Spring 5-18-2024

Feldenkrais and Music Informed Listening: A Neurophenomenological Perspective on Autism

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Capstone Thesis

Lesley University

May 18, 2024

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Clinical Mental Health Counseling: Expressive Arts Therapies

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Abstract

Phenomenologists identify the subjective body and its felt-senses as the basis for human development and consciousness, including mental health. Several mental health disorders, when viewed from a phenomenological perspective, share common symptomology related to varying extents of fractured selves, which in turn hinders dynamic interaction between individuals, their actions, and their relationships with their social and material worlds. Autism is one such condition. Hence, I created an intervention to investigate how listening, which foster subjective and intersubjective experiences, lies at the heart of somatic and arts-based interventions. This thesis, first, begins with a summary of the presenting symptoms observed in autism and highlights gaps in current treatment approaches. Second, listening and music improvisation are introduced and related to subjective and intersubjective outcomes. Third, this thesis project introduces the Feldenkrais Method, which is a somatic learning-based pedagogy for the development of the self-image. A 12-year-old boy diagnosed as operating on the autism spectrum and his family in the context of In-Home Therapy are involved in a case study. Two treatments sessions were given over a period of 4 weeks: one session utilized Feldenkrais Method and the second session used music improvisation. A first-person subjective approach was used to capture the results. Favorable outcomes such as play and pleasure, a developing self-image and spontaneous emergences were observed within the sessions. As such, this approach can be considered a useful one for a more in-depth evaluation of listening practices.

Keywords: *Somatics, listening, Expressive Arts, Feldenkrais, self-image, intersubjectivity, music improvisation*

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Introduction

Mental health research has increasingly begun to view mental health disorders from a phenomenological perspective. Phenomenologists like Husserl and Merleau-Ponty identity movements of the body as the basis for developing intimate, intersubjective experiences with others and the material world. According to Merleau-Ponty:

> Bodily self-experience and perception of the world are closely interwoven with the movements of the body and the implicit feeling of one's own bodily agency. Our bodily movements continuously shape the perceptual field and the possibility of interacting with the environment constitutes a crucial part of how the world presents itself as meaningful in our experience. The movements of the body are an essential part of establishing the intimate relation with the world that makes it appear intuitively meaningful (Boldsen, 2018, p. 909).

When viewed from a phenomenological perspective, several Diagnostics and Statistical Manual of Mental Disorders (DSM) conditions have been attributed to a loss of self and agency, disembodiment, and intersubjective fractures (Alphonso, 2023; Connolly, 2013; de Haan, et al, 2013; Fuchs, 2013,2017; Siegel & Drulis, 2023; Varela, et al., 2017). The shared underlying symptomology is evident in literature related to Autism Spectrum Disorder (ASD) (Bhat, 2021; Boldsen, 2018; Srinivasan, 2016), Attention Deficit Hyperactive Disorder (Clark et al., 2015), depression (Fuchs, 2013; Loffler-Statska, 2021; Siegel & Drulis, 2023), obsessive-compulsive disorder (deHaan, et al., 2013), and schizophrenia (Davidson, 2020; Galbusera, et al., 2017).

Davidson (2018) characterized the underlying symptomology to an “ipseity” disturbance, a term used to describe the disappearance of the basic sense of “I-feeling” that otherwise accompanies most human experience” (p. 122). Connolly (2013) described this phenomenon as a “disturbance in the sense of body ownership” resulting in “psychic deadness” (p. 636). She explained that “while individuals were very different as far as presenting symptoms…they all had certain features in common that are related to feelings of inner deadness” (p. 640). For example, a mild case of disembodiment may present as a lack of vitality or feeling of emptiness found in depression while detachment from reality is commonly found in patients diagnosed with schizophrenia. Connolly (2013) explained that an “invisible barrier (is erected) between them and other people” (p. 640). As a result, the person may have a feeling of being an outside observer, detached from the world (Connolly, 2013; Froese & Fuchs, 2012; Siegel & Drulis, 2023). This line of research suggests that one’s felt sense of the body --or self-image -- determines one’s identity, vitality, and mental health.

Recent research on Autism also points to ipseity as the basis of disruptions to self-regulation, sensory processing, cognitive delays, generativity, attentional capacities, and challenges to social interactions (American Psychological Association, p. 10; Lai, et al., 2017; Leekam, et al., 2011; Maskey, et al., 2013; Van Eylen, et al., 2015). The phenomenological perspective on mental health disorders such as ASD is amassing support from the fields of neuroscience, developmental psychology, action-perception research, and philosophy (Boldsen, 2018).

Neurophenomenologist like Francesco Varela and others have developed new research methodologies that enable the inclusion of first-person accounts (i.e., the client’s perspective) in combination with clinician/researcher experiences (i.e., the clinician’s felt senses). Moreover,

clinical theorical frameworks have also shifted to relationally-based models evidenced by mantras, such as 'It's the relationship that heals' (Yalom & Leszcz, 2005). The Feldenkrais Method is one such therapeutic approach which capitalizes on the emergent, uncertain, and dynamic nature of the client and the clinician dyad (Buchanan & Ulrich, 2001; Kampe, 2021; Kimmel et al., 2015).

The idea of a socially mediated self-image espoused by phenomenologists is operationalized in the Feldenkrais Method. Founded by physicist and Judo teacher, Dr. Feldenkrais (1985, 1975) viewed the self-image as a dynamically constructed holographic image comprised of actions, perceptions, thoughts, and feelings of and with the world. Dr. Feldenkrais gave this composite kinetic image a name, "acture" (1985, p. 108). Feldenkrais Method stresses "self-activation," "self-sensing" and "learning through the body" (Kampe, 2021, p. 4). Like Feldenkrais, Siegel and Drulis (2023) similarly stated that individuals shape their identity and their sense of belonging in the context and in connection with other individuals. Along these lines, Froese and Fuchs (2012) introduced the concept of an "extended body" and explained that "inter-bodily resonance between individuals can give rise to self-sustaining interaction patterns that go beyond the behavioral capacities of isolated individuals" (p. 205).

The Feldenkrais Method has been concerned with the arts since its inception in the 1940s, creating somatically-informed arts methods in psycho-physical movement developed within the twentieth-century theatre and dance cultures (Kampe, 2021; Sholl, 2021). The field of expressive arts (sometimes used interchangeably with creative arts therapies (CMT) was founded in the 1970s at the intersection of mental health, creative arts, and humanistic values. According to Knill et al., (2005), all modes of arts (e.g., music, visual art, dance, etc.) are inherently multimodal in that each mode recruits other modes through the highway of imagination.

