Blending Disciplines

Using Exercise Science to Explain Somatic Psychology

Stacy Reuille-Dupont

ABSTRACT

Exercise has the potential to decrease negative side effects, lower societal medical costs, and increase quality of life. Exposure to physical exercise increased participation and led the way for a variety of pilot testing movement-based interventions with a diverse, rural, clinical mental health patient population in treatment for numerous clinical diagnoses. The original research (Reuille-Dupont, 2015) is briefly outlined before a discussion of theory used to determine and perform movement-based interventions for psychological and physical health goal treatments. Throughout the paper, psychological and exercise science theory and research are overlaid to explain the physical implications and psychological shifts of movement-based treatment. It is important to understand common terminology to engage clients and other health care practitioners in movement-based treatment for psychological and physical health. In addition, as specialists in understanding the body's role in experience, it is the somatic psychologist's responsibility to promote and advocate for "exercise as medicine" when possible. Included are visuals to help outline and overlap the disciplines for better understanding, increased awareness, and expanding the language somatic psychologists need to engage in multidisciplinary healthcare teams.

Keywords: physical movement treatment, movement for mental health, exercise science, somatic psychology

Submitted: 15.08.2019
Revised: 29.02.2020
Accepted: 09.03.2020

International Body Psychotherapy Journal
The Art and Science of Somatic Praxis
Volume 19, Number 1,
Spring/Summer 2020, pp. 82-93
ISSN 2169-4745 Printing, ISSN 2168-1279 Online

Why Blend Disciplines?

Understanding Physical Exercise Participation in a Clinical Mental Health Population

For many, it is common knowledge that mental health impacts physical health, and vice versa. People may know the benefits of physical exercise, yet do not engage in behavior to meet physical health goals (CDC, 2018). Research shows that as little as two 30-minute sessions per week can be as good as a selective serotonin reuptake inhibitor for depression (Wipfli, Landers, Nagoshi, & Ringenbach, 2011). Movement is what we do. It is experience. It does not have to be large movement patterns. Make no mistake, all believed emotion and thought are movements at the cellular level, and shape the human experience. This author and researcher posed the question in a clinically diagnosed mental health population, *"What keeps people from engaging in movement when they know the benefits?"* (Reuille-Dupont, 2015).

> ***The exercise program training window looks very similar to the window of tolerance in many trauma treatment protocols.***

The specific question for this researcher began as *"What is the perception of barriers and benefits those with mental health challenges experience when trying to participate in physical exercise?"* Based on this author's in-office experience, psychological trauma seemed to be a barrier; however, it did not return significant results in the study

(Reuille-Dupont, 2015). In a study with 149 participants engaged in community mental health treatment, it was physical anxiety experiences, specifically panic, that were the true barriers to participating in physical exercise at levels to impact metabolic change (Reuille-Dupont, 2015).

Anxiety as the barrier to physical exercise participation is reasonable. The physical system (nervous system) is overwhelmed, and thus cannot participate in more overload (physical exercise). An interesting result showed significance between those with increased co-morbid mental health and substance abuse diagnoses (Reuille-Dupont, 2015). These participants described the least number of barriers to participation in physical movement, and more participation in physical exercise at levels that could influence physical and metabolic change.

As this author and researcher studied those with fewer barriers and more exercise participation, better understanding emerged around movement-based practices, specifically exposure to movement participation (Reuille-Dupont, 2015). The next question became, *"Can we manipulate the movement experience to promote engagement in physical exercise at appropriate rates and intensity, to "dose" mental and physical health symptomatology?"* Thus, can we create a treatment model with "exercise as medicine" that impacts psychological functioning while addressing physical health markers?

As noted above, the investment in physical exercise as a treatment for mental health symptoms is low; two 30-minute, moderate intensity aerobic sessions per week (Wipfli, Landers, Nagoshi, & Ringenbach, 2011), and the research shows similar benefits for anxiety, depression, bipolar, schizophrenia, ADHD, substance abuse disorders, and trauma (Kucyi, Alsuwaidan, Liaw, & McIntyre, 2010; Carless & Douglas, 2008; Wipfli, Rethorst, & Landers, 2008; Ding, Vaynman, Akhavan, Ying, & Gomez-Pinilla, 2006; Droste et al., 2003; Dunn, Trivedi, & O'Neal, 2001; Doyne et al., 1987). The research is also clear that a large percentage of those with mental health challenges face more physical health problems, utilize approximately 25% more health care services (Spitzer, Kroenke, & Williams, 1999), and die younger than those without a mental health diagnosis (Colton & Manderscheid, 2006). Yet many do not participate in or are guided to engage in physical movement (Spencer, Adams, Malome, Roy, & Yost, 2006) as part of their mental health treatment (Reuille-Dupont, 2015).

