

# Revisiting the Value of Somatic Education in Dance Training Through an Inquiry into Practice Schedules

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**Author:** many of the em dashes have been changed to commas and parentheses.

## Abstract

The practice conditions within dance training have remained essentially unchanged for decades. Those conditions appear to be based largely on a “culture of rigor,” a philosophy of which implies that continuous practice is the most beneficial way to improve (motor) skills. Current evidence in motor learning supports the concept of “distributed practice,” in which the resting phase within a practice session is comparable to, or longer than, the activity phase. Researchers in motor learning have shown distributed practice to be more beneficial to acquisition and retention of motor skills, and to decreased rates of injury, than continuous (“massed”) practice. At the center of somatic education is a pedagogical emphasis on balancing rest with activity. The authors reopen the question of the value of somatic education within dance training, drawing upon experiential evidence from their qualitative research and other recent research in neuroscience and motor learning.

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*bones from dust, the ancients rise  
and wander freely in lands gone by,  
membered bodies long laid down,  
cast in time of mind.*

*then pulse, then rope,  
then swelling breath,  
now form from grace resides.<sup>1</sup>*

It has taken over 40 years for Somatic education to become commonplace in many academic dance curricula.<sup>2,3</sup> While dance and somatics share many values and attributes (i.e., an interest in bodily movement, a valuing of personal expression, and a sense of reflection and research on the nature of kinesthetic phenomena) they also differ in some of their values. A primary difference lies in the philosophical (and therefore pedagogical) emphasis on the role of restful reflection in learning to move. Whereas professional dance practices tend to adopt a culture of imposed asperity and effort as a way of justifying perhaps, the *non-thingness* of dance as product, Somatic methods incline toward a more balanced approach between effort and rest, doing and being. In fact, dancers often admit to feeling a sense of guilt or dis-ease at the freedom of movement and sense of effortlessness afforded by somatics, and by the glimpse of “healthy” body-mind-spirit resulting from these experiences. While rigor is an important part of dancing—especially the idea of rigor as goal-directed effort—how that rigor is achieved (i.e., the practice conditions which promote “successful” dancing) merits further investigation through the use of Somatic practice as well as investigation and analysis in the field of

dance science.

This article reopens the dialogue between somatic and dance education, and to clarify the tenets of somatic education with a view toward redefining and distinguishing its role in dance training. In reviewing hallmark principles of somatic education, the authors will discuss the somatic notion of balance between rest and action as a fundamental pedagogical strategy, and its implications for technique and creative practice, as well as its effect on general wellbeing and personal authority. The method primarily includes excerpts from narratives of dancers who took a survey course in somatics at the American Dance Festival in summer 2006. The course was designed by Batson, who was the primary teacher, with guest teachers, Ray Eliot Schwartz and Janice Geller. The teachers introduced mainly mid-career dance artists to somatic methods commonly introduced into dance curricula, such as the Alexander Technique, Body-Mind Centering, Ideokinesis, and the Feldenkrais Method. While many of these dancers were highly sophisticated and evolved in their careers, few had had any experience with somatic methods. Several had experienced Ideokinesis (at Julliard, for example, where Ideokinesis has a continued history of embeddedness in the curriculum from the Sweigard years), or had taken private Alexander Technique lessons. On the whole, however, it was a group of novice learners.

### **The Somatic Legacy**

Throughout the 20th century, pioneers of somatic education, such as F. M. Alexander, Bonnie Bainbridge-Cohen, Moshe Feldenkrais, and Mabel Todd and Lulu Sweigard, discovered a vast array of principles of perceptuomotor learning. The investigations of virtually hundreds of somatic educators, as well, have promulgated a whole host of techniques (mental practice, release work, kinesthetic anatomy, etc.)<sup>4,5</sup> A major thrust in somatics lies in the dismembering of mind-body dualism and in engendering embodied consciousness through the integration of perception and action.<sup>6,7</sup> To such ends, these educators sought to create a seamless through line between two basic somatic acts: attention and intention.

