

# Posture & Perception in the Context of the Tonic Function Model of Structural Integration: an Introduction

Kevin Frank

---

*Kevin Frank is an Advanced Rolfing and Movement Teacher. His work focuses on articulating and integrating Hubert Godard's tonic function perspective. He and Caryn McHose are the authors of "How Life Moves: Explorations in Meaning & Body Awareness", and co-founders of Resources in Movement, a center for movement and consciousness inquiry in Holderness, NH. Their website is [www.resourcesinmovement.com](http://www.resourcesinmovement.com).*

---

*Abstract: Each of us shapes our world as our brain organizes a perception of it. Our perception of the world also shapes our body. Structural integration claims to help shift the shape of the body—to shift posture. The basis of posture is found in something called attitude. Attitude is revealed in the gravity orientation of the senses, in orientation of perception. The positions of two gravity centers (two theoretical points in the body—G and G') make gravity orientation of the senses observable. These two gravity centers describe the basis of a person's postural pattern. A person's postural pattern is linked to his/her perceptual pattern. Rolf states that a person's fascia and his/her relationship with gravity are two forces that determine posture. Gravity orientation with regard to perception provides clarification of Rolf's gravity-relationship concept.*

## What is Posture?

Posture is a central topic for Structural Integration. Rolf used standing posture as her chief measure of body integration and her book contains many photographs of standing posture.<sup>i</sup> What is posture, though? Is it an expression of the shape of the bones, the resultant shape of fascial forces? Is it habit? Is it equivalent to the "structure" in structural integration?

In a fall 2006 issue of *Massage and Bodywork* magazine Myers states that posture is "a pattern of movement... We are always moving, shifting, balancing, adapting..."<sup>iii</sup> We do though, as Myers illustrates, develop signature body shape, static, and in motion. Structural integration claims to help people change that signature.

Traditionally, SI practitioners mobilize fascia to rebuild postural health. Implicitly SI practitioners also rebuild coordination. If coordination changes, a person's being has been

willing to innovate. The tonic function model of SI highlights coordinative change as a useful measure of integration.<sup>iii</sup>

Godard, the originator of the tonic function model<sup>iv</sup>, defines posture as "crystallization of attitude."<sup>v</sup> We see in posture the manner in which a person meets the world, and allows the world to meet him/her. How we meet the world is an intimate coordination, not designed for casual adjustment. Yet it can change. Why and how does it do so?

## Posture is Coordination

Posture shows how the body actively stabilizes and arranges itself. Like any movement, postural activity is coordination. Coordination means the timing and recruitment of muscles specific to a particular function. It is an orchestration that the body draws on for dependable stability in each situation. Some coordinative patterns are hard wired. Most are learned, as an adaptation to life's challenges, to each situation.

What is meant by situation? Gravity is one part of the situation, usually a constant. Each new situation we encounter in life involves decoding the action and space around us, finding a specific meaning within the context. Context is another word for situation. Each context demands a response.

Weiner, the cybernetics pioneer, said that we are bombarded by a stream of "to whom it may concern messages,"<sup>vi</sup> and we actively select and interpret the messages that are relevant to us. Choosing certain messages, making meaning, building a sense of our context is a huge part of what we do. It is appropriate to call this activity a building process, because we do build it, like a

house, to live in. Our brain builds a version of the world into which all our other actions are gestures within that specific world.

### **We Build Perceptions, Build the World, and Build Body Shape**

Each new situation is largely a problem of organizing what strikes us into something we know how to react to. Our primary need is to build a sense perception, to build the perception of our context. The world exists because we build it as a perception. In building the perception of the world, we shape the world, and at the same time we shape this body. Body shape is an outgrowth of how we build the world in our perception.

### **Perception as a Gravity Orientation Event**

If we wish to change the manner in which we build the world and build this body, if we wish to address the foundation of our attitude, we will come over and over to the same issue, the one that Rolf spoke about with such passion: gravity. Gravity is at the heart of how we build the world. Gravity organization, at the level of perception, is what Structural Integration offers the seeker of postural change, because posture will only make a lasting shift when a person finds a different way to build their world.

