistic approach of dance/movement therapy toward an individual's conscious integration of unconscious perceptions effectively accesses neurophysiologic as well as psychological organizations in a manner that increases the potential of an individual's nervous system to heal and adapt globally. Based upon the literature presented by this study, the process of consciously embodying one's own nervous system through imaginal, expressive, and empathic processes might more definitively describe the practice of the dance/movement therapy field.

V. SUMMARY AND CONCLUSIONS

Two basic themes of modern physics are "the unity and interrelation of all phenomena and the intrinsically dynamic nature of the universe" (Capra, 1985). This examination of the relationship between organizational processes of neurophysiologic expression and integrational processes of conscious and unconscious states of perception in dance/movement therapy has essentially explored these same themes in terms of the human experience within a creative therapeutic process. Not surprisingly, the literature reviewed by this work confirms that the discoveries of the submicroscopic world translate through the studies of psychology, hypnotherapy, neuroscience, and dance/movement therapy. The research and theory of physicist David Bohm (1977, 1980) included by this study richly exemplifies how ultimately the multiplicity of paths converge most pointedly on similar ground. Therefore, a significant finding of this work is that dance/movement therapy theory/practice is exceedingly able to encompass research and theory from other disciplines in a manner that permits substantiation and further development of the field.

Summatively, the results of this study may be identified by the following six items:

I. Psychic and organic processes are dynamically and reciprocally interrelated.

II. The basis of cognitive, emotional, and physical expression is the neurologic processing of the spectral domain.

III. Perceptual processes engage the individual on all levels of function (i.e. psychic,

neurophysiologic, and motoric). Every perceptual event involves the global organization of these processes, even if it appears to be a reorganization of the previous state.

IV. Every state of perception within the self is a symbolic expression of the state of interrelationship of cognitive, emotional, and physical potentials on a neurologic level. Every state of organization within the self is a symbolic expression of the state of interrelationship of cognitive, emotional, and physical potentials on a neurologic level. Organization (i.e. psychic, neurophysiologic, and motoric) and perception comprise a gestalt in which change in one of these domains produces corollary change in the other. By becoming more conscious of the interrelationship of perceptual and organizational processes of the self, more congruent states of experience are able to be incorporated and expressed.

V. Movement is essential to perceptual processes. Imaginal and muscular movement *generate* patterns of information and *mediate* interrelated patterns of response of cognitive, emotional and physical function from one state-dependent organization to the next.

VI. Dance/Movement therapy accesses states of healing and adaptation within the nervous system by engaging the movement potential of the individual on multiple levels while promoting the conscious awareness of interrelationships between perceptual and organizational processes. Implications of this understanding indicate that dance/movement

therapy facilitates states of increased function within both psychic and organic domains of the self.

It is important for the author to emphasize that much further exploration of the subject matter is warranted and recommended. Although the theorists introduced by this study span a century, most of the perspectives presented are quite young in their evolution, particularly in terms of their availability to the masses. Therefore, related research is recently published, accumulating daily, and, fortunately, fairly easily obtained. The significance of the subject matter, from this author's view, lies most prominently in the opportunity it offers the field of dance/movement therapy to fully assert itself as "mind-body" therapy. For, although, dance/movement therapy theory and practice recognizes the interrelationship of psychic and organic processes, the field remains framed by psychotherapeutic constraints. There are certainly advantages to this framework. The psychotherapeutic field's ability to help bear forth and sustain dance/movement therapy is definitively one. What is being suggested is that continued research on the relationship between perceptual and organizational processes, on all levels of function, will not only substantiate and further current theory but also offer the therapeutic practice a means of fully embodying the underlying goal of the therapeutic process: wholeness.

One interesting direction for further investigation of the material presented is the question of the relationship between perceptual episodes dominated by processes of the

spectral domain and therapeutic states of healing in dance/movement therapy Recognizing that each event of the self becoming informed involves the participation of one's own nervous system within a domain in which space-time constraints are collapsed incites associations of deja' vu, missing time, extreme fear, pain, or stress, as well as experiences of ecstasy, creativity and spiritual identification. And, when considered in terms of Rossi's work (1993), so rooted in the discipline of hypnotherapy, parallels between those events which most strongly encode state-dependent processes of learning memory and behavior and experiences in which the structures of space and time seem to have been transcended are exceedingly evident.