Despite the lack of exercise adherence, this author's research illuminated options of intervention promise. The complex diagnosis presentations showed that those with necessity (lost driver's license, jail time, poverty, limited transportation options, physical needs to move/walk) had to use physical exercise at moderate levels to get through typical daily life activities. As a result, they touted the benefits of physical movement in personal mental and physical health states. This information was used to create clinical movement interventions in the author's office. Over time, lessons learned from pilot groups, program development, grant opportunities, and individual work offered refinement and development of a structure to help bridge the gap between physical and mental health treatment. In addition, feedback from study and intervention participants offered fertile ground to form questions that deepened understanding of underlying physical structures and reasons for somatic distress (Reuille-Dupont, 2015).

Psychology and exercise science disciplines are vast. The purpose of this article is to outline common categories and themes of overlapping theory concepts. These were used to create successful exercise-based movement interventions with a clinical population in a rural psychology practice. This is a narrow focus of applied knowledge, leaving much to be explored and expanded upon in future application and research. Below are outlines of several physical systemic operations, possible influences on psychology, and reviews of the overlap between exercise science and psychology theory. The article ends with implications and suggestions for using physical movement in treatment to reduce symptoms and/or build healthy coping skills.

The Importance of Embodiment

Many somatic psychologists intuitively know the internal landscape is reflected in the external environment. Embodiment is a way to return to health homeostasis in both (Calsius, De Bie, Hertogen, & Meesen, 2016). Physical and mental health are inseparable (Kucyi, Alsuwaidan, Liaw, & McIntyre, 2010; Carless & Douglas, 2008; Wipfli, Rethorst, & Landers, 2008; Ding et al., 2006; Droste et al., 2003; Dunn, Trivedi, & O'Neal, 2001; Doyne et al., 1987), and somatic psychologists are in a unique position to communicate the underlying structural shifts (physical) in defined personal experience (psychological/relational).

People with mental health issues, on average, die younger, often have five or more unrelated physical health symptom presentations when seeking physical health care, may have increased substance abuse or addiction behaviors, decreased economic resources, and have dysregulated nervous system activation (Newcomer, Steiner, & Bayliss, 2011; Colton & Manderscheid, 2006; Kroenke, Spitzer, & Williams, 2002). It is suggested that increased physical health conditions are a result of the allostatic load of stress on the body (McEwen, 2007). Medical healthcare staff often struggle to treat and accurately diagnose this population (Ring, Dowrick, Humphris, & Salmon, 2004). This struggle can result in expensive testing and medical care, increased pharmaceutical use, and increased invasive treatments (Kroenke, Spitzer, & Williams, 2002). Thus, these interventions could further exacerbate trauma in physical tissues, bodily structures, and may increase taxpayer costs. Addressing both physical and mental health

in psychological treatment offices has the potential to lower medical costs and increase quality of life (Green et al., 2011; Hunter & Goddie, 2010).

Often people come to physical and mental health care disembodied, and look outside themselves for relief (Kirmayer, Groleau, Looper, & Dao, 2004). This can lead to addictive patterns and disconnected relationships. This lowers the protective factor of physical health as the body deals with difficult internal and external environments (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002). As this disconnection becomes more pervasive in the individual, collective society at large may experience increases in fear, violence, and disrespect as the internal becomes external (Fleckman, Drury, Taylor, & Theall, 2016; Tandon, Dariotis, Tucker, & Sonenstein, 2012). One way to help individuals develop somatic embodiment is by helping them return to physical activities.

Blending the Disciplines: Exercise Science and Somatic Psychology

Movement facilitates the physical wiring and structure of being (Slepian, Weisbuch, Pauker, & Basian, 2014). Movement creates concrete manifestation of the abstract. The embodied experience becomes tangible because thought and emotion are movement at the cellular level (Lipton, 2008). Somatic psychologists ask questions like: *"What is the energy of the body telling me about this person's beliefs regarding self, others, the world? About the past? About the future?"* They explore the embodied state to shift awareness, relationship, and self-narrative (Schore, 2018; Ogden, Pain, & Fisher, 2006, Aposhyan, 2004; Kurtz, 1990).

The somatic practitioner can use anatomy to look for psychological blocks. For example, by looking at posture, the clinician might ask, *"What was this body built for? How is the client holding themselves in the world? Who do they think they are?"* Or, *"Where does the movement in the body get 'stuck' or transpose itself?"* These questions give a plethora of information to use movement in mental health treatments. Exercise interventions use corrective movement patterns from exercise science to identify and work with postural deviations, physical health problems, and movement misalignments (Calsius, De Bie, Hertogen, & Meesen, 2016), and can be expanded within the somatic psychology principles of relationship/connection, sense of self, environment, and human attachment (Schore, 2018).