Behind every sense perception is the pre-perceptive movement of orientation. For example, I can sense the world through my eyes. But my gravity orientation intervenes instantly and shapes the way I see. If I look at a flower, do I receive the sense impression of the flower, so the flower is allowed to touch me? If so, my sensory organization is, for that moment at least, organizing the data (in this case - flower) from a weight orientation point of view. The flower image is received and joins the weight sense in the body.

If, on the other hand, my gaze reaches out toward the flower, my sensory organization is building a sense of the flower from my sense of the space around me. The flower image draws me out, aroused to my context. You may wish to pause and see if it is possible to build your visual sense from a weight or space orientation. Which feels most familiar?

Small changes in sensory organization unlock habit, habit interwoven with our concept of subject and object. Freedom from sensory habit is an uncoupling from effort, a feeling that sense perception isn't local. When the flower is

not experienced as object and perceiver is not felt to be subject, perception is something non-dual. To discuss pre-perceptive orientation, though, we are speaking in terms of subject and object.

How we each build the world, moment to moment—these are largely non-conscious events. We become conscious of some of them if we pay attention. A shift in how I take in the world is a perceptual shift. We shift perception as we shift our orientation.

Orientation is a dynamic background event, fluctuating between the two poles of space and ground. Orientation guides each sense or the combination of senses with a space or weight orientation point of view.

### **Perceptual Change Indicated by Body Shape**

This discussion remains abstract until we ground it. We ground these ideas with the work of structural integration. SI practitioners assess bodies by observing shape, how that shape changes, or how movement initiates and the shape of the body in movement. Static posture has been the traditional assessment tool for SI practitioners. It tells them what to do as well as what has been accomplished. Coordination is also a precise measure, a measure of how well, for example how a person walks. The emergence of contralateral gait indicates the person has recovered coordinative integrity.<sup>vii</sup> Either through static posture or through coordinative measures, SI work involves assessment of body shape.

How can we describe body shape and body initiation in language that uses gravity organization landmarks and implies perceptive orientation? What words make sense for a functional map of SI? Godard has posited a body-orientation taxonomy involving two centers of gravity, as a foundation for his tonic function model of SI.

### **Two Gravity Centers in the Body**

It is useful to define two theoretical points in the body. These points can be described as anterior or posterior from a sagittal view. They are indicators that allow us to talk about how each of us builds our world and our bodies, while not falling down.

#### **G—the Lower Center of Gravity**

The general gravity center of the body is the spot is just anterior to the vertebral bodies at a

level between S2 and L3. In the present discussion we will define it at L3. We call this point G. G is the center of gravity around which the lower girdle operates. It is also the approximate point around which the entire body is balanced so that if you were to put an axis through the body (sagittally or coronally) and then spin the whole body like a pinwheel around that axis, G would be the best place to do this.

An imagined plumb line, dropped from G, will lie posterior or anterior to the Chopart joint, that we will define here as the talo-navicular (TNJ). If anterior to the TNJ, we call this "G anterior." If the line intersects a point behind the TNJ, we call this "G posterior." (The TNJ is the apex of the longitudinal arch of the foot, an appropriate point for load bearing.)

We see/feel the position of G as a person walks when we empathize with how the weight falls onto the foot during different phases of gait. We see/feel if the weight is landing relatively more posterior on the foot or relatively more anterior, and we also sense the emphasis in the rhythm of the walk, whether the heel strike is accented or sustained or lessened or avoided. We sense the position of G in static posture also, using touch to feel the quality of a client's postural sway, forward and back. It is possible to sense the neutral point of the sway and then infer the place of preference in the client's G position by actively moving the client forward or back.

