

Dalcroze Subjects as Therapeutic Tools: Cognitive Processes behind Five Dalcroze Subjects and Some Benefits of Their Development in Special Education

Introduction

For the last three years I have been doing special education and therapeutic work using techniques from the Feldenkrais and Dalcroze educational methods. Though Dalcroze is a method of music education, I was able to successfully use techniques from the Dalcroze curriculum to advance the cognitive and neuromotor goals I was pursuing from a Feldenkrais standpoint. Particularly with children, I found applying Dalcroze techniques within a Feldenkrais mindset to be more useful than the standard array of techniques found within the Feldenkrais tradition itself. I believe this is because the tools developed by Dalcroze develop not only musical skills, but also a broad array of cross-modal integration, flexibility and sensitivity that is pertinent to the goals of Feldenkrais work. I also believe that Dalcroze techniques use the inherent rhythmicity of cognitive processes that current research is beginning to confirm in a way that the Feldenkrais approach has not yet integrated. Dalcroze techniques can therefore add great power to work in the Feldenkrais method and this paper outlines some examples.

A brief introduction to the Feldenkrais method will be given, followed by a discussion of what related cognitive processes the Dalcroze method trains, and the paper will end with examples taken from actual cases.

The Feldenkrais Method

Moshe Feldenkrais, the developer of the Feldenkrais method, was a physicist who worked in the lab of Joliot-Curie, and the first Westerner to gain a black belt in Judo. Feldenkrais injured his knee in a soccer match, and was told by his doctors he would never walk again. This challenge spurred him to develop his method, which uses targeted movement experience to enhance the mind's kinesthetic self-image.

Feldenkrais argued that our actions are based not on physical structure or underlying capacity, but on the limited awareness of our kinesthetic self-image: by clarifying this underlying image of the physical self, Feldenkrais felt all activity would improve. In the Feldenkrais method this is done through either verbally guided or hands-on movement experience that requires the student to move in new ways and thus develop neglected aspects of the kinesthetic self-image. Through this work impossible movements become accessible, difficult movements become easier, and everyday movements gain clarity and efficiency. Feldenkrais not only walked again, but near his death at 84, despite his small stature, could still toss people around like styrofoam and bellow to fill a gym.

Feldenkrais saw greater implications to his method than just better movement. Struck by the fact that movement and the kinesthetic sense were the first aspects of our nervous system to evolve, long before sense organs or consciousness, he felt that movement pervaded all aspects of our psyche in the most fundamental way, and took the radical stance that correction of movements was the best means to any sort of self improvement. Feldenkrais' followers have proved him right: they have been able to use the sophisticated teaching of movement experience to help students surmount a wide array of difficulties, from paralysis to brain damage. Feldenkrais' own book "The Case of Nora" is an extraordinary case study of a woman who suffered a severe stroke, removing her ability to read, speak or even orient herself in a room; she was proclaimed an invalid by the neuroscientists in Zurich. Using his teachings, Feldenkrais gave her all of these abilities back, until she was indistinguishable from the "fully functioning". (Feldenkrais died before writing any more case studies.)

Children and Feldenkrais: Filling in the Gaps

My own therapeutic work with children fills gaps in a child's cognitive development through development of the gaps' motor aspect. In accordance with Feldenkrais' theories, the clarification of a child's physical and motor self-image has effects on cognition that are often extraordinary. Problems with attention, socialization, language skills, and self-expression can be improved dramatically by filling in noticeable gaps in how the child is processing their bodily actions, giving weight to the idea that our higher cognitive capacities all rest on a foundation of movement and spatial processing. The case studies at the end of the paper present some examples.

Dalcroze and Feldenkrais

Through my work in the Feldenkrais modality I was in a unique position to see the value that Dalcroze games and techniques could have for enhancing a child's kinesthetic self-image. I see the advantages of Dalcroze techniques as proceeding along three lines.

1) Neural processes for attention and action are rhythmically driven and are better accounted for with rhythmic rather than linear models. (This is the most technical section of the paper.)

Attention has been convincingly demonstrated to be a rhythmically-driven phenomenon: old models of attention involving resource capacity and channel filtering have proven less accurate than a rhythmic model in which attention is viewed as being in sync with, ahead of, or behind a phenomenon attended to.

How do we attend to a particular phenomenon in the midst of the constant confusion of life? We make a prediction as to the rhythm of the activity we wish to track, and then adjust our prediction based on whether or not we have successfully synchronized with the phenomenon we wish to track. Researcher Mari Riess Jones uses as an example three ways of hearing the same sentence: with attention to the sound of the syllables, with attention to the meaning of the words, or with attention to the sarcastic tone underlying

them. The stimulus is identical, but to attend carefully to any one requires a shift in the tempo and rhythm of one's attending, from very quick to pick up subtleties in pronunciation to slow and broad to detect whether a sentence is serious or a joke.

