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## The Therapeutic Intersection of Dance and Sport in Trauma, A Critical Review of the Literature

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**The Therapeutic Intersection of Dance and Sport in Trauma, A Critical Review of the**

**Literature**

Capstone Thesis

Lesley University

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Dance/Movement Therapy

Donna C. Owens, PhD

## **Abstract**

Trauma is the psychological and physiological response to environmental triggers as a protective measure. Adolescents with trauma histories or trauma symptoms are introduced to new environments as they grow and mature into adulthood; however, without the appropriate skills or understanding, these maturing youth cannot appropriately adapt to new environments or communities without the activation of the autonomic nervous system and its protective behaviors (fight, flight, freeze, or fawn). Dance/movement therapy and sports-based therapies are two body-based modalities that utilize movement to engage youth in the therapeutic process and to treat trauma symptoms. This literature review explores the ways in which dance/movement therapy and sports-based therapies can inform the research and practice of one another as well as exploring how the two modalities intersect. The search for literature regarding dance/movement therapy, sports-based therapies, trauma, and adolescents was conducted online via the search engines Google Scholar and Lesley Library Online. After an initial search for modality-specific research, more research was conducted in the same fashion regarding neuroscience, polyvagal theory, and neurobiology. Overall, the literature for dance/movement therapy proved to center around the creative movement process and internal reflection whereas the sports-based therapies literature centered around goal-oriented team-centered engagement. Recommendations are made for future research for each modality as they pertain to the application of adolescents with trauma or trauma histories.

*Keywords:* Dance/movement therapy, sports/based therapy, trauma, adolescents, neurobiology

*Author Identity Statement:* This author identifies as a US born, able-bodied, White, cis woman who resides in New England.

## **The Therapeutic Intersection of Dance and Sport in Trauma, A Critical Review of the Literature**

The body process is not linear but circular, always circular.

—Ida P. Rolf, Ph.D.

The human body consists of a global system of various connective tissues such as fascia, bones, blood, muscles, and skin (Myers et al., 2006). The design of the human body allows for environmental adaptations and structural adjustments to fit the needs of the individual—the body tends to stress and pressure and reacts to neglect and underuse (Myers et al., 2006). When the body experiences a physical injury such as a pulled muscle or a torn tendon, the body knows how to heal itself by reestablishing a lost connection; the body reestablishes and maintains functionality all the way to the cellular level (Myers et al., 2006).

How does the body respond when the injury or rupture is one of experience, or more specifically, how does a person's body respond when they experience trauma? According to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), trauma is an acute or repeated exposure to a stressful event(s) that result in psychological distress, which can emerge as several possible externalizing and/or internalizing behaviors and thought-processes (American Psychiatric Association, 2013). The American Psychological Association (2020) strongly recommends four variations of cognitive-based therapies for the treatment of posttraumatic stress disorder, which are four different treatment methods that focus mainly on the psychological distress and thought-processes of those who have had or witnessed traumatic experiences. While these treatments are largely focusing on the brain and the mind, the first question continues to remain: how does a person's body respond when they experience trauma?

Dance/movement therapy (DMT) is a body-based therapeutic modality that utilizes “movement to promote emotional, social, cognitive and physical integration of the individual” (ADTA, 2020, para. 1). DMT utilizes the integration of the body and the mind in the healing process, while also accessing the client’s creativity to enhance the continuous processing of previous traumatic events (Mohr, 2014). Similarly, sports-based therapy (SBT) is another body-based therapeutic modality that highlights the positive benefits of engaging with a close community through the physical act of participating in team-sports playing (Fuller et al. 2013). Together, these two modalities highlight the positive therapeutic advantage to utilizing one’s body in a physical way to aide in the therapeutic process (Cassen et al., 2020; Eitle et al., 2021; Kurz, 2020; Levine & Land, 2015).

As the DSM-5 describes trauma as both a psychological and a physical experience, I am curious about understanding more about how trauma impacts the brain and body. Incorporating neurobiology as currently used in research regarding DMT and trauma (Berrol, 2006; Homann, 2010; McGarry & Russo, 2011) and the anatomical underpinnings of the body’s tensegrity structure (Long, 2020; Myers et al., 2006), I aimed to develop a broader and deeper understanding on the connection between the mind and body, specifically the connection for adolescents who have experienced, or are continuing to experience, trauma. In continuing to grow my understanding of the mind body connection for individuals with trauma, I further aimed to review the DMT and SBT literature regarding how the body is utilized and activated during interventions aimed towards fostering emotional regulation. Finally, I make recommendations for dance/movement therapists and sports-based therapists working with adolescent clients with traumatic experiences. How does the body respond to trauma, why do we need to understand how it does, and how can we support the body’s knowledge within emotional regulation?

