

Body-Image, Movement and Consciousness: Examples from a Somatic Practice in the Feldenkrais Method

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Abstract: We think of consciousness as a thing. Observation of our experience indicates that we are actually consciousing, and that experiencing is closely related to movement and the muscular sense. The position of this paper is that mind and body are not two entities related to each other but an inseparable whole while functioning. From concrete examples from The Feldenkrais Method, it is shown that changes in the organization of movement and functioning are intimately related and that one cannot change without conscious experience. Implications for the resolution of controversies in the field of consciousness studies and the neurosciences are suggested.

Introduction: The Importance of Movement

It is odd that we have made the activity of sentience into a noun. We say consciousness and not consciousing, implying that consciousness is a thing. Yet for other related activities we say we are sleeping or that we are dreaming. The specific activities of a conscious mind are, however, verbs. We imagine, look at, think, listen, observe, feel, bring attention to, meditate, etc. We speak of consciousness as a state. Yet everything we know of consciousness is connected to movement. In order to see the book on the table across the room I must make an act of attention. I turn my head and eyes and focus at the distance. Whatever impinges on the retina is not what I see. This may be of a particular size shape and produce a certain color, but I see a book. That means my perception is organized to see a particular thing.

If I fix myself so that nothing moves and the image stays on the retina for so many seconds I will no longer see. But this is hard to do. My eyes naturally move all the time. If I watch my own process, I find a continuous shifting. My attention moves; my thought moves; there is an arising and falling of each distinct thought or moment of where my attention is directed. And as this activity continues, I have the ability to also observe the activity, the mind watching itself. Do we confuse ourselves by making a noun, consciousness? As I continue I will use both the noun and verb form.

I take a walk with my dog. My vision puts me in spatial flow where the movement through the landscape is my walking itself, and at the same moment directing my path. A rock wall comes into view and I skillfully step over it. I know in my sensation of my moving when I have lifted my legs high enough so that my feet come over the wall. I do not have to stop and think about it. It is all part of my immediate conscious experience. And yet I am surely not consciousing all the workings of my biological system. I stop to look for a rock to sit on in a dry arroyo. I find what I seek. Sitting, I am facing the sandy bed of the arroyo, and about twenty yards away a twisted mountain oak sprouting out of the rocks of the arroyo wall spreads its branches over the arroyo. I feel my breathing become easier, a flowing in my chest. I am enjoying the beauty of this view. My dog approaches. He sits looking at me. I lift my hand to pat his head and he licks my hand. I am attending, intending, interacting in sequence, and continuing that activity until I sleep again.

I can describe all this (another activity of consciousness) through the movement of my breath, palate, voice box, lips and tongue, or through the movement of my fingers on the computer. I can describe it because I experienced it. We say it is now in my memory. My experience was not, cannot be, raw sense data. On the contrary I was perceiving space, flow, my self in moving, objects in the landscape, the dog, sounds of birds, the feel of myself that I describe as aesthetic enjoyment. My moving itself is irreducible because it is coordinated, flowing, integrated and not separate from what I am perceiving with my other senses. When I am remembering, I am not re-experiencing exactly, but bringing forth fragments of the experience. From this I rapidly make sentences. When I write my fingers hit the keys in response to the rising words that at the same time I am sub-vocalizing, and the corresponding letters are struck without stopping to think which letters match the word. My finger awareness includes their orientation to the keyboard. My consciousness is shifting with each moment in time. The overall effect is a coordinated moving flow in time. My activity is organized and integrated. So are the perceptions that are essential for this integration of action and activity.

At the same time I am oriented in the space of my environment, and oriented in the body space so that when I lift my hand I know where my hand is relative to myself and relative to the environmental space. How precise this is can be tested by closing one's eyes and moving one's hand in front of one's face. You will see in your mind's eye some sort of image of your hand. It need not be very distinct but the image will correspond to a position in space. Open your eyes and check the correspondence. For almost everyone the image will correspond exactly to the position of your hand.

In the activity of my normal consciousness I am also oriented in time. I situate myself between past and future. I am aware that I have a history. I need not bring this up at any moment, but I can bring it up immediately when needed.

