

Article

Epistemology for the Feldenkrais Method

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PhD

Abstract

This article reflects on the experiential impact of a Feldenkrais Method lesson for a client and the difficulties in describing and evaluating these changes of feelings and/or self-perception. The importance of including in research observations these experiential aspects of our practice, alongside classic scientific methodologies, is presented. Especially important are the surprising observations that occur as a consequence of the empirical approach used in our practice. These observations need to be taken seriously by researchers, psychologists, medical practitioners, etc. and investigated in more detail. How can we demonstrate them to others and how can we induce researchers to look into our questions? We need research that excites and expands the basis of what we do.

Keywords

Feldenkrais Method, case study, epistemology, experience, research outcomes, evaluation, observation, scientific method

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Position Paper: EPISTEMOLOGY FOR THE FELDENKRAIS METHOD

Carl Ginsburg, Ph.D.

I recently gave a Functional Integration (FI) lesson to a young woman who was in distress. I knew her briefly as a student in a Feldenkrais training group where I was a guest trainer, and had given a lesson to her once before in connection with the training. After the lesson she wrote me the following:

“Thank you for the FI on Saturday. It was a return to my home (myself) and I recognized I’m on the right way. It was a liberation and the feeling for gladness. I believe the power I felt will help me to find the right solution.”

The experiential consequences of the lesson while personal to her situation and expressed in relation to her path in life in feeling terms was not an accidental outcome of the lesson. Observably, the shifts in her structure and functioning as measured by visual and touch observation at the end of the lesson, led me to predict to myself that she would have a different self perception and self feeling as a consequence of the lesson. The lesson itself was predicated on my ability to make precise contact with her in such a way that the small movements I made in this contact would evoke in her the necessary neuro-muscular and structural skeletal shifts that were necessary to a resolution of her discomfort.

The result of any lesson does not of course mean that the new state is permanent. Life is full of contingencies and the new learning needs to be used in daily life. Further learning is also important. Nevertheless shifts of a person’s embodied state seem a common outcome of an effective lesson.

What I am trying to point out here is that the work I do in teaching through my hands or in classes for Awareness Through Movement (ATM) is a precise art and perhaps even a science. Yet to evaluate this art seems like an intractable problem for a science based on ‘objective’ data and third person observation alone. How do you evaluate “a return to my home” and “a feeling of gladness”? How could an outside observer evaluate the precision of my touch without personally feeling what I can do and corroborate that my feeling sense is in fact precise in the way I claim. And then could any person detect precision? People vary in such a capacity depending on experience and such factors of the state of their nervous system. And then the precision is within the contact space between the person and me. The specific outcome of the lesson is not predictable from the technique or the contact. It is the dance between us that counts, and the state of each of us at the moment.

Recently another young woman who was born with a neuropathy that left her without feeling in her lower legs and feet received a lesson from me about

standing, walking and balancing. She also was in training and having arrived at the training barely capable of walking, was now quite functional while still having to gird herself to maintain balance. In my lesson I rolled the bottom of her feet over a Styrofoam roller and later put each foot the long way on the roller and asked her to lift her pelvis on that side. She was lying on her back. After I worked with one side, I asked her to experience herself standing. Her first reaction was that she had sensations in her foot that were entirely new to her and she felt a steadiness on this side that felt quite novel to her. She expressed her sensation as “feeling the bones of her foot”. At the end of the lesson she walked with a security she never experienced before. The experience led to tears and a powerful relief after a lifetime of struggle. Here the change was dramatic given the life history of the young woman’s difficulty. One could say there is no need for a controlled study since the person is unique and the improvement is measured in terms of comparing the change with the past state of the person.