There are broader ways that this rhythmic approach to attention corresponds to fundamental aspects of human motor learning. From the standpoint of the working brain, movement is not attempted until a projection has been made as to the trajectory of that movement, and after initiation of movement, the brain's primary activity is not developing the next portion of the movement but rather correcting its projection for error. The brain achieves this by deftly handling the creation of frames of reference that allow it to gauge for error in projection most efficiently. For example, in reaching for an object on a high shelf, the brain first makes calculations in retinal space for elevation; but once the trajectory of the movement is set in motion, the brain shifts its focus to gauging shoulder rotation to determine if things are going to plan. In terms of the basic problems that the brain is sorting out every day, the overwhelming majority involves setting the best possible frame of reference to gauge the accuracy of a projected action.

Rhythmic attention and communication function on the exact same basic neurological principle. A rhythmic sense allows us to project future action and then devote our energies to correcting for error in projection rather than treating the ongoing input as something fresh to be constantly tracked. Our development of rhythmic sense puts our consciousness on steroids by allowing the bulk of our comprehension to be done at the outset, through projection, and then having the freedom to devote our entire capacities of focus to the margins, checking for error in projection only, giving us much more capacity for clarity, nuance, and subtlety in action. A similar process has been at work for billions of years in the animal kingdom: neuroscience has confirmed that when following a fast object, many animals' brains make a quick calculation based on movement through retinal space and then move the eyes to a point in accordance with an inner projection about its rhythm, slightly before the object tracked actually moves there, rather than track the object constantly in retinal space. Accordingly the use of attention is deeply connected with both perceptual and motor learning, as our projections can become increasingly sophisticated the more we know about something's behavior.

Rhythmic attention has been convincingly shown, for all the same reasons, to be a primary reason spoken language is constantly accompanied by rhythmic and musical nuance. The musical nuance of spoken language sets up a projective structure that enables the listener to track and process a larger unit of information without taxing short-term memory by being able to anticipate the structure of the flow of information. The listener can then focus the bulk of his attention on the margins, or where the projected structure is altered to accommodate changes in the flow of information. It also provides a redundancy that allows us to fill in gaps in communication.

This incredibly important information about the role of rhythm in cognition is likely to have a huge impact on therapies and treatments as it reaches the medical mainstream.

2) Rhythmic actions expose not only the child's self-image but the sensitivity of that self-image to varied demands

The second way that Dalcroze techniques are valuable is the way rhythmic and musical scenarios allow us to study a child's movement in context. Making a rhythmic demand in a game with a child engages a huge amount of their mind that is ignored when movement, or more accurately readiness to move, is studied in itself using Feldenkrais techniques. Rhythm places a movement in a context: whatever movement solution is chosen must be applied in response to outside stimuli and therefore choices have to be made about tempo, timing, and energy in response to outside demands. A wealth of information about the child's motor processing is available by seeing how the movement is made to fit the context. In addition to seeing how the child organizes her movement, one can also see what aspects of the stimulus the child is responding to, and how sensitive the child is to what the stimulus is asking of her. There is a huge amount of information in a movement's rhythmic deployment than can help with analysis of the child's internal self-image.

One occasionally sees instructions in Feldenkrais lessons like "imagine you are walking through mud," etc., which develop the same facility, but in a much weaker and less precise way than guiding the movement through rhythmic and musical cues.

3) Musical games create spontaneous self-expression that shows how movement faculties relate to the genuine self

The third way that Dalcroze enables better kinesthetic work with children is that musical song and games impel the child to self-expression and creativity. By creating situations with drama, excitement, and emotion, the teacher can see how the children not only deploy an action in context (the second way Dalcroze helps, listed above), but see the relation between the action and the child's spontaneous self. A child may enjoy a movement session or game based on rules the teacher sets, but music is the ultimate catalyst for spontaneous movement: even children for whom linguistic communication is weak or nil suddenly hear things in music that they have opinions about and feel an intuitive knowledge about how to respond. The joys of music are thus the greatest spontaneous movement generator, and response to music throws off cascades of information helpful for work on a student's kinesthetic self-image. There is also a genuine self behind the creative improvisation asked for in Dalcroze games, and therefore neuromotor work that penetrates through to the spontaneous, expressive self is sure to stick, and to have a substantial impact on overall behavior.