Imagine yourself waking up from sleep in a hotel in a foreign country. At first you may be disoriented. You wonder where you are located. You might imagine yourself in a familiar space only to realize that that is not where you are and you do not even know what time or day it is. You have an uncomfortable sensation within yourself. As you come more awake you then orient yourself. Now you are awake and consciousness. You know where the bathroom is. You can step on the floor, erect yourself in gravity and not trip over the chair.

I am gradually making an inventory of some of the mundane activities of consciousness and deliberately leaving out such issues as symbolic thinking, subjective qualia, etc. that take attention away from the biological roots of what we put under the heading of consciousness. Many of our activities are not in the realm of consciousness. When I erect myself in gravity, I normally direct myself to do so. I might on the other hand be in a somnambulistic state. I can still do so having previously organized this activity. In addition much of the muscular activity to accomplish this action is not under conscious control, but is directed through the vestibular system, the extra pyramidal muscular responses, the vestibular-optical reflexes. I can stand up without paying mind to my action and act habitually and probably inefficiently. On the other hand I can develop my awareness in such a way that my experience of my acting is rich with knowing my self orientation, my relation to space and gravity, my sense of timing, and I will stand elegantly and efficiently using a minimum of muscular effort.

The Question of Consciousness

The fact that acts can be done with minimal awareness, or in some cases none at all is confusing to philosophers and scientists. It is thought then that consciousness has no biological function, that we could live without it. Paradoxically without consciousness no philosopher or scientist would ever be concerned about the issue. A more significant contention is that without consciousing no child could learn to erect himself or herself, and no child could self direct the activity needed for biological survival. The organization of erect standing and walking is undoubtedly the most complex thing a brain accomplishes in life, and at this moment in history well beyond the ability of the most sophisticated and rapid computers. My point here is that all human action requires an integration of conscious and nonconscious activity, and also requires immense and complex organization.

We do not usually study ourselves with this attention to what we experience. Nor do we consider the degree to which our activity results from the integration of so many different levels. On the contrary we tend to study the visual system as an isolated entity, or the behavior of a subject in responding to a target stimulus. We do so because our analytical cognitive abilities are easy to use. We have organized cognitive systems available, which through complex organized entities such as language, symbolic pictorial representations, mathematics, we can represent ideas as images, sentences, or mathematical equations. Such complex organizations make simplicity possible. We tend not to consider how these capacities come into an organized state. We use these systems as if everything of significance can be expressed within them, without concern for the degree to which they also limit our thought processes. If we allow it to be so, we end up limited by the linearity of our communication systems, and specifically by the linearity of the logical structure of thought that is symbolically mediated, i.e., driven by the needs of language or other communication. Integration, coordination, interconnectedness is then hard to understand. It is easier to see functions as modularized and not worry how separate functions become integrated actions. Can we develop another way to think?

The question of consciousness is one, then, that has baffled attempts to deal with it in a structured analytical way. There is a gap between what we can know of our own lived experience, which depends on consciousness or consciousing itself, and what we can postulate as an explanation of how consciousness is possible. Thus the controversies so familiar to those involved in consciousness studies.

In this paper I wish to take an entirely different tack, and shift the thinking. My professional experience is in the area of movement learning in relation to developing awareness using The Feldenkrais Method. Although I work in the realm of a particular method, I believe that the success of this work reveals something quite general about the workings of the nervous system and indeed can show that the activities of consciousness or consciousing are essential to human biological life. What I propose is that the phenomenology of the Feldenkrais method allows one to connect changes in the domain of inner experience with changes in the organization of outer behavior. It thus provides a way to observe the correlations between the domain of phenomenology and the domain of external observation.

The Somatic Insight

Moshe Feldenkrais wrote in 1964. "My contention is that the unity of mind and body is an objective reality, that they are not entities related to each other in one fashion or another, but an inseparable whole while functioning. To put the point more clearly I contend that a brain without motor functions could not think or at least that the continuity of mental functions is assured by corresponding motor functions."