(In physiotherapy, a device called a "force platform" measures the distribution of weight on the feet and show G positional preference in a statistically satisfying manner. The force platform locates the projection of G on the floor, and shows the frequency of postural sway, and the Romberg test which compares the sway with open and closed eyes. The difficulty for postural diagnosis is that the position of G can be the same in two individuals with very different postural strategies. The position of G may move only a small amount but the position of the trunk can be at the same time quite different.)

#### G'—the Upper Center of Gravity

Godard introduced the upper center of gravity concept to the SI community by—it is an idea that comes in part from Sohier.<sup>viii</sup> G' (pronounced "G prime") defines a second gravity center that complements the traditional one and describes a separate gravity organization of the head, trunk, and shoulder girdle. In

contrast to the general gravity center G, G' is a partial gravity center since it defines gravity center for the body without pelvis and legs.

Conjure the image of someone who has focused primarily on the lower center of gravity in, for example, certain traditional martial arts forms. What is that body capable of? What are its strengths and potential functions? Can you imagine movements for which an awareness of an upper center of gravity provides further options?

G' is located in the center of the chest cavity, anterior to the vertebral body at approximately the level of T4. G' is the center of function for the upper girdle. The first session of Rolf's SI protocol is about improving the mobility, the adaptive capacity of G'.

For body analysis, G' is described as anterior or posterior. This is determined by dropping an imagined plumb line from G' and observing where it falls in relation to the transverse hip joint axis (THJA). If the plumb line falls anterior to the THJA, we call this G' anterior. If the plumb line falls posterior to the THJA, we call this G' posterior. We can feel with our hands if the front line is the primary support as it is with G' posterior, or if the back line is primary support, as it is with G' anterior. Primary support feels like constant muscle activity that prevents a person from falling over.

As of this writing, there is not yet a device that can measure the position of G', either in static posture or in a dynamic movement. Given the usefulness of the concept, creative technology may develop such a measure. Until we have a mechanical measure, however, we can observe relative shifts in the position of G' in ourselves and in others. The best way to do this is to actively use pre-perceptive shifts of orientation as will be described later in this article.

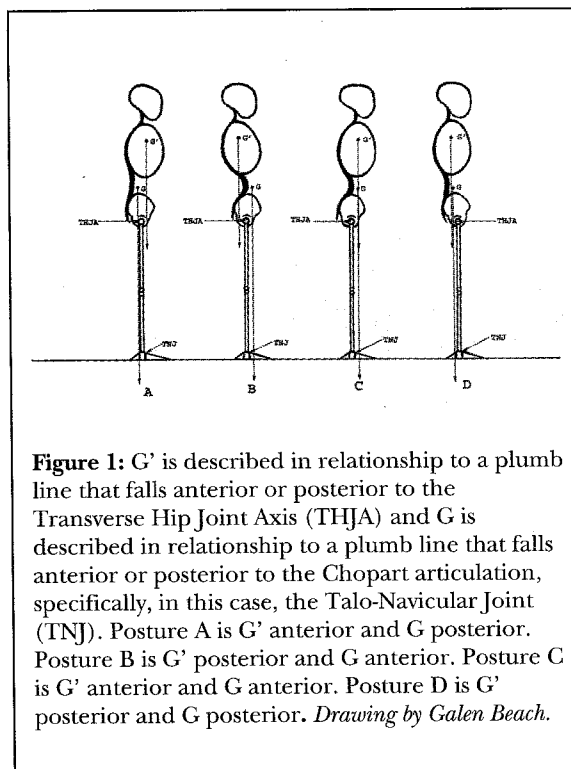
#### **Four Permutations/Combinations of Gravity Organization**

Figure 1 illustrates the four basic permutation/combinations for the position of the two gravity centers. The body has many ways to compensate for each combination. These compensations include tilt and shift of the pelvis, flattening or accentuating of the lumbar and cervical curvatures, elevating or depressing the functional transition point between the lumbar and thoracic curvature, rotation of the hip and shoulder joints, accentuated or diminished arch development, flexed or extended knees, etc.