Somatic methods rely largely on augmented sensory processes while moving, and the re-distribution of movement efforts in order to facilitate a more psychophysical state of embodiment conducive to coordinated action. The primacy of sensory awareness (sensing) over physical practice (doing) is not just for itself, but is a key to promoting embodied self-organization (internal authority).

Internal authority is the determination of agency from internal physiological cues and conscious kinesthetic awareness of the self in action.<sup>8</sup> Embedded in this concept of internal (sensory) authority is the importance of refining awareness of one's internal sensory feedback (or feed-forward) processes. This kinesthetic authority could be called sensory authority—a first-person basis of identifying and clarifying the self. As Eddy notes, “Somatic inquiry focuses the awareness process on ‘the whole person’ inclusive of his or her associated physical and emotional needs, inviting the wisdom ‘from within’ to inform decisions.”<sup>9</sup> Dance culture has modeled various external authorities (teachers' cues, mirrors, movement imitation) as validating and defining the principles of success.<sup>10</sup> While many dance practices, particularly those of the classic western forms of ballet and modern dance techniques, embrace visual modeling to elucidate and communicate shape and ideal body patterning, somatics tends more readily to embrace the use of verbal, haptic, kinesthetic, and proprioceptive experience in defining form. Focused attention to proprioceptive input to augment and refine sensory feedback as the major means of learning of smooth, coordinated movement.

In somatics, slowing movement down and reducing muscular effort is done in order to refine sensory (proprioceptive) awareness for better coordination of motor action, particularly in the initial stages of learning. It should be noted though that, while part of the canon of somatic methods, the minimization of effort in relation to desired physical outcomes is one, and only one, of many methods by which embodied learning is enacted and informed within somatic practice. Whatever the pace (or even activity) within a somatic lesson, the goal is to understand how sensory awareness, whether in action or at rest, is a powerful agent of change in movement behavior.

Most somatic practitioners would argue that there is plenty of effort and discipline in somatic work,<sup>11</sup> and yet somatics, with its emphasis on embedded rest within activity, has often been perceived as “soft” practice (and therefore, not legitimately worthy of being a “dance technique”). This is particularly true within the western world, where the culture of rigor is paramount. Rigor can often connote a more strict definition of stiffness, implying that life and work must be, by necessity, difficult, challenging, or uncomfortable. Ironically, dancers, whose use of their bodies justifies their profession, are not alone in accepting physical suffering as a culturally-condoned, courageous act. In a recent article researching the effects of and

attitudes toward having to stand while working, Canadian employees' perceptions of effort and self worth suggest that their "discomfort" in standing was "a positive sign, proof that they were honest, producing a day's work for a day's pay."<sup>12</sup> Even with strong evidence that prolonged standing is a contributor to many health problems, pain, and suffering, the researchers reported, the idea that rigor equals success and viability remained strong.<sup>12</sup>

Precisely because of this culture of rigor, integrating somatic education into dance curricula has been challenging. There has been a tendency to conflate somatic disciplines with conditioning practices as a means of justifying their inclusion within a culture of rigor. Conditioning exercise programs (such as "fitness" Yoga and Pilates) that use sensory awareness as a *means*, but not an end, to body organization are often embraced by dance educators as somatic disciplines. While these programs may be taught with somatic influences and have indeed expanded the notion of what training can be—suggesting in their approach a healthier model for addressing the body—they also place a value on controlling the body (Pilates was originally named "Contrology"<sup>13</sup>). Somatics, by contrast, "encourages respect for lived *experience* and the wisdom that can be found through 'attending to' rather than 'conquering' or 'controlling' life processes."