Feldenkrais goes on to note that, "We have no sensation of the inner workings of the central nervous system; we can feel their manifestation only as far as the eye, the vocal apparatus, the facial mobilization and the rest of the soma provoke our awareness. This is the state of consciousness!" (Emphasis mine.) And lastly the conclusion resulting from these contentions: "..the state of the cortex is directly and legibly visible on the periphery through the attitude, posture, and muscular configuration, which are all connected. Any change in the nervous system translates itself clearly through a change of attitude, posture and muscular configuration. They are not two states but two aspects of the same state." With one stroke we have eliminated the mind-body problem.

The stance taken here by Feldenkrais is hypothetical, and also operative. It is a working position, substantiated by the practical work he had been exploring for thirty years, and shared by a pioneering group of thinker-explorers of the twentieth century who were interested in finding practical ways of furthering human development. Among these people were F. Mathias Alexander, Heinrich Jacoby, Ida Rolf, Gerda Alexander, Elsa Gindler and her many students, Charlotte Selver, Emmi Pikler, Berta Bobath among them, and of course Feldenkrais who was influenced by this movement through his contact with Jacoby, but also through his work in Judo and contact with oriental teachers. (For an overview see Johnson, 1995.)

Elsa Gindler, whose "arbeit am menschen" (work on the human) was so influential, cured herself of tuberculosis by so refining her awareness of her breathing that she taught herself to rest her diseased lung and breathe more fully with the healthy lung. F. Mathias Alexander discovered through extensive self-examination how he could inhibit habits of use of his head and neck that interfered with his voice, something essential for his original profession as an actor. Berta Bobath developed new approaches to physical therapy that involve a neuro-developmental approach, and Emmi Pikler, a radical way to rear children through her detailed observations of development. All of those mentioned developed practices of embodied awareness. Such practices show a correlation between a phenomenology of awareness and the refining and reorganization of human skills and capabilities.

In the short space of this essay, it is not possible to explore any of these practices in any depth. However, I will take some specific examples from my practice of the Feldenkrais Method to illustrate what can be learned from these somatic practices. We can emphasize again that there is no mind-body problem from this perspective. What I hope to suggest is a direction to the solution of the other standing problems of consciousness.

Examples from the Feldenkrais Method

We call our processes in the Feldenkrais method, lessons, and they are in two styles. Awareness Through Movement lessons are presented verbally, usually to groups. The presenter guides the lesson by directing the participants through a series of movement sequences that increase the level of self-awareness of the participant,

and at the same time increase the level of sensitivity to the nuances of kinesthetic sensation.

Here is a particular Feldenkrais Awareness Through Movement lesson. As with many of these lessons, it has a large element of exploration in which the learner is directed to explore different movements with the attention directed to the quality of execution rather than the size of movement. Everything is done softly with emphasis on expanding awareness. For the sake of brevity I will only describe the major elements of the lesson. At first one is directed to sit comfortably cross-legged on the floor and to put the hands together as if praying with the elbows out. The instruction then is to keep the bases of the two palms together and separate the fingers from each other without moving the elbows. One tries both hands and then just the right and just the left. One then turns the hands so that the fingers point away from the body. The same movements are repeated. For many people it is quite difficult and only a small movement is possible to do comfortably. Now one is instructed to think that the right eye contains something like a small telescope where the lens is. One then looks to the right and then up and around so that one makes a slow careful circular movement with the right eye attending to any parts of the movement which are not smooth and easy. By moving very slowly, delicately and attentively through the difficult portions of the movement, one begins to improve the quality of moving the eye. One can then make circles in each direction. Finally one combines this movement with the movement of the hands. Returning to the movement of the hands, the following effects are generally noted. First the right hand is now more capable than the left in the movement of keeping the base of the palms together and lifting the fingers away. Secondly the distribution of tonus throughout the entire right side of the body has changed. This is observable to an outside person observing the face, the shoulders etc.