This article doesn't address these compensatory strategies. They are, however, a rich source of discussion for Structural Integrators, and will be a topic for future articles. (For example, depending partly on congenital pre-conditions, G' posterior will generally cause femurs to rotate externally, and G' anterior will cause them to rotate internally. From this rotation will derive articular variations at the knee and foot, sometimes congruent and some in reactive compensation.)

If you are able, try out the four combinations of the gravity center positions in your own body. Although there are many variations within these four, you may feel a lot of information about structure and function from these combinations alone. You may even be surprised to notice that you suddenly recognize in yourself the pattern of another person whom you know. Do you get a sense of "attitude" as you try on each posture? Godard is quoted earlier as saying that "posture is the crystallization of attitude." What is attitude? Earlier, attitude was defined as how we meet the world. What is it like to meet the world in each of these body patterns?

How we meet the world has Earth's gravity as a constant. Also, our genetics are a constant - cell DNA shapes specific responses to embryological and developmental contexts. Context shapes attitude. Each context demands a response and each response helps birth attitude. Two hypothetical examples pertaining to early childhood illustrate: I lift my infant head to look/smell/skin-sense for food. The nipple is right here. I develop an attitude of expectation—my need and interest will be rewarded. In another example, I find the source of the nipple is distracted. I develop an attitude of agitation and projected expression to catch the attention of my caregiver. What kinds of long term attitude arise in each example? We really don't know.



**Figure 1:** G' is described in relationship to a plumb line that falls anterior or posterior to the Transverse Hip Joint Axis (THJA) and G is described in relationship to a plumb line that falls anterior or posterior to the Chopart articulation, specifically, in this case, the Talo-Navicular Joint (TNJ). Posture A is G' anterior and G posterior. Posture B is G' posterior and G anterior. Posture C is G' anterior and G anterior. Posture D is G' posterior and G posterior. *Drawing by Galen Beach.*

The story is complex, but we know attitude will be affected by experience as well as gravity and genetics.

Attitude, determined genetically or from our history, shows up in our pre-perceptive gravity orientation. We can have a weight or space orientation manner of looking with our eyes, with each of our senses. What else can we say about how that orientation couples with attitude? And then, what can we say about how attitude affects the body map involving G and G'?

### Weight and Space— Introvert and Extrovert

Jung defines introvert as an attitude in which one receives energy from the world.<sup>ix</sup> In a sense, the introvert feels "the world is in me." Perceptually, the introvert occupies the subjective position, as when in peripheral vision, the seer is the center of all that is viewed. This is termed "ego-centric" to mean just that, the self in the center.

Jung defined extrovert as an attitude in which one's impulse is to energize the world. The extrovert position feels that the world is outside—"I am *that* world." This can be called "allo-centric" (other centric) in complement to ego-centric. Focused vision exemplifies allo-centric perception as it places the object at the center of the world.

Jung's position is not far from the position of weight orientation and space orientation as each affects sense perception. We can think about attitude, at the gravity orientation level, as linked with weight and space, ego-centric and allo-centric as a two position paradigm. Integration requires, and movement reveals, that we have some of both qualities of orientation. Improved adaptive capacity, recovered coordinative intelligence—what structural integration is all about—involves helping a person gain more of what is missing, congruent with their goals and needs.

Attitude and orientation are related. Orientation, as mentioned earlier, governs sensory perception. When weight orientation is emphasized, sense impression links more strongly to proprioception, to how the body knows itself from within. When space orientation is emphasized in sensory perception, sense perception links more strongly to ex-proprioception, to how the body knows itself from without.

Each sense has a weight and space orientation version, and all manner of variation between the two extremes.

### **Attitude and Posture**

Attitude links to posture. Attitude means here how we orient our senses to gravity, our basic stance to the world as in “the world is me” or “I am that world.” How does gravity orientation of sense perception affect posture? When we experience how gravity orientation affects sense perception and feel how shifted sense perception affects posture, we can verify that perception and posture are linked.