However, Knill, et al. (1995) also stated that sound, rhythm, and vibrations, generated by movement in music, more readily induce a dynamic interchange of sharing, play, and a development towards maturity with one another. Interestingly, music and movement (i.e., martial arts) were also found to be effective for children operating on the spectrum (Amonkar, et al, 2021; Kossak, 2023; Malchiodi, 2012).

The most recent and comprehensive review of arts-based interventions for Autism conducted by Amonkar, et al. (2021) also pointed to music and martial arts as being the most effective methods of treatment for this population. This substantive study included over 1,900 participants diagnosed with ASD and 72 experiments with music, martial-arts, yoga, theater, and dance movement modalities. Their results indicated that "the strongest evidence, both in terms of quantity and quality, exists for music and martial arts-based interventions, followed by yoga and theater" (p. 1). However, the reports conclusively stated that "the greatest quantity of evidence is for music-based interventions" (p. 39). With respect to music, the authors elaborated that "there is substantial evidence that musical practice promotes multimodal integration by activating long range connections that simultaneously engage the auditory, visual, somatosensory, motor, and premotor areas as well as brain networks such as the mirror neuron system that are especially dysfunctional in ASD" (p. 35).

With regards to dance / movement therapy, Amonkar et al.'s (2021) findings suggested that "despite the potential for promising effects on multiple systems through the very kinetic nature of the experience, the current evidence on dance therapy in ASD is very limited" (p. 37). However, the research caveated that strong evidence was found in martial arts-based based interventions. These tentative findings on dance movement therapy seem to suggest that interactive forms of movement, contrasted with solipsistic forms of dance often found in fitness

and dance education (Mattes, 2016), are more effective for children on the spectrum. Despite reported limitations of this research -- e.g., exclusion of case studies, confluence of arts and conventional methods, and the lack of first-person accounts, Amonkar, et al.'s (2021) report provided a sizable inventory of art modalities evaluated across multiple domains of functioning for children on the spectrum.

This thesis posits that a substrate to music therapies (especially improvisational based) and the Feldenkrais Method is a dynamic interplay between subjects which can evoke the self-organizing capacities of each participant. Another common substrate to these approaches is the cultivation of diverse and rich ways of listening to oneself that is kinetic, sensorial, and transformative. Hence, this paper endeavors to synthesize somatic and sound practices to address the ipseity and disconnections experienced by those on the spectrum, or off the spectrum.

Literature Review

Autism

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder affecting multiple developmental domains including social communication, behavioral-affective, sensorimotor, and cognitive systems. ASD is prevalent with children in the United States, with around 1 in 36 qualifying for an ASD diagnosis and boys being four times more likely to be diagnosed than girls of the same age (Maenner, et al., 2023). Hallmark signs of autism include poor reciprocal social interactions, difficulties with verbal and non-verbal communication, and restricted and repetitive behaviorism (Young & Rodi, 2014).

Overview of Diagnosis and Symptomology

In the social domain, autistic behavior is observed as difficulties in recognizing social stimuli, including body language, gestures, and facial expressions. These difficulties strain joint

play, collaborative activities, and, ultimately, the formations of relationships (Mundy & Crowson, 1997; Srinivasan, et al., 2016).

Behavioral symptoms further interfere with social bonds. Children operating on the spectrum often present with disruptive behaviors such as aggression, defiance, other signs of negative affect, which separates them from their peers (Hartley, et al., 2008; Reese, et al., 2005

Additionally, executive functioning is often diminished and manifests as attentional deficits, cognitive inflexibility, and lack of self-regulation. These negative symptoms often stress social interactions during unstructured (e.g., improvised activities) compared to structured, time-bound activities (Lai, et al., 2017; Van Eylen, et al., 2015).

From a sensory motor view, children operating on the spectrum may also experience hypo- and hyper-sensitivity to sensory stimuli in multiple domains including the auditory, tactile-proprioceptive, vestibular, olfactory, and visual senses (American Psychological Association, p. 10; Leekam, et al., 2011). These physiologically- or neurologically-based presentations may be the foundational underpinning to some of the behavioral presentations.

In addition to the above diagnostic criteria, several studies have focused on the sensorimotor impairments which are not captured in the diagnostic criteria. Some studies noted that children with ASD are impaired in their activities of daily living, with a few examples listed below (Dewey, et al., 2007; Iverson, et al., 2018; MacDonald, et al., 2013). Amonkar, et al. (2021) list some of the prevalent challenges:

> [B]ilateral coordination, gait and postural stability, handwriting, manual dexterity skills, and visuomotor control), as well as socially embedded motor skills, including imitation, praxis (performance of skilled functional movement sequences/gestures),

> and interpersonal synchrony (ability to synchronize movements with those of another person) (p. 2).

Children on the spectrum contend with a wide gamut of impediments that challenge multiple domains of functioning and personal well-being. Furthermore, sensorimotor impairments pose challenges to classroom teachers and peers who may not account for or be able to support fundamental physiological or neurological impediments within classroom settings. The challenges to daily living also place burden on caregivers.

Limitations of Current Treatment Approaches for Autism

In line with phenomenological view, a recent surge of studies on neurodevelopmental disorders have identified sensorimotor dysfunctions as the basis for learning disorder, deficits in language acquisition, social anxiety, limitations on cognitive development, symptoms of depression, and other functional abilities (Bhat, 2021; Clark, et al., 2015; Mundy & Crowson, 1997; Srinivasan et al., 2016). According to Amonkar, et al. (2021), traditional and conventional approaches deprioritize sensorimotor impairments relative to cognitive, academic, and executive challenges. While many approaches do address joint-attention, play, and other child-preferred therapeutic activities, they "do not focus on addressing the sensorimotor impairments that are clearly highly prevalent in ASD" (p. 2). Indeed, Bhat's (2021) report, based on a study of nearly 14,000 children with ASD and with risk of sensorimotor impairments, projected that these symptoms continue to develop into adolescents.

One limitation in a few of these studies is their reliance on parents' reports, which are subject to reporting bias (e.g., the Horn effect); that is, parents may over-state their children's impairments. Conversely, parental reports also provide a diverse view of varied functional

limitations experienced by a child. Parent reports are the best way to obtain information from a large sample to "elucidate the broader population patterns" (p. 16), explained Bhat (2021).