What we have here is a clear demonstration of the effect of directed conscious awareness on the activity of the nervous system itself. Note that in moving the right eye the left eye automatically moves also. Thus the changes in the distribution of muscular activity are not the consequence of the movement per se. The change then can only have resulted from the directing of awareness to the movement of the right eye. And this change is not localized with the eye, but distributed through the musculature of the entire right side and the corresponding movement organization. Any theory of consciousness and nervous system functioning must take such phenomenon into account. I believe this phenomenon, and many others not yet acknowledged, does indeed challenge a lot of our current thinking about mind, brain and consciousness.

Phenomenologically one feels one's right eye in a new way. Initially as I begin to move my right eye in a circular motion, imagining the eye as a telescope, I move the eye in accordance with this image, feeling the movement of the eye with an attention that I normally do not bring to moving my eye. At first I may find it difficult to make the circle round; at certain points I find that I cannot move the eye the way I want. Slowly as I move, directing my attention to where I can move with quality, i.e. a sense of ease and comfort, I find that I can approach the difficult places in the circle and begin to make a complete smooth and enjoyable movement. Now I experience a spreading ease throughout first the right side of my face, then with my breathing. Eventually I am directed to return to the movement of the hands, and find my right hand more supple and moveable. This is learning, however, not at the level of simple association, or conditioning.

Here is a story to show the same thing another way. I was teaching a Feldenkrais class to a group of people in a large corporation. Many were scientists, engineers and technical workers. The common characteristic of the group is that they all suffered with back pain at varying times. In one lesson we explored movements on one side of the body for almost forty minutes. In that space of time most class members improved their easy range of movement about seventy percent or more. I then had them check the same movement on the other side. They found themselves about as restricted as when they first tried to move on the first side. I then had them imagine the same movements as they did in the forty minute sequence on this other side for about five minutes. Suddenly they found that they could move eighty percent more on this side. One engineer looked up at me after experiencing this change and said, "That doesn't compute." What happened for him obviously challenged a belief he had that mind and material were separate and that immaterial mind could not influence matter, i.e. his body. Empirically he could not deny the experience; intellectually he could not account for it. Here a mental activity, imagining, affects the state of the organization of the nervous system as indicated by a new organization of movement. It is not an immaterial process in the sense that if one observes the person while that person imagines, one can detect subtle activity in the musculature which accompanies the imagining.

Our second lesson process is named Functional Integration. This is a hands on process in which the practitioner communicates with the participant through touch. Feldenkrais described this teaching process as "dancing together." The practitioner touches and feels where the person touched can move and the person touched feels what is wanted or intended and responds. The aim again is enhanced awareness in which the person touched realizes new possibilities of kinesthetic sensing and feeling, and experiences shifts in the body (movement) image. Often the experience of the lesson for the participant is beyond verbal description, but the reverberations of these shifts become clear after the lesson as the person experiences daily life with a changed self-appreciation. How profound this can be will be illustrated with the specific examples cited below.

Over the years I have given thousands of Functional Integration lessons. On the surface it appears as if I use my hands to communicate with the person receiving the lesson. In fact I have trained myself to use the movement of my entire structure to make the contact and sense the other person. I produce within myself a very clear organization of my spine and pelvis so that what is communicated with my hands is produced with my entire self-action. For myself, as practitioner, I find that I am effective when I shift to an open awareness, shut down my usual verbal self-chatter, and give up any attachment to producing results. My thinking is embodied in the sense that I move directly from sensing and feeling into the action of communicating through my own movement to the person receiving the lesson. I find in this way that I can be very precise to the needs of the person I am working with. Many people I work with report that they feel I have contacted them and felt their presence in an unique way.

Here is an example from my individual practice that further indicates the relation of conscious experience to even the most reflexive activities of the nervous system. My client Jeff was recovering, very slowly, from Guillain-Barre Syndrome. This syndrome apparently involves an acute viral infection of the spinal nerve roots. Muscle weakness and paralysis result from disturbances of the lower motor neurons. Sensory symptoms involve loss of position sense, and some distorted sensations such as

tingling. When he was acutely ill, Jeff was completely paralyzed, but he had not lost body (touch) sensation. He had recovered, by the time I began to work with him, to the point that he could make any voluntary movement asked of him. However, he found himself very weak and needed two crutches to walk. Often he used a wheel chair. At this point he was two years past his acute illness.