Further, the role of somatic education in dance largely has been ascribed to "release" of tension, and its role, therefore, often is relegated to injury prevention and healing.<sup>14,15</sup> While many somatic practices augment awareness of muscular effort and use (whether through anatomical, functional, imaginative, or sensory approaches) their methods primarily are designed to enact phenomenological inquiry, and act to bring the whole person to the table as a *soma*. As Johnson notes:

Thomas Hanna who coined the term somatics was inspired by the phenomenologist Edmund Husserl, who at the turn of the century set out an agenda for what he called a "somatology," a study of the relationships between knowledge derived from direct bodily experience and scientific studies of the body. These phrases originate in the classical Greek contrast between the dead body, *necros*, and the enspirited person, *soma*. That "somatology" would stand as a corrective to what might be called a "necrology," the body of medical science whose fundamental ideas about body parts and their structures have been derived from the dissection and analysis of corpse.<sup>6</sup>

The phenomenological roots of somatics illumi-

nate a profound distinction from somatics' ascribed role as "therapy" to rehabilitate the body from misuse and abuse. As Brodie and Lobel summarize from their description of somatic educational approaches, "Shifting the focus from product (skill acquisition) to process (what is actually happening in the body) can promote optimal functioning...."<sup>16</sup> In making this shift, a question arises as to the application of the principles inside of these methods, and their relationship to our practice as artists, educators, and activists.

### Augmented Rest: An Organizational Tool

The act of creating and executing movement involves many (yet to be defined) states of consciousness. Somatic methods offer a potent means of differentiating between seemingly related states of consciousness. The notions of stillness and rest, for example, holding fast in the moment versus simply "being," are one example of such two distinct states. In stillness, a person may, from the outside, appear to be not moving, but inside the body, movement manifests largely: blood rushes, breath enters and exits, and joints adjust and shift in relation to micro level responses to the gravitational field. In rest, all of this may also be occurring, but without the constraint of stillness, necessarily. Resting is ideally a time of non-doing. It is an act of settling into oneself and allowing proprioceptive and kinesthetic sensations to arise, be processed, integrated, and organized in preparation for future kinetic action.<sup>17,18</sup> Virtually every somatic practice has embedded within its methods a balance between activity and rest. Sweigard's "Constructive Rest," F.M. Alexander's (semi-supine) Lying-Down work, the high rest-to-activity ratio in Feldenkrais Awareness Through Movement (ATM), the open awareness frames of Continuum work, and in Body-Mind Centering, the periods of "yielding," both to gravity and to sensation, all speak to the importance of allowing the motor nervous system to be less dominant in our attention.

The contemporary culture of dance, on the other hand, often emphasizes the "motor" end of the sensorimotor continuum,<sup>19</sup> where building a professional identity is accomplished by testing physical limits through extreme effort and exhaustive practice. This value system seems to be in direct contrast to the work of say, the Feldenkrais Method®, where the learning lies not so much in the choice or practice any one movement itself, but rather in the *neurological process of coordinating* (the movement). This learning occurs primarily in the period of rest. When practicing ATM, for example, periods of action are balanced with equal or longer periods

of rest. Each period is given equal relevance in the work. No one action is practiced for more than 1 to 3 minutes on the average with an equal resting period following in which a person is instructed to “do” nothing. The concept of *doing* nothing implies an *active* reduction of somatic effort. In resting, a student is encouraged to observe themselves with attention to residual sensations, novel organization of their self-image, and a general state of open awareness to their present experience. From within this reduced activation, a recalibration of self-organization occurs that allows for more freedom of choice when reactivating movement.