### **We Build the World with the Eyes and Touch**

An experiment with sense perception and posture could use any sensory channel: seeing, hearing, smelling, or touch. For this discussion we use sight.

Eyes are primary in the way they are linked to constructing our internal representation of the world. Even for a sight-blinded person, there is visual perceptive activity—the visual cortex is still active because other sensory stimuli substitute for limitations in the eyes.<sup>x</sup> The visual cortex is linked to touch especially.

Touch and visual activity help build a working image of the world. These two together, touch and vision make up what is called the haptic sense.<sup>xi</sup> The haptic sense is the way we make an internal world from actively seeing and touching the world. Haptic is a useful concept because it speaks to the combination of touching, being touched, in both eyes and hand, in the same way the computer science constructs virtual reality.

Because of the link between sight and touch, and the power of how we build the world from this information, a shift in the way our eyes relate with the world is a profound shift in attitude.

### **Receiving the Visual Impression, Amplifying Weight Orientation**

An earlier example asked us how we look at a flower. We can reach out to, or we can receive the image of the flower. We can make this shift with our gaze toward all the objects around us. As we receive objects with our gaze, as we amplify the proprioceptive sense, as we make a stronger link to the inner ear that gives us the most direct sense of gravity, we are more deeply oriented to weight with our gaze. What happens to your posture as you allow the objects around you to be received with your gaze? Try this in your own body, or observe another to find out.

Typically, we will see some posterior shift of G' as orientation of sense perception shifts toward weight. A person standing or moving with G' quite forward may express the largest amount of shift posterior in this experiment. However, since most of us live with some balance of weight and space orientation, a person with G' posterior is likely to still move a little more posterior, to show some posterior shift of G'.

### **Postural Change that Supports Weight Orientation**

Why does a shift of G' in a more posterior direction accompany enhanced weight orientation in our gaze? G' is the center around which the upper girdle functions. G is the center for lower girdle function. If we initiate walk with hip, knee and ankle flexion, the walk begins with the legs, with the lower girdle, and leg initiation links to weight orientation. Weight orientation asks the question, “How do I find support from below, from the ground?” This question gets asked not in words but in coordinative logic. To find support from below the body relaxes the muscles that hold it forward, especially muscles that hold the chest and shoulder girdle forward because by doing so, the sense of weight in the legs increases.

A sense of weight orients one's posture to the vertical. This sense of weight comes mainly from pressure receptors of the feet in conjunction with other proprioceptive information (joint receptors and muscle spindles) including the inner ear.

Weight orientation in the senses, in this example the eyes, links to weight orientation in the sequence of coordinated steps that prepare for forward movement.

## Reaching with Senses—Amplifying Space Orientation

To return to our flower, what happens if our gaze reaches out toward the flower, in contrast to allowing the flower image to be received? We are always doing both, of course. Perception is a feedback system. Perception requires back and forth activity—we scan and we receive and we build our perception from many moments of both. In this example, however, we want to notice what it's like to augment one side of the equation. We wish to find out how differently we can orient in our perception and then see how this affects posture.

If you reach out with your gaze what happens—to your stance or to your walk? Let your gaze reach out to any objects within view. Try to provoke your desire to “see what's out there,” to detect the things that populate your world. What do you do to arouse this curiosity? What happens to attitude? What happens to G'?

You will probably find that G' shifts forward some amount—the amount it shifts depends on two things: your baseline and the potency of reach with your eyes.