As we did our weekly lessons, he improved his balance and his stamina. In a few weeks he was able to graduate to the use of one crutch. One day, as we started another lesson, my attention was drawn to Jeff's feet. I knew that he could feel my hand touching his feet, distinguish one toe from another, and wiggle the foot up and down, as well as the toes. Yet, when he wasn't trying to move his feet, they were lifeless. And when he walked, his feet slapped at the ground like floppy shoes.

I chose then to do an experiment with a flat board. I had Jeff lie on his back. I put a soft roller under his knees and a Styrofoam roller under his ankles. This had two effects. First it took Jeff out of the gravity field so that he was not compelled to make an effort to stand up. Secondly I could feel how his feet moved without the heels pressing on the table and could move his entire self through pressure on his feet. I knew Jeff could make voluntary movements with the muscles of his lower legs, but from past experience I knew his weakness probably related to a lack of reflex tone in these same muscles. I also knew that by pressing his feet gently with a hard, flat surface, I could possibly elicit more so called reflex activity.

It was a good choice of a lesson for Jeff. I began by pressing my hard board gently against Jeff's left foot. His foot, initially floppy and toneless, did not respond at all to the pressure of the flat surface as I tilted the board one direction or another. The foot stayed where it was, unmoved by the stimulation. I would interpret what I felt as I moved the board against Jeff's foot as "I am not connecting." The foot had a quality I could most easily describe as lifeless. In a normal situation a person's foot would follow the movement of the board as the foot reacted to the stimulation of the surface. Slowly as I pressed the toes and the ball of the foot, small responses began and Jeff's foot began to follow my movements. I could detect each increase in response with my hands, which then resulted in my increasing the stimulation of Jeff's foot. After twenty minutes or so, Jeff's foot responded with a good approximation of normalcy. I was now able to move his entire skeleton through his foot in a simulation of the function of standing on that foot. I do this by moving the board with my pelvis well grounded so that the movement of my center is transmitted through my arms to the foot, knee, pelvis, spine and head of my client. In my own feeling sense, I could imagine his entire spine and detect how each vertebra connected in the movement. To my estimation his lower leg muscles had increased in tone. The skeletal structure carried the movement to his head.

But Jeff in fact was unaware at this point. I asked him to compare the left foot, the one we had worked with, with the right. He said that he felt no difference. I then asked him to get up slowly and take a few steps. I was pleased at this point. My work with Jeff had resulted in a discernable change in his foot and as he began to walk I could see that his left leg carried weight better than the right. His left foot no longer slapped the ground, but moved normally with the action of his walking. I let Jeff walk and didn't ask anything new of him. Jeff paused; a look of surprise passed across his face.

"I didn't realize," he said. "I didn't realize that I had lost my foot. It's unbelievable. I have a foot again. I can feel it clearly." Jeff began walking more vigorously, feeling his left foot again and again.

Here the nuts and bolts of changing neurological organization appear first. He walks differently and then finds a profound shift in his body feeling. That he says, "I have a foot again," indicates that the spatial area of his conscious appreciation of himself has expanded. It is not just a question of sensation. Remember, he never lost touch sensation. The phenomenology of the body-image is a profound subject. Here the body-image is linked completely to the return of organized functioning. Oliver Sacks in his book *A Leg To Stand On* (1984) provides one of the best first person descriptions of this relationship on record in writing about his recovery from a devastating injury to his leg. For Sacks the experience had an aspect of revelation as he realized the profound connection between his self image and his functioning, a phenomenological connection completely ignored in his medical training.

In this second example, again from my practice, the change in body-image provoked a crisis. On the surface it appeared that my client and I were dealing with a problem in physical structure. This client was born with congenital malformations of both her hip joints. In her growing up she learned to do the things she wanted, i.e. mobilize herself to walk, stand, run, erect herself in gravity, despite the fact that both hip joints did not have proper sockets, and the joints were supported only by the tissue of the joint capsule. What she did with herself she did in her own fashion, finding a way that worked so that she could be as much as possible like other children. As a normal child does, she constructed patterns of action/movement that allowed her to succeed to the best of her ability. These patterns were not the same as those of a child without her structural difficulties. One point about these movement patterns is that they had value. They were the ones that worked given the constraints of her physical difficulties.