Afterwards the class had a discussion about the lesson. A person who was trained in the medical field asked how it was possible for this young woman to feel anything in her foot given that she suffered the neuropathy, which interferes with nerve transmission? From the person’s point of view, the whole thing was suspect and maybe the woman just imagined some sensation. From the person’s training and understanding the diagnosis of neuropathy meant that such feeling was impossible. The evidence I detected in touching and moving the young woman’s head in gravity while she was sitting indicated that from a very shaky balance before the lesson her reactions to shifts in gravity changed. The irregular reactions to movement disappeared. For me, this was observed evidence that a profound shift in her system occurred. Truthfully I didn’t care whether it was possible in scientific understanding. I could only consider her report as truthful to her experience at the moment. And it was consistent with the functional change in her foot in relation to standing and walking. It was certainly consistent with her experience of new sensations in her feet.

For the young woman, the lesson was a triumph because her physicians had often told her she could never improve her condition. As far as she could find out the diagnosis of neuropathy meant that her feeling sense was impaired for the rest of her life. The diagnosis had no meaning beyond that, as no one could explain further or suggest how to help.

The question is, where is the difficulty? Do we need to expand our understanding of what is valid? Are the standards of classical scientific investigation and the accompanying model of epistemology adequate to the task of dealing with the high level of complexity exhibited by living organisms? How can we incorporate experiential material in ways that can be appreciated as valid? All these questions are pertinent to research into the validity of the Feldenkrais Method.

Limitations of Classic Scientific Methodologies

Classic scientific epistemology established a norm of scientific investigation that very successfully dealt with questions of pre-quantum physical science where clear-cut cause-effect relationships exist. The sciences of living organisms adopted similar methodologies partly with the intent of establishing the same rigor and certitude for biology, psychology and other related sciences. What we know from the findings of researchers during the past 150 years has added tremendously to the store of knowledge available to these sciences and to the practice of medicine. Yet as with the physical sciences, more knowledge has led to impasses and revisions. In physics, the discovery of atomic level phenomena has led to re-assessments of the notion of cause and effect and the understanding of the nature of physical entities. In the life sciences, the immense accumulation of findings has given us a glimpse of mechanisms and understanding of life's processes. Yet at each point of seeming satisfaction with explanations, new findings have upset the apple cart. I offer just one example: Early experimentation established the fact that nerve cells seem to transmit information via periodic impulses which release neuro-transmitters to pass the signal to the next neuron. Seemingly the neuron and the synapse where the neuro-transmitters are released were fixed entities. Signals were passed forward to processing areas. Changes such as happen in learning involved changes in the synapse, which increased the probability that the neuron would pass on the signals to the next neuron.

From the resemblance of this process to transmission of electrical signals in devices such as computers, scientists postulated that sensory information was projected forward to the higher centers of the nervous system where the information was processed in fixed nerve nets and then turned into output. The brain in other words was a digital machine in which nerve impulses behaved like impulses in a computer and input was directly linked to output. This model is still frequently invoked to explain brain activity such as controlling movement or speech. New findings suggest that this simple model is not at all accurate even as a simplification for heuristic purposes. Professor John Smythies in the introduction of his book, *The Dynamic Neuron*, states, "Recent research, however, has shown that this classic picture is wildly inaccurate."ⁱ

Just to point out what is now better understood: Neurons are not simple cause and effect linear transmitting devices, but are governed through dynamic processes that can involve non linear bifurcations, integrations, synchronizations, etc. following complex relations within the context of processing. Even at the level of the release of transmitters complex dynamic processes prevail. In the highly intersecting web of neurons, neurons are always connected in tandem between brain areas so that while feed-forward signals move between area A and area B, feedback signals are also directed back to A.ⁱⁱ This is also true for all the sensory surfaces. In addition, some neurons are directing activity while others are inhibiting transmissions creating a tensegrity dynamics.ⁱⁱⁱ Without such

balance of activity, order could not be formed in the nervous system. Lastly single neurons are never active as individual units but are linked into dynamic cell assemblies in brain activity through integrative processes including synchronization, and multifarious rhythmic activities. While brain dynamics is at a beginning stage of development, dynamic processes seem to govern the activity of life at all levels from the molecular and cellular level to the level of organisms and then to the level of the environment. Life is complex in a way that was unimagined not so many years ago.