Many facets of human experience are impacted as a result of blending disciplines. Systems impacted are those of the physical structures: cardiovascular, musculoskeletal, endocrine, and nervous systems (Walker, 2017; Martini, Ober, Garrison, Welch, & Hutchings, 1998). In addition, when the intention of the movement is psychological, systems of attachment, social engagement, and corrective experience become present (Schore 2018; Porges, 2011; Ogden, Minton, & Pain, 2006; Kurtz, 1990) in the treatment room or on the fitness center floor. This results in a collective and holistic approach to health.

POSSIBLE TARGETS FOR BLENDING EXERCISE SCIENCE WITH SOMATIC PSYCHOLOGY

Physical Structure	Mental Health
Endocrine and lymph systems / Inflammation and immune responses / Chronic pain / Autoimmune disorders / Hippocampal damage	Stress response of the hypothalamus-pituitary-adrenal axis (HPA-axis), trauma, emotional dysregulation
Breath and heart: Respiratory sinus arrhythmia and heart rate variability	Nervous system/ Vagal nerve regulation
High blood pressure	Emotional intelligence / Alexithymia
Gastrointestinal issues / Gut flora / Microbiome / Neuro-transmitter production	Clinical mental health and addiction diagnosis presentations / Emotional regulation
Inflammation and immune responses / Joint issues & range of motion	Trauma and stress responses / Chronic pain disorders / Digestive issues / Emotional regulation
Electrical communication in the body: heart, brain, fascia, neurons	Nervous system / Pressure & trigger points / Meridian lines
Brain / Limbic resonance / Mirror neurons / Right brain-to-right brain relational connection	Co-regulation / Shared regulation / Mammalian interdependence

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Kinesiology, Physiology, Biomechanics, and Somatic Psychology

Kinesiology is the study of human movement from exercise science perspectives of anatomy and physiology: the study of the body at work and rest, and biomechanics: the study of movement patterns and mechanics of human movement (Wilmore & Costill, 1988). Through study of these areas, many of the physical systems are explored in relationship to movement patterns of the body. The endocrine system functions as the "little nervous system," and helps dictate the role of chemicals throughout the body-neurotransmitters, neurotrophins, hormones (Yoke, 2010). Electrical and chemical systems of the body, such as the heart, fascia, and brain, communicate using waves of energy that influence cellular structures and impact cellular changes such as muscle contractions (Adstrum, Hedley, Schleip, Stecco, & Yucesoy, 2017; Miura, Miki, & Yano, 2010; Martini et al.,1998). Structures in the physical system communicate in vibrational patterns that are sensi-

tive to other vibrational patterns (Walker, 2017; Ferrari, Clemente, & Cipriani, 2018; Fuentes, Gomi, & Haggard, 2012; Ivanenko, Talis, & Kazennikov, 1999). Gross motor movements of the musculature and skeletal systems allow organisms to manipulate environments and manifest action in personal situations. However, each of these systems operates in tandem to create a complete physical experience.

In the words of Hanna, *"the themes of somatic philosophy are, quite simply, perception and behavior"* (Hanna, p. 214, 1970). Utilizing movement and applying exercise science interventions to psychological treatment allows for work with boundaries, trauma, attachment, power, confidence, and relationship issues (Caldwell, 1997; Knaster, 1996) while impacting physical health problems (Walker, 2017; Stauffer, 2010; Martini et al., 1998). It also allows a tangible way to impact brain structures such as the parietal lobe and motor cortex to increase the patient's ability to learn (Lojovich, 2010; Davis, 1977), thus helping them implement the treatment exercises more effectively. Mindful neuromuscular junction work (attention to slow movement) allows for increased awareness of physicality and experiences (Ogden, Pain, & Fisher, 2006). This hyper-awareness of the movement pattern then allows the client to rewrite the narrative around the experience that created it, and offers an opportunity to engage in conscious self-development (Aposhyan, 2004; Hartley, 2004; Caldwell, 1997; Knaster, 1996; Kurtz, 1990). The trained practitioner can see muscle imbalances and postural misalignments, and program movement to help re-balance the physical and psychological structure of being.