At the age of twenty-six, her physicians, having noted that her bone growth had ended, replaced through surgery both hip joints with stainless steel balls and implanted Teflon sockets in her pelvis. Subsequent to this surgery and her convalescence she continued her life, but as time went on she began to experience increasing pain in her back. She continued with physical therapy. It was of no avail to her. Now in her thirties she was referred to me to see how my approach might aid her.

What I observed about her was that despite the new hardware that gave her perfectly usable hip joints, she still walked and erected herself with the same patterns that were useful to herself as a child. These patterns involved an extreme arching of her low back and a bringing of her knees together for support. What I knew was that she had no sensation or feeling of other patterns. This may seem like mind reading. Nevertheless it is important to the outcome of what I do to make educated assumptions about my client's experience. I needed to know what she needed to experience in order to find a new pattern. The new patterns could not be taught externally and certainly not through language. The fact that ordinary physical therapy was of no use indicated this. We had to create an experiential pathway to a new body-movement image. To do this she and I had to retrace the learning path of erecting herself in gravity.

I could feel in the quality of rigidity in her spine and ribs, which was unyielding even when she was lying down how little feeling she had of this middle part of herself. It was the consequence of the extreme efforting that she needed to hold herself erect. And indeed in standing one felt almost an impossibility of any change as she held her spine so strongly in fear of falling. In a more ideally organized person the spine is a flexible supporting column in which the muscles are of even tonus, ready for movement and action. The lessons that I did were created in part by watching how children learn the actions of coming up to stand, and imagining what needs to be felt internally in conjunction with this learning. Thus I began by getting her to move her pelvis and spine in relation to each other. It can only happen as an awareness. Even after a few lessons she had much less pain.

At one particular lesson a new pattern emerged for her more clearly. At the end of the session she appeared to me to be frightened. She told me that she felt very strange. The next day she reported that she was in a crisis and that she hadn't slept well. I asked her what she was experiencing. She said, "I don't feel like myself. I don't feel like the same person. It's very disturbing." Later in our discussion she said, "But I know I also feel how much easier it is to walk." It was this later observation that allowed her to go on with the lessons. The lessons were leading to patterns that were completely novel to her experience. She discovered with each change some sense of disturbance of her self-feeling and thus her self-identity. What was fortunate for her progress was that each time that she felt strange to herself, she allowed herself the feelings of fright and disturbance, knowing that what was new to her sensation of herself would be "normal" in a few days. She thus found a way to transcend the identity of herself with a particular pattern of feeling of herself. The complexities we are approaching in this instance are beyond the scope of this paper. I will come back to the point, however, because one begins to appreciate that our issues do not exist in the vacuum of the isolated nervous system and person.

In any case my client had to make a conscious step at a higher level. She had to observe two qualities of her changing and choose what best fit her life.

I would like to make a brief diversion to indicate that phenomenologically sensory perceptions are not in isolated sensory systems. From my own experience I discovered a relation of body-image to vision. On a visit to an optometrist who specialized in a field called, behavioral optometry, I explored wearing prism glasses that distorted the experienced visual spatial field. One set made the floor appear much closer than in my normal vision. My internal body space decreased so much that I felt about four feet tall. When I tried to walk, I could barely move my legs and had no idea where to place my feet. It took some minutes with the glasses to begin to recover normal movement. It is apparent that perceptions such as body-image are cross related within the many sensory systems. Any distortion in one place immediately produces disturbances in other perceptions as well as in functioning. And yet very quickly the nervous system begins to reorganize to restore the same coherence of perception and therefore the quality of action and movement. What interests me in all of this is the great plasticity of ourselves in self-organizing to provide us with a biological stability. I think I have strongly made the case so far that although we do not control the learning process directly, the activities of consciousness are essential to this level of learning in which perceptions and actions are interlinked and constructed.