## Method

My literature review included a review of the theoretical underpinnings of both DMT and SBT as a basis for further conclusions and questions. More specifically, my research included current literature specific to adolescents and DMT, adolescents and SBT, trauma and DMT, trauma and SBT, and adolescents and trauma. These modality and population specific search terms were further expanded to explore the measurement of self-regulation, emotional-regulation, internalizing behaviors, and externalizing behaviors to pinpoint peer-reviewed sources that specifically discuss the modality's and/or the population's relationship to regulation. Additional search terms included polyvagal theory, neuroscience, and neurobiology. Any resources that did not include information regarding regulation or neuroscience were not included in this literature review.

The research process for obtaining these literature and resources involved using trusted search engines such as Google Scholar and the Lesley Library Online. Inputting the previously mentioned search terms into these search engines allowed access to larger journals and publication databases. Google Scholar and the Lesley Library Online yielded results specifically for peer-reviewed articles; however, as resources presented as inaccessible due to a paywall, I utilized the website/Chrome-extension Sci-Hub to gain access to possible resources. From the resources found via these search engines, I also utilized access to media, such as informational videos from Alexander Street and textbooks, to provide a more robust understanding of theoretical and historical contexts. Separate from my peer-reviewed resources, I utilized Google search to find resources regarding various sports-based or recreation-based organizations that are currently using sports and games with adolescents who have experienced or currently experience traumatic events or interactions.

I used Zotero to manage a continuing reference list, which was organized in a separate resource folder, via the article's title. After reading an article's abstract, I printed select articles to annotate and summarize in bullet points on the printed copy—I placed each annotated, printed article in a three-ring binder for future reference. To aid in my thought process and synthesis of the literature, I kept a research notebook for free-writing and diagramming connections and structures for writing the larger literature review.

## **Literature Review**

### **Trauma and the Body**

People spend their whole lives existing within their bodies in various capacities. Some people experience their senses deeply and specifically, while others chose to focus mainly on the cognitive processing needs of daily living. For individuals who have experienced traumatic events or who have lived through lengthy periods of unrelenting stress, they might not identify wanting to exist within their bodies—their bodies may not feel safe to them as the result of trauma inflicted on to their bodies, or possibly due to the sensory experience of the traumatic event.

From a neurobiological standpoint, the human body has an autonomic nervous system that is designed to protect us from life threatening or traumatic situations with the instinctual actions of fighting, taking flight, freezing, and fawning, which is a simultaneous top-down and bottom-up experience (Porges, 2021). According to polyvagal theory, neuroception is the process of the brain processing and understanding the assumptions of intentions of movements and sounds, which results in signifying the stimulus as safe or as dangerous (Porges, 2021). The activation of the autonomic nervous system is highly embodied as the process does not require conscious mental processing of the situation:

The autonomic reactions send sensory information regarding bodily feelings to the brain where they are interpreted and consciously felt. The bottom-up limb of the neuroception is functionally equivalent to interoception. Thus, although we are often unaware of the stimuli that trigger different neuroception responses, we are generally aware of our body's reactions (i.e., visceral feelings) embodied in other autonomic signatures that support adaptive behaviors (i.e., social engagement, fight/flight, shutdown). (Porges, 2021, p. 5)

Ultimately, trauma alters the way the human autonomic nervous system functions when in social context where “trauma retunes the autonomic nervous system from calmness and spontaneous social engagement to defense, thus interfering with the ability to socially engage, communicate, and connect” (Porges, 2021, p. 6). Although Porges' (2021) is a condensed review of polyvagal theory, this literature provides an abundance of information regarding the relationship between the human body's nervous system and the regulation of the body's nervous system.

Further elaborating on the role of polyvagal theory in the field of treating trauma, Quillman (2013) uses the polyvagal theory to explore the ways in which treatment via the body, personality, and intersubjective field can influence recovery from trauma. The first lens in which Quillman (2013) explores is the client as a “dysregulated human mammal” (p. 358). Through this lens, Quillman discusses the somatic experience of an individual undergoing a trauma response due to the activation of the autonomic nervous system—a discussion that also includes the implicit communication the patient receives from internal stimuli as well as external stimuli. The second lens Quillman discusses is the client's personality and how one can develop certain personality tendencies as a protective response from trauma-activating triggers. Within this section, Quillman continues to discuss the somatic responses of the client and how the

continuation of the somatic responses repeats certain internal stimuli that can continue certain trauma responses. Finally, Quillman addresses the role of countertransference between a client and a clinician, particularly regarding how somatic transference activates the autonomic nervous system, thus escalating both the client and the clinician. Highlighting this interaction between the client and the clinician, Quillman brings attention to the importance of the clinician's ability to hold space for the client to process all feelings and sensations. Overall, Quillman emphasizes the importance of the clinician's empathetic curiosity when working with a client with a trauma experience; subsequently, this author emphasizes the neurobiological need for the clinician to support the client with their somatic experiences and sensations in addition to the client's verbal and cognitive experiences as the somatic experiences relate to the autonomic nervous system.