BIOMECHANICS AND SOMATIC PSYCHOLOGY	
Common Muscle Imbalance Areas	Possible Psychology Focus
Feet & Lumbar Spine	Stepping into life/goals/self. Mechanics of walking are impressive and offer conversation around "small structures making big changes." Work with the feet directly impacts the pelvic floor and hip structures, making them a good entry for sexual dysfunction/trauma treatment. Also, working with low back and stability/safety issues as all movement comes from the core. Reliance on the big toe to walk effectively can feel "dangerous". 80% of people have low back pain due to a variety of issues, and this area is critical in digestive and reproductive health, feeling strong, supple, and stable in all movement patterns.
Hips	Hips are chronically tight in many, yet without appropriate flexibility they cannot move freely. The hip joint is designed to move 360 degrees (one of only 3 joints in the body). With limited hip range of motion, many other movement chains become dysfunctional. Flexibility and rotation are concepts around self-regulation and the ability to move with adaptation, focus, purpose, and confidence in the world.
Thoracic Spine	This area is often overlooked for the more popular lower back. However, it is very important in somatic psychology because imbalance in this region leads to difficulties in breathing, collapsing of the chest, and rounding of the shoulders. Many people feel stress through this region, and tension pulls energy away from supple movement options. When the above is disrupted, the nervous system is also disrupted.
Shoulder and Shoulder Girdle	This area includes the scapula and clavicle regions wrapping the top of the torso. Many people have elevated shoulder girdles and feel stress, burdens, and crushing despair through this region of the body. The shoulder, like the hip, is designed to move 360 degrees, yet many do not have that level of flexibility. Internal rotation of the shoulder can lead to collapse of the chest cavity and strain on the neck, thoracic spine, and abdominal cavity organs. This adds stress to elimination (kidneys/liver), digestive, and pulmonary systems. When these are impacted, inflammation and stress rates rise in the body, and breathing impacts heart rate and heart rate variability, thus directly influencing nervous system states.
Neck, Throat and Head	Misalignments and imbalances throughout the head and neck create issues related to communicating clearly, speaking, seeing, hearing, and regulation both from physical and emotional perspectives. Many have neck/headache pain which may decrease ability to regulate during increased stress states, difficulties in connection, learning, attention, and engagement in the environment.
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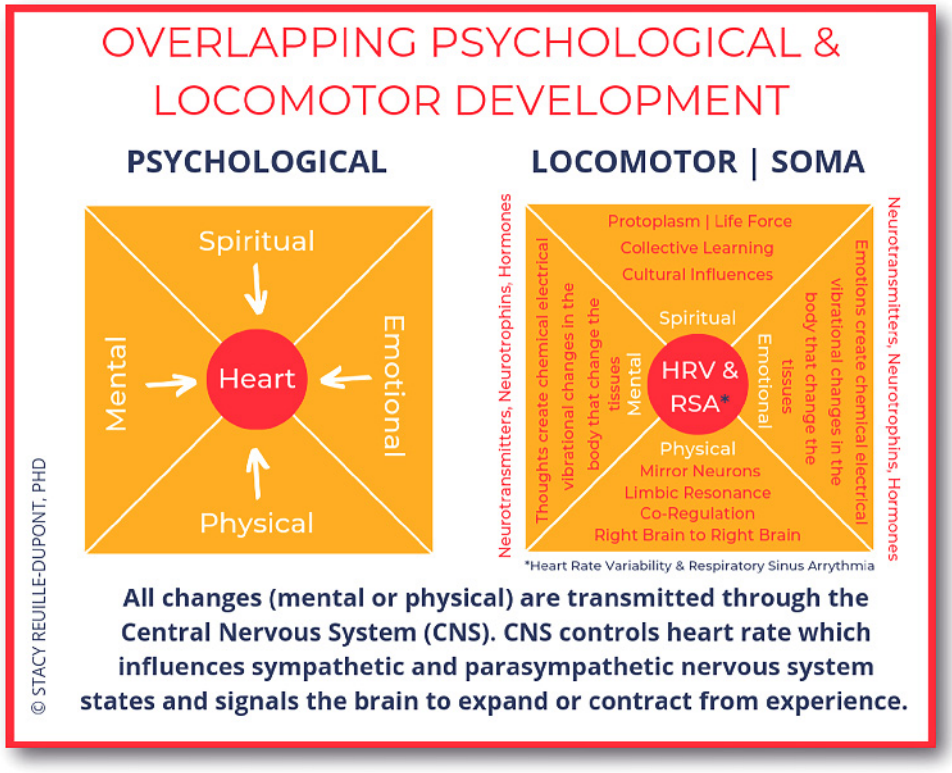
Overlapping Psychological and Physical Information Systems

Based on this author's research with a clinical mental health population, a number of concepts were illuminated. The data suggested that people understood that physical movement could help mental health symptoms, positively impact physical health, and decrease cravings for addictive behavior (Reuille-Dupont, 2015). However, many participants in the study were not exercising at levels needed to shift metabolic measures, such as blood pressure, body composition, or blood sugar levels. In addition, although they knew it would help their mental health, they were not physically moving enough to influence mental health symptomatology. Thus, this author questioned what was getting in the way of physical

EXERCISE-BASED THERAPY – OVERLAPPING PHYSICAL AND PSYCHOLOGICAL TREATMENT

Looking for a way to explain what is physically happening in somatic psychology interventions



Spiritual – The larger realm, wisdom, trust, rest, gifts into the world, unique pieces of the larger whole guides all experience. The unseen connection.