I would like to conclude with a description of a Functional Integration process that emphasizes how the nervous system responds much more directly to complete integrated action patterns rather than isolated parts of movement. I am working with Brenda who suffered a cerebral accident when she was in her twenties some twelve years before. She has pursued many avenues toward recovery of use of her paralyzed left hand, this hand which contracts into a snarl of confused twisting along with her wrist and arm when she tries to use it. When she ignores the arm and hand, it hangs with the elbow partially bent. We have worked together for four sessions and have already discovered together a number of new things not made available before. First and foremost, Brenda finds it easier to progress when she doesn't push, use effort, or try hard to get the result. She can also progress when one shifts focus away from the hand and the details of the action. And there is her discovery that it is not just the hand and arm where there is loss of mobility and function.

I began my first lesson with Brenda by touching the ribs and spine on each side to reveal to myself that the affected left side was quite immovable compared to the right. When I passively moved the left arm, the ribs stayed glued to the table, an indication that her internal experience of this area is missing; this is in contrast to the right side where my lifting her arm led to the entire rib cage following and facilitating the movement. As I continued the lesson I spent a good bit of time with the "good" right side exploring how pressing the foot moved the ribs and spine on this side as well as continuing with movements of the arm in conjunction with the trunk and pelvis. Only then did I approach the left side again, and in doing so I also brought Brenda's awareness to the differences. As I sensed improvement, such as feeling that ribs and spine began to respond when I pressed the left foot, I checked with Brenda to find out whether she felt the difference. She did and indicated that she really appreciated sensing herself in moving. Moving the arm head and shoulder all together I was able to slowly, passively move her hand to touch her shoulder and then her neck and finally her face. At no time did I attempt to move her past any resistance that I sensed in her.

Now in the fifth session I feel that when I move her arm, the ribs follow. I ask Brenda to take my hand and move it in space. This she does by catching my hand in her still spastically contracted fingers. But her arm and shoulder are no longer behaving in a spastic pattern of fixed contractions. I ask her to move me wherever she wishes. This she does lifting my arm, pushing it forward, pulling it back. Suddenly she realizes that she can move me, and, therefore herself to places that were unreachable when we started together. It is as if this functioning came out of nowhere. Later Brenda tells me that she has caught herself spontaneously using her left side in situations where previously she would never have considered it.

We work more with the hand. I have her touch and feel my hand, touch herself and stroke herself. In my moving her passively to bring her hand to herself in previous sessions, I arranged her fingers, as they diminished in their spasticity, to touch her neck or her face. We work also with her sensation and perception. How she feels and identifies each finger and feels where they are in space and in movement. It turns out that her sense of space and movement is not reliable whereas touch is. As she uses the hand in the small ways that are possible, in touching, feeling, her sensation becomes more accurate.

What is different about our work together. There are elements here of communication and contact, my ability to sense at all times what is going on with

Brenda and stopping when it is too much, or when she begins to resist. There is the support I am able to give her, so that she trusts that my touch is safe, that I will respect her space and being. There are aspects of my skill that allow me to be intentional without being invasive, that allow me to guide without ever needing to be forceful. There is my constant reminder that there is no need to succeed, that success will follow process. I evoke a coupling that allows Brenda to find a new possibility. I do not give her any information, but out of the coupling, the dance we do together, she senses differences and in effect creates new information. Each one of us avoid the arrogance of thinking that we are responsible for what happens in the lesson.

How is such a dance possible without consciousness, aware-ing at an expanded level? I must take into account Brenda as a thinking, feeling, breathing being. There is no way to achieve any result without accounting for the phenomenological, how she is experiencing the exchange between us, and what I am experiencing. We are coupled together so that although I cannot get inside her feelings, I can still respond to that through my feeling of her movement, and response to me. Consciousness can be eradicated in abstract thought, not in the lived world.