The realization of this complexity of living systems has slowly shifted the concepts by which we understand the workings of life on the planet. As the conceptual structure changes it becomes clear that findings are often maintained, but they are not definitive in establishing interpretations. New findings may clarify issues; on the other hand proof of any specific theory or hypothesis is elusive. As E. T. Gendlin puts it, "Theories can contradict each other, but findings cannot."^{iv} Complexity challenges many long held theories in biology, psychology, sociology, medicine, etc. But it is interesting to note that in narrowing areas of inquiry, the conflict of interpretations became common.

Gendlin gives as an example the historical conflict between behavioral psychologists who study animals in the laboratory and ethologists, who study animals in the wild. The findings of the behaviorists about conditioned learning stand in relation to the learning phenomenon of conditioning as do the findings of ethologists that animals exhibit many complex behaviors that seem to never have been learned. The contexts under which the observations were made are completely different. Their respective theoretical and conceptual frameworks clashed and each side made universal pronouncements from the findings. There is a myth of scientific proof that hides the question of interpretation. With new findings, we can now say neither side of such debates could be definitive with regard to general laws. For example, the laws of learning developed by behaviorists are specific only to learning through conditioning. For the ethologists, the behaviors considered were valid for only the question of a released behavior, and not the behavior in relation to animal's interactions in its living situation. Neither side in this debate addressed the question of developmental learning, which was hidden behind the theoretical stance taken either in favor of conditioning or released behavior. As Moshe Feldenkrais demonstrated, developmental learning and the use of awareness is both rapid and overcomes the limitations of conditioning and habit. Developmental learning is perhaps a prime example of the efficacy of dynamic processes in the self-organization of order in a living being. Complexity does not mean anything goes. The order evolves out of the interaction of the person in the environment, which includes other humans and the structure of the world including gravity. The person finds the order that works through the interaction in calibrating the nervous system to the world. The environment doesn't cause the learning and there is no program to guide the process. Each normal person reaches the same developmental steps, but in a personal and unique way.

In some disciplines the recognition of complexity lags. Much medical and psychological research has continued without changing basic cause – effect thinking. Such thinking while sometimes useful surely has its pitfalls. For example, in our society, medical research is considered the pathway to developing valid methods of treatment. Its successes in understanding many disease processes are abundant enough to justify such a designation. Yet the lack of recognition of complexity often leads to what seem intractable problems, often hidden under the notion of side effects. Thus the use of antibiotics has resulted in the appearance of so called super bugs which resist these life saving medication and result in serious illness and death. There are many other egregious examples involving the misuse of drugs and the effect of overprescribing, as well as the unrecognized suffering that can result from surgery and its overuse. In diseases such as cancer where there is still little understanding despite many years of intense research, the major resort is to heroic medicine involving radiation and chemotherapy, which can kill as well as save some lives. With advances in molecular biology the complexity of living systems still remain as an impediment to unlocking many mysteries of life.

Nevertheless, we often still hold on to the myth of classic scientific proof. The practice of science proceeds slowly at best and always with revision of previously held beliefs. This has its good side in that inadequate ideas eventually get replaced. But often the very practice of rigorous procedures to find certainty may hide what we need to find out. This is particularly so in the basic approach to a scientific method, which extols the idea of creating specific limited experiments to test hypotheses. Scientific progress often requires thinking outside of the box. Sticking to common practice can be an impediment to finding answers.