Physical – The base upon which all else is created, the tangible manifestation of the spiritual, grounded in experience and energy, allows for focus through concrete tactile opportunities, connection.

Emotional – Intelligence system #1: Information becomes physical in subtle form, impacting the endocrine and nervous systems, changing physical structures. This impact informs health or disease. Physical sensations are true to form expressions of experience. However, emotion labels and behavior are based on past experience (bio-systems/ancestors, not only individual) and these past experiences may or may not be an accurate lens.

Mental – Intelligence system #2: Thought changes the physical structures by influencing the endocrine and nervous systems, due to judgment and planning abilities of the prefrontal cortex. Judgment and plans are often based on past experiences, which may or may not be accurate in the moment. The conscious mind may not know all influences being judged and planned for.

Heart – Connection not only to others, but to our experience. It links the physical and the spiritual through heart rate variability (HRV, outlined below). It takes our thoughts and emotions, and "pumps" them through the system, bathing the cells with chemical changes. It is controlled by the central nervous system (CNS). The CNS is constantly taking information from our internal viscera (meridians, pressure points, organs, chemical trails) and external sources (senses). As a result, the central nervous system tells the heart how to pump – sympathetic (SNS) vs. parasympathetic (PNS) via the sinoatrial node, which influences the brain. The brain takes this signal and sends the message to rest and digest/stay/play (PNS) or flee/fight (SNS).

For example – Movement X does something. This something changes the endocrine balance, influencing hormones, neurotrophins, and neurotransmitters. The neurotransmitters change physiology by up- or down-regulating the nervous system through the heart rate and heart rate variability. These changes create patterns and postures in neuromuscular junction operations, thus impacting how one moves in and experiences the world.

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exercise participation. These questions, and the answers provided through a number of pilot studies, test programs, and individual program prescriptions helped shine a light on how emotional experiences were intertwined with the physical experience of embodiment. This led to the concept map for exercise-based therapy (above) as an attempt to bridge understanding of the physical structure experiences leading to the mental health presentation, and conversely.

Explaining How and Why Exercise-Based Therapy Works

Physical Systems of Regulation

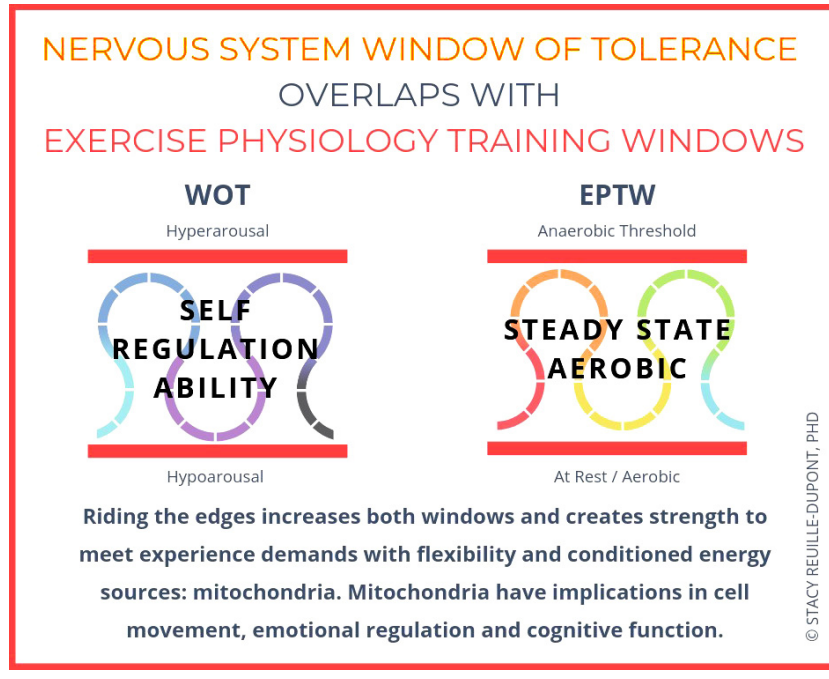
Using movement created within the guidelines of exercise science, one can program movement to impact metabolic change (Yoke, 2010; Wittert, Livesey, Espiner, & Donald, 1996). This is significant, because many with mental health diagnoses have increased physical health challenges (Schnurr & Spiro, 1999; Veiweg et al., 2007), and/or mental illness decreases ability to heal from physical injury or illness (Miller et al., 2013; Arpino, Lavarone, Parlato, & Moraci, 2004). Movement to meet metabolic needs can be done in a variety of ways. It can be as structured or fluid as a client needs, and can be done individually, in groups, with personal trainers, in patient's desired location, and can utilize a variety of equipment, or none.