Some Conclusions

The perspective we have outlined here has, as I have shown through a number of concrete instances, empirical justification. I believe such a perspective has the power to resolve a number of continuing difficulties in the ongoing debates about consciousness, AI, cognition, etc. It is not my purpose here to do this. I would like, however, to point out that we can make some conclusions and actually eliminate some approaches to the problem at hand. I am forced to conclude through the medium of my approach, that I come close to a very direct contact, nervous system to nervous system in the practice of my lessons. The kinds of ways that the people that I work with change their patterns is indicative of this, as is the ways that I can work with myself. I make my conclusions, then, based on the practical consequences.

One conclusion is that the nervous system responds to the impress of entire connected functions and structurally shifts to a better state of organization. Bits and pieces which have no particular meaning or relation to anything else have no effect. That's why trying to move the fingers of a person whose hand is paralyzed by stroke has very limited effect, but as in Brenda's case getting her to move me results in a profound reduction in her muscular spasticity, and the beginnings of her own movement capability. Similarly with Jeff, the contact with his entire skeleton simulating the function of standing on his leg brings back the image of his foot. It is clear then, for human beings, and for other living creatures, the whole is indeed greater than the parts. A corollary of this is that the level of change in the nervous system is the level of meaning. Change must be connected to life.

The phenomenological perspective can not be eliminated. One could say that one operates one's nervous system through the highest level of organization, which implies experience and consciousness.

Reductionism, one can conclude, is neither a pragmatic, nor effective approach to working with people at this level, nor to understanding the integrative aspects of the nervous system. To cite the example of movement science, years of attempts to

understand coordinated human movement experimentally by trying to work at the level of individual motor units or some such bottom up approach has been spectacularly unproductive. Latash (1996) writes of this kind of approach as "trying to understand its (a complex system) function on the basis of the summed activity of its elements." "Apparently," he concludes, "this is a dead end route.":

If this is so for a supposedly tractable problem such as the integration of the muscular system for movement, what then for studying consciousness? Fortunately this kind of impasse is leading to new directions. There is certainly research that is beginning to show that some kind of dynamic systems approach will be necessary. To cite one example: Walter Freeman in his investigations of the olfactory bulb in rabbits showed a number of startling things (Freeman, 1995). First that the initial signals from the smell receptors vanished in the cerebral cortex, and were replaced by a new pattern of cortical activity. Second that when the rabbit was reconditioned to a different response to the same stimulus (smell), a new pattern emerged, and that all the conditioned patterns to other smells shifted also. There may be good reason to believe that a nervous system does not deal with nor store raw sense data. If the responses of a higher animal relate to the meaning of a stimulus in regard to how the animal will act in the environment, we are dealing with a high level of biological complexity. This includes for higher animals the social environment. One could conclude that any project to explain even such a direct observable as behavior on the basis of knowing the precise state of the nervous system is doomed to failure.

How then can we enlarge our understanding of our nervous system and its relation to the phenomenological realm, and consciousness? The organization of such a system requires the organization of effective action and movement as a ground for all further cognitive development. This is the major task of a nervous system. The corollary is that movement is essential to the task of self organizing the system. Very little has been explored scientifically in this realm. Some authors, Maturana and Varela (1984), Gerald Edelman (1987), have seen the essential importance of movement to understanding the nervous system and biological systems in general. Recently there has been a revival of dynamic systems theory in understanding movement and the brain. I suggest two sources, Kelso (1995), and Thelen and Smith (1994) for overviews.

Whatever we want to say about the act of consciousness, we are always in it, and cannot escape to independently corroborate anything. Nor can we escape the fact that we live, develop, learn, organize our nervous systems in connection with a community of fellow beings. We have to assume that this is so for all higher living creatures. We can not have a separate understanding of the brain or consciousness without understanding experiencing, without accounting for the details of the phenomenology of lived experience. This experience can indeed be shared. What is needed is more exploration at the top level, which includes accurate study of the influence of consciousness on consciousness itself. Such a project has been endorsed by at least a few investigators recently. I mention particularly Nunez (1997), Varela (1996), and Wilbur (1997). I hope what I have contributed here helps further this understanding. Hopefully it will lead also to new explorations at the lower level of the operations of the nervous system itself.

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