Examples: Five Dalcroze Subjects in Therapeutic Use

1) Beat

Beat is many things, but most economically defined as the fundamental unit of relative time as opposed to absolute time. A feeling of beat is essential to create a predictive consciousness capable of navigating the subtleties and complexities of the modern world,

and even the complexities of one's own body. Developing a strong capacity for self-generated beat is the most fundamental activity of cognitive eurhythmics work. At the same time the fundamentality of the subject also shows its spareness: beats with no context, clapped or walked simply for their own sake, hold little motivating value.

Beats are negative musical space that shapes the actual musical content: composers do not compose beats, they compose music that shapes itself as beats. This does not relegate beats to second-class status: on the contrary, recent neurological research theorizes that the brain spends the bulk of its processing work on negative and contextual space. Neurologist Rodolfo Llinas posits that the thalamus handles the brain's content, and the cortex, the gray matter that is what we think of as "higher brain", handles purely context or negative space, showing the tremendous complexity and importance of such a task.

1a) Beat, Prediction, and Alzheimer's Disease

My 18 months of work with a center of Alzheimer's patients was for many weeks an exercise in finding how simple and basic I could make a rhythmic game. Though I've learned many simple games for children that usually begin with simple gross motor movements and elementary use of the pentachord, with Alzheimer's patients I had a very different starting place. There was often great difficulty with movement and my work with them primarily involved sitting in chairs. Further, simple music flowed in one ear and out the other, and the music that caught their attention and motivated them was jazz and precursors to jazz like ragtime that connected to earlier days when their cortical functioning was more intact. Our primary curriculum thus involved beats and beat-centered dynamics set to jazzy music.

Verbal cues didn't do much - partly because many were native Spanish speakers - so activities I wanted to see pursued by the whole group had to be modeled. I would often begin by modeling a clap with some jazzy music, getting them clapping to the music, then moving on to improvised movements and music. This was my standard layout for the opening activities but it took a long time to get off the ground. A modeled movement would be reflected for as long as it was seen, but as soon as the model was taken away and the music returned to, the clapping would disappear. This is a common condition with Alzheimer's patients; they tend to react to what's right in front of them, and as soon as it is taken away it is gone from their minds. My first task with the Alzheimer's group thus became to get them to retain a beating movement without a model. Through encouragement of the successful soloist, and of course the power of music that made them want to move, after a few weeks the students improved dramatically, and could sustain beat-centered movements like claps with the barest of cues to get them started, sustaining beats with each other indefinitely. They further began to improvise their own movement response to the jazzy music, pick up each others' movements, and carry them on indefinitely. The weaker students began to learn from the stronger. Despite their deterioration, the "beat sense" of these old ladies grew in strength across the board.

It was not long before they started recognizing me and remembering all my exercises, though I lacked the resources to find out if they also had changes at home. Gradually, in

the face of a disease with supposedly destroys learning and memory, the students were able to learn more and more complex rhythmic games with quick responses to a variety of cues and supple responses in movement to changes in music. I think these games go to the heart of the brain's memory function, which like our attention, motor and language functions uses the power of prediction inherent in rhythmic structure. In giving them back the power to sustain a beat in an endless variety of ways, I felt I was giving them back their ability to make sense of the world, to project rather than just to react, and to parse information to make it more meaningful and sensible.

1b) Beat, Stroke and Motivation

My client Marcia had suffered a stroke in the rear of the brain that left her with among many other characteristics, a prominent lack of motivation. A formerly vivacious intellectual and prominent academic, Marcia now took the easiest way out of all situations presented to her. If any question could be answered with a yes or no, she would merely indicate with her head. If a question required verbal response, she would wait a long time, raise her head, and say the bare minimum necessary, then return her head to its sunken position. Asking her to hand me my glass of Coke required waiting around seven seconds. I was brought in because her partner knew of Feldenkrais and thought it worth trying.

I knew the situation was getting interesting when I asked her to conduct some rhythmic music. Her atemporality vanished, and she began to swing her head in perfect rhythm. I have encountered this situation with a variety of neurological impairments from ages four and up. It is clear from my work that rhythmic time is captured in an area of the brain separate from absolute time. Stimulus-response can be incredibly slow, but rhythmic synchronization remains fully functional.

In Marcia's case, not only did moving to improvised music - mostly of the Tchaikowsky and Rachmaninoff variety - get her back to a world of functioning time, it brought back her capacity for motivation. Within her deteriorated body she eagerly accepted the challenge of improvising adjustments to her movement to accomodate changes I made in dynamics, texture, register, phrasing, etc. She had a tremendously sophisticated ear and it was suddenly on display again.