When considering the physical health of a client, it is common to use heart rate to indicate fitness level (Yoke, 2010; Wilmore & Costill, 1988). Once heart rate is known, it is used to create a target heart rate zone individual to the patient (Yoke, 2010). This zone is used to program appropriate levels of overload to impact metabolic systems. Physical training becomes a function of energy system manipulation (Tjønna et al., 2008; Wilmore & Costill, 1988). The exercise program training window (Wasserman, 1984) looks very similar to the window of tolerance in many trauma treatment protocols (Siegel, 2009). The top edge of the window feels chaotic, out of control, and overwhelming, while the bottom edge is sedentary, operates systemically slower, and can appear still, dissociated, or shut down (Rothschild, 2018). In the middle is the ability to regulate and maintain engagement in the current environment (Porges, 2018; Wasserman, 1984). In both physical training and trauma treatment, the work is to push the edges away from each other (Sales et al., 2019; Yoke, 2010; Siegel, 2009), thus creating a larger window of regulation and the ability to remain in connection with current situations.

Riding the edges of each window creates strength to meet experience demands with flexibility and conditioned energy sources – the mitochondria (Yoke, 2010; Martini et al., 1998, Wilmore & Costill, 1988). Mitochondria are important players in physical movement and cognitive function (Mehdizadeh et al., 2017). They are the energy sources of the cell, and utilize adenosine triphosphate (ATP) to complete many movements from cellular to gross motor patterns (Yoke, 2010; Martini et al., 1998). ATP is indicated and important for a variety of cellular processes, cognitive health, and emotional regulation (Wille, Amort, Singewald, Sartori, & Lusser, 2016).

Understanding the Cardiovascular and Pulmonary Systems in Psychological Function

The function of a healthy cardiovascular system is measured by the heart rate (Wilmore & Costill, 1988). Heart rate (HR) is measured by counting the beats per minute (Shaffer & Ginsberg, 2017). Generally, the lower the HR (to a point), the more healthy the heart and cardiovascular system. A lower HR is usually indicative of a strong, ef-



ficient heart, capable of pumping enough blood through the physical structures with each contraction (Martini et al., 1998). As one becomes more cardiovascularly conditioned, the HR lowers, and the practitioner can gauge the nervous system function (Schaffer & Ginsberg, 2017). According to Schaffer and Ginsberg (2017), *"In a healthy human heart, there is a dynamic relationship between the PNS and SNS [parasympathetic PNS and sympathetic nervous system SNS branches]. PNS control predominates at rest, resulting in an average HR of 75 bpm [beats per minute]"* (p. 3). In addition to measuring HR to gauge activation, one can look to another measurement for better understanding of the nervous system state. This measurement is known as heart rate variability.

Heart rate variability (HRV) is a direct link to the nervous system (Porges, 2018). Heart rate variability measurements examine the fluctuation in time between the heartbeats (Schaffer & Ginsberg, 2017). According to a review by Kim, Cheon, Bai, Lee and Koo (2018), *"HRV represents the ability of the heart to respond to a variety of physiological and environmental stimuli"* (p. 235). They go on to say, *"Low HRV is associated with impaired regulatory and homeostatic autonomic nervous system functions, which reduce the body's ability to cope with internal and external stressors"* (p. 3, 2018). Through adjustment of the HR one can influence the PNS or the SNS (Thayer, Hansen, Sausrose, & Johnsen, 2009) by influencing HRV. Heart rate variability has many implications for cognitive function (Kocsel et al., 2019) as well as emotional regulation (Quintana, Guastella, Outhred, Hickie, & Kemp, 2012; Geisler, Vennewald, Kubiak & Weber, 2010). Thus, the clinician working with cardiovascular training has a direct link to manipulating the nervous system.

In addition to links between heartbeats per minute (HR)

BRINGING HUMAN DEVELOPMENT TOGETHER

The stages listed below are based on several common psychological and human development theories as well as commonly known locomotor development patterns. They are intended to help the psychologist begin to overlap development stages, and are not an exhaustive list of psychological or physical experiences attended to at each stage of development.

