

Mnemonic Body: Partner For Life

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In contacting another human being we, as Rolfling® Practitioners, cannot help but stimulate the release and reception of information within that person. If the theories described in this writing are correct, then the processes of the storage and transmission of memory take place not only in the structures of the brain but in every living cell. Each moment of contact is a creative act where previously experienced information mingles with new. In this sense, our work with living tissue contributes to the reshaping of both our client's personality as well as our own.

There are many moments throughout the sojourn of our lives, when our minds are not aware of our faithful bodies. Yet, these magnificent structures are continually engaged in unfathomable processes of expression and support. The more we come to study and to know them the more we understand how intimately, subtly and thoroughly they are involved in each person's process of individuation. We can see from observing each other how alive and fluid our bodies are in channeling information and determining personality. In the following discussion I will define how impulses arise through the body and prompt us to move through distinct developmental stages. I will then discuss stage theory in terms of the traditional and non-traditional theoretical perspectives on the process of personality formation. I will also mention how experience in one stage is

cumulative and necessary to prepare one to meet the challenges of the following stage. The discussion will continue with the nature of experiential knowledge, memory and the body's role in storing and carrying information from one stage to the next. This leads to the need to define and link the theory of engrams to current information on soliton waves and cellular processes which may have important implications for the understanding of personality. In conclusion, I will explore the relationship between engrams, personality and genetics.

STAGES

Impulses are spontaneous actions which impel us towards changes. They are biological sensory-motor responses coupled with psychological promptings that arise and express themselves through the body. Impulses are drives, or forces that provide us with dynamic incentives to explore, learn, and develop our unique personalities. Our journey through life can be described as a stream of impulses. Psychological theory instills impulses with conscious

and unconscious determinants of behavior. Impulses are synonymous with *m*, or, the power to produce movement, action and change. Our impulses, or motivations, can be seen as drives to satisfy needs, such as, hunger, reward, curiosity, tension reduction, selfactualization and so on. (Schultz, 1992) Their power moves us through the developmental stages of our lives.

In Freud's psychosocial theory of personality formation, pleasure is the chief motivator of the individual's development. Freud regarded unconscious sexual impulses as the prime motivators of behavior and personality formation. Developmental theorist Erik Erikson viewed motivation as a drive to resolve inner conflicts and the resolution would be dependent upon support from the person's social environment. In his theory, our motivations are to ease our inner struggles and establish a personal identity. Jean Piaget's cognitive developmental theory proposes that a search for knowledge provides the impulses towards growth and change. His theory, like Erikson's, says that we seek to find equilibrium within against the challenges and "disequilibrium" that life presents. Humanistic theorists, such as, Abraham Maslow and Carl Rogers

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see the developmental impulses of personality drives propelling us towards selfactualization and a search for the ideal self, respectively. Finally, in Buddhist approaches to the journey of life, we are motivated towards unity, enlightenment and the transcendence of earlier, more personal ego states.

Throughout life, impulses channel through our bodies and minds, affording us with incentives that carry us through a series of developmental stages. These stages are distinct periods or phases of life through which we progress. The stages are sequential with each having distinguishing biological and psychological challenges and rewards. Some developmental theorists, such as Jean Piaget, limit their stages to childhood, from birth to adolescence, while others, such as Erik Erikson, apply stage theory to the entire life span. Erikson saw a person's journey through life as an "epigenesis," or step-by-step sequencing of growth through stages. In epigenetic theory early stages are simple and the following stages then become increasingly complex.

Piaget is credited with setting forth a rigorous definition of stage theory. He stated that stage theories must: "(a) unfold in an invariant sequence, (b) describe qualitatively different patterns, (c) refer to general properties of thought, (d) represent hierarchic integrations, and (e) are culturally universal." (Crain, p. 122)

Non-Western disciplines, such as, Buddhist and Hindu traditions, also recognize stages of development through which we pass on our journey of life. In *Transformations of Consciousness*, Ken Wilbur compares conventional (Western) and contemplative psychological perspectives. He points out that stages represent quasi-universal deep structures of invariant sequence in conventional and contemplative disciplines. Acknowledging epigenesis in psychology, he defines the stage model as, "certain classes of behavior [which] subtly emerge only after certain

other classes." (Wilbur, p.9) It follows that stages have relational interdependency. "Acceleration or (relative) retardation [of each stage] is assumed to have a modifying influence on all other stages." (Erikson, 1963, p.272)