Though stroke took Marcia out of time with the regular world, with rhythmic time Marcia was back in time and in life.

2) Measure and Attention Deficits

While there are doubtless numerous ways of measuring the degree of someone's Attention Deficit Disorder, I find that it can be effectively and scientifically measured in the form of walking tempo beats. Though this paradigm is unlikely to take hold, I feel that it should.

In the case of my student Ian, who had a severe disorder of attention, focus, and memory, the situation was as stark as it usually gets. Depending on the game, I might clap, bounce, step or play three beats. How many do you hear? "Three!" Then I might do the same with seven beats. How many do you hear now? I would probably get "three" back, or a similar number depending on what he's doing inside. Now suppose I present four beats. How many do you hear now? "Four!" I do seven again. How many do you hear now? Again, a random number, likely four since it worked for him a moment ago.

Ian's condition is the best demonstration I know of the meaning of musical measure. He is a child for whom a repeated stimulus just piles up until it overloads. This is in contrast to the normal brain: as soon as we hear three or four of a stimulus, we immediately begin to set up an internal hierarchy to catch overflow and look for higher principles of order. For example, train tracks tend to be subconsciously grouped into threes and fours. Measure aligns with this function of our cognitive processing. Based on the earlier quoted comments from Dr. Llinas, we can see how this connects to the idea that the massive cortical apparatus is purely to create context: if we don't have some inner mechanism putting everything into context and hierarchy, pileup is immediate and the results drastic.

The solution, then, was to teach Ian how to make measures in his mind with the information he is given. A simple game that worked wonders was to work within his range of beats and give him a cumulative payoff on the downbeat. For example, Ian was given a ball and asked to create a four beat measure by bouncing it. The downbeat was bounced off the wall, the other beats were bounced on the floor. At first we count the beats within the measure: "1 2 3 4 1 2 3 4", etc. After a while, vocal nuance is such that the music of his voice has clearly internalized the metric structure. I then tell him that after he has gone through five cycles he gets to run around the room. I begin counting in a different way: "1 1 1 1 2 2 2 2," etc, thus switching the counting to tracking a second level hierarchy. Often there are stumbles but the essence of the game is usually crystal clear to the child, and that means, like in a Feldenkrais lesson, that it is time to let trial and error work its magic for a while.

Over time Ian improved dramatically at these measure games, and this showed residual benefits in the class in, for example, games of slow motion or gentle motor control, which he could sustain with much more ease. Gradually raw beat processing increased until we would get quite accurate responses at six, seven and often eight - nearly a doubling of the capacity of this measure of short term attention.

3) Rhythm Patterns, Speech, and Reading

When working with children who have difficulties in attention or reading, a common starting place is also with simple beats and rhythms: in particular, the ability to synchronize beats in a variety of modalities, which in the case of bad readers is universally poor, just as research has shown that children with retarded reading abilities have poor ability at retaining a rhythmic pattern in memory.

For example, Vanessa came to me, a seven year old with developmental gaps that left her with, among other things, great difficulties with attention or reading. I asked her to say her name. I say it back to her and make sure it's right. Then I "clap it back to her", saying it and clapping it at the same time, usually undergirding it with a clear beat structure. I ask the student to say the name and clap it back to me. We are at a critical point in my initial assessments.

Feldenkrais wrote that the use of movements that bring the hand to the mouth is the most basic place to start, because they are the most redundantly stored movements in the cortex due to their great survival value. A parallel phenomenon in Eurhythmics work is I think the saying of the name, perhaps the most redundantly stored verbal information due to its great survival value. The name and its properties is very often where I begin with special needs children.

Very often the special needs student cannot coordinate clap and name, and does not realize she has made a mistake, but thinks she has done well. Unlike the previous case of Ian, who thrived in an atmosphere of movement challenges, I don't address this with some sort of yardstick. I prefer the Dalcrozian way of going "back to the sandbox" until the pieces are there for the desired behavior to emerge.

In this case, Vanessa like so many children loved animals, and I used animals to generate the various qualities of rhythmic movement I was looking for. We began with the nursery rhyme "Hickory Dickory Dock". Vanessa's initial recitations of this rhyme were stilted and arrhythmic. However, we then recited it as bears -- low and slow -- and as mice -- quiet, high, and fast -- and every other animal we could think of. Then we stepped those animal's movements while speaking, one step per syllable. The image of the animal impelled Vanessa to tune her movement to show a variety of qualities. In solving this problem, she developed the flexibility she needed to keep the material in rhythm.