Feldenkrais believed that no new organization could emerge from continuous repetition of a movement pattern, especially without awareness.<sup>20</sup> In fact, repetition without rest leads to deeply ingrained habits which evade self-awareness and shut down potentials for choice.<sup>20,21</sup> Instead, pausing

relieves the nervous system from its organizational processing in order to integrate (neurologically) new details of a person’s self-image into the pattern of action. From this new place of self awareness, deeper embodiment and novel execution of desired actions can take place.<sup>21</sup>

## Method

The syllabus for Batson’s course was divided into six somatic units: Introduction to Sensory Awareness, Body-Mind Centering, the Feldenkrais Method, Ideokinesis, Alexander Technique, and Integration of Somatic Methods into Dance. After each somatic module, students were given an assignment that asked them to integrate somatic principles and practices through independent periods of activity and reflection (*see* Assignment 1 for “Record and Response” template). For example, for the Feldenkrais Method® module, students were

### Assignment 1 Record and Reflect Template\*

#### **Record and Respond: Independent Experiential Work**

##### Guidelines for Assignments

This course mainly is experiential. Assessment for the course will depend on participation in class and successful completion of weekly assignments. The following is a template to guide weekly experiential practice of a somatic discipline, as assigned. These sessions are intended to support your understanding of material addressed in class and in the assigned readings. The Record and Respond template provides a format for keeping a log of your personal experiences with a variety of approaches to somatic work. The template with the assignment will be posted on Blackboard and will be collected in class as the due date indicates.

A suggested model for successful completion of these assignments is:

1. Practice the assigned somatic discipline *three (3) times* during the week between class meetings.
2. Allow 30 minutes for each session, not including response time.
3. For each session, record the date and time. It may also be interesting to record the location (where you are working), and anything else you wish to note in relation to the activity.
4. Following practice session #1 and #2, write and/or draw in response to your experience. These responses may be brief (e.g., descriptive words or phrases; simple drawings) or longer (e.g., full sentences, stories, poems; “Before and After” drawings). They may be more or less literal or poetic. Imagery, metaphor, and anatomical references may all be helpful.
5. Following session #3, reflect on your process over the course of the week and formulate a written response of at least four (4) complete sentences that describe and comment on your experience with the activity. Please record your experience as explicitly and specifically should be as explicit as possible.

#### **Response and Record Template**

Session #1:	Date:	Time:
Activity: (Briefly describe what you did.)		
Response:		
Session #2:	Date:	Time:
Activity:		
Response:		
Session #3:	Date:	Time:
Activity:		
Culminating Response:		

**Author: Table has 3 different terms:  
Title: “Record and Reflect”  
Second line: “Record and Respond”  
Then “Response and Record”  
OKAY?**

\*Thanks to Amy Ginsburg, Ed.D., M.A., in the conception and development of the Record and Response Template.



asked to explore, and reflect on the relationship between activity and rest for three 30-minute periods (described below). Other assignments addressed these principles:

- Listening for the presence and quality of micromovements in coordinating standing. (Introductory Assignment: Standing still for 10 minutes);
- Accessing multi-system support to balance the muscular system and relieving it from overdrive. (Exploring the concept of “contents and container” through the lens of Body Mind Centering);
- Using imagery (Ideokinetic facilitation) to facilitate efficiency in pedestrian and in dance movement (Ideokinesis);
- Clarifying kinesthetic thinking in organizing action through noticing directional pulls in the body—in pedestrian movement and in dance technique class—to recognize “habitual” effects in the body; and
- Recognizing and evaluating the responses to letting go of habit. (Alexander Technique).

These assignments particularly were revealing in that they testified, even in the simplest exercise (e.g., Standing still for 10 minutes), that somatic awareness, is a potent resource for dancers<sup>13</sup> and a source of personal empowerment.<sup>23</sup> The following paraphrased excerpts from student responses to the introductory Standing exercise, speak to these issues and show that cultivating sensory awareness does more than just relax tension or help recuperate from injury. Note how this somatic exercise elicited powerful emotional responses, clarified personal behavioral patterns, and stimulated desire for personal authority:

- There are so many adjustments that we make in our bodies that we take for granted everyday.... Subtleties that I never realized I did just to stand.
- Being still is not easy; it takes conviction and practice.
- It is hardest to slow down to “be” in myself. Simply slowing down and reflecting gave me time to process.
- It is good to take time for ME and to feel my bodily responses, at the same time it is difficult to really listen to what my body was saying and “not just let my mind control the situation.”
- Antsy, anxious, irritated, giving way to tiredness.
- I accepted my body and wasn’t compelled to “DO” anything about it (i.e., change it). I was merely able to “watch” it.
- Each standing session informed the next so by

the third reflection period, I had “a bag of tools of informed awareness” to draw from.