. As an example, the drive in current medical practice is to find the nirvana of exactitude through data. This particular attempt at hard science can have unexpected consequences. Most egregious at the present is the near universal reliance on hard measurable data to carry out diagnosis and treatment. The attempt here is to eliminate the human observer and thinker. Harvard medical professor Jerome Groopman, documents in his book *How Doctors Think*^v a number of cases in which failures of proper diagnosis occurred. The extent of misdiagnosis or failure to find a diagnosis is probably unknown. But anecdotally one hears of numerous cases. Groopman tries to show that the difficulty is all too human, that jumping to conclusions and not attending to the person often leads to error as physicians focus attention only on tests, body scans, and other data. Nicholai Bernstein pointed out many years ago that “an elderly experienced physician needs simply to glance at a patient with his weak eyes to diagnose an old, neglected disease, whereas young medical students cannot do so with their young acute eyes.”^{vi} Good observation then requires an attentive, aware, and perceptive human observer in addition to data and other accoutrements of modern technology. But even to understand hard data and ask the right questions requires human observation and thinking. One wants exactitude but

often gets statistical inference. Life involves complexity at every level. Scientific procedures that were developed for understanding simple mechanical systems are inadequate for complexity. The growth of statistical methodologies for testing everything covers up a great deal of ignorance.

Gendlin points out one other difficulty in science. "Science does not include its context. One result of this is that when it has a satisfactory analysis, it finds no reason to pursue the existence of anything it has not found. Then it claims to know all the factors."^{vii} Complexity often kicks back. The inventors of antibiotics never imagined that the use of these agents would result in the evolution of super bacteria that resisted the effects of the antibiotics. Gendlin says, "Actual events are interactions, never just patterns and factors."

The Cyberneticist's Debate

Around 1970 a small group of thinkers began to grapple with the implications for scientific epistemology of a new idea about living systems. These were the cyberneticists who had been gathering together from the 1950 onward to discuss the then new concepts of feedback, internal circularity, information, cognition, and how these concepts could change thinking about life processes, and control at different levels from the cell to society. These were the considerations that moved thinking toward the current dynamic view. In a recent publication, *The Certainty of Uncertainty*, Bernhard Poerksen dialogs with a number of people involved with this movement.^{viii} One can trace in these discussions the evolution of a new epistemology, which could begin to replace 'the view from nowhere' characteristic of the objectivist stance. The idea of objective procedures was to eliminate human bias and error from scientific observation and the search for truth. In the first dialog in this book, Heinz von Foerster, at one time the Director of the Biological Computer Laboratory at the University of Illinois, and the secretary of the Macy Conferences on Cybernetics notes, "The moment you try to eliminate the properties of the observer, you create a vacuum: There isn't anyone left to observe anything – and to tell us about it."^{ix} Poerksen then notes that Heinz was quoted as saying, "Objectivity is the subject's delusion that observing can be done without him." The human being in this view is essential to developing findings and interpreting. Poerksen also notes that Heinz's ethical stance involves an awareness of one's blind spots. Nevertheless, there is an opening here to a giving up of any objectivity if such is possible.

In another dialog, Chilean biologist Humberto Maturana Maturana, who was also a friend of Heinz von Foerster, says, "Becoming aware that one is doing the observing and then being aware of being aware that it is one's self who makes the distinctions, one attains a new domain of experience."^x It requires a kind of responsibility. He says later, "The concept of the observer is a challenge to study the operation of the observer and to face up to the circularity of the understanding of understanding... My proposal, however, is to accept this circularity fully right from the start and make one's self the instrument by which

the question of one's personal experience and one's own actions is to be answered through one's very own activities." One can then question the hidden assumptions and hidden epistemology of experiments. In the objective stance we are attempting to correlate our activity or the activity of a subject to the external world. For Maturana it dawned on him "that the correlation I was looking for could in all probability never be established." He shifted his researching to the internal correlations in a system.