Given the significant and far-reaching impact of sensorimotor impediments, children with ASD would benefit from treatment modalities that emphasizes sensorimotor awareness, with the broader aim of promoting a sense of self while diminishing the social isolation.

The Primacy of Sound

Sound mediates experiences with the inner and outer worlds, felt and vibrational in one sense, and perceptual and intermediating in another. Practices in sound listening evoke both the bodily senses as well as the perceptual senses.

Vibrational Dimension of Sound

Evolutionary biologist Todd (2015) explained that there is a close partnership and shared history between sounds, vibrations, and gravity which traces back to early "geological time at least 500 million years" ago (p. 348). The vibrational aspect of sound permeates and animates all life forms, and shapes many areas of human development.

With respect to human development, somatic educationalist and clarinetist Kaetz (2017) pointed out that hearing is already taking place even before the fetus is born. The sounds and vibrations that emanate from a world outside the fetal membrane stimulate the fetus in a way that seeing does not, and will not, for several weeks or so after birth (Dealessandri & Vivalda, 2018; Feldenkrais, 1976; Henriques, et al., 2022; Reissland, et al., 2016). The fetus senses the mother's heartbeats, digestive tracts, breathing rhythms, and vocal reverberations. For Dr. Feldenkrais (2010), the "infant is predominantly a hearing animal" (p. 46). Kaetz (2017) echoed and related the profound effects of sound vibrations on sentient creatures: "Like all creatures with watery

bodies … (we are) subject to gravity, we are touched, moved, and in some way affected and imprinted by vibrations even before we have ears, brains, and names" (p. 50).

Sounds Inspire Movement

Sound vibrations play a role in mediating courtship from plant life (Bhandawat & Jayaswall, 2022; de Melo, 2023; Shivanna, 2022) to early marine life, and to present-day primates (Shubin 2015, 2008; Todd, 2015). Reissland, et al. (2016) found that mouth movements in infants are a response to the sounds heard in the infant's environment. Kaetz (2017) related the tongue (as in the organ) to language (as in one's mother tongue). In other examples, Henriques, et al. (2022) discovered that the melody of a new-born's cry is influenced by the melody of the language (e.g., the rhythm, prosody). McGilchrist (2019) explained that music and singing predate language, and further explained that language is made possible by the way sound develops brain functions in early human life. Finally, in an experimental brain research, Morrison, et al. (2020) discovered that the skin is also an organ for listening in that it processes affective signals and transmits social information via the skin-brain pathways.

Toward Listening

Beyond the vibrational aspect of sound is the perceptual dimension. Somaticist and Professor of Music Sholl (2019) compelled listening to life itself when he stated that "listening, then, is life (the dead do not listen) – it is a form of movement and an animation of our inner worlds" (p. 2). For expressive arts therapist and jazz musician Kossak (2015), listening takes the form of "therapeutic attunement," which he described as "the art of being with another person and listening to what is said and what is implied (which then) becomes an act of tuning in" (p. 13).

Kaetz (2017) explained the difference between ways of engaging with sound, specifically the difference between hearing and listening. He explained that hearing refers to sensing the mechanical vibrations of sound, and listening refers to the perceptual encounters and meaning-making of sound. Hearing is analogous to sensing, while listening is akin to attention. He elaborated here:

> Hearing is something you *have*. There is some *doing* involved, but mostly hearing does what it does without asking you. As for listening, it is not something you *have*: you either *do* it or you *don't* (italics included) (p. 9).

Hence, hearing and listening are distinct yet synergistic aspects of sonic events. Listening, however, beckons an active participation. Listening needs intention, and a choice to pay attention.

Characteristics of Listening

Attention-ing or Awareness. Noé's (2015) research on perception, consciousness, and the arts supported the importance of this intentional and attentional dimension of listening. He stressed that how one listens alters the perceptual landscape of a situation. Similarly, McGilchrist (2019) suggested that "attention… underwrites … the way in which we relate to the world. It doesn't just dictate the kind of relationship we have…it dictates *what it is what we come to have a relationship with* (italics included)" (p. 130).

Dr. Feldenkrais also referred to listening and used acoustical rather than visual analogues. For example, he said he "listened…with his hands" (Sholl, 2019, p. 4). Feldenkrais (1995) also used listening and paying attention interchangeably. Here is one example:

> You will not succeed without listening or paying attention. It is like changing your accent in speech or singing. You must open your mind and listen with the utmost concentration, without effort, for that to occur…You can pay attention when you do it slowly (p. 37).

Listening in the above passage seems to suggests a titration of attention. That is, it is the application of attention without the exertion of superfluous effort. Valence of attentional listening is extensively elaborated in neurophenomenological studies aimed at understanding the first-person subjective experiences (Depraz, Varela, & Vermersch, 2003).

Suspending, Waiting, and Rests. Listening implies a slowing down of time and an adjustment to the tempo of thoughts, and invites liminal experiences. Acts of suspending action, letting go, and waiting have been characterized by musicians and therapists as ways of "making new discoveries, and gaining insights and awareness towards authentic, interpersonal, adaptive ways of being in the world" (Kossak, 2009, p. 13).

Neurophenomenologists Depraz, Varela, and Vermersch (2003) inscribed a quality of a "waiting" and "suspension" to arrive at a higher order awareness that recruits an embodied attention (p. 28). In the authors words: "(in) first step of suspension, I abandon my other activities … in order to orient myself to this listening to my experience… you go from 'looking for something' to 'letting something come to you' to 'letting something be revealed'" (pp. 28-31). Sholl (2019) resounds this evocative pause when he said "to listen to the sensorium most clearly requires a stopping to allow a listening to the possibility of change" (p. 34). The choice to wait, suspend, or let go is viewed by Ceraso (2018) as "intersensorial self-negotiation (that hovers at the) fulcrum of sensing the resonance of past action and waiting for the serendipity of what new action formed by attention without effort will bring" (p. 10).

From an expressive arts therapy standpoint, Kossak (2009) described ways of attuning to the present moment as an "emptying the mind of everyday thoughts or dialogue" to "move from what is felt…or what the internal impulses are calling for (whereby) there is a release of inhibitions or habits…in the service of the imagination" (p. 34-35); and added that "when combined with a reflecting process that includes …musical expression, it is a very powerful form of serious play" (p. 35).