Vanessa soon showed success in stepping the rhythms of speech and speaking the rhythms of steps. For at least twenty minutes in each lesson there was an "afterglow" where her speech would be far more rhythmic, colorful, and expressive-sounding, an afterglow that will likely develop into overall change in her communicative skills as we are able to continue our work.

4) Time-Space-Energy

The central strategy in constructing a Feldenkrais lessons is the setting of constraints. Constraints are set upon movement so that the student is required to access nonhabitual movement patterns and unexplored aspects of the kinesthetic self-image in order to solve a movement problem. The lessons expand our awareness of our bodies and what's possible for our bodies, and in so doing our brain, without effort or friction, absorbs these new possibilities into its patterns of action. The brain's ability to solve its own problems is unleashed, a far more powerful force than any invasive, external approach.

Games of time, space and energy are of a piece with the Feldenkrais mindset. TSE games set constraints not on a specific physical aspect of a student's action, but upon its physical results. In this way I see Dalcroze's TSE as a logical extension of Feldenkrais techniques.

4a) TSE Games and Skeletal Alignment

Stewart is a developmentally disabled four year old of average intelligence who has worked with me for a year. Partway through our work, Stewart's mother handed me a large assessment he had been given. It included, among many other items of interest, an observation that Stewart happened to stand on the insides of his feet and recommended orthotics to correct the situation. Because of my Feldenkrais background, I saw this as an immediate red flag and told his mother not to rush to get Stewart orthotics. Being skeptical of mainstream recommendations herself, she was willing to try an alternative.

One Feldenkrais-informed glance at his movement showed that his weight distribution on his feet was the end result of a broader skeletal tendency. His natural movement was almost entirely bursts of running with sudden stops. "Does he ever walk slowly?" I asked his mother. "Not really," she said. Stewart's weight was perpetually pitched forward beyond his control. In learning to walk he had not learned to coordinate his weight so that it passed downward through the skeleton along a central axis. Consequently when he moved, his weight tipped out of his control. He compensated by pitching himself forward, and taking his legs wide apart to create a larger base of support. With his legs at wider angles to create the larger base of support, Stewart's feet were further out, and his weight fell towards the insides of his feet. Yet surely the more important question was, why could Stewart not balance with his legs directly under his skeleton? To solve that would solve the problems with the feet.

As with so many young children, simply present them with a range of possible behaviors and they will spontaneously adopt the most efficient solution. Stewart and I began games of funny walks, each named after an animal: duck-walks with the heels close together but toes apart; pigeon walks with the heels apart but the toes together; and Stewart's own invention, penguin walks, inspired by March of the Penguins, in which both feet are laid straight, but brought in so close they pressed against each other as he went. Stewart had enormous troubles at first: his duck walk could only succeed, not surprisingly, with feet wide apart and tilted out, not with the heels together; the pigeon walk was nearly impossible. However, he clearly grasped the concept and threw himself into improvisation and experimentation. I knew from there that Stewart would begin to find his way.

We also worked with control of weight distribution, using the model of a train. We would pull slowly out of the station, get faster, slow down, and then pull into another station, all while keeping our feet on a straight "train track". Stewart found the train image quite engaging and was quickly thrown up against his inability to do a slow start and gradual stop. For the lesson, I aided him by supporting him from behind by his hips, holding his weight back to keep him from pitching forward, so that he could have the sensation of his goal prior to independent attainment. Once he was given the sensation of a gradual start

and stop, with weight upright, he was immediately able, with minimal trial and error, to begin replicating it on his own.

Stewart and his mother practiced their walks all week, and when he returned he walked, stood, and gestured entirely differently. He stood utterly upright, noticeably taller, his shoulders and chest enviably relaxed. He started and stopped a slow, easy walk with complete control. His penguin and duck walks showed the results of practice and experimentation, with much more control and clarity of movement. And his weight, quite naturally, now sat evenly distributed throughout his feet. The need for orthotics was eliminated. Address the root problem through education of the nervous system, and the many small problems we myopically struggle over will be swept up in a process of joyful, spontaneous personal education and development.

Conclusion

Dalcroze often spoke of his work as training the human body as musical instrument. The fact that the human body is our fundamental musical instrument has implications that were not lost on him: it was an observation that carried a tremendous potential impact on how the body and mind are viewed in all of society's disciplines. A discipline like Feldenkrais that studies our capacity for spontaneous movement and what it reveals about inner neurological structure can interact fruitfully with the Dalcroze method of musical training. While dry, atemporal movement exercises reveal a great deal about how we function in the world, playing the human musical instrument reveals the self in an additional dimension of richness. It has the potential to create therapeutic applications that are enormously powerful, holistic, and truly human.