Continuing further into understanding the impacts of trauma on individuals and neurobiology, Long (2020) discusses the role of myofascial connections and neurobiological activation. Long specifically looks into the somatic psychotherapeutic benefits of fascial-work, which includes the understanding of body armor as "layers of fascial tensions and atrophy patterns elicited from socio-emotional contexts and physical traumas" (p. 89). As previously mentioned, the body is connected through a myriad of connective tissues, including fascia, which is the connective tissue Long specifically explores when discussing the prevalence of body armor. Fascial connections exist throughout the whole body and are patterned to adapt to the needs of the mover, and since an individual does not move in solely one way, "body armor in an individual is not a singular pattern, but rather many layers of discrete and blended patterns that show up in different contexts with perhaps as much variation as parts of the personality" (pp. 91-92). In addition to providing the anatomical perspective of fascia and its connection to the nervous system, Long also delves into the implication of structural bodywork within body

psychotherapy. The author continues to explore a specific case study as it pertains to the emotional and physical changes the client endures after several sessions of structural bodywork and myofascial release. Long asserts that the goal of including myofascial release in the body psychotherapy sessions is “the ability to feel a full range of emotions while remaining regulated, and to simultaneously restore as much motion and function as possible to the client’s body” (p. 98). Although this current literature review is not specifically exploring the implications of tactile, myofascial release and body psychotherapy, Long provides immense insight into the role of the body and the role trauma plays in the movement development and fascial connections of a client.

### **Trauma and Adolescents**

Before exploring the roles of DMT and SBT in the treatment of trauma within adolescents, trauma must first be explained. As previously stated, the DSM-5 describes trauma as a psychological and physiological experience (APA, 2013). More specifically, the DSM-5 identifies several different diagnoses under the larger category of “Trauma- and Stress-Related Disorders,” which includes diagnoses of: “reactive attachment disorder, disinhibited social engagement disorder, posttraumatic stress disorder (PTSD), acute stress disorder, and adjustment disorders” (APA, 2013, p. 265). Between all these listed diagnoses, a common thread is that an individual experiences a traumatic event or consistently stressful situations that then alters the way that individual lives within and mentally perceives their environment and the world around them. One specific aspect of adolescents’ lives that research is currently examining is the relationship between one’s exposure to trauma and their capacity for self-regulation (Darnell et al., 2019; Modrowski et al., 2019; Thompson et al., 2020). Recognizing and utilizing self-regulation techniques and strategies is key when working with adolescents as they are emerging

members of many communities and environments. As adolescents grow older and encounter new individuals or environments, they could potentially be activated by an emotional trigger—self-regulation strategies are necessary for existing as an individual within communities and environments.

One overarching framework that is used when working with youths with complex trauma is the ARC framework (Blaustein & Kinniburgh, 2010), which specifically works with attachment, self-regulation, and competency. Collin-Vézina et al. (2019) explores the usage of the ARC framework with incarcerated youth in Canada, and specifically explores the involvement of staff and caregivers before engaging in the therapeutic process. In this theoretical research paper, Collin-Vézina et al. examine the nine components of the ARC framework that fall within the domains of (a) attachment—"caregiver affect management, attunement, consistent response, and routines and rituals"; (b) self-regulation—"affect identification, modulation, and expression"; and, (c) competency—"executive functioning and identity" (p. 636). All nine of these components are utilized to build the 10th component of the ARC framework which is "trauma experience integration" (p. 637). These authors further assert the prerequisite involvement of caregivers for these incarcerated youths (such as parents, guardians, and facility staff) for the ARC framework to provide effective care and treatment for the youth engaging in the therapeutic process. More specifically, these authors name five components that effectively prepare caregivers in engaging in the ARC framework with the incarcerated youth: "staff selection and commitment"; "training, coaching, staff evaluation and self-care"; "data systems and use of data"; "practice and policy integration, facilitative administration and systems integration"; and, "client and family involvement" (pp. 638-641). These authors' emphasis on

the role of the caregivers in working with traumatized, incarcerated youth provides insight into the role connection plays when looking at the treatment of adolescents or youth with trauma.

### **Dance/Movement Therapy**

Looking more specifically at the established interventions to treat trauma symptoms, I would like to first look through the DMT lens as the modality field approaches treatment.