## Postural Change that Supports Space Orientation

Why does G' shift forward when we reach with our eyes? The upper girdle and chest are the part of the body that we reach with. The reach is an action of the limbs but it is also an action of the senses, and the chest. The chest is, in fact, the most responsive part of our body to our impulses to track or respond to other.<sup>xii</sup>

The chest moves forward as the body amplifies the sense of space around it. A sense of space around the body constitutes an aspect of support different than the ground. Support improves as the body locates itself. Location precedes action for our sensory and our motor system. This is palpable when you amplify your sensory awareness (through one or more senses) to the space surrounding you. With some practice, the space around you feels substantial, and your body feels located. When the body feels its location, coordination is enhanced. (A detailed guide to creative use of weight and space orientation for sensory and movement exploration, is found in: *How Life Moves, Explorations in Meaning and Body Awareness*, by McHose and Frank<sup>xiii</sup>)

## The Dynamic of G' and G in Postural Patterns

G' may be brought anterior or posterior in response to a shift in perception, a shift at the level of gravity orientation. What about G? The position of G will, like G', be affected by genetics and history. G will also be affected by an attempt to bring the body into optimum arrangement for movement. If G' shifts forward, a congruent arrangement is for G to shift more posterior, thereby maintain lordotic curves in the spine and reducing effort in posture. If G' shifts posterior, a congruent arrangement is for G to shift more anterior, again to maintain optimal sagittal curves of the spine and least effort.

However, both G' and G can present as anterior, or both can be posterior. This is termed non-congruent. Non-congruence can be the result of different conditions. G, for various reasons, may not shift adequately to compensate the G' position. The body adapts in some other way. (Or G may overcompensate to the position of G'.) Each of these examples can be tried out in your own body, and figure 1 provides a visual guide to start from.

Flury makes a study of the permutations of postural type in his papers on shift and tilt and in his book.<sup>xiv</sup> Flury's work builds on Sultan's observations about structural types in his paper on external and internal patterns.<sup>xv</sup> Godard's model posits shift and tilt of the pelvis and internal and external rotations of the femurs as secondary responses to gravity center position. Gravity centers express most directly the manner in which a person is orienting in sense perception.

## Implications and Applications

### The Error of Making a Body Map

What are the implications of Godard's points about perception and posture for Structural Integration?

First and most importantly, we cannot infer the psychological attitude of a person by observing their posture. The link between perceptual style and posture is compelling but it is not an equation. For example, we cannot predict that a person who is G' anterior is extroverted or that a person who is G' posterior is introverted. We cannot say that G' anterior means someone is more likely to reach than to push or the opposite for some who is G' posterior.

The link between attitude and posture demands that we respect the power of perception and attitude and then become curious as to the meaning structure that also shapes a person's postural preference. Perceptual orientation is further filtered by a person's individual way of interpreting his/her perceptual experience. His/her reaction is an additional factor that shapes the body in stance and in movement initiation.

We can be curious about what aspects of orientation and perception, and personal meaning combine to produce postural preference and help clients become wise to the manner in which postural preference is reinforced through function.

### **The Role for Perception in Structural Integration**

Rolf demonstrated that lasting and sometimes dramatic shifts in function were possible through a combination of myo-fascial manipulation and movement instructions. Embedded within Rolf's protocol is a functional taxonomy, which consists of client movements, perceptual cues and sequences. Godard's tonic function model makes the functional taxonomy more explicit.

Perceptual work is often associated with integration of the "manipulative work," with bringing a client into movement. At the end of a session or series, coordinative change is something SI practitioners look for as an outcome.

The link between sense perception and posture suggests an enhanced role for perception and coordination in SI work. If we wish to affect a person's coordination of posture, in stance and in movement, we need to know how the person shapes his/her world and his/her body at the perceptual level. We improve our outcomes if we think of our fascial manipulations as education for the perceptual field of the client. We plant the seeds for our ultimate goal when we frame the work to the client in terms of coordinative change, and emphasize that coordination follow from perceptual work. Clients can be enrolled in thinking about coordination and perception if they experience the power of it at the beginning.<sup>xvi</sup>

### **Meaning Behind Weight and Space**

As we introduce clients to perceptual change, we make a substantial request. When we ask a client to notice the horizon, or reach to an object, or if we ask him/her to allow weight, we are asking him/her to touch a foundational part of who he/she is. The meaning associated with reaching, or with sensing the space around someone is populated with that person's life experience. We want to be curious about what lives there, what the phenomenology of that person's space is.<sup>xvii</sup>

If we invite someone to allow themselves to ground, to allow weight into their feet, knees, and pelvic floor, we are encountering the meaning that lives in him/her about "landing," about "resting" about any number of issues derived from culture, from genetics, from personal history which link to his/her meaning structure around weight.