In *The Magical Child*. Joseph Chilton Pearce refers to stages of development as "matrices." Our biological task is to form, direct, prepare and move us through from one matrix, to the next, in a set cycle. Having a structured knowledge of one matrix, "[w]e move into the new matrix only by standing on the old matrix." As we progress through the matrices from more concrete to more abstract each matrix experience includes the previous one (Pearce, pp. 18-21) Thus, as the stream of impulses carries us into and through each stage we continue to gather and accumulate experiential knowledge allowing us ever greater creative possibilities. It is obvious that Pearce's perspective on child development concurs with Erikson's epigenetic charting.

B O D Y

What is the nature of this experiential knowledge and how is this information carried from one stage to the next? The answer lies in our bodies, in the energy and substance of cellular dynamics.

Jim Oschman, a biophysicist, and his wife Nora have spent considerable effort in studying the relationship of energetic phenomena and cellular function. They mention palpable "soliton waves" that flow through the person's tissues. (Oschman, 1994a, p.18) These waves are the product of all living systems in that living organisms "produce giant coherent or laser-like oscillations that are conducted throughout the organism and that are also radiated into the environment." (ibid.) A soliton is like a tidal wave moving through the tissues having "profound physiological and emotional effects." (ibid.) Solitons can be generated by electromagnetic fields, touch and movement.

All cells share certain structures. Cell membranes are one example. Normally the cell membrane is thought of as a protective barrier against harmful, intruding disease elements. It is also considered semipermeable, in that it regulates cell function by allowing exchange of fluids, waste products, gases and nutrients in and out of the cytoplasm. It accomplishes this through certain biochemically triggered openings or "channels." The Oschmans, however, offer another image of the cell membrane, as "a window through which the living cell senses its environment." (ibid., p.20) It is the cell membrane which senses the electromagnetic waves from the environment and carries it into the physical structures within the cell in the form of soliton waves.

Microtubules are another example of structures common to cells. They are comprised of minute proteins within the cell membrane and are capable of quickly assembling and disassembling when stimulated. Citing anesthesiologist Stuart Hameroff's work with microtubules, the Oschmans write:

"The cytoskeleton can then be viewed as a programmed electronic computer with the capability of storing, recalling, and processing information of all sorts. Soliton waves traveling through neural and non-neural cells would leave in their wakes memories in the form of patterns of cytoskeletal structure and/or vibrations. This information could be subsequently read out and utilized to make informed decisions as to the appropriate direction for cellular processes. Within the brain, the collective functioning of cytoskeletons could give rise to phenomena we refer to as images, thoughts, and ideas." (ibid., p.25)

Therefore, not just nerve cells but every cell that has a cell membrane and microtubules is capable of managing the function of memory and information processes.

Memory, therefore, is not confined to

some, as yet, undetermined, area of the brain, but is associated with a whole body experience. This theory has been reinforced by placebo experiments done with the immune systems of white mice. Deepak Chopra, author and physician, mentions experiments for placebo responses on white mice in which stimulation of the immune system was accomplished by coupling camphor odors with injections of an immune system stimulant. By simply smelling the camphor the mices' immune systems would activate without the injections. The memory of the camphor was enough to create a response in the mice.

"Where is that memory locked? Is it in the brain cells? Obviously not. It's even in the immune cells. In fact, the memories are encoded, are structured in, every cell of our body. Our memories are constantly transforming themselves into physical reactions in our body. In other words, the way we interpret our experiences in every moment of our existence results in this printout which the body is." (Chopra side 2)

He describes the experience of encoding as "an interpretation one makes to oneself. . . . These interpretations subsequently become memories and then these memories trigger transformations spontaneously." (ibid.) Experiences, interaction of impulses and environment, become self-interpretations, self-definitions and then become memories.