Starting with a DM/T approach to trauma treatment, Levine and Land (2016) conduct a qualitative meta-synthesis study to “contribute to the development of a body-oriented intervention for mental health care practitioners to use for trauma” (p. 330). This study used a three-step process to select nine previously published qualitative studies that utilized “open-ended interviews, semi-structured interviews, case study observations, and ethnographic observations” to collect data (p. 332). The age of participants ranged from 5 to 38 years old, and the variety of participant ethnicities included Ugandan, Israeli, Chechen, African, Haitian, Kenyan, Sierra Leonean, and Congolese. After synthesizing the emerging themes from these nine studies, four new themes emerged:

- (a) making the connection between mind and body (with a subtheme of awareness accomplished through meaning), (b) increasing mobility and range of movement, (c) creating a healthy physical relationship with the self and others, and (d) creating a new relationship with the movement. (p. 332)

According to Levine and Land these themes translate into four different ways in which dance/movement therapists utilize movement to promote healing.

Kurz (2020) conducted a phenomenological study and an artistic inquiry to discuss and understand the embodied experience of those who have undergone miscarriages or stillbirths. Before meeting with the three participants aged 30-41, Kurz utilized three various movement

explorations to discover and understand her own personal biases and assumptions. Once allowing herself the space to receive each participant's "subjective experience," Kurz engaged in an entrance interview, informed consent procedure, movement elicitation procedure, and semi-structured verbal interviews (p. 10). For the data analysis of the study, Kurz utilized "personal movement improvisation, movement sequencing, and journaling" to monitor herself while assessing the data from the participants (p. 11). Following the use of member checks, Kurz continued to use imaginative variation structural analysis process through movement improvisation and reflective journaling, which was then followed by artistic inquiry and creative synthesis through improvised movement and spoken word. The results of this artistic analysis of data include the emergence of five themes: "Momentum of new life," "Stuck in emptiness," "Where is my body and where am I," "We got together," and "Love does not forget" (pp. 15-16). This study concludes with the suggestion to utilize DMT to address bereavement and the body's role of holding and honoring the loss and trauma of the participants.

Betty (2013) continues to explore the implications of emotional regulation for youth who have experienced maltreatment and who are also residing within a residential treatment facility. In this work, Betty (2013) utilizes a literature review to develop a theoretical framework incorporating a DMT-specific lens to apply to the previously mentioned population of maltreated youth within a residential treatment facility. The main themes of the literature discussed include "development of emotional regulation," "early maltreatment and emotion regulation," "emotion regulation in psychotherapy"—which contains specific sections for DMT and other therapeutic programming approaches—, and "residential treatment" (pp. 41-44). From these larger themes, a theoretical framework emerges, grounded in four continuous stages that include "safety, emotional awareness, internal emotional coping, and external management"; additionally, the

stage of safety is further elaborated upon via the themes of “self-support,” “adjusting,” “joining,” and “assessment” (pp. 45-48). Each stage of this framework is pertinent in the continuous treatment of a youth who has experienced trauma such as maltreatment as this framework cultivates “interpersonal rhythms and supports the mind and body working together” (p. 45). Also, one key aspect of this framework is the caregiver’s attunement to the child, especially when engaging in therapeutic and relational work. This framework provides insight as to what traumatized youth require when working towards engaging in emotional regulation practices as well as emphasizing the importance of the role of the caregiver when forming positive and appropriate relationships with the youth.

Integrating concepts of neurobiology, such as mirror neurons, McGarry and Russo (2011) explore the current literature surrounding the understanding of activating mirror neurons within a DMT context. Within this literature review, McGarry and Russo explore neurobiology, particularly the mirror neuron system, which the authors explain as “Sensory input is relayed to the premotor cortex and parietal cortex via the superior temporal sulcus. This activity leads to greater activation in the limbic system during observation of and participation in emotional action” (p. 179). From this definition, empathy emerges from the continuous cycle of the mirror neuron system leading to limbic activity, which then leads to mirroring, which then leads to the activation of the mirror neuron system (p. 179). From this assertion regarding the mirror neuron system, the authors explore the literature further, separating the research into the categories of “mirroring and dance therapy as treatment” and “dance and mirror neurons.” (pp. 181-182). Further expanding on the literature being reviewed, McGarry and Russo conclude their review with suggestions for possible research within this field. From this literature review, a pertinent conclusion is that

to understand another's emotional movements, we activate the neural areas associated with creation of these movements, which in turn affects the limbic system, enhancing our sensations of the emotions associated with these movements. As a result, we come to better understand other people's intentions by feeling these intentions, or emotions, ourselves. (pp. 182-183)

As the availability of empirical research pertaining to mirroring and DMT is rather limited, McGarry and Russo identify the gaps within the field while also connecting the holes between the influence of DMT within neurobiology and treatment. This literature is particularly informative regarding the notion of a bottom-up approach when addressing empathy and emotional regulation, which is a connection to SBT that I will discuss in a later section.