## Results

Student responses to a practice and reflection assignment on Feldenkrais ATM given by Schwartz (see Assignment 2) explored moving and resting as a co-joined and intentional act. Students were invited to comment on their relationship to personal patterns, use of effort, and awareness of possibility within the frame of this activity. When asked to reflect on the notion of rest and movement in relation to her dancing life, one student spoke of the difficulty she had with slowing down. She mentioned the idea that she felt too much, or found herself disturbed by her inability to fully rest when called to do so. And yet as time passed and she repeated the assignment, things got easier. She noticed that allowing herself to rest gave her a clearer understanding of where the impulse to move comes from, allowing for greater clarity in initiation of a movement gesture or pattern. As well, she found that resting re-energized her. By discerning a rhythm of rest and action she was able to modulate her effort and dance for longer periods of time with more efficiency, less fatigue, and a deeper sense of commitment to her dancing.

For another student the experience of integrating periods of rest and activity into her work brought up questions of personal authority. Immersed in a dancing environment where she was conforming to external expectation and a sense of pushing herself to achieve, she seemed to notice a conflict with her desire to focus on her own rhythm for arrival, activity, and creative output. Resting encouraged a sense of self-listening which, when attended to, bolstered a sense of personal choice-making in regards to how and when she attended class. By re-claiming her own authority she was able to engage in the classes she was taking with more satisfaction and presence. Other student reflections gave additional support to these comments, while also noting that conscious resting was a welcomed counterbalance to the efforts of dancing practice and contributed to an overall sense of well-being. The act of framing action with rest helped the body not only “recharge,” but also produced awareness of possibilities and choices, allowing for a kind of “unconscious reflection that opens a new space to revisit movement with less baggage.”

Below are excerpts from various students’ responses to the ATM assignment. Responses suggest that the act of attending to periods of rest has powerful implications for technique and creative dance-making. As dancers considered their over-effortful

tendencies, they could see benefits to developing more balanced practices and to incorporating an ongoing rest-work rhythm throughout the day.

- I found this to be a very rewarding experience and I realized that I don't think I have ever tried moving and then resting back and forth. I did not find the rest to be interrupting as I thought I might, and really it helped me to be more creative in my movement. It was as if creating this break helped my mind and body start fresh and new and so each time I rose from my back, a new dynamic and a totally new set of movements seemed to pour out of my body. While I was resting I tried to just listen to my body, sometimes I noticed the sound of my breath, or where I felt the breath in my body. Other times I felt my heart beat in different places or noticed the slowing down of my breath as the time passed. I also felt where things were tight or loose and what part of my body was "itching" to initiate the next movement. It felt very organic and I hope to use this as a technique for choreography now that I saw
- how wonderful a tool it was for me to create movement with a sense of ease.
- At the end of this time I felt extremely relaxed and refreshed. I finally admitted to myself that I'd been going to a class that was very difficult, that only made me feel frustrated, trying to "prove" to myself that I could do it. More importantly though I felt my body thanking me for allowing it to move in its own way, without constantly being told what to do. I thought about the reference to this work and the larger paradigms of authority, especially with public school children who are always being told what to do and never allowed the autonomy of making their own choices and decisions. I went on to my afternoon class and discovered my body was much freer, and I was able to learn material much more easily than usual.
- Progressively, my rest became deeper each time I returned to it. And returning to action ranged from 'springing into action' initially, to a calmer less urgent initiation. I definitely like to burn the midnight oil, going on far too

## Assignment 2 Feldenkrais Assignment

### Homework Assignment for Feldenkrais Method® Module.

While many somatic practices facilitate bodily awareness and attention to effort and use whether through anatomical, functional, imaginative, or sensory methods; there is also a question of the application of the principles inside of these methods, and their relationship to your practice as artists, educators, and activists. For this week's reflection process I want to invite you to consider the Feldenkrais Method® as a source point for approaching an investigation of the balance of movement and rest. Feel free to approach things from the simplest place – the beginner's mind.