Sensing. The body has been characterized as a musical instrument (Keeney & Keeney, 2020), a tuning fork (Kossak, 2024; Stone, 2006), and a resonating chamber (Andahazy, 2019; Glennie, 2014). Glennie (2014) is one of the greatest contemporary solo percussionists who also happens to be deaf. She had a lot to say about how sound touches and moves the body:

> To perceive sound through the body, and using your body as some sort of resonating chamber, that has to take practice, and, you know, listening skills is about concentration, it's about focus, it's really digesting what is actually going through that body … I'm sure if you covered up part of the body of a viola, or violin or cello or something, it would be a completely different type of sound, possibly more 'choked.' So, we have to open that instrument up. And likewise, our bodies, they are the instrument, at the end of the day, and we have to open the body up, in order to perceive sound (01:45 – 02:30).

For Sholl (2019), sensory listening begets an aesthetic sensitivity to a whole plethora of sensations within the body, including the kinetic relationship between parts, the spatial distances, the relative tonalities, and more. Sholl (2019) described the ways of sensorial listening here:

> To listen to oneself, to the quality of one's own sensorium, is to listen to the quality of movement in the body: the tonus of the area between the eyes, and the connections between the jaw, neck, spine, ribs, hands, pelvis and feet, and the ways in which these parts work in action (p. 34).

Engelsrud (2023) emphasized the sensory relationship with the ground. She stated that bodies "uptake … vibrations from the ground (which) directs their movements" and such "experience(s) of ground, touch and the sensuous flow … can be defined as somatic modes of attention" (p. 2). She added that "the senses like vision and listening team up with intellect to create a response, while kinesthetic feeling and sensing team up with the body to do so" (p. 2).

The act of opening up that instrument (Glennie, 2014), sensing the quality of one's sensorium (Sholl, 2019), and sensing the ground (Engelsrud, 2023) in the above passages implies a volitional actor. In other words, the listener who attends to the sensations is distinct from the sensation themselves. Both play their part, but the act of listening inward is the emphasis pointed to in this study.

Intersubjective Listening. From a therapeutic standpoint, Kossak (2009) stated that "In similar ways therapists and artists are both looking to understand and "tune into" the human condition. As a therapist enters into the intimate world of the patient, the artist enters into the intimate world of material, space, sound, and a deep connection with other participants" (p. 13). Connecting to the idea of the extended body, Froese & Fuchs (2012) suggested that "both individuals' intra-bodily resonance loops are embedded in an interpersonal resonance loop and an inter-affective system" (p. 212). Fuchs & Koch (2014) described this interaffectivity:

> Our body is tacitly affected by the other's expression, and we experience the kinetics and intensity of (their) emotions through our own bodily kinaesthesia and sensation. This means that in every social encounter, two cycles of embodied affectivity become intertwined … continuously modifying each partner's affective affordance and resonance (p. 517).

The methods in music improvisational is not new in Autism research as it emphasizes this interaffectivity. Raglio, Traficante & Osadi (2011) draws on attunement research and stated that "Generally speaking, sound is an extremely important element in determining the affect attunements and it gives rise to meeting moments" (p. 126). Music improvisation evokes an interdependence of actor, action, and environment as it promotes a "we-space," with elements of shared attention (and intentions), kinetic gestural, facial mirroring, and perceptual coupling. Joint listening and action are recruited and heighted (Krueger, 2010, as quoted in Bishop, 2018, section 2.2).

Listening practices can be evocative, leading to profound subjective and intersubjective inroads. Engaging with sound practices through the felt and perceptual senses holds the potential of bridging social divides, and personal transformations through liminal experiences (Bishop, 2018; De Jaegher & DiPaolo, 2007; Henriques, et al., 2022; McGilchrist, 2019; Reissland, et al., 2016). This view finds support in dynamic systems methods, which states that a change to one member in system tips the scales for others (Kimmel, et al., 2015). The very act of listening mediates relationships through attention and sensing. Valence of listening, attunement, sensing, and attention-ing, is rooted in somatic practices.

Feldenkrais Method

Foundations & Applications

The Feldenkrais Method is a dynamic-systems based approach (Buchanan & Ulrich, 2001; Kimmel et al, 2015) founded by Israeli physicist, black belt, and pioneer healer, Dr. Móshe Feldenkrais. Feldenkrais based his work after his thorough review of the scientific state of the art at the time, which has held up in many ways (Mattes, 2016). Neuroscientist Karl Pibram described Dr. Feldenkrais as "one of the first neuroplasticians" (Doidge, 2016, p. 169). The Feldenkrais Method was founded on humanistic and feminist approaches (Kampe, 2021) for consciousness and learning (Feldenkrais, 1975; Hillier & Worley, 2014; Ginsburg, 2010; Stephens & Hillier, 2020).

The method has been linked with the arts, neurology, and health and wellness, with more research publications in the areas of neurology (Criville, et al., 2021; Joyce, 2006; Reziti, 2023), kinesiology (Mattes, 2016; Russell, 2020), mental health (Clark, et al., 2015; Vrantsidis, et al., 2009; Worsley, 2021), and mindfulness (Fonow, et al., 2017; Kampe, 2015). For the most recent review, refer to Stephens and Hillier (2020).

A System of Sensory-Based Learning

Feldenkrais Method has been described as a system of learning how to learn (Stephens & Hillier, 2020). The method embraces a core set of principles, which include awareness through movement; sensory discrimination; an experimentative approach; and comfort- and pleasure-seeking rather corrective; self-directed learning; and rests for synthesis, reflection, and inquiry (Feldenkrais 1949; 2012; 1990; Feldenkrais & Kimmel, 1985; Hillier & Worley, 2015; Kampe, 2016; Mattes, 2016; Sholl, 2019; Stephens & Hillier, 2020). As experientials are organized around the student's learning needs, they are called 'lessons' (Kimmel, et al., 2015). Feldenkrais

imbued the principles of self-education as a means of personal growth and drew from the work of auto-poiesis, or self-creation as described by Chilean biologists Maturana and cognitive biologist Varela (2017) to describe the self-maintaining living systems. Neurobiologist Hansel (2021) employed a similar expression, "self-formation," to underscore that one "acquire(s) a sense of self …through learning" (p. 172). He explained that learning in the broader senses surpasses skill acquisition or behavioral changes when individuals learn through "directed attention" (p. 172).