Although this is not a D/MT study specifically, Cassen et al. (2020) developed and studied the use of body-oriented group therapy for complex trauma survivors via randomized control trial. This study followed 18 Canadian women aged 18 years or older who have experienced childhood trauma as they participated in 20 weeks of group intervention; subsequently, the self-reported survey results were compared to a group of 19 Canadian women meeting the same criteria as the treatment group yet were put in the waitlist group to be utilized as a control. The treatment group followed the similar structure of breathing exercises, somatic check-ins, discussion of at home practice, mindfulness exercises, psychoeducation, practice exercises, and homework; and, the waitlist group participants were asked to not participate in any other group/body-oriented therapy while waiting. The results of this study demonstrated an “increasing awareness of somatic experience but did not reduce the use of dissociation to disconnect from bodily experience including one's emotions” (p. 10). As this study maintained a relatively small sample size, I am curious about how the results would change given a larger

sample size, and I am curious about how the results would change given the level of physicality of the interventions.

To explore regulation and resilience more specifically within the DMT context, Buck and Snook (2020) utilize a literature review in addition to conducting a qualitative study with a narrative design. Regarding the literature review, these authors explore themes such as “mental resilience” and “community dance and dance movement therapy;” additionally, these authors incorporate a literature review and findings from their own studies to further explore themes such as “psychological effects of dance,” “physiological effects of dance,” “medical and interventionist effects of dance,” “cultural knowledge through dance,” and “pedagogical ways of knowing through dance” (pp. 290-300). With this mixed approach to exploring regulation and resilience within DMT, Buck and Snook specifically explored the differences between community dance and dance/movement therapy—both of which explore the use of creative learning through dance. Comparing the creative and social aspects of dance movement therapy to the functional movement aspects of dance, these authors discussed the influence of “activities [that] required creativity, problem solving and collaboration” in building mental resilience (p. 302). Considering adolescences who have experienced traumatic events or who are currently living within a traumatic environment, the presence of resilience and regulation is pertinent in their lived experiences. Although these authors do not specifically discuss the adolescent population specifically, the distinction between dance and DMT provides further insight in the application of DMT when considering the task of developing one’s sense of resilience and regulation.

### **Sports-Based Intervention**

Stepping away from the literature surrounding DMT, I would also like to take a critical look at the literature regarding SBT and other sports-based programs that are implemented with youth with trauma. Although some of the literature does not specifically use the term “sports-based therapy,” this section will include literature that discusses the therapeutic use of sports as intervention.

Using semi structured interviews, Fuller et al. (2013) explored the experiences of Hartford-based minority boys who participated in sports-based youth development programming. Participants were sixth to eighth grade students that were both selected by school staff and self-selected via word of mouth from peers. After collecting self and parent interviews, the conclusion of the 24-week intervention included triangulation of data via teacher resources, member checks of both the participants and of the intervention staff and analyzed through NVivo 9. With the information they collected, Fuller et al. coded for initial attraction to the program, continued motivation, and personal development regarding “competence, confidence, connection, character, and caring...and contribution” (p. 475). The inclusion of data around one’s attitude toward initial participation and continued participated allowed for insight around the accessibility of movement-based therapies like sports-based youth development and DMT. Furthermore, this study highlights the importance of creating a program that caters to the interests of the participants and is “guided by a culturally relevant theory of change” (p. 480). Considering these findings in relation to the application of DMT with a similar demographic, a possible hole in previous application is integrating the types of movement that the participants are interested in—like sports.

Similarly, in an earlier study, Lufi and Parish-Plass (2011) utilized a qualitative study design to “assess the therapeutic potential of physical activity employed in a group therapy

session” (p. 220). Lufi and Parish-Plass specifically studied the differences with Israeli boys diagnosed with ADHD and Israeli boys diagnosed with other behavioral disorders, with the average age of participants being slightly older than 10-years-old. These authors tracked the behavior of the participants by using three different surveys that were administered at three different points: before the study began, immediately after the study ended, and one year after the study ended. After 20 weeks of integrating verbal processing, individual sports playing, team sports playing, and various behavioral interventions, Lufi and Parish-Plass highlighted that result of both groups improving in the behavioral categories of anxiety and somatic. As this study is limited in that the participants are Israeli boys only, this study provides an informative perspective on how the combination of body-based and verbal-based interventions can coincide to support positive growth within youth. Additionally, even though this study does not directly focus on youth with trauma, the symptoms of ADHD—such as hypervigilance and disassociation—can also be symptoms of PTSD, which helps to inform this current literature review.