Maturana's colleague and student Francisco Varela, who at the end of his life was research director of the Centre National de Recherche Scientifique in Paris, said in his dialog, "...scientific truth does not consist in the correspondence between theory and reality. Scientific knowledge is inevitably related to circumstances of the social world and – between virtual quotes – *the reality*." And, "My concept of truth...is best understood as a theory of coherence: what counts is the consistency of theories, the coherence of viewpoints. Truth is, the motto of pragmatism proclaims, what works." ^{xi}

What can we do with all of this? These observations can lead to an abandonment of all notions of an ultimate reality and objective truth. At the extreme the temptation is to move to the stance of post modernism and the notion that we humans are continually constructing our own reality. Anything goes. Gendlin says, "Currently many philosophers say that 'nature' is a cultural idea. The scientific universe seems a mere 'construction.' If you don't like your findings, just change your hypothesis. Science is just a game."^{xii} He then points out the following: "Since we arrive by airplane at our conventions, let us not announce there that science is a mere construction. While in the air we have been hoping that factors such as the weight, speed, and amount of fuel have been correctly calculated in relation to the curvature of the wing."

Can we be Precise without a Classic Epistemology?

Last evening a young man came to me in a lot of pain with a back spasm. He could not fully erect his spine. This morning he called to thank me profusely. He was out of pain except for a few twinges; he slept well; he was now moveable. How did that happen? Was it science or magic? Or hypnotism? In fact I observed the evening before that he was sufficiently improved. I could with good chance predict that he would be much more moveable, be capable of erecting his spine, and mostly out of pain the following day. There must be a valid empiricism in the process. There is clearly enough regularity in the nature of human beings as moving, living beings. But how can it be described in a meaningful way?

Many people would want to put the process to a double blind test. Take so many people with back spasm and pain. Divide them into a control group (do nothing), and others into different intervention groups. Evaluate the results by people who do not know which person was in which group. Find out if there is statistical significance. But my process is not a singular organized, algorithmic

intervention and back spasm pain is not a singular defined ailment that would require a singular intervention. When you observe carefully, each person's back spasm has different patterns and resulted from different processes. A double blind study does not make sense. Furthermore, there is not any new information to discover in such a study. It is a blind alley. I am not an aspirin. I contend with the evidence of much prior experience that I could repeat similar successes with many people in such a situation. Other Feldenkrais Practitioners might also repeat successes and others not. We are not all equal in our skillfulness and awareness. Is there any way to establish public validity? As long as 'experts' insist on a standard epistemological process, it appears not possible. I contend this standard is both limited in its application, and such insistence a political maneuver to protect the socially agreed upon consensus. But worse, I contend that following a fixed protocol and standard procedure would fail to achieve consistent results.

And do We Need a New Empiricism?

At this point at the beginning of the twenty-first century, the answer seems to be yes. Where scientists have begun to consider the extent of complexity in all of life and in the relation to environments, it becomes clearer that we need to investigate beyond the simple stories we have accepted for understanding ourselves and other life forms. In his paper of 1997, E.T. Gendlin dissects the epistemological problem in a very interesting way that should be of interest to we Feldenkrais practitioners. Gendlin is both a philosopher and a psychologist who is most famous for his work in developing experiential psychotherapy, and for his process known as *Focusing*.^{xiii} The process involves teaching people to contact the embodied *felt sense* that accompanies us in daily life, often unrecognized. Recognition and processing the meanings involved can become a gateway to reorganizing the psyche, thus Gendlin's interest in an empiricism, which acknowledges experience and alternative routes to validation. The title of this paper, "The Responsive Order: A New Empiricism," introduces a new term and one that should prove to be very valuable to us, the *responsive order*.

The responsive order goes beyond the logical order that sits behind classic epistemology. The logical order need not be abandoned. But the responsive order includes "us and our procedures." Thus the human observer is brought back into the picture as is the complexity of interaction between observer and observed is acknowledged. Moshe Feldenkrais implicitly understood this despite his training in classical objective driven science. His intent was to train himself and then other human beings to become much better observers.