### **Breath Linked to Attitude**

We see this meaning/perception/function story illustrated in the relationship between posture and breath. Newton's articles on breathing in the gravity field describe the tonic function view that the movement of breath is a complex dance of postural preparation and gravity orientation.<sup>xviii</sup> To prepare the body to take a breath, a person consciously or unconsciously allows an encounter with the world, allows the world to enter, allows himself/herself to be inspired by the world. How the world feels, how it looks, and what the world means affects the willingness of the person's body to prepare for inhalation.

Conversely, a person prepares for exhalation by finding support from the ground. Support precedes the willingness to exhale. As mentioned above, the meaning and perceived sense of the ground has the largest impact on optimum coordination of exhalation. The cycle of breathing is secondary to the orientation, to the perceived experience of space and weight.

Physical attitude and perceptive attitude are two aspects of the whole attitude that underlies breathing.

### **Respecting the Potency of Perceptive Change**

Implied in the previous paragraphs are embedded considerations about the pace and capacity of a client to make perceptual changes. Levine introduced Somatic Experiencing®<sup>xix</sup> to the SI community and with it the notion of

“titration”—a pace of perceptive shift that stays within the limits of a person’s ability to regulate successfully. Perceptive and coordinative change is deep change. Deep change happens given sufficient resource and given appropriate pace for the organism to integrate. We don’t have to practice somatic psychology to do perceptive work in Structural Integration, but tracking skills and familiarity with the politics of the autonomic nervous system are a useful skill set. One source of skill building for SI practitioners is Harper’s perceptive skills trainings offered through Continuum Montage.<sup>xx</sup>

### Posture—Rolf’s Window to the Sole

What distinguishes structural integration from somatic psychotherapy? Both involve perception and attitude. Both involve listening to body experience. SI involves the use of fascial manipulation, which psychotherapy does not.

Most significantly, the difference lies in the analysis of posture. Rolf pointed to static posture.

Godard and others have defined posture in terms of movement. Posture is a refreshingly non-subjective measure. Posture expresses something below the level of psychology, but it includes psychology. Posture is visible, tangible, and not ultimately under voluntary control, the more so if it is the posture of movement initiation.

How a person initiates movement can be observed in many ways. The pre-movement, the manner of preparation, is a window to the fundamental attitude of the client. It is a window to how person has shaped his/her internalized version of the world and is an essential guide to how they have shaped his/her body. It is the first step in helping a person change the shape of his/her body.

*The author wishes to acknowledge collaboration and conversations with Hubert Godard that helped make this article possible.*

---

### Endnotes

<sup>i</sup> Rolf, I.P., *Rolfing, The Integration of Human Structure*. Rochester Healing Arts Press. 1977.

<sup>ii</sup> Myers, T. “Acture! Posture in Action,” *Massage and Bodywork*, Oct/Nov. 2006, Evergreen, CO: Associated Bodywork & Massage Professionals, Inc., p.43.

<sup>iii</sup> Frank, K. “Working with Coordinative Structure: Tonic Function and Contralateral Gait,” *Journal of Structural Integration*, Spring 2004, Boulder, CO: Rolf Institute.

<sup>iv</sup> Frank, K., “Tonic Function - A Gravity Response Model for Rolfing® Structural and Movement Integration,” *Rolf Lines*, Boulder, CO: Rolf Institute, March 1995, pp. 12-20.

<sup>v</sup> Lecture notes of the author.

<sup>vi</sup> Author’s recollection of conversations between the author’s father and cybernetics mathematician, Norbert Wiener.