Looking at a specific sports-based intervention program, Moreau et al. (2014) utilizes a qualitative study with nine Canadian teens from a standard Canadian high school and a specific “center for you social and economic integration” (p. 89). According to these authors, the goals of this study centered around what the participants considered to be most important within the program, and how the program influenced “the physical, psychological and social spheres of their life” (p. 86). The design of this study included three athletic challenges, separated by a month’s time, the youth partook in: a 10-hour nocturnal hike in the woods, a nonstop 200-kilometer cycling activity, and a 300-kilometer relay race under 30 hours (Moreau et. al., 2014). These authors followed up the challenges approximately 5 months after the last challenge with a

semi-structured interview process; subsequently, the participants' responses were analyzed and underwent a thematic stratification process for the categories of "intrinsic features" of this program and this program's "impact on youths" (p. 91). Within these two categories, the authors were able to discern between primary, secondary, and tertiary categories of recurrent themes from youth's responses. These authors conclude their study with six dimensions of elements that enhance the benefits of participation with youths:

(1) cooperation during sports activities; (2) "edutainers" discipline, involvement, and positive attitude; (3) moving the youths beyond their physical, psychological, and social comfort zones; (4) the interplay between enjoyment and effort; (5) constant innovation in training content; (6) risk as a driving force for cohesion and social ties. (p. 97)

As identified within these six dimensions, one theme that I would like to highlight is the particular importance on the social connection between youths and the adults. Considering the comparison between DMT and sports-based interventions, the emphasis on attachment and engagement within this particular study is something I will be discussing in a later section.

Moving away from a more specific sports-based intervention, Wilson and Barnett (2020) conducted a literature review of 12 different studies involving youth in out of home care across several countries. A pertinent theme across these chosen studies is that these studies utilized a range of physical activities from team-based football to wilderness-based activities to yoga. Additionally, the population of these studies focused on youth within orphanages or residential care located in various countries such as: Russia, Australia, Haiti, the U.S, Portugal, Israel, Turkey, and India. According to Wilson and Barnett, results of this study highlighted the "most common outcome categories being general mental health and psychological temperament, self-concept and self-efficacy, or behavioral issues" (p. 11); however, these authors also acknowledge

the possible influence of co-occurring interventions such as “social and personal development or team building methodologies” (p. 14) that coincide with group-based physical activities. Overall, these authors provide insight into the global perspective of utilizing physical-activity based interventions with youth in out of home care—insight that emphasizes the “importance of lifestyle factors and social determinants of health” for youth who have previously experienced a trauma that has resulted in their current out of home placement (p. 15). As this literature review critically analyzes literature around various physical activities, Wilson and Barnett’s study serves as a starting point to understanding how certain forms of physical activities can serve a therapeutic purpose.

Another literature review that examines sports-based interventions was Hermens et al.’s (2017), which specifically looks at “evidence of life skill development in sports programs serving socially vulnerable youth from quantitative and qualitative studies” and to further understand and describe what are deemed “conducive conditions” in previous studies (p. 3). In their critical review of the literature, Hermens et al. looks at 18 different studies that include qualitative and quantitative research, and from these studies, these authors specifically look at the emotional, social, and cognitive life skills results. When conducting their review, Hermens et al. highlighted the larger themes of cognitive and social life skills being more apparent in the literature in comparison to emotional life skills. Specifically, only four studies reported improvements on emotional life skills whereas 11 studies reported on improvements in cognitive life skills and 12 studies reported on improvements of social life skills. Regarding the inclusion of conducive conditions, Hermens et al. found that

conditions found to be conducive in the included studies were a positive youth–coach relationship, sports coaches who encourage youth to deal with challenges that arise in the

sports activity, a sense of belonging to the sports program, and the inclusion of a life skills education element. (p. 13)

The results from Hermens et al. (2017) exposes the gap in the current literature around sports-based interventions as it pertains to the emotional aspect of the participant's growth and development; therefore, this study provides an opening for discussion around the possible intersection and influence of DMT within a sports-based intervention context. Additionally, this study's discussion around the conducive conditions within sports-based interventions highlight the importance of attachment and connection between the participants themselves and between the participants and the facilitators, which is another aspect that will be discussed further in a later section.