The Epistemic Tools of the Feldenkrais Method

Without accurate ways of assessing the progress of the client or student in the lesson process, the outcome of the lesson can vary considerably. This is so for FI lessons as well as in teaching ATM. In a successful ATM teaching, the

practitioner assesses the students' progress and modifies the lesson in response. In a successful FI, the practitioner has a sense of what needs to be learned and can detect when learning has occurred through touching, contacting and observing visually and kinesthetically. When moments of shift occur for the client, mutually acknowledging the change verbally or non-verbally can affect the outcome for the better. In the lesson with the young man with back pain, I used touching and moving my client as the primary source for finding out what I needed to know, but also for what he needed to know. When I felt a change, for example, in how he allowed his pelvis to move, I asked if he noticed a difference. His acknowledgement then signaled that I could move on. While I did not follow a fixed protocol, I did create a natural progression for the process. In doing so, I also created a contact and presence with him that deepened a trust and connection between us. Without this, he very well might not have been able to make the shifts necessary for a successful outcome.

What are the conditions for this practical success? We know as practitioners from our personal experience, that our nervous system requires a quiet safe state for this kind of learning and changing patterns. Thus we are trained through the experiential process of our training to quiet ourselves, to listen to our sensations, to use our hands and bodies as instruments for contact and further listening, and to use the experience of our own kinesthetic sense in expanding self-understanding as well as an ability to access what can work for others. We have learned also specific techniques that can evoke outcomes. In the growth process of the training, we develop an accuracy in this that exceeds other methods of assessment. We become better human instruments. We develop a useful implicit knowledge. We are responsive to a context and situation. These are our epistemic tools. We use them to know how to proceed. At the same time we avoid declaring an objective 'truth.' Our measure is the outcome of the process. How can we use our learned skills to establish both a research track and public accountability?

Primarily, I believe, we have to expand our abilities to document our work. Science is not adverse to carefully documented observations. I cite two examples: Psychologist Paul Ekman inspired by Charles Darwin's study of emotional expression in humans and animals began his career by studying whether people in different cultures could recognize emotional states from observing pictures of human faces.^{xiv} There is a cross here between inner experience of emotions and outer expression. Ekman eventually studied his own facial movement by detecting how to move each facial muscle movement until he could express different emotions and subtle variations. His research has been well published, but he also teaches people who need such skills to read emotional expression, even slight flickerings of facial movement, which expose feelings that a subject may want to hide.

As a second example I include Daniel Stern's research into infant – mother interactions.^{xv} Here Stern used videotaped data to infer interactive states

between mother and child by working in a team to develop a consistent way to evaluate the video material, and train others in observing. This work was a great departure from previous objective based observing in which human interaction was considered as invalidating observations. He created a revolution in thinking about infant development. In later work, he explored the experience of present moments in daily life through a process called the micro-analytic interview in which experimenter and subject discuss a particular experience through back and forth examination in detail until a verbal statement is considered a valid expression of the incident.^{xvi}

Although Feldenkrais, trained as he was in objective science, thought hard as to how he could use such methodology to publically validate his discoveries. He found the challenge too daunting in relation to his need to spread his work in training others to develop the necessary skills and abilities. However, everything he presented was tested in practice with his assistants. The moves he developed in FI work were tried out with others and he had his assistants try the procedures out with himself until the effectiveness in learning was clear.^{xvii} ATM was also tested with groups and Feldenkrais taped his presentations and adjusted his directions until he could observe improvement in the results with his classes.^{xviii} In other words, he expanded his idea of the scientific experiment to develop his work by crossing the objective procedure with the subjective evaluation. It depended, of course, on his own and his assistants observational skills. The subjective evaluation is indeed in the realm of what Gendlin calls the responsive order.

What Do We Need to Do?