Memories are triggered by stimuli. An article in *Discover* magazine, by Minouche and Eric Kandel, describes two different forms of memory: implicit and explicit. "Implicit memory deals with our unconscious knowledge of motor or perceptual skills, or 'knowing how'. Explicit memory deals with our knowledge of facts, people, and places, or 'knowing that'." (Kandel, p.35) Explicit memory resides in the temporal lobes, in "the new brain." Implicit memory is managed in "the old brain," in the amygdala and the

cerebellum and autonomic nervous system. (ibid) Stimulation of the implicit system may trigger the explicit memory experience as in the example given by the Kandels of a woman doing neck exercises to relieve tension and recalling the experience of her father choking her. (ibid., p.3) Similar to white mice smelling camphor and triggering memory in their immune systems, the woman's feelings of movement sensations in the cells of her neck triggered the memory of being choked. Presumably, soliton waves were generated and released the information stored in the microtubules in the cytoskeleton of the neck structures.

E N G R A M S

The process through which we store and recreate experience and learning in our bodies and re-experience them as living memories was predicted in the 1920's by Richard Semon describing his theory of engrams. An engram is a latent, not immediately perceptible, alteration in the cells left behind after the experience of sensation. (Semon, p. 153) In Schacter's citing of Semon's definition he defines it as "the enduring though primarily latent modification in the irritable substance produced by a stimulus." (Schacter, p. 132) A medical description from *Taber's Medical Dictionary* refers to it as "a durable mark or trace. The protoplasmic change left by a stimulus in neural tissue." And, "a lasting mark or trace . . . applied to the definite and permanent trace left by a stimulus in nerve tissue." *Dorland's Medical Dictionary* goes on to say that "[in] psychology it is the lasting trace left in the psyche by anything that has

been experienced psychically, a latent memory picture." He further describes *engraphia* as "the process hypothesized in the theory that stimuli leave definite traces (engrams) in the protoplasm, which when regularly repeated induce a habit that persists after the stimulus ceases." Deane Juhan, author of *Job's Body*, talks about an engram as a "discrete sensory record" whereby the body remembers how it *felt* to do something. "The motor systems are then set into motion to reproduce the remembered sequence of sensations laid down in the engram." (p.266)

These definitions of engrams have tended to reduce them to single isolated arrangements of cellular substance left behind in nerve cells by specific events. Although Semon defines an engram as a latent alteration left behind after sensation, he regarded engram processes as quite dynamic. "A conception much more in accordance with our meaning leads us to regard such fragments . . . as *integral components, as emergent points of a connected simultaneous complex of sensations.*" (Semon, p. 164) An engram, then, can be described as sensory experience at a point in time, the traces it registers throughout the body, and the motor responses to the stimuli. Resultant sensations create new engrams. In other words, an engram can be every sensory experience in a particular event involving every sensory system which contributed stimulus information to the affect in the cells and the motor patterned response which readies it for recall and carries it out.

As the Oschmans' studies imply, the effects of experiential interactions with

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the environment call for a new, dynamic interpretation of the meaning of engrams. This interpretation would not limit engrams to one type of cell, neurons, nor confine it to reference only the traces left in the cytoplasm. Rather, it would refer to a sea of information carrying motions, soliton waves, that associate throughout the entire body and are capable of recalling, in their entirety, previous experiences stored within all cell and tissue patterns.

Again, predicting and concurring with soliton wave affects in cells and the inner dynamics of memory processes in the body, Semon wrote that memory recall depended upon "energetic situations."

"We have to understand by 'energetic situation' not only the influences working from outside upon an organism but also its inner energetic condition taken in the widest sense. We might further elucidate the above definition by adding that the partial return of an outer, as well as of an inner, energetic situation acts ephorically [retrieval of memory]." (Semon, p. 80)

As in the Oschmans' descriptions of soliton wave behavior, engrams involve cohesive physical and energetic networks of experience in motion. The inner workings of the body and the stimulation of the environment are in mutual rapport exchanging, storing, and channeling information and energy with each other. Further, the entire engram-complex which created the innumerable engram traces need not be repeated exactly in order to free the information and energy into the organism. Only a partial stimulation can activate the complex of emergent points. (Semon, p. 180) Thus, impulses that are motivating us to be curious, explorative and involved with the objects in our environment are providing our bodies with living information to be stored and retrieved spontaneously. This can happen only in the milieu of a whole body communication

of living, information-sharing components like the Oschmans describe.