In their 2021 study, Eitle et al. examined the relationship between male high school students' participation in athletics and the perpetration of intimate partner violence (IPV) in adulthood. This study used data from 9,290 respondents who answered an in-school survey in 1994-1995 while in Grades 7-11 and then partook in an in-home interview in 2009. After the creation and analysis of various logistic regression models, high school sport participation was found to be a preventative measure against the perpetuation of IPV, which is defined as "(a) threats of violence... (b) physical violence... (c) sexual violence... (d) violence resulting in injury to their partner" (p. 190). The discussion of this study addresses the differences in findings between high school and college athletes and the perpetuation of IPV, which demonstrates the need for further research as to which aspects of sports participation corresponds to pro-social behaviors and which do not. I am curious about what specific aspects of high school sports relate to the protection against the perpetuation of IPV, and I am curious about how these aspects appear or could appear in DMT.

## **Discussion**

The overarching purpose of this literature review is to explore the literature surrounding DMT and SBT, particularly how these modalities approach the treatment of trauma and trauma symptoms within adolescents. To further supplement and understand the literature for DMT and SBT, this literature review also delves into research around neuroscience, neurobiology, and regulation. Throughout this process of critically examining the literature, two themes emerge as places of intersection and further research and will be discussed in this section: the mind-body connection and interpersonal connection.

### **Mind-Body Connection**

As it pertains to this current discussion, the mind-body connection is the relationship between the state of one's cognitive and emotional processing and the state of one's physical activation. From the physical perspective, the mind-body connection is exemplified by Porges (2021) and Long (2020) as both authors discuss the role of the body in the emotional regulation of humans. A recurring theme throughout the DMT-specific literature is the intentional use of activating the body and bringing specific awareness to one's body in an effort to explore the connection to one's mental health (Betty, 2013; Cassen et al., 2020; Kurz, 2020; Levine & Land, 2016; McGarry & Russo, 2011). Majority of the SBT literature, on the other hand, does not explicitly explore the relationship between the type or quality of movement activities and the measurable aspects of the participants' mental health (Eitle et al., 2021; Fuller et al., 2013; Hermens et al., 2017; Lufi & Parish-Plass, 2011; Moreau et al., 2014). As Wilson and Barnett (2020) conduct a literature review specifically to examine the different types of sports and physical activities utilized in sports-based interventions, there is a gap in the current literature regarding how specific movement activities can impact mental health for those with trauma

backgrounds. Exploring how the body moves in relation to how an individual self regulates or measures their mental health is one aspect of understanding how the mind-body connection is utilized in body-based interventions. The mind-body connection can appear as a habitual holding or tension within a certain body part due to trauma or stress (i.e., a clenched jaw or tense shoulders), which has the possibility to further impact other parts of the body and one's range of movement (Long, 2020; Meyers et. al., 2016). One example of how DMT research can influence SBT research is by utilizing one sports activity and exploring how the movement of that sport corresponds to quantitative or qualitative data while controlling for the influence of peers or facilitators. How would engaging youth in basketball drills and games compare to engaging youth in cross country running? How can clinicians facilitate sports-based interventions that correspond to different ranges of movement that the client has not yet explored themselves?

Another recurring theme within the realm of mind-body connection is the presence and activation of mirror neurons when engaging in movement with others. Mirror neurons are an active part in the connection to movement and feelings of empathy (McGarry & Russo, 2011), and DMT utilizes this connection to build empathy and kinesthetic empathy between clients and clinicians within the sessions through the intervention of mirroring (Berrol, 2006). Mirroring and mirror neurons are concepts that should be further explored within the practices and literature around SBT, especially when utilizing team-based sports. Activating the mirror neuron system within youths with trauma via team-based or group-based physical movements offers another means for the development of attunement and positive connections between clients and staff, which are important factors when working with youth with trauma (Betty, 2013; Collin-Vézina et al., 2019). Furthering this area of research, future studies can consider the impact of mirror neurons and empathy development when engaged in offensive-defensive gameplay and how

attunement between individuals is impacted when the directive for each person is in opposition to one another. Additionally, DMT literature has established the relationship between direct mirroring from the facilitator or the group and attunement and empathy, yet there is space for the literature to explore the influence of face-to-face indirect mirroring on attunement and empathy. When a client engages in a full body movement experience where they must attune to another individual to prevent the other person from reaching their objective, how does the client adapt to this type of attunement? Does this type of mirroring also allow for the development of empathy?