The literature presented by this study supports the view that movement generates these states by providing patterns of information from one moment to the next and mediating the response of the self on all levels of function (Pribram, 1991; Bohm, 1980). Pribram (1991) identifies a means of achieving spectrally dominant states through methods of "practiced inference," such as meditation. Perhaps these experiences underlie that which conscious awareness is constrained to one state-dependent organization to another: the inward point of presence from which space, time, matter, and mind unfold into amplified expressions. These states of altered consciousness apparently permit awareness to embody the more subtle and implicate orders of self, orders in which the distinction between self and other are not viable: orders of inherent union. It appears that both imaginal and muscular movement may serve as a means of consciously accessing experiences in which

the distinction between the perceiver and the perceived is not evident. Inquiries into the transformational effects of these states on various mental and physical disorders, how to consistently access these states most effectively in dance/movement therapy, and further understandings of the patterns of frequency waves that appear to comprise the basis of self expression in terms of these spectrally dominated states would seemingly prove rich and interesting paths of study.

In conclusion, this study points toward a theoretical ground which may support further exploration of the capacity of dance/movement therapy to heal the self on a global level. The implication of this work that dance/movement therapy *literally* moves the individual nervous system toward more integrated states of health and function is, in the author's view, just the beginning of what is to be realized about the healing potential of movement.

References

Bateson, G. & Bateson, M. (1987). Angels fear: Towards an epistemology of the sacred . New York and Sydney: Bantam Books.

Berrol, C. (1992) The neurophysiologic basis of the mind-body connection in dance/movement therapy. American Journal of Dance Therapy, 14 (1), 19 - 29

Bohm, D. (1980) . Wholeness and the implicate order . London and New York: Routledge.

_____ . (1985) . The enfolding-unfolding universe: A conversation with David Bohm. In K. Wilber (Ed.) , The holographic paradigm and other paradoxes (pp. 44-104). Boston and London: Shambhala. (Original work published 1978)

_____ . (1977) . The implicate or enfolded Order - A new order for physics. In J. B. Cobb, Jr & D. R. Griffin (Eds.), Mind in nature: essays on the interface of science and philosophy (pp. 37-42). Washington, D.C.: University Press of America.

Brenner, C. (1955) . An elementary textbook of psychoanalysis . New York: Doubleday.

Capra, F. (1985) . The tao of physics . Boston: Shambhala.

Chodorow, J. (1991) . Sophia's dance. American Journal of Dance Therapy , 14 (2) , 111 - 122.

_____ . (1995) . Body, psyche, and the emotions. American Journal of Dance Therapy , 17 (2) , 97 - 114.

Dossey, L. (1982). Space, time, and medicine. Boulder and London: Shambhala.

Jacobsen, E. (1953). The affects and their pleasure - Unpleasure qualities in relation to the psychic discharge process. In R. Loewenstein, (Ed.), Drive, affect, behavior . New York: International Universities Press.

Jung, C. (1978). The transcendent function. In H. Read, M. Fordham,

G. Adler, & W. Mcguire (Eds.), The collected works of C.G. Jung (Vol. 8, pp. 67 - 91) . Princeton, N. J.: Princeton University Press. (Original work published 1957)

_____ (1978) . The structure of the psyche. In H. Read, M. Fordham, G. Adler, & W. Mcguire (Eds.), The collected works of C.G. Jung (Vol. 8, pp. 67 - 91) . Princeton, N. J.: Princeton University Press. (Original work published 1927)

Lewis, P. (1979). Theoretical approaches in dance/movement therapy . Debuque, Iowa: Kendall/Hunt.

Pelletier, K. (1985). Uncertainty principle factors in holographic models of neurophysiology. In K. Wilber (Ed.), The holographic paradigm and other paradoxes . Boston and London: Shambhala. (Original work published 1978).

Piaget, J. (1960) The child's conception of the world. N.J.: Littlefield, Adams &Co.

Pribram, K. (1985). What the fuss is all about. In K. Wilber (Ed.), The holographic paradigm and other paradoxes. Boston and London: Shambhala. (Reprinted from Revision Journal . 1978)

_____ . (1991) . Brain and perception . Hillsdale, N.J. Hove and London: Lawrence Erlbaum Associates.

Pulaski, M. (1971). Understanding Piaget. New York, Evanston, San Francisco, London: Harper & Row.

Rossi, E. (1993). The psychobiology of mind-body healing. New York and London: W.W. Norton and Company.

Schilder, P. (1950). The image and appearance of the human body . New York: International Universities Press.

Siegel, E. (1984) . Dance - movement therapy: Mirror of ourselves . New York: Human Sciences Press.

Silberman-Deihl, L. & Komisaruk, B. (1985). Treating psychogenic somatic disorders through body metaphor. American Journal of Dance Therapy, 8, 37 - 45.

Stonier, T. (1990) . Information and the internal structure of the universe . New York: Springer-Verlag.

Talbot, M. (1991). The holographic universe. New York: Harper Perennial.

Winnicott, D. 1958). Collected papers . New York: Basic Books.

Wolf, F. (1995). The dreaming universe . New York and Singapore: Simon and Schuster Inc.