Mattes (2016) framed the Feldenkrais Method as follows: First, thinking, feeling, sensing, and action comprise the bodymind unity. Hence, changing the motor patterns of an action changes the whole person. Second, the creating sensory contrasts most directly attracts the student's attention. That is, attention paid to sensory differences allows the person's to autonomously select the best course of action in real-time to meet the situation at hand. Third, since movement is organized by the nervous system, changing movement patterns behavior is viewed as a learning task.

The process, Hansel (2021) explained, involves a calibration between what is expressed and depressed (or potentiated and inhibited) to functionally and structurally meet the situational demands of real-time experiences. The globalization of these learning is expressed through a generative behavior and outlook in approaching new situations. Hence, to effect a change in the individual, Feldenkrais mastered the process of creating the conditions for learning. He used the felt-sense of communication to create sensory experiences that could be felt by the participant (or pupil). Dr. Feldenkrais felt that in spite of any diagnosis, the person's innate capacities for learning was still available through senses and movement pathways (Feldenkrais, 1975; Sholl, 2019).

Synergies with the arts

These guiding principles are evident in the burgeoning literature on Feldenkrais and the arts and, a half a century later, continue to resound in some of the formidable thinkers and shapers contributing to a transdisciplinary field encompassing neurophenomenology, enactive embodiment, and health. For example, many of the principles and practice of Feldenkrais are echoed in Koch (2017)'s thinking in calling for a framework for the arts (and explicitly, the active phase of art-making). Her criteria are outlined here:

> (a) Hedonism…for pleasure and play (affective function; creative, productive)
> (b) Aesthetics …for beauty and authenticity (integrative function)
> (c) Non-verbal Meaning making … for symbolizing and communicating, art for being seen (identity, social- and transpersonal functions)
> (d) Enactive Transitional Support… for shelter and test-acting in times of change (transition function)
> (e) Generativity… for productivity/creation (love and work)
> (f) Self-efficacy (cognitive-affective function; evolutionary function) (pp. 88-89).

The Practice: The Functional Integration Mode

There are two modes of delivery. The first is verbally directed group lessons called Awareness through Movement (ATM). The second is individualized, tactile lessons called Functional Integration (FI), and the focus of this thesis project. ATM is structured for individual

learning while FI is inherently intersubjective and can be likened to the relationship between the parent-child and therapist-client dyad (Kimmel, et al, 2015; Montirosso & McGlone, 2020; Siegel & Drulis, 2023). For Kimmel et al. (2015), FI is "the art of encounter" (p. 111). Feldenkrais himself characterized this communication as 'two nervous systems dancing together.' He elaborated:

> Through touch, two persons, the toucher and the touched, can become a new ensemble: two bodies when connected by two arms and hands are a new entity. These hands sense at the same time as they direct. Both the touched and the toucher feel what they sense through the connecting hands, even if they do not understand and do not know what is being done (i.e., pre-cognition) (Ginsburg, 2010, p. 267).

From the biological perspectives, Maturana and Verden-Zöller (2008) emphasized that touch and physical "proximity (are) not cultural habits but a biological necessity as it engenders a biology of trust and intimacy which is essential to our human coexistence, lending a wide range of essential qualities, ranging from intimacy to social connectedness. In the authors' words: "In the acceptance of the body nearness of another, in the pleasure of that nearness in total trust … are necessary for human well-being and harmony" (p.117). Affective touch has gained endorsement in the field of Autism as well (Li, et al., 2022).

Affordances of Functional Integration

When two individual systems synchronize into a felt loop, the practitioner or the client can report a perceptual shift where the individual boundaries are more permeable and thus

extendable to others beyond oneself (Kimmel, et al., 2015). From an enactivist viewpoint, Gallagher (2017) suggested that this extended relationship opens up affordances space such that distance-mediating senses (e.g., hearing, speech, etc.) such as hearing are foregrounded (p. 164). He explained here:

> movement itself, including early crawling behavior, influences the development of perception and cognition. The change of posture that comes with standing and walking equally affects what we can see and to what we can attend (p. 168).

Thoma & Fuchs (2017) added that not only is the affordance landscape broadened, but one's inclination to act on new affordances is bolstered. They reinforced the phenomenological notion of "sensus communis" by stating that "sensing and touching the world, whereby the subject gets in close contact with what is sensed, moves towards it, and is moved by it" (p. 139).

With foundations in brain plasticity, sensory-based learning, and self-awareness, Feldenkrais Method is uniquely situated to fill some of the unaddressed gaps in treatment reported in autism research discussed earlier. First, the approach galvanizes innate capacities for learning by capitalizing on primeval channels of sensing and movement. This allows for a more direct access to the nervous system, and thus, the self-image of the individual receiving the work (Clark, et al, 2015; Criville, et al., 2021; Kimmel, et al., 2017; Mattes, 2016). Second, the intersubjective mode inherent in Functional Integration creates a pleasurable learning oasis that invites a cooperative dance of play and experimentation so conducive for children or clients of any age. Also, this mode of working enacts the safety of dyadic attachment while entraining

subjective and intersubjective bonds so crucial in foster social emotional learning. Finally, self-enactivist aims of the method cultivates a sense of agency and self-reparative capacities.

Methods

This thesis project endeavored to explore the role of multimodal listening in two interventions, one using Feldenkrais Method Functional Integration and the second using musical improvisation. A 12-year-old boy diagnosed as operating on the autism spectrum participated in the Feldenkrais Functional Integration Intervention. The boy and his family participated in a musical dialogue intervention.

Materials / Environment

The FI session and the music ensemble sessions took place on the family living room floor. For the FI session, a yoga mat was used for the client to lie on, and a few paperback books to support his head and neck. The mother was present during the session. For this musical improvisation, a variety of strings, drums, and other instruments were used.

Procedure

Functional Integration

Sixty minutes was reserved for the FI session, 40-45 minutes for the lesson itself. I asked my client to move through various positions, from standing, to sitting, to lying down, and, at the end, to standing and walking. The experientials during each position informed the subsequent ones, progressing along a developmental arc that grows in complexity. Light and non-invasive tactile contact was introduced in some areas of the body while not in others to sharpen sensory differences. I asked questions, both verbally and with tactile suggestions with the aim of directing the client's attention.

Musical Dialogue

The group gathered around the living room and each one selected a musical instrument. Various directives were offered: (a) to explore their tactile relationship with their instruments; (b) to practice various modes of vibrational listening with a focus on subjective experiences; and (c) to explore broadened listening to include other members, instruments, and the space. The experiments grew in complexity in accord with my sense of their readiness. Scores included coupling/decoupling (e.g., solo playing vs. joint playing); temporal shifts (e.g., rests, fast/slow); and locale of attention (e.g., internal vs. external). Finally, I gradually minimized my role as the facilitator to encourage self-directed explorations of the scores.