<sup>vii</sup> Frank, K. “The Relationship of Contralateral Gait and the Tonic Function Model of Structural Integration,” *Journal of Structural Integration*. Boulder, CO: Rolf Institute, Dec. 2003, pp. 17-21.

<sup>viii</sup> Raymond Sohier, *La Kinésithérapie analytique de la Colonne Vertébrale*, Tome 1, Rachis Cervical, 1969.

Raymond Sohier, *La Kinésithérapie Analytique de la Colonne Vertébrale*, Tome 2, Rachis Dorsal et Lombaire, 1970. Editions Kiné-Science S.P.R.L., La Louvière Belgique

<sup>ix</sup> De Laszlo, V. ed, *The Basic Writings of C. C. Jung*. New York: The Modern Library, 1959.

<sup>x</sup> M.A. Heller, *Picture and Pattern Perception in the Sighted and the Blind*, *Perception*, vol.18, n°3, pp.379-389, 1989

J.M. Kennedy, *Drawing and the Blind: Pictures to touch*, Yale University Press, 1993.

<sup>xi</sup> Gibson’s work speaks about the haptic sense as “The sensibility of the individual to the world adjacent to his body by use of his body” Gibson, J., *The Senses Considered as a Perceptual System*. Westport, CT: Greenwood Press, 1983. Modern virtual reality research attempts to simulate experiences by taking advantage of the way our touch actively explores the environment.

<sup>xii</sup> Smith, and Smith, “Cybernetic Factors in Motor Performance and Development,” *Differing Perspectives in Motor Learning, Memory and Control*, Goodman, Wilburg, and Franks, eds., North-Holland: Elsevier Science Publishers, 1985, pp. 239-283.

<sup>xiii</sup> McHose and Frank, *How Life Moves, Explorations in Meaning and Body Awareness*, Berkeley, CA: North Atlantic Books, 2006

<sup>xiv</sup> Flury, and Harder, “The Tilt of the Pelvis,” *Notes on Structural Integration*, December 1988, Zurich: H. Flury pub., pp. 6-15.

Flury, H., “How Can We Know What Works?—Review of a Study,” *Notes on Structural Integration*, December 1988,

Zurich: H. Flury pub., pp. 16-26. Flury, H., “Theoretical Aspects and Implications of the Internal/External

System,” *Notes on Structural Integration*, November 1989, Zurich: H. Flury pub., pp. 15-35. Flury, H., “The Line, the



---

Midline, the Postural Curve, and Problems of Stance," *Notes on Structural Integration*, September 1991, Zurich: H. Flury pub., pp. 22-35.

<sup>xv</sup> Sultan, J.H. "Towards a Structural Logic," *Notes on Structural Integration*, May 1986, pp. 12-16.

<sup>xvi</sup> Frank and McHose, "Enrolling Clients In Perception-Based Movement for Self-Care in the Context of Structural Integration," *Journal of Structural Integration*, Boulder, CO: Rolf Institute, pp. 13-15.

<sup>xvii</sup> Godard, H. interviewed by McHose, C. "The Phenomenology of Space, the Space is in You and You are in the Space," *Contact Quarterly*, Spring 2006. Northampton, MA: Contact Collaborations, Inc., p. 32-38.

<sup>xviii</sup> Newton, A., "Breathing in the Gravity Field," *Rolf Lines*, Boulder, CO: Rolf Institute, Fall, 1997, pp. 27-33.

Newton, A., "New Conceptions of Breathing Anatomy and Biomechanics," *Rolf Lines*, Boulder, CO: Rolf Institute, Winter 1998, pp. 29-37. Newton, A., "Posture and Gravity," *Rolf Lines*, Boulder, CO: Rolf Institute, April 1998, pp. 35-38.

<sup>xix</sup> Levine, P. *Waking the Tiger, Healing Trauma*, Berkeley, CA: North Atlantic Books, 1997.

<sup>xx</sup> Susan Harper's Em'oceans and Sensations Trainings can be viewed at [www.continuummontage.com](http://www.continuummontage.com)