Common Psychological Development Stages	Approximate Age of Development	Common Locomotor Development Patters
Security and safety	6 months – 1 year	Exploring body sensations, containment, holding, expanding, unfolding, beginning to rotate
Having needs: Relying on the environment	6 months – 18 months	Cross-diagonal patterns are beginning / Fascial planes
Acceptance and Belonging	18 months – 3 to 4 years	Biped, right/left balance, core development, proprioception
Self-expression	3 – 6 years	Compound movement and co-ordination development
Community	6 – 12 years	Organized sport, socialized learning, continued coordination refinement
Identity	12 to 17 years	Continued refinement and mastery over the body, sexual development, exploration and awareness of connection and somatic countertransference
Engagement (age range depends on culture expectations of adulthood)	18 – 25 years	Continued brain, bone density, organs / limbs development and growth. Deepening of one's somatic connection to the world at large and conscious embodied connection
Contributing and caring: Task and relational management	28 – 65 years	The body movements become specialized for routine tasks and management of daily living activities. Dysfunctional patterns may emerge, movement may become stunted or decreased, burdens may feel "heavy" in the body, and play may decrease.
Legacy, quality of life, and reconciliation. If successful reconciliation, play returns until the body can no longer perform.	65 + years	The body has gone through many changes due to routine living, may have imbalances, disease states, and dysfunctional movement patterns. Decreasing movement may lead to impairments in balance, proprioception, cardiovascular and bone health. May see decreased engagement in environment. Slowing down move-ments, possible joint pains and weight gain due to overuse / sedentary lifestyle, substance use, or medical conditions. Movement needs may return to focusing on basic patterns such as balance, awareness and proprioception.

This table offers a conceptual way to consider overall common psychological themes based in many human development theories and the locomotor development patterns present during that stage of human personality development. It is meant to help the clinician consider how to use appropriate movement patterns throughout the lifespan.

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and time intervals between the beats (HRV), the HR is directly tied to breathing. This link is called respiratory sinus arrhythmia (RSA), and can be a way to influence HRV (Houtveen, Rietveld, & De Geus, 2002). As the breath rate slows, the HR slows and the converse is true. Therefore, the somatic psychologist can use breathing exercises to offer corrective experiences of nervous system states for the client. The exhale is the key that "turns on" the PNS (Appelhans & Luecken, 2006). By extending the exhale, one can increase the parasympathetic response. Focusing on the inhale influences the sympathetic state (Appelhans & Luecken, 2006). Thus, practitioners can increase or decrease nervous system engagement in the office by offering a variety of breathing exercises to influence mental health symptoms on either side of nervous system activation.

Applying Exercise Science in the Somatic Psychology Treatment Room

There are many schools and options for breathing techniques, psychology interventions and physical training methods. The task for the practitioner becomes choosing the right exercise for the right client at the right time. As biological organisms, human beings develop along a continuum. This is true for both the physical and the psychological. To begin understanding how to embrace and work with movement in the psychology treatment room, it is best to conceptualize what is happening in each stage from both a psychological and physiological point of view.

Using the above table as a guideline, psychological treatment can become an active endeavor of physical movement. Movement allows exploration of the unknown to create space for creativity, and allows experiences to become tangible (Hartley, 2004; Caldwell, 1997; Knaster, 1996). As one gains awareness of embodied experience, the body performs a variety of movement – seen or unseen. Hanna (1970) states *"dilation is a streaming outward of somatic energy that is pleasurable: it is sensual, open, and relaxed. Contraction is a tensing inward of somatic energy that is unpleasant: it is anxious, blocked, and constricted"* (p. 135). These movements provide opportunities for the client to engage in self-awareness via operations of spatial knowing (Stauffer, 2010). Dynamic conscious movement patterns create places clients can explore strength, power, worth, boundaries, and connection. Many somatic models already use movement to explore aspects of personhood. However, there is more to be gained by programming movement into the psychotherapy room for metabolic change. Considering metabolic need can create "movement as medicine" for physical and mental health treatment (Atlantis, Chow, Kirby, & Singh, 2004; Netz & Lidor, 2003; Nicols & Glenn, 1994). When optimal health is obtained, the individual is better able to engage in society with healthy patterns of relationship, personal responsibility, and collective focused choices.

Movement to Heal

All movement comes from the core of the body (Yoke, 2010). Clinical application of movement-based treatment must consider the other body systems (nervous, endocrine, muscular, skeletal, cardiovascular), and how movement organizes the body to bring harmony between physical and mental structures (Siegel, 2009).