Three times over the next week please spend some time working. This could be in a studio, in your room, outdoors – wherever you feel that you will have the space for focused activity and reflection. You are welcome to work alone or in groups.

Your assignment is to spend 30 minutes exploring an equal relationship to movement and rest. This essentially means that you will try to achieve about 15 minutes of rest and 15 minutes of activity. You can portion the time any way you like. Rest for fifteen minutes, move for fifteen minutes; move for one, rest for one; move for three, rest for seven, move for two etc. However you organize it –and I recommend trying a different organization for each of your three sessions – commit to an equal amount of time for each aspect.

After each session engage in a reflection of the experience. The reflection is meant to support the translation of experience into syntax. Feel free to write, draw, record yourself speaking or making sounds, make a film, etc. Whatever media or format you choose is fine providing you feel that the imprint of your reflection is an active attempt to communicate something about your experience, rather than just a continuation of it. Here are some questions to guide your process:

In the Feldenkrais Method®, it is said that "the learning occurs in the rest." To me this means that our nervous systems needs time to integrate experience. By approaching your self with a sense of giving space to rest, you are also considering the nature of your own effort in your life. What do you feel when encouraged to rest? How do you balance the efforts of starting and stopping? Can you begin again? Do you work in such a way that once you start you must keep going until you are "finished"? How does the rhythm of action and rest inform you about your own patterns? Where does movement come from? How do you know you are moving? Do you always initiate in the same way? Does the act of inviting a frame of resting and acting allow you to become conscious of moments of surprise, novel possibilities, etc.?

long before resting. There's always that little bird fluttering inside that over-palpitates. Time management strategies would be helpful for me to actually plan rest as a part of each day. I think I've always been proud of my strength, and endurance. But overdoing is definitely a habit.

- In this activity I decided to look at rolling down and up, first in standing then lying down on the floor to isolate the parts for exploration. For about ten minutes while standing, initiating movement from my head I would roll down and roll up. Then I would rest on the floor and with each breath sense this experience in my skull and spine. I remained at rest for quite some time before visible movement occurred. I would attempt several times to repeat rolling while on the floor, each time seeming less successful. Finally, after more resting and allowing the body to think I would stand up again and do the exercise only once finding it more efficient and having a clearer sense of the top of the skull leading my spine while rolling down and my tailbone pulling my spine and skull as I rolled back up. Doing a lot, at first, which I really had no sensation other than doing the action and repeating it over again before resting. In the rest, however, I found a great sense of what my muscles were telling me based on this information. I think that noticing in rest and doing the rolling up and down both on the floor and in standing demonstrated clear differences that could be applied to the action in both planes and it's use as images for one another could be applied for greater ease.

This sampling of responses, as well as others' from the class, suggest further that rest revealed much about the manner in which the dancer learned and opened up a whole new realm of potential for choreographic inspiration. Mark Haim, a popular teacher and choreographer, after being introduced to the somatic practices presented in Batson's course in 2005, began integrating periods of rest into his technique classes. Haim noticed that when students were given time to rest within the frame of class time, profound changes occurred in the dancing. For example, Haim states:

Generally speaking, I've noticed that if I give the students the freedom to rest at the beginning of the class, they respond to me with more trust and respect. I'm not sure why, but I can venture a guess: perhaps this idea of allowing for rest and sleep shares more of the power with the students...*they* are in control of their bod-

ies and the teacher is not there to force them to move if they don't feel like it. Sometimes I wonder whether feelings of powerlessness lead to exhaustion. Here at ADF, during both summers, I've noticed that by the end of class, the students are dancing fully, both physically and emotionally. There have been virtually no injuries in the class, either, and that's saying something, considering we've been dancing in 90 plus degree heat for almost 2 hours on a hard-ish floor! I wonder, too, whether embracing the idea of NOT moving (to the point of sleeping, where one is not even thinking) within the realm of technique class heightens all the moving and locomoting that we do. Maybe it is perhaps like feeling more alive because you also see death. We move in the presence of stillness. We think and feel in the presence of no consciousness...something like that. I've seen the students really invest in what they were doing, especially across the floor at the end. They danced with total commitment...all of them...at every level.

## Discussion

With the evolution of dance medicine and science over the last few decades, questions have arisen as to the role of somatics in dance training due to its apparent lack of evidence of clinical research indicating its effectiveness.<sup>22</sup> Many dance educators have advocated for greater integration of somatics into dance training.<sup>9,19,23,24</sup> The depth of personal investigation, growing body of scientific support, and innumerable attempts by both major founders and generations of students to give voice to the principles, beliefs, and methodology of somatic practices offers much to consider in relation to dance. Pedagogically, what can somatic approaches offer as a way to balance control-based models that rely on exhaustive effort to achieve success in motor skills? Employing a learning paradigm in which augmented body awareness in the context of "spaced," or "distributed"<sup>25</sup> practice could be one somatic strategy that dancers could use in the learning and refinement of skilled coordination.

Dancers know that the effort required to convey the impression of flow of movement, a balance between muscular and skeletal effort, and a sense of interior sequencing and connectivity is far from simple. Such aesthetically nuanced activities are only achieved through practicing movement (i.e., through repeatedly executing and refining neuromuscular coordination). And yet the nervous system needs time to formulate, process, and integrate

experience. A leading notion in motor learning is the “power law of practice,” which suggests that skilled performance evolves solely by the number of task repetitions.<sup>26</sup> At the same time, mounting evidence from sports psychology, motor learning, and neuroscience supports the value of spaced practice conditions (balanced activity-to-rest ratio) in a variety of motor learning contexts. Compelling evidence exists indicating that the passage of time between practice sessions is an important factor in the acquisition and retention of motor skills.<sup>26-28</sup> Several reviews and meta-analyses imply that “distributed” practice is more beneficial than “massed” practice in both acquisition (e.g., faster acquisition and fewer errors in performance) and retention (long-term learning).<sup>29-31</sup> “Distributed” practice is “the amount of rest between trials is equal to or greater than the amount of work within the trial”<sup>25</sup> whereas, “mass practice” is “periods of work that are substantially longer than the amount of rest between trials.”<sup>25</sup> Studies report, for example, that intervals up to 24 to 48 hours enhance learning, implying that even sleep itself is beneficial to learning movement, especially long movement sequences with high attentional and perceptual demands.<sup>27,28</sup>

Where does dance derive its concepts for practice conditions? A recent textbook based on applying motor learning concepts to dance training<sup>32</sup> does not even approach the issue, and search engines brought up no studies on practice conditions in dance or protocols for building healthy learning environments. On the other hand, injury from overuse is a well-known phenomenon in dance science, with many references to rehabilitation and with and without concomitant references on practice conditions that would prevent overuse.<sup>33,34</sup>

Why might dancers be prone to overuse injuries? The physical and neurological injuries from overuse,<sup>35-37</sup> and even the types of practice conditions that result in overuse, are well-documented in the workplace and among musicians.<sup>38,39</sup> What we are beginning to understand is the need for an augmented rest-to-activity ratio in repetitive practice (even in low force skilled muscular activity).<sup>40,41</sup> Timing between repetitions is vital. Repetition without rest appears more implicated in overuse syndromes than either the amount or type of force (muscular contraction) generated. Ischemia (lack of blood flow) in a muscle can occur during repetitive movement with as little as 5% of the maximum voluntary contraction.<sup>37</sup> Current theory suggests that overuse syndromes result from alterations in muscle chemistry and sensitivity of the muscle spindle (the muscle’s sensory organ) that result

in altered perception.<sup>35</sup> Both metabolic and neurologic changes (however slight or subtle) result in decreased sensitivity to effort and pressure, particularly to low-level pain, so that persons may be totally unaware that an overuse syndrome is developing,<sup>35,40,41</sup> (and therefore keep dancing).