Post Intervention Assessment

Two assessments followed the intervention, one occurred immediately following the meeting, and the second occurred one week later. Immediately following the Functional Integration lesson, select aspects of the lesson were reviewed. The client's overall presentation, e.g., vocal registry, facial tone, pupil dilation, eye contact, and general excitability or inhibition were observed. Changes to ideations of self were at the end of the session and one week following the intervention.

For the musical improvisation, the group members were not given any specific closing directives. Here, I opted to wait and witness their interactions and sense of flow.

Results

Session #1: Functional Integration

The client was a gregarious boy. I was not sure we would connect on a non-verbal plane. Would he be receptive to non-verbal communication? I was aware of my own inquiries while also gauging his sense of security and receptivity throughout our work together. I greeted him by

extending my arm for a handshake. A handshake is a familiar and conventional gesture, and our hands are the most direct mediator with the world. The client grasped my hand and wagged it vigorously. I switched hands and was met with the same response. He was forceful and beaming with mischief. This was our beginning, and we will return to this at the end.

I then moved to stand within arms-length distance from him, far enough to meet social norms yet sufficiently proximal to sense each other's physical presence. I turned to look at him inquiringly, and he looked at me expectantly. I placed my hands on his shoulders, letting the weight of my hands settle and waited for his response. He was still looking at me expectantly. I then introduced a slow oscillatory shift of weight over his feet. I shifted his axis by shifting mine. I listened with my hands and asked myself: Do I sense the floor beneath his feet? Do the few grams of pressure downward deviate, dampen, or diffuse along the way? The gentle touch directs his attention to the sensation of pressure moving through his body. The stimulus I introduce is a form of a question, suggesting and inquiring simultaneously, a form of meeting the client where he is. I looked for a path for the pressure to travel down his spine to his legs and varied the trajectory and degrees of pressure. I engaged him verbally: Did he feel the pressure changes over his feet? He replied that he did not. The stimulus was too subtle. Often, amplifying the difference might allow him to sense it more clearly. Still connected to him, I shifted my axis such that he was standing predominantly over his right foot. He confirmed he felt his right leg more. Over the next several minutes, I repeated the procedure, vacillating from right to left and back, listening to his path of ease and slowing down when I sensed a resistance or a trajectorial change. I continued to engage him verbally, asking him to listen to any differences he noticed. He answered the first several times but gradually stopped saying anything and I stopped asking.

After about 10 minutes or so, I noticed that his knees were strongly hyperextended and bowed backward. This not only restricted the oscillatory transferences of weight but impeded the movement of breath. The rigidity characteristic of Autism was apparent here in the most concrete sense. What role do joints play in mediating the ground forces and, in turn, how does this affect one's ability to feel grounded and in resonance with oneself and others? I too felt with my hands jagged edges and the irregular rhythm of the sphere. I wondered what does he (or we) need to enable a more fluid interaction? I suggested he lie down on his back where he would be better supported by the floor. On the floor, the concaved shape of this torso was more pronounced. It was then I felt the extreme contraction of the major muscle of respiration, the diaphragm, which vibrated like a rumbling volcano. Any suggested movements felt heavy and effortful. Rather than attempting to correct or fix the rigidity, I accentuated his proclivity by asking him to lie on his side in a semi-fetal position and added a few thin paperback books from the bookshelf to lift his head to be in line with his spine. I paused to give him a few minutes to orient to this position and for his breath to settle. I felt relieved and he settled into a quiet calm. From the corner of my eyes, I noticed his mother. She looked awestruck at observing her talkative son was now quiet and absorbed in his experience. At this point, I paused. This allowed me to sense my own breathing, attend and attune to his, and to listen in to my next impulse.

Over the next 30 minutes or so, I attuned to the client's breath as I related parts of himself into a cohesive whole in symphony with his breath. I started by tracing the vertebrae of his spine, pausing at each vertebral bone to listen, accompany, and accentuate the rising and falling of his breath. I subsequently followed the expansion and contraction of his ribs which swelled and shrunk like an accordion. The room got quieter. After a few moments' silence, I cradled his head gently in my hands and listened to the projection of his breath with my hands. His head gradually

felt lighter. I paused to give myself and him a rest. I then turned my attention to his legs, which were folded one on top of the other. It was crucial to provide him with a sense of how his legs meet his spine as they transmitted the ground forces with the ground itself. To do so, I placed the top foot to stand on the calf of the lower leg and, moving it like a paintbrush, caressed the lower leg with his own foot. This generated a rocking motion with his entire torso from side to back to side. I was delighted to feel the weight of this movement gradually felt lighter, suggesting a reduced contraction of his musculature. Finally, in a whole-body motion, I brought his knees in an arc towards his face and, reciprocatively, his face and head toward his knees, accentuating the fetal curve as it expanded and contracted with his breath. A lot had transpired by now. I also realized we had been working quietly for over an hour. I was beginning to feel saturated. I paused to rest.

Rests serve to synthesize the sensations and movements to the actions implied in expansion and contraction. When I returned, I pulsated several times from the soles toward the head by way of recreating the sensation of standing. Conversely, I exerted light compressive pressure from the base of his skull toward his feet, rekindling the same motions from standing at the start of this session. Finally, I turned him on his back. Here, I waited, listening for his response. These inactive rests gave him the privacy to reflect and make sense of the experiences he was having.

At this point, the client suddenly sat up and said, “I almost fell asleep!” I prodded him to sit and stand, and then walk. I noticed his legs were still taut. Making a game of it, I asked him to deliberately lock his knees as he walked, while turning his attention to how the action of walking felt when did that. His expression reflected he was listening to his feeling of himself. I made various offers: soften the knee as you walk, or rest in standing, etc., each time directing his

attention to his feeling of himself, making sensory distinctions, and forming an evaluation of his own states, while performing the act of walking about in the space. He replied immediately that the unlocked version felt “easier.” I encouraged him to repeat both versions again. I had hoped he would form his own appreciation of himself as he moved about in his living room. As he began to walk rhythmically, I directed his attention to his eyes and face. See where your eyes take you. As he replied, my attention was drawn to his voice. I probed him: does your voice sound different or the same as before? “It sounds relaxed,” he replied, and added. “I feel calm.” I observed that the tone of his face, eyes, and breathing had markedly shifted. Before parting, I extended my hand once more. This time he shook it gently and I registered the warm and soft pads of his palm.