Continuing to look at the role of neurobiology within the mind-body connection, the polyvagal theory provides a new look into the literature and practice of DMT and SBT, specifically regarding how each modality designs interventions when working with adolescents with trauma. According to the polyvagal theory, trauma impacts the individual's perception of danger and safety by altering how the autonomic nervous system reacts when visceral feelings (i.e., increased heart rate) are detected (Porges, 2021). Trauma alters the individual's perception where the context of a situation is no longer considered and these sorts of visceral feelings are recognized as dangerous, which then activates one's protective adaptive behaviors (fight, flight, shutdown; Porges, 2021). As body-based modalities, DMT and SBT ultimately require some sort of movement from participants whether that movement is creative and spontaneous or functional and predetermined, which requires some increased level of cardiovascular engagement (Betty, 2013; Cassen et al., 2020; Eitle et al., 2021; Fuller et al., 2013; Hermens et al., 2017; Kurz, 2020; Levine & Land, 2016; Lufi & Parish-Plass, 2011; McGarry & Russo, 2011; Moreau et al., 2014; Wilson & Barnett, 2020). When working with youth with trauma experiences, DMT and SBT interventions must consider how the youth could physically respond when visceral feelings are elicited through dance, sports, or movements. A possible path for further research is to explore

how the social engagement and incorporation of movement via DMT or SBT can influence one's ability to increasingly identify the differences between safe and social interactions and dangerous interactions.

### **Interpersonal Connection**

Stepping away from a more introspective look on the therapeutic process like the mind-body connection, this section will look at how DMT and SBT influences interpersonal connection. The previously discussed literature regarding DMT and SBT contains studies and interventions that range from individualized to group settings—as interpersonal connection pertains to an individual's capacity to form relationships and connections with other people, this section will focus primarily on the literature that discussed group settings or group processes. With the DMT literature, common themes when working with groups or dyads were the themes of attunement (Betty, 2013), collaboration (Buck & Snook, 2020), and relationship (Levine & Land, 2016). Between these three studies in particular, the authors discussed the influence on relating to one another when assessing participants' experiences and treatment after participating in a DMT group (Betty, 2013; Buck & Snook, 2020; Levine & Land, 2016). Simultaneously, the literature regarding SBT in this literature review pertains mainly to group settings and address the influence of group dynamics and connection (Eitle et al., 2021; Fuller et al., 2013; Hermens et al., 2017; Lufi & Parish-Plass, 2011; Moreau et al., 2014). From these articles, a large theme of discussion was the involvement of the coaches or staff (Hermens et al., 2017; Moreau et al., 2014) and the inclusion within the group (Eitle et al., 2021; Fuller et al., 2013; Hermens et al., 2017). Highlighting these themes between clients and facilitators, these studies and reviews bring attention to the way sports and movement provide space for interpersonal connection to grow and develop within therapeutic settings.

Understanding how DMT and SBT interventions provide space for the development of interpersonal connection, a pertinent question to follow is why interpersonal connection is important within the discussion of trauma and trauma-symptom treatment. Fostering and developing a strong sense of relationship or connection within a group or within the clinician/client dyad is pertinent in the therapeutic process as it creates a holding space of familiarity and supports the process of self-regulation (Collin-Vézina et. al., 2019; Quillman, 2013). The ARC framework specifically focuses on organizing the therapeutic process around attachment, self-regulation, and competency, which provides an effective structure for working with youths with trauma (Collin-Vézina et. al., 2019); additionally, the introduction of familiar, empathetic, and consistent clinician supports the de-escalation of a dysregulated client via somatic attunement and progressive regulation of the autonomic nervous system (Porges, 2021; Quillman, 2013). As the ARC framework is an established framework of trauma treatment, there is room within the DMT and SBT literature to explore how interventions can utilize movement, dance, or sport to engage with attachment, self-regulation, and competency needs. The previously discussed DMT literature engages in the role of attunement and mirroring within the therapeutic process, and there is a gap in the literature in understanding how competency can also be incorporated within the creative DMT session. Since SBT interventions involve goal-oriented movement practices that invoke sensations of competency, how can DMT utilize movement goals to also activate the sensation of competency?

## **Conclusion**

The literature surrounding DMT and SBT has space for further development as it pertains to understanding and utilizing the mind-body connection and utilizing frameworks to introduce new interventions to the treatment of adolescents with trauma or trauma histories. DMT and SBT

overlap in the way that they are body-based, trauma-informed modalities that can be effectively used with adolescents; however, the research regarding each modality differs by lens in which the researchers use: DMT focuses largely on the creative and internal experience of the moving client, and SBT focus more on the goal and team-oriented movements with a group of clients. Although each modality approaches the use of movement in different ways, DMT and SBT find common fundamental practices based on neurobiology and interpersonal connection. Ultimately, I recommend further research to be conducted within the fields of DMT and SBT to further investigate how aspects from each modality can inform one another. Creating an understanding on the intersection between DMT and SBT has the potential to expand the use of body-based treatments for adolescents with trauma, and this future research could make body-based interventions as accessible and recognizable as the standardized methods of cognitive therapies.

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***THESIS APPROVAL FORM***

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

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