P E R S O N A L I T Y

"Every moment of individual life adds something to the already existing sum of simultaneous engram-complexes." (Semon, p. 171)

Implied in the theory and function of engrams, as defined here, is the basis for understanding the determinants of unique personalities. In light of the interaction of cells with their environment, personality is an ongoing process of formation and expression.

Personality is conscious and unconscious traits, drives, responses, memories, feelings, insights, intuitions, and self-awareness. It is also the shape, feel and functions of our physical bodies moving through the matrices or stages of developmental existence. Webster's Collegiate Dictionary (tenth edition) describes personality as "The totality of an individual's behavioral and emotional characteristics." In short, a living gestalt, a unique wholeness of all that comprises one's life.

Our bodies play a key role as partner in the formation of personality. They express through our behaviors the unique sum of the individual's simultaneous engram-complexes. They store and channel information and experience in their cells and tissues and free it with sensory processes. Experience leaves living traces in every cell that come alive when stimulated and affect every part of our bodies. Our personalities include the thoughts, emotions, tastes, sounds, images, perceptions, smells, colors and qualitative experiences that we encounter and the expression of our responses to them. They are formed moment to moment by impulse directed interactions with the environment. Pleasurable and traumatic experiences alike contribute to sensory and motor information deeper than the consciously obvious.

"The human creature is able to combine

afresh every element of his individual engram-store with every other, and thus to form innumerable novel combinations of engrams." (Semon, p. 175)

Every moment that contributes sensory experience to the engrams, of our lives is unique. No two individuals have exactly the same personalities because no two persons have exactly the same engram-complexes, the same interactions with environment, the same genetics. Our personalities are unique. They display the distinguishing characteristics of our uniqueness.

Kathleen Stassen Berger of City University of New York, believes that personality characteristics fall into groups that are called **The Big Five**. The Big Five include extroversion, agreeableness, conscientiousness, neuroticism and openness. In her text, *The Developing Person Through the Life Span*, Berger says,

"These traits are determined by many factors, including genes, culture, early child-rearing, and the experiences and choices made during late adolescence and early adulthood." (pp. 576-7)

Personality formation and expression is not solely determined by the environment, however. Genetics, too, has its role.

"Scientists now view the interaction between heredity and environmental contexts as intensely dynamic and incredibly diverse, an ever changing combination of influences that affect each person differently . . . the specific expression of these genetic influences, the actual behaviors they promote, depends not only on the individual's specific genetic makeup but on all the surrounding contexts as well - the intricate and often tangled interplay among cultural and ethnic values and expectations, socioeconomic status, cohort experiences, varying family dynamics, and the myriad other contextual elements that impinge on individual development." (Berger, p. xxiii)

Living engram-complexes influence genetic information as well. Interaction with the environment is a determining factor as to whether someone is able to reach their full genetic potential. For example, poor nutrition can inhibit the growth of an individual who is genetically determined to be 6 feet tall to only 5 feet 9 inches. Also, social contexts and parental modeling can enhance or diminish genetic tendencies towards introversion or extroversion.

More remarkable however, is the notion of heredity as a function of memory. Schacter reports on memory as an ancestral link and that memory as a "fundamental property of organic matter" survives temporal elements. (1982, p. 117) The point is that genetics is organized information, specific structural patterns within the cells. As we have seen, fundamental organic matter in cell dynamics is continually being influenced and reinforced each moment we are alive through our interaction with the environment. Favorable traits will continually be stabilized and reshaped, then shared phylogenetically. Soliton-*engram (soligram)* activity offers a bridge between heredity and the environment. Perhaps the old dualistic arguments of *nature vs. nurture* should be shifted to *nature and nurture*.

Whether personality formation is motivated by tension-release (Hornby), pleasure (Freud), anxiety, equilibrium (Piaget), perfection (Adler), unconscious forces (Jung), search for identity (Erikson), satisfaction of needs and self-actualization (Maslow), or genetics, all can agree the body is intimately involved. The mnemonic body, then, with its capability in storing, retrieving and channeling memory and energetic information, is an integral participant in the formation and expression of each unique human personality. Conscious and unconscious cognitive aspects, memory and present awareness, body and mind interact in relativistic continuum to create a diversity of human expression.

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