Session #2: Musical Dialogue

To begin, the client was harassing his sister. He encroached in her personal space, talked over everyone, and was aggressive toward his father. I did not intervene. Instead, I assigned each one an instrument. I am not sure why I assigned instruments, but it was an opportunity to thwart and redirect attention. To begin, I prompted them to get acquainted with their instruments, to make different sounds, and explore various ways to relate with their instruments. Everyone readily turned to their instruments and the room slowly started to fill with the instrumental sounds displaced the bickering. I sensed a tentative start. I was aware that the father and daughter got along well, and neither felt comfortable with the client. The family dynamic was imbalanced. The client’s music playing was discordant and his mannerism strident, which further exacerbated the skewed balance. The divide in the room began to feel like my responsibility and I felt nervous about how to conduct the improvisation. Perhaps, each one was trying to find a space to express him/herself. I listened within, and realized I felt lonely and simultaneously cringing at

the unabating cacophony. At this point, I put down the instrument I was intermittently playing and decided to only listen to sounds, sentience, the spaces in between.

First, I turned their attention to the physical. I suggested varying the position and placement of the instrument on their bodies and, at each change, comparing the feeling with the previous arrangement. I drew attention to the tactile sensations with the instruments. The nature of playing began to shift. For example, the father began to tap the body of his guitar; his sister played with her non-dominant hand; and the client fiddled with his instrument but remained mostly heads-down (literally). Shifting attention, I inquired into the vibratory dimension of sound. I asked if they sensed the vibration emanating from their instruments. They affirmed, some affirmative nods and the client's exuberant "Yeah!". Adding to it, I suggested that the skin also feels vibrations and invited them to place their hands at various locales (such as the navel, chest, throat, etc.) to echo the sounds. The children seemed to respond to this more readily than the father (not unexpected). Building on this, I then asked: Is it possible to feel the vibrations from other instruments in the room and subsequently suggested that their sound-making be a response to the sounds they were hearing Here, the client's head cocked up toward his sister. His sister in turn looked at her father. In the next several minutes, father and daughter began a dyad together, while the client endeavored to respond to his sister's sounds. Two parallel dyads ensued. The musical relationships all seemed tentative and fleeting but hinted at the beginnings of something.

I then turned to vocals, which can introduce vulnerabilities and risks of embarrassment. Briefly introducing and leading them through the sounding of the vowels (e.g., "ahh", "ohh", etc.) over the next several minutes, I then directed their attention to the felt sense of the vibrations in their bodies. As they became more comfortable, I introduced a few variations, e.g.,

pitch, projection, etc. I noticed that the client and his sister were unabashedly exploring their voices, while the father said he felt self-conscious.

We were 30 minutes or so into the experience and I felt a momentary pause would be welcome. To my surprise, they were very talkative and launched into each of their experiences. I, on the other hand, did not register any of their words, but, rather, broadened my aperture enough to register their positive affect and shared rapport. I also noted that I and they probably had enough time and energy to resume.

I segued into an exploration of simply listening. The invitation was to listen to the breath, the movement and sensations of breath in its four stages, i.e., in, rest, out, rest. This was a short segue before the instruments were reintroduced. Here I introduced a new score to syncopate their sound-making with the timing and duration of the exhalation, e.g., one note per exhale, two notes, three notes, and, finally, alternating counts at will. The demand on their attention significantly heightened in this score, and with that the risk of goal-centric tendencies or even perfectionism (as the sister herself has admitted). I added the final directive: abandon the instruction at any time of your choosing and start new at the exhale or the next. There began to orchestrate several instruments: body, breath, attention, and choice, e.g., to alter, exit, start over, etc. Attention peaked and was piqued. Listening reigned. The room also felt dense, to me. I also felt my conductorship was intense and directive, and I needed to create more space. I turned my attention to the spaces outside the soundscape formed by their instruments. It was 5 p.m. on a Sunday afternoon and the sun's rays beamed in discernable stripes across the wall of their living room. I then heard the silent space outside our circle, a space that circumscribed our soundscape. "Listen to the room, Feel the space," I offered. This may have been the first time everyone listened to space, beyond the boundaries of themselves, me included. I let the silence reign.

Slowly, they began to share their experiences: the client blurted out, “I could really feel the sound in my body.” “That was euphoric,” “relaxing,” and “I felt connected to something bigger than myself,” said his sister. “That was great.” I quietly started to pack, leaving the family to engage amongst themselves, but the father suddenly started singing. “When am I going to pick up Mom,” and kept repeating the refrain until he was joined by the client and his sister. I joined in. We began to riff on the first words for a few rounds. The sister then added the next line: “After going the grocery story,” and again the riffing and rapping ensued. The four of us were laughing and jumping about. Noteworthy is that in some way their Mom, who was not present for this session, was included. Finally, the client said, ‘Goodbye, Arona.’ We all laughed! I took my cue, but noticed they were carrying on.

Discussion

This intervention adopted a phenomenological perspective on mental health, which posited that many symptoms common to several DSM disorders can be attributed to a somatically-based fractured sense of self. This loss of self-ownership has consequences for affected individuals’ intersubjective relationship with their social and material worlds. Autism is one such disorder, and the focus of this project. Diverse modes of listening, influenced by Feldenkrais Functional Integration and musicology, were used to evoke the latent capacities for learning to listen to oneself and others in the social and material world.

Play and Pleasure: The Aesthetics

I approached the client as an ordinary kid endowed with the capacity to learn, in spite of his diagnosed impairments. My attitude towards him gestured in the handshake was received by him as a game, evidenced by his wide, beaming smile, and his response in toying with my arm. My arm here, like a musical instrument, was his first instrument. I did not judge or correct his

vigorous play but danced with it. In so doing, I opened a space for joint play, void of goal-centric orientation mentioned by Feldenkrais (1995), Koch, (2017), and Sholl (2019). It also leveled the playing field with respect to the power differential in our dyad. Thus, we began the dialogue of intercorporeal relating which is later revisited when he played with other musical instruments.