In the light of what I have outlined so far we need to take certain actions individually and communally. First we need to document our work with video, interviews, follow up, postural assessment, etc. We need to analyze our better lessons and keep notes about what seemed to succeed. A lot of material from the training groups and individual practice is already available even though it has not been used for formal evaluation. We can learn to use this material in a way that expands our understanding. For example, noting how the practitioner may use an unusual position and try it out to see what effect it has and then compare with alternatives. Second, we need to train ourselves to observe the material and find other expert evaluators to find out what can be seen in the documentation. Human observers are indeed more sensitive than mechanical movement recording as used in the movement laboratory. Third, we need to train ourselves in describing the experiential realms of feeling and affect as well as sensory changes to be much more precise. In this Gendlin's work can be very helpful, especially his work in learning to describe the felt sense.^{xix} I would propose that the Research Committee could find practitioners who could form groups to carry out these tasks and perhaps find experts to guide us in the learning. Lastly I would propose that we look into research questions that make sense to us and

take advantage of new techniques that can reveal changes in the nervous system.

What I mean in this is that we need to research what we do not know, not what could be obviously demonstrated. With an ATM about turning, we can obviously demonstrate that people can turn further after the ATM process. On the other hand only research using some form of brain scanning might reveal if doing ATM over a period of time would enhance the growth of some parts of the brain. Other research needs to be done to validate procedures that are part of our repertoire. For example, does reducing effort and slowing the process actually enhance learning possibilities? Does connecting through the skeleton out of gravity result in changes in muscular organization along the pathway of connecting? Does feeling a new stability after a lesson or series of lessons result in different feeling and affective states for a person? I am sure many other such questions can come to mind.

One aspect of research needs to involve those aspects of our work that can inform other investigators. There are surprising observations that occur as a consequence especially of the empirical approach used in our practice. The first is that the observation of organized movement, posture, and tonus for a subject turns out to have direct links to the states of the nervous system. The second is that changes in these observed characteristics imply direct changes in the nervous system. This should be an obvious conclusion since the states of the musculature are directed through nervous system activation. It is little noted by other observers outside our work. We also observe that feeling states are linked, although not necessarily one to one, to embodied neuromuscular activity. Thus the most direct connection to a person's nervous system is through the body and through modifications of states of mobilization and organization of tonus. Since these factors are directly linked to skeletal organization in gravity, what we call posture or what Feldenkrais called acture in a living, moving being has deep connection to all other nervous system activity including the autonomic nervous system. Changes then will relate to affect, emotion, the feeling of well being, and numerous other experiential qualities in life. I believe these observations need to be taken seriously by researchers, psychologists, medical practitioners, etc. and investigated in more detail. How can we demonstrate them to others and how can we induce researchers to look into our questions? We need research that excites and expands the basis of what we do. At this point we need to act rather than creating more discussion.

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ⁱ J. Smythies, 2002, *The Dynamic Neuron*, MIT Press, Cambridge, MA. (p. 2).

ⁱⁱ See M. Spivey, 2007, *The Continuity of Mind*, Oxford Univ. Press, New York, NY, particularly Chapter 5.

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- ⁱⁱⁱ G. Buzszki, 2006, *Rhythms of the Brain*, Oxford Univ. Press, New York, NY, particularly Cycle 3, where he states, "Tensegrity dynamics can be maintained only if the excitatory effects are balanced by equally effective inhibitory forces, provided by specialized inhibitory neurons. If only excitatory neurons were present in the brain, neurons could not create form or order or secure some autonomy for themselves." (P. 61).
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- ^v J. Groopman, 2006, *How Doctors Think*, Houghton Mifflin Company, Boston, MA.
- ^{vi} N. Bernstein, 1996, On Dexterity and Its Development, in M. Latash and M. Turvey (eds.), *Dexterity and Its Development*, NetLibrary, Inc., Boulder, CO, (p. 107). Bernstein wrote this text in the 1940s in the Soviet Union and before it could be published it was suppressed. It was recovered and translated by his student, Professor Latash.
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- ^{viii} B. Poerksen, 2004, *The Certainty of Uncertainty: Dialogues Introducing Constructivism*, Imprint Academic, Brampford Speke, Exeter, GBR.
- ^{ix} Poerksen, 2004, (P. 2)
- ^x Poerksen, 2004, (p. 52)
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- ^{xii} Gendlin, 1997, (p. 3)
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- ^{xix} Gendlin, 1981.