BROAD EXAMPLES OF OTHER OPTIONS FOR MOVEMENT-BASED TREATMENTS			
Curling up – back chain of the body / support. Tight hamstrings and low back, thoracic spine difficulties, lower rib jutting, collapsed anterior deltoids, kyphosis / lordosis, tight through the calves and feet, trapezius 1 & 2, neck issues, fear of stability, guilt, anger.			
Expanding out – Front body tightness / protection. Shoulders, chest, hip flexors "stay small," "can't be big," "can't be tall," "can't be full," "can't move forward," "scary to step out," weakness through abdominals "falling out," collapsing through solar plexus "no power."			
Diagonal plane – Right/left imbalance, moving into/away from life, pelvis tipping, twisting/horizontal axis stiffness / locking / vagal freezing, energy systems off-can't flow, masculine / feminine (right / left or front / back) dynamics off, fascial plane flexible sliding vs "stickiness" / stuck movement in the tissues.			
EXERCISE AND WELLNESS PARADIGMS USED IN MOVEMENT-BASED PSYCHOLOGY TREATMENT			
Target Heart Rate Zone	Strength Development	Power / Force / Velocity	Lifestyle Management / Implementation
Biomechanics	Socialized Learning	Incremental Change Theory	Behavioral Activation & Accountability
Weight Management / Nutrition	Metabolic Process Focus	Exercise Physiology	Postural Screenings / Observation
Coaching / Cheerleading	High Intensity Training / Tabata / Fartlek	Cardiovascular Fitness	Structural Analysis
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Movement done with others provides opportunities for social engagement (Porges, 2018; 2011) and increased exercise adherence (Wing & Jeffery, 1999). Schore (2018) highlights research showing how empathic relationships build right-brain to right-brain connection, thus helping increase creative capacities and developing a stronger sense of self through interoception. Carr, Iacoboni, Dubeau, Mazziotta & Lenzi (2003) show how mirror neurons build empathy between people. Building empathy through social engagement offers individuals ways to increase the ability to self-regulate and decrease SNS activation (Porges, 2018). Through the relational aspects of movement-based psychotherapy interventions, clients can expand personal capacities to engage in stressful environments, and increase the ability to navigate new situations.

Using anxiety, depression, and trauma as examples of beginning stages of movement-based treatment helps explain the concept that exercise is medicine for mental health presentations. Anxiety and depression are opposite nervous system responses (Rothschild, 2018). Anxiety equals flight/fight nervous system energy, whereas depression equals lethargy and helplessness. Trauma oscillates between those two states, as well as hypoarousal and dissociative responses (Porges, 2018; 2011; Ogden, Minton, & Pain, 2006). The trained practitioner can utilize a variety of cardiovascular, strength, and flexibility training models alongside relational exploration of self, others, and environment when treating clients with co-occurring diagnoses for optimal health care treatment. Although well-meaning, typical health standards for physical exercise may be dysfunctional for the nervous system state of the mental health diagnosis. Meeting the energy of the distress at the appropriate level, and then shifting it to a healthier pattern, creates mental flexibility, physical health, and allows for positive life choices from an embodied place.

Conclusion

Somatic psychology posits that the body and mind are inextricably linked. The body houses all experience in physical structure. Cognition cannot be separated from the physical experience of the body, because all thought and emotion create cellular movement (Lipton, 2008). As outlined above, the physical is linked to the psychological, and the abstract concept of thought or emotion is tangible in movement at the cellular level. Meaning derived from experience is based in biology, physiology, neurology, and psychology. Cellular movement, as a result of environmental changes and past learning, creates neural structures to categorize and determine cognitive explanations. These systems create a coherent self-narrative, and may be implicit or explicit knowledge. Through understanding links between the biology, physiology, and neurology of experience, one can influence the psychology and provide corrective experience to change all systems.

Future studies are needed to better understand how somatic psychology influences relational dynamics during movement-based treatments, and how body psychotherapy-led movement diverges from other types of social exercise groups. Further exploration of the differing types of physical activity on physical structures and mental health diagnoses are needed. Specifically, varying chemical pathways such as adenosine triphosphate (ATP), acetylcholine, and brain-derived neurotrophic factor (BDNF) should be explored. These chemical markers are implicated in a variety of physical and emotional regulation systems, as well as neuroplasticity – all of which have large implications in the treatment of psychological disorders. More study is required to better understand what skills are necessary for the somatic practitioner to utilize exercise science interventions in order to implement movement-based treatment options appropriately and confidently for both physical and mental health care.

Stacy Reuille-Dupont, PhD is a licensed clinical psychologist, licensed addiction counselor, certified personal trainer, and certified nutrition coach. She earned her PhD in clinical and somatic psychology from The Chicago School of Professional Psychology – Los Angeles (TCS). She holds an MS in community counseling from the University of Wisconsin – Superior, and BS in kinesiology from Texas A&M University – Corpus Christi. Research support was given by TCS and Axis Health System. Throughout her career, she has worked with adult, children, crisis, and has integrated healthcare teams, and been a consultant to community-based groups and healthcare practitioners regarding clinical mental health and exercise science treatments.

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