Finally, neuroscientists have shown that the strain also is “in the brain.”<sup>38</sup> Both body parts and movements are represented (“mapped”) in the cerebral cortex in ways that are highly dynamic, changing with learning and experience, yet with each body part maintaining its own discrete neuronal “map.”<sup>42</sup> The old adage, “if you don’t use it, you lose it,” is true in brain science in that if you immobilize or discontinue use of a body part, it’s “map” (body representation) shrinks in the cortex.<sup>43,44,45</sup> On the other hand, if you misuse your body, especially with repetitive activity, these maps become damaged,<sup>38,45</sup> with overexpansion (“bleeding”) into neighboring territories. Researchers of repetitive strain injury (e.g., as seen in pianists with “focal dystonia”), have shown that such abnormal neural “penetration” into adjacent receptive fields confuses the brain. No longer are the flexor and extensor surfaces of the fingers clearly defined, for example, leading to hand cramping with use. The brain is a delicate organ. Re-learning how to move is a long, arduous, and often unsuccessful process because one must retrain *perception* (normalized responses to sensory input).<sup>35,38</sup>

A paucity of data exists on overuse injuries involving trained athletes as subjects in protocols involving multi-joint movements.<sup>46</sup> Reviews on this topic have emphasized biomechanical causes, such as agonist-antagonist imbalance,<sup>33</sup> rather than neurological ones. On the other hand, shorter exercise durations (distributed practice) has surfaced recently as a hypothesis for injury prevention.<sup>47,48</sup> In a study comparing injury rates of ballet dancers and Tae-Kwon-Do artists due to overuse, results showed a lower injury rate among the Tae-Kwon-Do group despite higher training intensity.<sup>47</sup> Results appeared dependent on shorter time intervals for Tae-Kwon-Do training.<sup>47</sup> How much rest is needed between practice repetitions? A dearth of research exists in sports science, motor learning, and neuroscience, validating rest-to-activity ratios. Only sleep (24 to 48 hours) has been related to the learning and consolidation of motor skills, suggesting that a lengthy period of rest is needed to build on skill learning.<sup>27</sup> The compelling responses of the dancers in Batson’s Somatics course indicate that the meaning of rest has multidimensional effects on behavior within the context of dance practice that warrant further investigation.



## Conclusion

This discussion reopened the dialogue between dance and somatic education in light of research on practice conditions in motor skill learning. When somatic education and dance making intersect, opportunities arise for reflecting on how a value system based in collaboration, dialogue, and shared ownership affects creative practice. As a discipline interested in “the living body’s subjectively experienced capacity for self-education.”<sup>49</sup> Somatics has much to offer beyond the technical or rehabilitative aspects. Somatic education values dialogue, respect for individual histories, and a sense of balance between body, mind, and spirit. It considers experience essential to learning, and it holds the student and the teacher accountable to one another when co-constructing a learning process. Too often, for dance educators, it is only the scientific aspects of the work that are distilled out from the larger body of research that is somatic movement education to justify its use in the classroom. Combining personal narrative and scientific research in this article is one way of supporting the motor learning aspects of its claims, while bringing to bear the importance of cultural attitudes, disciplinary values, and a curiosity about the effect of experience on personal authority and creative potentials.

Perhaps future research can help to illuminate other aspects of the dialogue between dance and somatic practice. As well, further research is warranted on practice conditions, especially within the dance classroom, to validate what somatic practitioners have found successful in practice: that rest is integral to movement learning.

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