Valence of Listening: Non-Verbal Meaning Making

The client became quieter when his attention stirred inward. Likewise, I, too, engaged in various forms of listening: with my hands, through my feet, and the displacement of my own weight in extension of his. My listening to him evoked his own inner-listening. His extended silence suggested his attention was drenched with new experience. Something new caught his attention and that something new was his very own personhood. He entered into an altered state, which he mistook for sleep. When he awoke, he looked like he had slept a whole night. His mother was taken aback at his long silence and, I at his sustained inward attention for over an hour. His attention and sensorium were commanded by a deep and concentrated listening, a sensing, and an effortless attention-ing, as elaborated by Glennie (2014); Ceraso (2018); Depraz, Varela, and Vermersch (2003); Feldenkrais (1995); Kossak (2015); and Sholl (2019).

An aspect of this listening was afforded by our kinesthetic attunement. We were in an intercorporeal dance of two nervous systems, as Dr. Feldenkrais characterized (Ginsburg, 2010). I was an extension of him, and he of me in an extended configuration, as characterized in Froesce & Fuchs's (2012) notion of the extended body and Kimmel, et al.'s (2015) description of permeable boundaries. In one view, I acted as the container; yet, in another, we were joined by a common dance in a shared sphere. The tactile sense mediated a most direct communication that allowed me to express nuances that the client, given the sensorimotor impairments, would be

challenged in doing by himself. Yet, by the end of the lesson, the client modulated his gait, handshake, and voice.

In the week following the intervention, I noticed a few things about how the client was listening differently. First, he appeared to be waiting in listening as others spoke, such that the indispensable talking stick often used to indicate the designated speaker was no longer required. Further, he considered what was being said rather than quickly interrupting and talking over his sister or father. I also noticed his feet were on the ground, whereas they were usually on the chair, legs folded tight, wrapped by his arms. One could say he was more grounded.

When I asked him at the end of the lesson whether he liked his voice, what interested me was whether he heard the difference in his voice and how he went about answering that question. First, he inquired within, a reflective act. This was apparent to me in his pause and inward gaze, which I attribute to his developing capacity to attune to himself. Finally, he made an aesthetic choice in favor of the "calm" voice, in his words. The client's vocal tone, is a strong indicator of parasympathetic affect, as suggested by Reissland, et, al., (2016) and Siegel & Drulis (2023). His affect was also evident in the way he shook my hand, that is, with a softer hand and his ability to calibrate and meet the tone of my handshake.

Self-Image: Enactivism

Following the intervention, the client's image of himself was beginning to shift, as became evident in his use of "I" to refer to himself. This is a contrast to the desubjectified pronouns he had previously used, e.g., "they" and "people." It can be said that the client's map of his personal space was becoming clearer to his own perception. This finding resonates with the literature linking Feldenkrais with increased interoceptive, as mentioned in numerous studies,

including Brummer, et al. (2018); Crivelli, et al. (2021); Joyce (2006); Mehling, et al. (2013); and Wallman-Jones, et al. (2023).

The results of the Functional Integration lesson suggested a new organization of the client's relationship with the ground. Given the choice to make sensory distinctions, he found a way of coming to walking that felt to him easier and more fluid. The rigidity characteristic of autism had significantly diminished such that he began to soften his knees, thus affording a better connection with the ground. This was described by Engelsrud (2023). His choice demonstrated a heightened aesthetic appreciation as well as increased ability to attune to himself. This shift in his self-appreciation echoes Dr. Feldenkrais's (1985) idea of acture and self-formation, which was also seconded by Hansel (2021). The lesson endowed an understanding of himself, physically and somatically.

A softer body, a calm voice, and an upright gait are plusses for a child on the autism spectrum. However, a self-attunement toward sensory discrimination garners an agency and generativity that goes beyond skill-building – ideas elaborated in the praxis of Feldenkrais (1945; 1985), Thoma and Fuchs (2017), Koch (2017), Bishop (2018), and Hansel (2021) -- and ultimately carry him throughout life. I was also impressed by a feeling of meeting a grown-up teenager rather than a hyper-vigilant boy. The findings are in line with the affordances associated with upright standing described by Thoma and Fuchs (2017).

Subjectivity to Intersubjectivity: Generativity

The intersubjective means of relating developed during the Functional Integration dyad was heightened during the group ensemble. What started with the usual sibling rivalry turned into a we-some composition and group singing. The scores took the group from subjective forms of listening and broadened into interpersonal realms into what became a spontaneous song

composition, a show of social cognition and generativity as referenced in Koch (2017) and others.

To begin, an attunement to self and others on the vibrational sense primed the sensorium for what followed. The primacy of the vibratory sense in our genetic endowment, as described by Todd (2015), accessed a primeval instinctual mode of communication that bypassed the impediments observed in verbal communication. McGilchrist (2019) reminded us that music predate language.

During the vocal score, the client was learning to gain mastery with himself. Practicing pitch variations functioned as a rehearsal for self-modulation and self-expression, with an added focus on the organ of the larynx, which Gallagher (2017) associated with an affordance made available in upright standing. The client expressed being able to feel the sound in his body. This recognition alludes to an increased interoception, a growing awareness of a bodily sense of himself, and a diminishing ipseity. Like a musical instrument, he percussed with other sound instruments, i.e., with his family members and the musical instruments in the room. The client sustained attentive to each score was notable.

Implications for Clinical Practice

Multimodal listening supports a first-person approach to understanding and treating mental health conditions with a basis in ipseity. The somatic and acoustical underpinnings evoke intrinsic capacities that can be honed to entrain enactive and generative capacities for self-understanding and self-directed learning. Deep listening is an interdisciplinary domain that owing to its invisibility lies in the shadows yet deserves its own place in clinical training.

Implications for Future Research

To understand the long-term effects of the interventions, additional experiments will be needed. Controlled experiments would also help examine the beneficial effects of each mode of listening. The preliminary findings in this case study support further investigation of listening practices which underpins Feldenkrais Method and musically-based interventions.

Disclosure Statement

Arona is a Guild Certified Feldenkrais Practitioners for 16 years.

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THESIS APPROVAL FORM

Lesley University
Graduate School of Arts & Social Sciences
Expressive Therapies Division
Master of Arts in Clinical Mental Health Counseling: Expressive Arts Therapy, MA

Student's Name: Arona T. Primalani

Type of Project: Thesis

Title: Feldenkrais and Music Informed Listening: A Neurophenomenological Perspective on Autism

Date of Graduation: 5.18.2024
In the judgment of the following signatory this thesis meets the academic standards that have been established for the above degree.

Thesis Advisor: Dr. E Kellogg